UNIVERSIDAD NACIONAL DEL CALLAO

FACULTAD DE INGENIERIA MECÁNICA Y DE ENERGÍA

ESCUELA PROFESIONAL DE INGENIERÍA MECÁNICA

"DISEÑO DE UN SISTEMA DE CLIMATIZACIÓN CENTRALIZADO DE 252 TON CON PLANTA DE AGUA HELADA DE VOLUMEN VARIABLE Y RETORNO INVERSO. EDIFICIO ECOLÓGICO EMPRESARIAL – MIRAFLORES"

TRABAJO DE SUFICIENCIA PROFESIONAL

PARA OPTAR EL TÍTULO PROFESIONAL DE INGENIERO MECÁNICO

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CALLAO, MAYO, 2018

PERÚ

DEDICATORIA

Dedico este Informe a Dios, a la Virgen María quienes inspiraron mi espíritu para la conclusión de este trabajo. A mis padres quienes me dieron la vida, educación y el total apoyo incondicional. A todos los que creyeron en mí se los agradezco en el fondo de mi alma. Gracias totales.

AGRADECIMIENTO

Agradecimiento especial al maestro, Ing. Manuel Azahuanche Asmat por su apoyo incondicional.

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INTRODUCCIÓN

Las edificaciones de oficinas modernas requieren un sistema adecuado de climatización para satisfacer las exigencias de confort en sus interiores y no generar el "síndrome del edificio enfermo" que causa en las personas síntomas de alteraciones biológicas limitando su adecuado rendimiento laboral.

Debido a esta problemática se requiere contar con un sistema de aire acondicionado y ventilación mecánica capaz de satisfacer los requerimientos de temperatura, humedad y limpieza del aire, por lo que mi proyecto de informe de trabajo de suficiencia profesional, titulado ***"DISEÑO DE UN SISTEMA DE CLIMATIZACIÓN CENTRALIZADO DE 252 TON CON PLANTA DE AGUA HELADA DE VOLUMEN VARIABLE Y RETORNO INVERSO – EDIFICIO ECOLÓGICO EMPRESARIAL MIRAFLORES"***, proporciona una guía de diseño de los equipos y componentes que caracterizan a un sistema de agua helada.

El presente informe se desarrolló en concordancia a las siguientes fases: ***requerimientos generales del proyecto*** el cual estableció los parámetros de diseño que sirvieron de ingreso de datos a los software de cálculo, ***cálculo y selección de equipos*** para dimensionar el sistema centralizado de aire acondicionado, ***diseño preliminar*** con el cual se logra el trazado y dimensionamiento de ductos y tuberías, ***diseño definitivo*** con el cual logra la elaboración de planos finales para luego terminar con la fase de ***metrado*** cuyo fin es el de obtener el presupuesto del proyecto. Para el desarrollo del proyecto se elaboró un diagrama de flujo que nos permitió tener un orden en el desarrollo de la ingeniería. Se hizo uso de software para el cálculo de carga térmica, dimensionamiento de ductos y tuberías que agilizaron el desarrollo del proyecto.

El resultado final es contar con un edificación ecológica moderna que cumple con las exigencias normativas del ASHRAE, SMACNA, NFPA, Reglamento Nacional de Edificaciones (RNE), LEED 2009 for CORE AND SHELL DEVELOPMENT.

Siendo el principal beneficiario los usuarios del edificio quienes gozan de una adecuada calidad de aire para un rendimiento laboral exitoso.

I. OBJETIVOS

1.1. Objetivo General

Diseñar un sistema de climatización centralizado de 252 TON con una planta de agua helada de volumen variable y retorno inverso para el confort en las oficinas del edificio ecológico empresarial Miraflores.

1.2. Objetivos Específicos

- ✓ Definir los parámetros de diseño para la ventilación mecánica y aire acondicionado de acuerdo a lo estipulado en el American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) y en el LEED 2009, para cumplir con las exigencias de confort del edificio sustentable.

- ✓ Calcular la carga térmica y el caudal de ventilación mecánica desarrollando un adecuado balance de caudales para la selección de la capacidad del sistema centralizado de aire acondicionado chiller.

- ✓ Trazar y dimensionar los ductos de aire acondicionado, ventilación mecánica y las tuberías de agua helada y de condensado para un diseño preliminar.

- ✓ Calcular la caída de presión en los ductos y tuberías para la selección de fan coil, ventiladores y bombas centrífugas para establecer los planos finales.

- ✓ Realizar el metrado de los equipos y componentes del sistema de aire acondicionado y ventilación mecánica para la elaboración del presupuesto del proyecto.

II. ORGANIZACIÓN DE LA EMPRESA O INSTITUCIÓN

2.1. Reseña Histórica

En 1960 Walter Piazza Tangüis y José Valdez Calle forman “Piazza y Valdez Ingenieros”, empresa de consultoría en ingeniería eléctrica y crean PIVASA Ingenieros S.A. empresa constructora encargada de montajes de plantas industriales.

En 1963 PIVASA forma un consorcio con SADE de Argentina, empresa de propiedad de General Electric, para instalar la primera línea de transmisión de 220 KV entre la Central Hidroeléctrica de Huinco y Lima.

En 1967 el Consorcio SADE – PIVASA se convierte en **COSAPI**.

Las principales características de la empresa son:

- Razón Social: COSAPI S.A.

- RUC: 20100082391.

- Oficina Principal: Av. República de Colombia 791 – Edificio Plaza República, San Isidro, Lima – Perú.

2.2. Declaraciones Estratégicas

Misión

Somos una empresa de ingeniería, construcción, gerencia de proyectos, servicios mineros, concesiones de infraestructura y desarrollos inmobiliarios; certificada en ISO 9001, ISO 14001, OHSAS 18001 y además contamos con la certificación de ABE, ESR; fundada en el Perú en 1960; que basada en personas con valores y conocimientos, tiene la misión de:

- Contribuir al éxito de nuestros clientes, desarrollando sus proyectos con calidad, seguridad, y dentro del plazo y presupuesto previstos.

- Promover el desarrollo personal y profesional de nuestra gente formando líderes cuyos logros trasciendan en la empresa y en la sociedad.

- Mantener un clima empresarial abierto y de confianza que fomente la innovación y la mejora continua.

- Integrar a socios y proveedores estratégicos para formar equipos de alto desempeño.

- Proveer un lugar de trabajo seguro y saludable, respetuoso del ambiente natural y de las comunidades que nos rodean.

- Generar utilidades para mantener la solidez financiera, impulsar el crecimiento y retribuir adecuadamente a nuestros accionistas.

Visión

"Ser la empresa de ingeniería y construcción, sólida, innovadora y de clase mundial, reconocida como la mejor en los proyectos, mercados y emprendimientos donde participemos".

Valores

COSAPI tiene la filosofía de pasar eficientemente de los objetivos y estrategias a las acciones concretas, que posibiliten alcanzar logros y resultados. La gestión de dichas estrategias debe realizarse dentro del marco de valores que sustentan el accionar de la empresa. Ellos son:

- Integridad: Coherencia entre la palabra y la acción en un sentido de rectitud, probidad y respeto.

- Liderazgo: Capacidad de crear un clima que oriente el esfuerzo de los grupos humanos en una dirección deseada, promoviendo una visión compartida, estructurándolos, dirigiéndolos, generando oportunidades de crecimiento, inspirando valores de acción y anticipando escenarios de desarrollo.

- Espíritu de equipo: Colaborar, cooperar y conjugar esfuerzos con un grupo de personas a fin de alcanzar objetivos comunes, enriqueciendo la experiencia propia con la de otros miembros del grupo, y produciendo un resultado mayor que la suma de los esfuerzos individuales.

- Innovación: Disposición de modificar las formas existentes de hacer las cosas asumiendo con responsabilidad el riesgo de llevarlas a la práctica, buscando optimizar la eficiencia de los procesos y la eficacia de los resultados.

Fortalezas

COSAPI considera a su gente como su principal activo organizacional. Posee un equipo altamente competente y especializado, conformado por 1628 empleados y 6073 obreros que comparten los valores corporativos de la compañía.

Políticas de Calidad

En **COSAPI** el enfoque de la Política de la Calidad es brindar a nuestros clientes servicios de ingeniería, procura y construcción de manera de cumplir compromisos legales y contractuales para satisfacer sus requisitos en cuanto a costo, plazo, seguridad y medio ambiente.

Para garantizar a nuestros clientes servicios de calidad:

- Empleamos las mejores prácticas en nuestros procesos operacionales y de gestión de manera de aumentar la confiabilidad de los servicios ofrecidos.

- Integramos equipos de profesionales comprometidos con cumplir o exceder las expectativas contractuales.

- Promovemos en nuestra gente una permanente actitud innovadora dirigida al mejoramiento continuo de los procesos.

Para el cumplimiento de estos objetivos, utilizamos herramientas de gestión que nos ayudan a controlar y asegurar nuestros procesos en todos los proyectos y áreas de la organización, bajo un mismo estándar enfocado a la mejora continua e innovación.

Nuestro Sistema de Gestión de la Calidad cuenta con una certificación basada en la Norma ISO 9001:2008 vigente, la cual nos brinda una ventaja competitiva en el mercado, un compromiso con la calidad y con nuestros públicos de interés.

Seguridad

Como reflejo de nuestro compromiso con la seguridad y la salud de nuestros trabajadores hemos alineado nuestros procedimientos a los estándares DuPont para la construcción y los hemos certificado bajo la norma OHSAS 18001.

Nos hemos propuesto la meta de CERO ACCIDENTES y hemos puesto en marcha una serie de programas para conseguirla que nos han ayudado a disminuir la frecuencia de accidentes, llegando a superar el millón de horas hombre sin ATP en varios proyectos.

Por otro lado, nuestro compromiso con la seguridad se extiende a nuestros subcontratistas, a quienes incluimos en nuestros programas de capacitación.

En este sentido **COSAPI** asume el compromiso de:

- Trabajar en forma segura como cuestión prioritaria.
- Promover una cultura de seguridad y salud como forma de vida.
- Gestionar los riesgos en forma oportuna y eficiente.

- Emplear criterios de seguridad en la selección y evaluación de proveedores y subcontratistas.

- Promover la mejora continua en los estándares y prácticas de seguridad.

Salud Ocupacional

COSAPI tiene como prioridad la salud de sus trabajadores, razón por la cual contamos con médicos y tópicos en todas nuestras obras que se encargan de auxiliar a las personas que lo requieran y elaborar campañas de prevención y cuidado de la salud. Asimismo, realizamos exhaustivos exámenes médicos de ingreso y de monitoreo, cumpliendo con la ley peruana, la normativa internacional y las exigencias de nuestros clientes.

Respeto por el Medio Ambiente

Comprometidos con la preservación del medio ambiente en todas nuestras operaciones, hemos certificado nuestros planes y procedimientos de gestión ambiental bajo la norma ISO 14001 – 2004.

Uno de nuestros objetivos es promover una gestión sostenible, generando el bienestar a los diferentes grupos de interés garantizando la conservación y permanencia de las fuentes de recursos naturales.

Desarrollo Personal y Profesional

En **COSAPI** consideramos que el recurso más importante es nuestra gente. Por eso nos esforzamos en brindar oportunidades de desarrollo, ofreciendo un crecimiento profesional y personal a nuestros colaboradores.

Universidad Corporativa Cosapi (UCC)

La Universidad Corporativa Cosapi (UCC), creada el 2011, es la primera universidad corporativa de la industria de la construcción en el Perú. Se ha creado con el propósito de acelerar el proceso de desarrollo de nuestros profesionales para así alcanzar los objetivos estratégicos de la organización. La UCC ofrece cursos de formación general, diplomados y programas que permiten formar secuencial y sistemáticamente, desde el entrenamiento inicial hasta la especialización.

Hoy, la UCC constituye nuestra principal herramienta de capacitación y desarrollo integral de nuestros colaboradores. La estructura de la Universidad Corporativa Cosapi es la siguiente:

Figura N°1: Estructura de la UCC

Fuente: Pagina Web COSAPI – RSE

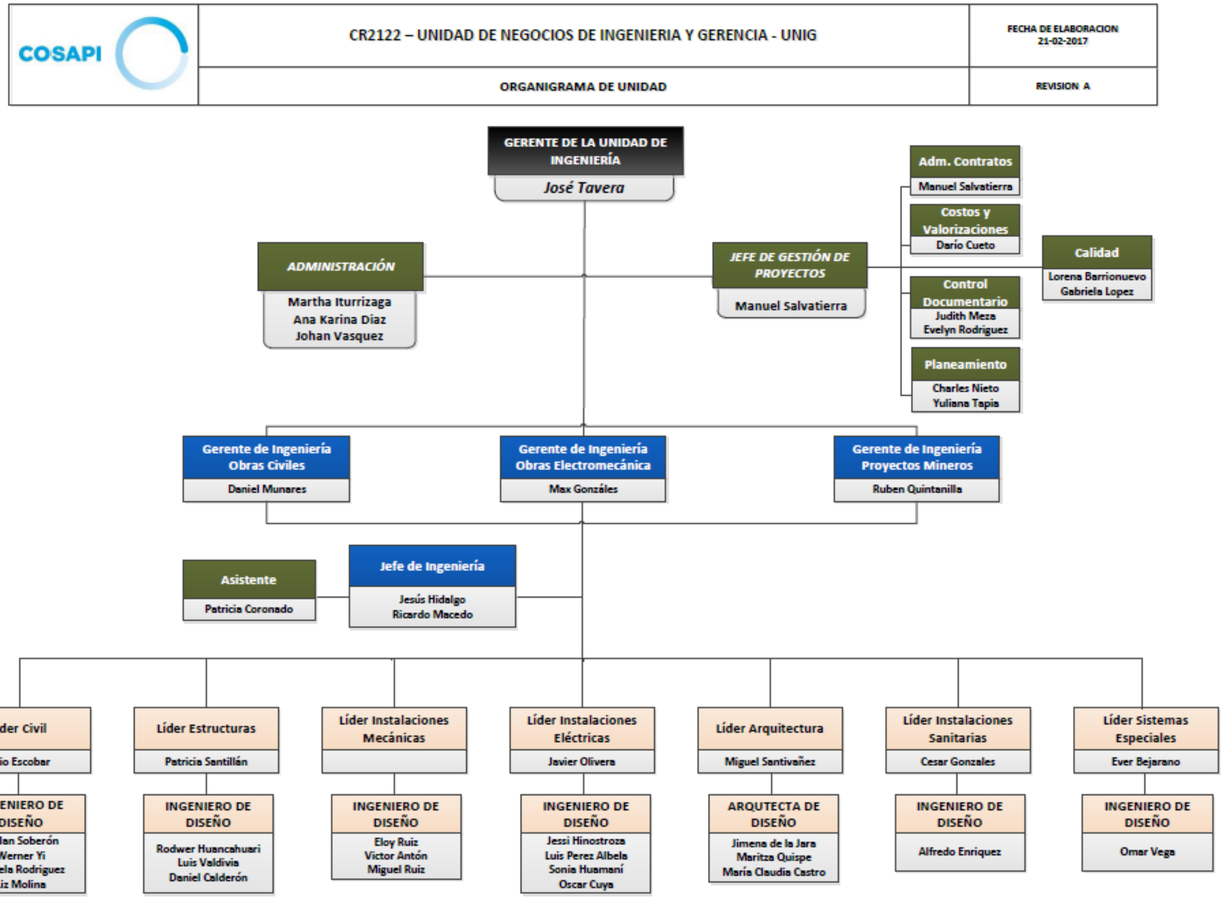
Gobierno Corporativo

Regimos nuestra gestión en base a una política de Gobierno Corporativo que vela por el respeto de los derechos de los accionistas de la empresa y garantiza la equidad y transparencia en su funcionamiento. Asimismo, estamos alineados a los Principios de Buen Gobierno Corporativo para las Sociedades Peruanas y año a año medimos nuestro desempeño en este sentido.

2.3. Organigrama

La estructura organizacional de la Unidad de Ingeniería de la empresa **COSAPI S.A.** está dado por:

Figura Nº 2: Organigrama de la Unidad de Ingeniería – COSAPI S.A.



Fuente: Elaborado por COSAPI S.A.

2.4. Descripción de puestos

Gerente de la Unidad: Es el representante de la Unidad y tiene a su cargo la dirección y administración de los proyectos de la Unidad.

Gerente de Ingeniería: Es el encargado de planificar el inicio de cada proyecto, organizar las prioridades de cada actividad, elaborar los procedimientos y políticas de trabajo para cada uno de los proyectos que presenta la Unidad.

Administración: Responsable de dar soporte a todos los miembros de la unidad, gestionando de manera eficiente diversos requerimientos y recursos.

Líder de Especialidad: Responsable de administrar los proyectos que competen a su especialidad desde su inicio hasta su culminación, asegurando que se termine en el tiempo planeado y con todos los estándares que el proyecto requiera.

Ingeniero Mecánico de Diseño: Responsable del diseño y de la realización de especificaciones técnicas de equipos mecánicos así como de sistemas de aire acondicionado, sistemas de protección contra incendios, piping, sistemas de gas natural, gas licuado de petróleo y sistemas de aire comprimido.

Proyectista: Es el encargado de la elaboración de planos y trabaja conjuntamente con los especialistas de cada área.

III. ACTIVIDADES DESARROLLADAS POR LA EMPRESA O INSTITUCIÓN

3.1. Servicios

COSAPI S.A. ofrece al mercado servicios de ingeniería y construcción, servicios mineros, negocios en concesiones de infraestructura y desarrollos inmobiliarios. Con más de 50 años en el mercado, es considerada como la segunda empresa de ingeniería y construcción de capital nacional en el Perú.

3.2. Principales Clientes

Recuperación del Santuario del Señor de Luren

Cliente: Shougang Hierro Perú S.A.A.

Proyecto: Recuperación de los servicios culturales religiosos y de tradición religiosa del Santuario del Señor de Luren, en el distrito de Ica

Plazo de Ejecución: 540 días

Obras en Área Seca de Mina Toquepala

Cliente: Southern Perú Cooper Corporation

Proyecto: Trabajos de Obra Civil e Instalación de Acero Estructural de Chancado y Clasificación Secundaria, Chancado y Clasificación Terciaria y el Edificio de Finos para el Proyecto de Ampliación Toquepala

Plazo de Ejecución: 15 meses

Obras Civiles de Central Térmica Costa Norte en Panamá

Cliente: POSCO E&C - AES Panamá

Proyecto: Obras Civiles de Central Térmica Costa Norte - Panamá

Plazo de Ejecución: 20 meses

Modernización de Refinería de Talara de Petroperú – Obra Civil Área 1: Unidades HTD y HTN - RCA, TGL - RG2

Cliente: Técnicas Reunidas Talara SAC

Proyecto: Modernización de Refinería de Talara de Petroperú - Obra Civil Área 1: Unidades HTD y HTN - RCA, TGL - RG2

Plazo de Ejecución: 6 meses

Centro Ambulatorio Clínica Internacional Sede Surco

Cliente: Rímac Seguros y Reaseguros SAC

Proyecto: Centro Ambulatorio Clínica Internacional Sede Surco

Plazo de Ejecución: 367 días calendario

Edificio Torre del Parque

Cliente: Urbanova Inmobiliaria SAC

Proyecto: Edificio Torre del Parque

Plazo de Ejecución: 420 días calendario

Construcción de los Edificios Área Administrativa de la Refinería de Talara

Cliente: PETROPERÚ

Proyecto: Construcción de los Edificios Área Administrativa de la Refinería de Talara

Plazo de Ejecución: 18 meses

Saneamiento de la Planta de Talara

Cliente: PETROPERÚ

Proyecto: Saneamiento de la Planta de Talara

Plazo de Ejecución: Junio 2015

Templo de Jesucristo de los Santos de los Últimos Días

Cliente: MHTN ARCHITECTS

Proyecto: Templo de Jesucristo de los santos de los últimos días

Plazo de Ejecución: 40 meses

Obras Civiles Central Térmica Puerto Bravo

Cliente: POSCO E&C (COREA)

Proyecto: Obras Civiles Central Térmica Puerto Bravo

Plazo de Ejecución: 240 días calendarios

Rehabilitación y Mejoramiento de la Carretera DV. Imperial - Pampas

Cliente: MTC - PROVÍAS NACIONAL

Proyecto: Rehabilitación y Mejoramiento de la Carretera DV. Imperial - Pampas

Plazo de Ejecución: 570 días

IV. DESCRIPCIÓN DETALLADA DEL PROYECTO DE INGENIERÍA

4.1. Descripción del tema

Aire acondicionado

El presente proyecto corresponde al sistema de aire acondicionado del edificio ecológico empresarial Santa Cruz, ubicado Distrito de Miraflores.

El edificio cuenta con 7 pisos, el primer piso está conformado por un área de proveedores, dos (2) locales comerciales, un hall de ascensores y un cuarto de control. Los pisos del 2° al 7° son netamente de oficinas. La azotea tiene dos (2) salas de reuniones y una oficina administrativa. El edificio posee siete (7) sótanos, de los cuales seis (6) son de estacionamientos y el último sótano es de uso de cisternas y cuarto de bombas.

El edificio de oficinas cuenta con dos (02) unidades enfriadoras de agua (chiller), con compresor tipo tornillo, condensadores enfriados por agua y refrigerante ecológico R-134A. La capacidad de los dos (02) chillers es de 126 toneladas de refrigeración cada uno.

El sistema de agua helada propuesto es de volumen variable con retorno inverso y cuenta con tres (03) electrobombas en el sistema primario, dos (02) electrobombas en el sistema secundario, tres (03) electrobombas en el sistema de agua de condensado; además cuenta con válvulas motorizadas de 02 vías para los fan coils.

Los chillers, al igual que las bombas de agua helada primaria, secundaria, y las de agua de condensación, se sitúan en la azotea.

Desde esta ubicación, se distribuye el agua helada a cada uno de los pisos del edificio, abasteciendo los requerimientos de cada una de las oficinas, futuras oficinas y de las áreas comunes.

Las dos (02) torres de enfriamiento correspondiente a los chillers, se ubican en la azotea del edificio. Cabe mencionar que las referidas torres cuentan con losas impermeabilizadas, sumideros y sus drenajes respectivos. El lugar de operación de las dos (02) unidades de enfriamiento será en la azotea del edificio.

La capacidad de los chillers, torres de enfriamiento y bombas de agua se encuentran indicadas en el plano IM-20.

El tratamiento del aire en cada piso del edificio se realizó mediante equipos fan coil de agua helada. La distribución del aire se realizó mediante ductos troncales metálicos, ductos secundarios flexibles, difusores y rejillas de retorno, cabe resaltar que todos los fan coil instalados cuentan con filtros sintéticos de 30% de eficiencia.

El aire acondicionado de las futuras oficinas será implementado por el futuro locatario, únicamente se ha proporcionado puntos de suministro de agua helada con la capacidad suficiente para que instalen sus propios sistemas de manejo de aire.

La inyección del aire tratado se realiza a través de difusores adosados a las baldosas del falso cielo raso.

El retorno de aire se realizará a través de rejillas adosadas también a las baldosas del falso cielo raso, empleándose el espacio sobre este como plenum de retorno.

Tanto los chillers como las bombas centrífugas de agua, cuentan con losas flotantes dotadas de amortiguadores de vibración, con el objeto de eliminar la transmisión de vibraciones provenientes de estos equipos, al edificio.

Aire acondicionado para cuarto de servidores

El proyecto contempla instalada una torre de enfriamiento de 120 GPM para suministrar agua de condensado a los equipos de aire acondicionado de los servidores de las oficinas, en tal sentido en los planos se indica los puntos de agua de condensado al ingreso de cada oficina, los cuales cuentan con su respectivo medidor de caudal.

Para el presente proyecto cada futuro locatario que implemente un ambiente para servidores hará uso de este medio de enfriamiento, para lo cual deberá adquirir equipos de aire acondicionado con condensador enfriado por agua.

A efectos de que el agua de condensado que utilizan los equipos de aire acondicionado se mantenga “limpia”, se ha considerado el uso de un intercambiador de calor que separe el sistema en 2 (Torre- Intercambiador; Intercambiador-Equipo de aire acondicionado).

Extracción de aire viciado

En los ambientes de oficinas, el aire exterior inyectado es extraído por el sistema de ventilación de servicios higiénicos, el cual opera en forma continua durante las horas de oficinas. Para tal fin, los extractores de los servicios higiénicos cuentan con tableros eléctricos dotados de temporizadores horarios programables.

La extracción de aire viciado de ambientes densamente poblados, como son las salas de reuniones, se realiza mediante sistemas integrados por extractores y ductos, exclusivos para este fin.

Inyección de aire fresco

Con la finalidad de proporcionar una adecuada renovación de aire a cada uno de los ambientes que integran el edificio, se ha proyectado un sistema de inyección de aire exterior, integrado por ventiladores helicocentrífugos, instalados estratégicamente para proporcionar aire fresco a los ambientes.

El sistema de inyección de aire fresco posee una caja porta filtros que cuenta con pre-filtros lavables de malla de aluminio y de fibra de poliéster con marco de plancha galvanizada, una etapa de filtros corrugados (“pre-pleat”) con calidad de filtración MERV 8 y filtros tipo bolsa, con una calidad de filtración MERV 13.

El aire exterior una vez filtrado, es impulsado por los respectivos ventiladores hacia los ductos de distribución. En cada uno de los niveles del edificio, el aire es entregado dentro del espacio existente entre la losa del techo y el falso cielo raso (plenum del falso cielo raso), siguiendo la trayectoria mostrada en los planos.

Los ductos de inyección de aire exterior llegan hasta cada uno de los espacios cerrados. Este caudal de aire exterior es captado por cada uno de los fan-coils los cuales lo inyectan a los ambientes a los cuales sirven.

En cada uno de los ductos de suministro de aire exterior a los diferentes ambientes, se ha considerado dámper de regulación manual que permitirán balancear el sistema e inyectar el caudal que corresponde a cada punto de suministro.

El caudal mínimo de aire exterior inyectado a los diferentes ambientes del edificio, ha sido determinado en base a lo establecido en el ASHRAE 62.1-2007.

Ventilación de servicios higiénicos

El sistema proyectado es individual para cada servicio higiénico y su capacidad ha sido calculada para proporcionar 20 renovaciones de aire por hora, es decir, un cambio de aire cada 3 minutos.

Para tal fin, se instalaron extractores que descargan el aire viciado mediante ductos de plancha galvanizada, conectados a montantes de ventilación previstos para dicho propósito.

El aire extraído hace forzar el ingreso de aire a través de rejillas que se instalaron en la parte baja de las puertas, con las dimensiones indicadas en los planos.

El encendido y apagado de los extractores se realiza a través de un interruptor de iluminación del servicio higiénico. Adicionalmente está instalado un retardador de apagado ("off-delay") que mantendrá encendido el extractor por un periodo de 5 minutos, luego de haberse apagado la iluminación.

Adicionalmente, en la azotea, se instalaron extractores centrífugos tipo hongo, conectados mediante ductos metálicos a los respectivos ductos de mampostería. Estos extractores tienen por función crear una presión negativa en los ductos de mampostería, y de ese modo, contribuir a que los extractores individuales de los baños puedan vencer la caída de presión que se tendrá en los ductos de mampostería. La operación de estos extractores centrífugos tipo hongo es comandada por temporizadores horarios programables.

La extracción de aire de los servicios higiénicos opera en forma continua durante las horas de oficina, coincidiendo con el horario de operación de los inyectores de aire exterior.

De este modo, el sistema de ventilación de los servicios higiénicos, opera con la extracción del aire viciado de las oficinas.

Por lo tanto, se consigue un ahorro de energía, ya que se está empleando la extracción de aire viciado, para la ventilación de los servicios higiénicos.

4.2. Antecedentes

Los principios del aire acondicionado se remontan a 1842 con Lord Kelvin, el cual con el objetivo de conseguir un ambiente agradable y sano, creo un circuito frigorífico hermético basado en la absorción de calor a través de un gas refrigerante. En el año 1902, el estadounidense Willis Haviland Carrier sentó las bases de la refrigeración moderna al diseñar una máquina que controlaba la temperatura y la humedad por medio de tubos enfriados, dando lugar a la primera unidad de aire acondicionado de la historia.

4.3. Planteamiento del Problema

¿En qué medida el diseño de un sistema de climatización centralizado de 252 TON con planta de agua helada de volumen variable y retorno inverso permitirá un confort térmico de los usuarios y el funcionamiento adecuado de los servidores en el data center del edificio ecológico empresarial – Miraflores?

4.4. Justificación

4.4.1. Teórica

Para el desarrollo de la ingeniería del sistema de acondicionamiento de aire y ventilación mecánica se ha hecho uso de software y hojas de cálculo que nos permiten corroborar y agilizar los resultados manuales.

Entre los programas utilizados se encuentran:

- Elite Chvac V7.01.169: Cálculo Térmico.
- System Syzer V4.4: Dimensionamiento de tuberías de agua helada.
- ASHRAE Duct Fitting Database V2.2.5: Caída de presión de accesorios en ductos.
- DuctSizer V6.4: Dimensionamiento de Ductos.

4.4.2. Legal

El desarrollo del proyecto está amparado bajo la normativa y procedimientos de:

- Reglamento Nacional de Edificaciones (RNE): Parámetros de diseño local.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE): Normativas teóricas y prácticas para el diseño de sistemas de calefacción, ventilación y aire acondicionado.

- Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Estándar de construcción de ductos.

- Air-Conditioning, Heating, & Refrigeration Institute (AHRI): Certificación de eficiencia de equipos de aire acondicionado.

- Underwriters Laboratories (UL): Estándares de seguridad y calidad de los productos.

Para los criterios LEED, se ha tomado en cuenta la siguiente normativa:

- LEED 2009 FOR CORE AND SHELL DEVELOPMENT: Edificios sustentables.

- ASHRAE STANDARD 62.1-2007 (Ventilation for Acceptable Indoor Air Quality): Calidad de aire interior.

- ASHRAE STANDARD 90.1-2007 (Energy Standard for Buildings except Low-Residential Buildings): Consideraciones energéticas de edificios.

4.4.3. Tecnológica

Se ha hecho uso de un sistema centralizado de agua helada en contraste a un sistema de volumen de refrigerante variable (VRV) dado que se están considerando oficinas futuras dentro del edificio por lo que se están dejando puntos de alimentación de agua helada para dichos espacios. En caso de un VRV no sería posible dejar dichos puntos de alimentación dado que es un sistema "completo" resultando electrónicamente inoperativo cuando no reconoce una unidad interior (evaporador).

4.4.4. Metodológica

El procedimiento para el diseño de un sistema de climatización centralizado de un edificio ecológico mediante una planta de agua helada consiste en seguir una serie de pasos, donde primero se debe realizar la identificación y zonificación de ambientes afines, estableciendo los parámetros de diseño, a través de los cuales se procederá con el cálculo de acuerdo al requerimiento del recinto ya sea por aire acondicionado o ventilación mecánica. Haciendo un balance de caudales para que el sistema esté compensado.

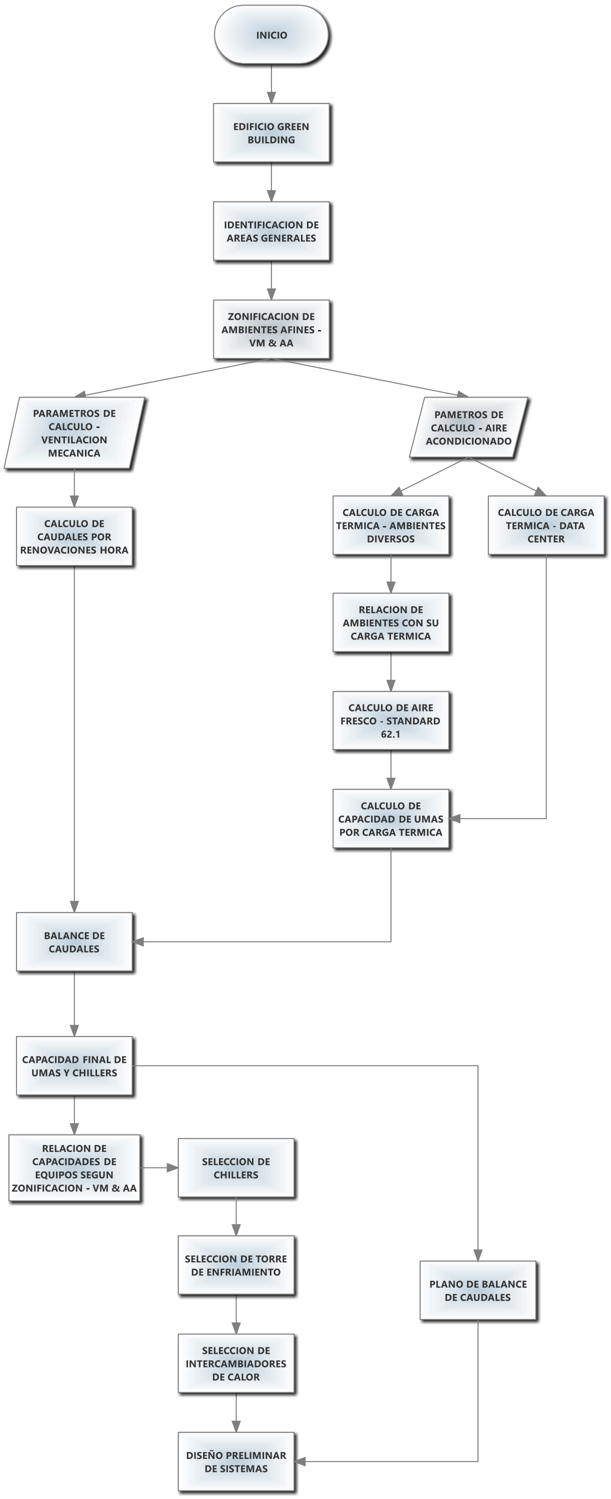
Posteriormente se hará la selección de los equipos como son los chiller, las torres de enfriamiento y los intercambiadores de calor.

En seguida se elaborará el diseño preliminar realizando el trazado y dimensionamiento de ductos y tuberías para los sistemas de inyección de aire fresco, extracción de aire viciado, circuito de tuberías de agua helada, circuito de tuberías de agua de condensado y el desarrollo de los esquemas de principio. Con los cuales se desarrollará los planos preliminares.

Luego se calculará la caída de presión en ductos para seleccionar los fan coil de agua helada así como los equipos de ventilación mecánica, se hará el cálculo de caída de presión en tuberías para la selección de las bombas centrífugas. Mediante la cual se tendrá la especificación de los equipos con sus caudales y caídas de presión, pudiéndose así elaborar los planos finales.

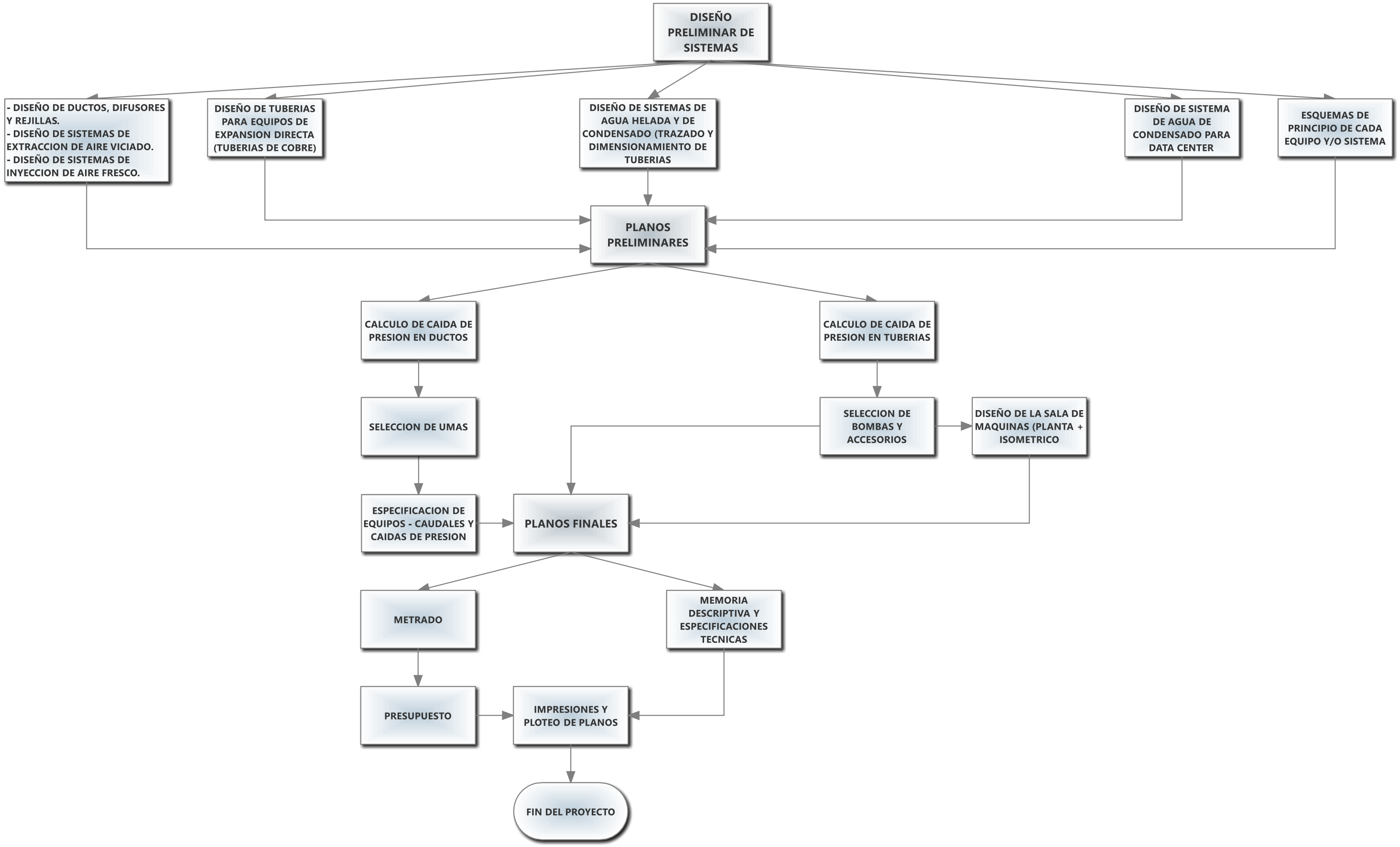
Por último se elaborará el metrado para obtener el presupuesto del proyecto así como el desarrollo de la memoria descriptiva y especificaciones técnicas de los equipos.

Figura Nº 3: Diagrama de flujo



Fuente: Elaboración propia

Figura Nº 3: Diagrama de flujo (continuación)



Fuente: Elaboración propia

4.5. Marco teórico

4.5.1. Antecedentes de estudio

- QUEZADA ESCOBAR, Juan Francisco. ***Criterios para la selección de equipos mecánicos en sistemas de aire acondicionado que utilizan equipos chillers entre 60 y 110 toneladas***. Tesis para optar el Título Profesional de Ingeniero Mecánico. Guatemala. Universidad de San Carlos de Guatemala. 2006.

  De la tesis en mención se obtuvieron los criterios para la selección de los chillers y manejadoras de aire.

- GUTIERREZ GIRALDO, Daniel. ***Sistema de climatización para hotel cuatro estrellas ubicado en la ciudad de Lima***. Tesis para optar el Título Profesional de Ingeniero Mecánico. Perú. Pontificia Universidad Católica del Perú. 2009.

  De la tesis en mención se tuvo en cuenta la estructura en el desarrollo de la ingeniería así como la bibliografía referenciada. También se hizo referencia al cálculo de ductos y tuberías de agua helada.

- VASCONCELOS BAPTISTA, Marcio Antonio. ***Diseño de los sistemas de aire acondicionado y ventilación forzada para el complejo comercial – habitacional La Encrucijada***. Tesis para optar el Título Profesional de Ingeniero Mecánico. Venezuela. Universidad Simón Bolívar. 2007.

  De la tesis en mención se tuvo en cuenta la metodología de diseño para la ventilación forzada en base a renovaciones de aire por hora.

4.5.2. Bases teóricas

El desarrollo de la ingeniería del proyecto está basado en las siguientes teorías.

4.5.2.1. Edificios Green Building

Construcción ecológica[1]

El proceso de construcción ecológica fluye a través de todo el ciclo de vida de un proyecto, comenzando por el nacimiento de la idea del proyecto y continuando sin interrupción hasta que el proyecto alcanza el final de su vida útil y sus partes se reciclan o reutilizan.

El término ***edificio ecológico*** abarca la planificación, el diseño, la construcción, las operaciones y, en última instancia, el reciclado o la renovación de las estructuras al final de su vida útil. La construcción ecológica busca soluciones que representen un equilibrio dinámico y saludable entre los beneficios ambientales, sociales y económicos.

Certificación[2]

La certificación de edificios sustentables LEED (Leadership Energy & Environmental Design) se genera por el organismo US Green Building Council (USGBC) y tiene por objeto dar los parámetros para comparar y calificar a un edificio en su comportamiento sustentable.

La certificación se basa en cinco (5) apartados que son:

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[1] U.S. Green Building Council - Guía de Conceptos Básicos de Edificios verdes y LEED 2° ed.
[2] NAMM – Como documentar un proyecto para cumplir con el ASHRAE 62.1 - 2007

- Selección del sitio (Site Selection – SS): está referido a la menor afectación al sitio y la no contaminación al ambiente en el proceso de construcción.

- Manejo eficiente de agua potable (Water Efficiency – WE): está referido al uso eficiente del agua potable en las diferentes aplicaciones del proyecto.

- Energía y atmósfera (Energy and Atmosphere – EA): referido al mejor desempeño energético, eficiencia, confort y fuentes alternativas de energía para los edificios.

- Materiales y recursos (Materials & Resources – MR): los materiales que se utilicen en la construcción deben de tener el menor impacto ambiental posible y sean tratados en un ciclo correcto de reciclaje.

- Calidad del ambiente interior (Indoor Environmental Quality – IEQ): hace referencia a una calidad adecuada del ambiente interior, en cuanto a ventilación, calidad del aire y confort en los espacios.

Calidad de Aire Interior

La calidad del aire interior es uno de los elementos principales a tomar en cuenta para poder acceder a una certificación LEED, debido a que forma parte de los prerrequisitos imprescindibles.

La calidad del aire alrededor del sitio seleccionado para el proyecto, debe cumplir con la calidad mínima de acuerdo a la siguiente tabla:

Tabla Nº 1: Estándares de calidad de aire

TABLE 4-1 National Primary Ambient Air Quality Standards for Outdoor Air as Set by the U.S. Environmental Protection Agency

Contaminant	Long Term			Short Term		
	Concentration		Averaging	Concentration		Averaging
	µg/m³	ppm		µg/m³	ppm	
Sulfur dioxide	80	0.03	1 year[b]	365	0.14	24 hours[a]
Particles (PM 10)	50	—	1 year[b,g]	150	—	24 hours[a]
Particles (PM 2.5)	15	—	1 year[b,e]	65	—	24 hours[f]
Carbon monoxide				40,000 10,000	35 9	1 hour[a] 8 hours[a]
Oxidants (ozone)					0.08 0.12	8 hours[c] 1 hour[h]
Nitrogen dioxide	100	0.053	1 year[b]			
Lead	1.5	—	3 months[d]			

Fuente: ASHRAE STANDARD 62.1 – 2007

De acuerdo al ***LEED 2009 for Core and Shell Development*** se debe aumentar a la tasa de ventilación del aire exterior de la zona de respiración ***"breathing zone"*** al menos un 30% por encima de las tasas mínimas requeridas dadas por el ASHRAE Standard 62.1 – 2007.

4.5.2.2. Ciencia del calor aplicada a los sistemas HVAC

Leyes de la Termodinámica[3]

La termodinámica trata de la cantidad de transferencia de calor a medida que un sistema pasa por un proceso de un estado de equilibrio a otro.

La ***primera ley*** de la termodinámica, conocida también como el principio de conservación de la energía estipula que la razón de la transferencia de energía hacia un sistema sea igual a la razón de incremento de la energía de ese sistema.

La ***segunda ley*** de la termodinámica determina que el calor se transfiere en la dirección de la temperatura decreciente.

Ciclo de Refrigeración

Una de las principales áreas de aplicación de la termodinámica son los sistemas de refrigeración para el acondicionamiento de aire, que es la transferencia de calor de una región de temperatura inferior a otra superior.

Los dispositivos que producen refrigeración se llaman refrigeradores, los ciclos que operan se denominan ciclos de refrigeración y la sustancia o fluido de trabajo que realiza el ciclo se denomina refrigerante.

Cualquier sustancia que pueda absorber calor se llama refrigerante, llamemos ***refrigerante primario*** si sufre un cambio de fase en el

[3] Yunus A. Cengel – Transferencia de calor y masa 3° ed.

proceso y ***refrigerante secundario*** aquel que no sufre cambio de fase. Se emplea el agua como refrigerante secundario bajo que se tiene la ventaja de que se puede aplicar un control completamente modulador.

El ciclo de refrigeración es la base termodinámica fundamental que nos describe el proceso de eliminación de calor de los edificios, y como es rechazado este calor al medio ambiente.

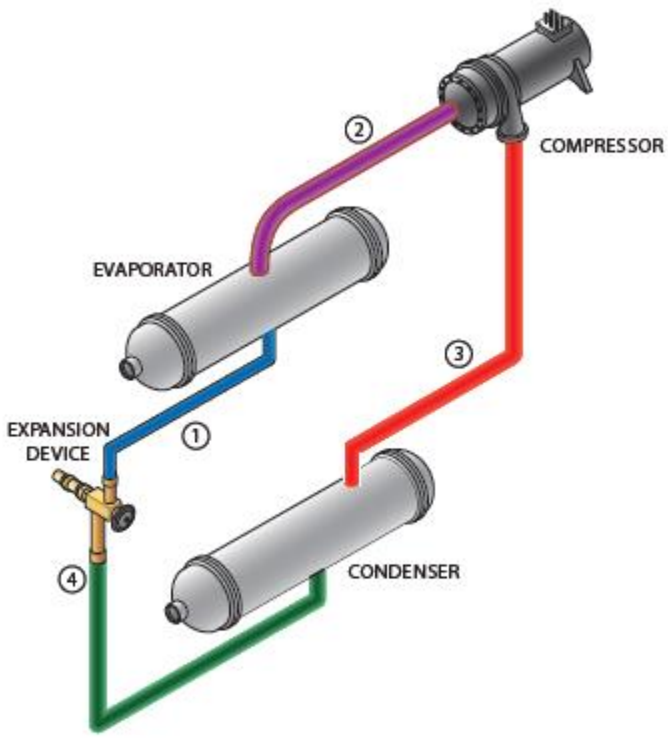
El ciclo de refrigeración que más se utiliza con frecuencia es el ciclo de ***compresión de vapor*** en el cual el refrigerante se evapora y condensa alternadamente, para luego comprimirse en la fase vapor.

En aplicaciones residenciales – comerciales como un edificio de oficinas se emplea un chiller o enfriador de agua el cual utiliza un ciclo de compresión de vapor de refrigerante (refrigerante primario) para enfriar el agua (refrigerante secundario) y rechazar este calor recogido del agua más el calor generado en el proceso de compresión a otro circuito de agua enfriado por una torre de enfriamiento o directamente al exterior.

El ciclo de refrigeración consta de los siguientes cuatro (4) componentes:

- Evaporador.
- Compresor.
- Condensador.
- Dispositivo de expansión.

Figura N° 4: Componentes de un ciclo básico de refrigeración en un chiller

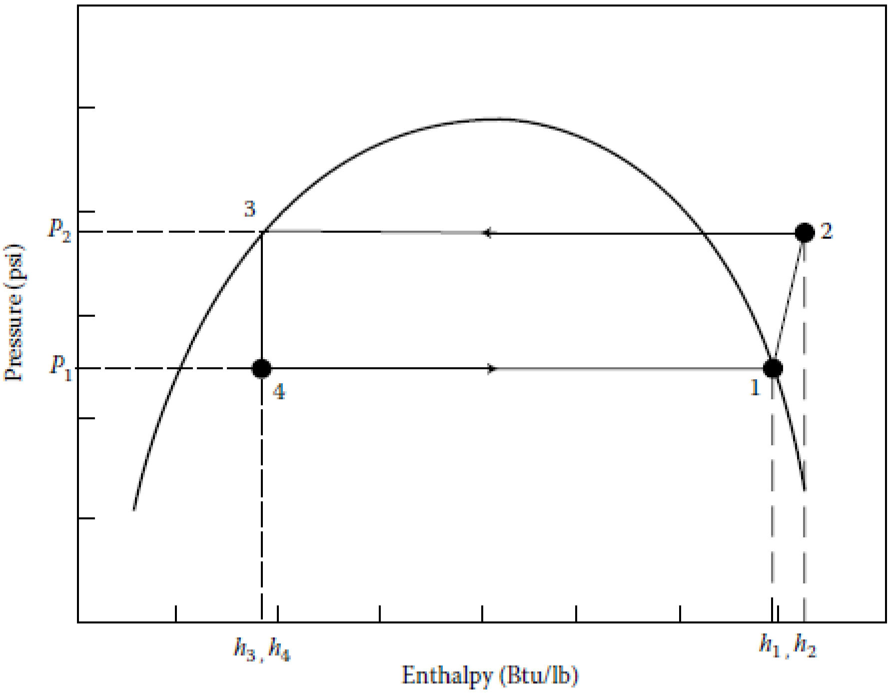


Fuente: Application Guide Daikin

El diagrama presión – entalpía (p – h) muestra la relación de estos componentes. Este diagrama cubre la región líquido – vapor para un refrigerante específico. Se compone de cuatro (4) procesos:

1-2: Compresión de vapor de refrigerante.
2-3: Rechazo de calor a presión constante en el condensador.
3-4: Estrangulamiento en un dispositivo de expansión.
4-1: Absorción de calor a presión constante en un evaporador.

Figura N° 5: Ciclo de refrigeración ideal impuesto sobre un gráfico presión – entalpía



Fuente: HVAC Water Chillers and Cooling Towers – Herbert W. Standford III

Psicrometría

La psicrometría es la ciencia que trata de las propiedades termodinámicas del aire húmedo y la influencia de este en los procesos de acondicionamiento de aire.

Las leyes de conservación de la energía o balance de energía y de la conservación de la masa o balance de masa son la base para el análisis de los procesos de aire húmedo.

Los procesos básicos para el análisis de los sistemas de acondicionamiento de aire son:

- Calentamiento y enfriamiento de aire húmedo.
- Enfriamiento y deshumidificación de aire húmedo.
- Calentamiento y humidificación de aire húmedo.
- Humidificación adiabática de aire húmedo.
- Mezcla adiabática de dos caudales de aire húmedo.

El acondicionamiento de aire involucra dos o más de los procesos anteriormente considerados, el aire suministrado deberá tener una temperatura y un contenido de humedad suficientemente bajo para poder absorber la carga total de enfriamiento del espacio.

Mecanismos de transferencia de calor[4]

La ciencia de la transferencia de calor está vinculada con la razón de intercambio de calor entre cuerpos calientes y fríos llamados fuente y recibidor.

El requisito básico para que haya una transferencia de calor es la presencia de una diferencia de temperaturas entre dos (2) medios, es decir la diferencia de temperaturas es la fuerza impulsora para transferir energía en forma de calor.

La transferencia de energía en forma de calor siempre se produce del medio que tiene la temperatura más elevada hacia el de temperatura más baja y esa transferencia se detiene cuando ambos alcanzan la misma temperatura.

Los mecanismos de la transferencia de calor en las cuales el calor puede pasar de la fuente al recibidor, aun cuando en las aplicaciones

[4] Yunus A. Cengel – Transferencia de calor y masa 3° ed.

de sistemas de acondicionamiento de aire son combinaciones de dos (2) o tres (3) son:

Conducción

La conducción es la transferencia de energía de las partículas más energéticas de una sustancia hacia las adyacentes menos energéticas, como resultado de interacciones entre esas partículas. La conducción puede tener lugar en los sólidos, líquidos o gases. En los gases y líquidos la conducción se debe a las colisiones y a la difusión de las moléculas durante su movimiento aleatorio. En los sólidos de debe a la combinación de las vibraciones de las moléculas en una retícula y al transporte de energía por parte de los electrones libres.

Convección

La convección es el modo de transferencia de calor entre una superficie sólida y el líquido o gas adyacente que están en movimiento y comprende los efectos combinados de la conducción y del movimiento del fluido.

Radiación

La radiación es la energía emitida por la materia en forma de ondas electromagnéticas (o fotones) como resultado de los cambios en las configuraciones electromagnéticas de los átomos o moléculas. A diferencia de la conducción y la convección, la transferencia de calor por radiación no requiere la presencia de un medio interventor. De hecho, la transferencia de calor por radiación es la más rápida (a la velocidad de la luz) y no sufre atenuación en el vacío.

4.5.2.3. Intercambiadores de calor

Fundamentos[5]

Los intercambiadores de calor son aparatos que facilitan el intercambio de calor entre dos (2) fluidos que se encuentras a temperaturas diferentes, además ambos no se mezclan entre sí.

En un intercambiador la transferencia de calor comprende convección en cada fluido y conducción a través de la pared o medio físico que los separa. En el análisis de los intercambiadores de calor es conveniente trabajar con el coeficiente global de transferencia de calor (U) que toma en cuenta todos los efectos de esta transferencia.

Tipos de intercambiadores de calor

Los intercambiadores de calor se clasifican de acuerdo con el arreglo de flujo y el tipo de construcción y pueden dividirse en tres (3) grandes grupos:

- ✓ **Intercambiadores compactos:** los cuales están hechos de placas o láminas paralelas.

- ✓ **Intercambiadores tubulares:** los cuales están hechos a base de tubos.

- ✓ **Intercambiadores misceláneos:** tienen diferentes configuraciones según el requerimiento especifico.

[5] Yunus A. Cengel – Transferencia de calor y masa 3° ed.

Intercambiador de calor de placas

El intercambiador de calor de placas consiste en un paquete de placas de metal corrugadas con tomas para el paso de los dos (2) fluidos entre los que se realiza el intercambio de calor.

Un intercambiador de placas se selecciona en base al flujo que circula (GPM) y al rango de temperatura que se desea establecer.

Figura N° 6: Intercambiador de calor de placas

Fuente: Catalogo Alfa Laval

4.5.2.4. Diseño de ductos

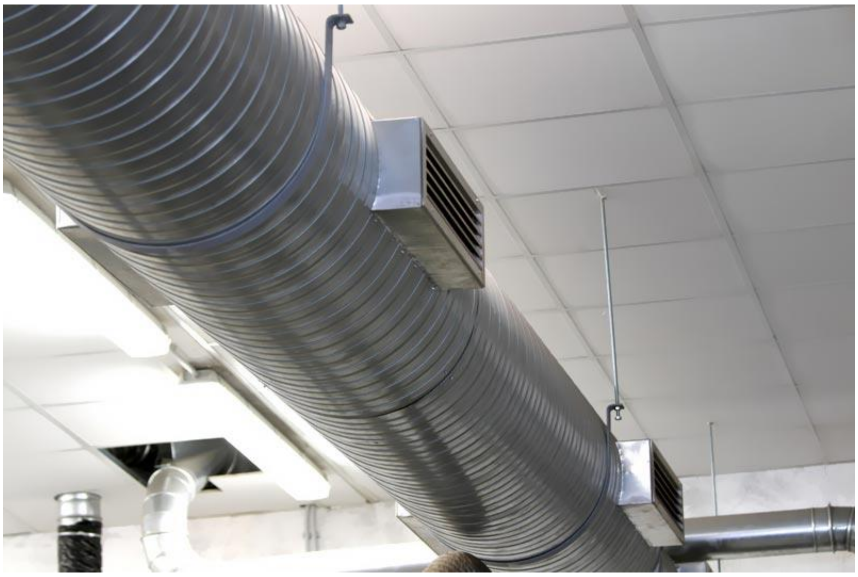
Fundamentos[6]

La misión de un sistema de conductos es transmitir el aire desde el aparato acondicionador o ventilador hasta el espacio que va ser acondicionado o ventilado.

[6] Carrier – Manual de aire acondicionado

Para cumplir este objetivo de forma práctica el sistema debe proyectarse dentro de ciertas limitaciones establecidas de antemano relativas al espacio disponible, perdidas por rozamiento, velocidad, nivel de ruido, pérdidas o ganancias de calor y fugas.

Figura N° 7: Ducto de aire acondicionado



Fuente: Pagina Web / http://www.aireporconductos.es/

Dimensionamiento de ductos

Para lograr niveles bajos de ruido se han establecido límites de velocidades para ductos de acuerdo a la siguiente tabla.

Tabla N° 2: Velocidades recomendadas y máximas en ductos para sistemas convencionales

Recommended And Maximum Duct Velocities For Conventional Systems

DESIGNATION	RECOMMENDED VELOCITIES, FPM		
	RESIDENCES	SCHOOLS, THEATERS, PUBLIC BUILDINGS	INDUSTRIAL BUILDINGS
OUTDOOR AIR INTAKES[1]	500	500	500
FILTERS[1]	250	300	350
HEATING COILS[1,2]	450	500	600
COOLING COILS[1]	450	500	600
AIR WASHERS[1]	500	500	500
FAN OUTLETS	1000-1600	1300-2000	1600-2400
MAIN DUCTS[2]	700-900	1000-1300	1200-1800
BRANCH DUCTS[2]	600	600-900	800-1000
BRANCH RISERS[2]	500	600-700	800
	MAXIMUM VELOCITIES, FPM		
OUTDOOR AIR INTAKES[1]	800	900	1200
FILTERS[1]	300	350	350
HEATING COILS[1,2]	500	600	700
COOLING COILS[1]	450	500	600
AIR WASHERS[1]	500	500	500
FAN OUTLETS	1700	1500-2200	1700-2800
MAIN DUCTS[2]	800-1200	1100-1600	1300-2200
BRANCH DUCTS[2]	700-1000	800-1300	1000-1800
BRANCH RISERS[2]	650-800	800-1200	1000-1600

[1] THESE VELOCITIES ARE FOR TOTAL FACE AREA, NOT THE NET FREE AREA; OTHER VELOCITIES IN TABLE ARE FOR NET FREE AREA.

[2] FOR LOW VELOCITY SYSTEMS ONLY.

Fuente: Trane Air Conditioning Manual

Un sistema de ductos de baja velocidad generalmente tendrá una pérdida de presión comprendida aproximadamente entre 0.08 a 0.15 pulgadas/100 ft. Para los ductos de ventilación mecánica se tomará 0.1 pulgadas/100ft y para los ductos de aire acondicionado 0.08 pulgadas/100ft.

Pérdidas secundarias

Las pérdidas secundarias resultan de las perturbaciones del flujo causados por equipos y accesorios montados en ductos como son: entradas, salidas, codos, transiciones, uniones, etc., los cuales cambian la dirección de flujo, área de la trayectoria del aire o cuando el flujo se divide entre dos (2) ductos y se manda parte del flujo a una de las ramificaciones. Estas pérdidas generalmente son de mayor magnitud que las pérdidas a través del ducto.

Diseño de difusores y rejillas

Para diseñar difusores y rejillas es necesario hacer uso de catálogos de selección de fabricantes siendo recomendable diseñar con un rango de velocidad de 300 a 400 FPM.

Ruta crítica

Para determinar la presión total del ventilador requerido por un sistema debemos de evaluar la ruta crítica que es la ruta de mayor caída de presión.

4.5.2.5. Diseño de tuberías

Fundamentos de diseño

De acuerdo al Manual del ASHRAE FUNDAMENTALS 2013, Chapter 22 – Pipe Sizing, para el dimensionamiento de tuberías de un sistema hidrónico, se debe de tener en cuenta una limitación de caída de presión permisible en el rango de 1 a 4 pies/100 pies de tubería, un valor de 2.5 pies/100 pies representa un valor promedio a la que se diseñan la mayoría de los sistemas.

Las tuberías de un sistema hidrónico en circuito cerrado tienen un tamaño que está por debajo de ciertos límites arbitrarios, como un límite de velocidad de 4 fps (1.2 m/s) para tuberías de hasta 2 pulgadas y un límite de caída de presión de 4 pies/100 pies para tuberías mayores a 2 pulgadas. Las velocidades mayores a 4 fps se pueden utilizar en tuberías de mayor tamaño.

El siguiente gráfico nos ayuda a dimensionar las tuberías en base al caudal que circula por una tubería y a los límites de velocidad y caída de presión anteriormente expuestos para tuberías de acero comercial.

Figura N° 8: Pérdidas por fricción para agua en tuberías de acero comercial

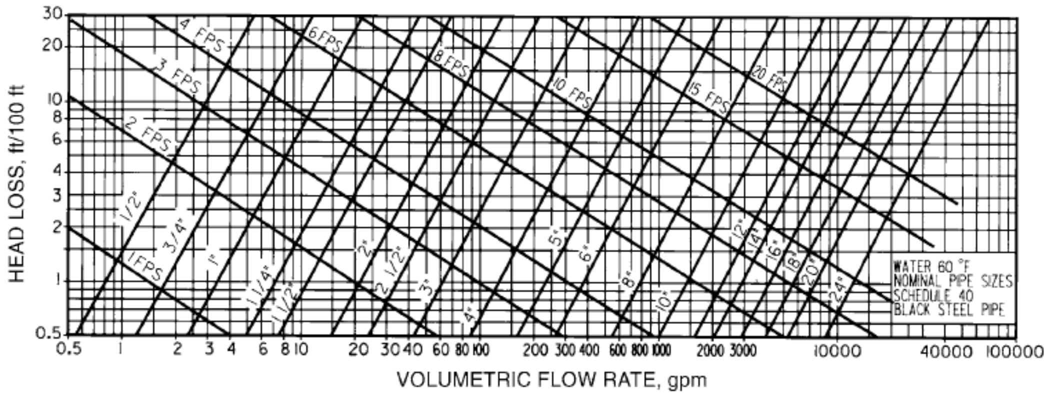


Fig. 4 Friction Loss for Water in Commercial Steel Pipe (Schedule 40)

Fuente: ASHRAE FUNDAMENTALS 2013

4.5.2.6. Carga térmica

Fundamentos

El propósito de esta sección es determinar la cantidad de enfriamiento que se necesita para mantener un estado de confort a los ocupantes de los diversos ambientes del edificio.

Si la temperatura y la humedad del espacio ocupado se deben mantener a un nivel confortable, se debe extraer calor para compensar las ganancias de calor. A la cantidad neta de calor que se retira se le llama carga de enfriamiento. El cálculo de esta carga es base para seleccionar el equipo de enfriamiento adecuado.

Se debe tener en cuenta las ganancias de calor de dos (2) grupos distintos: ganancias de calor sensible y de calor latente. Las ganancias de calor sensible ocasionan un aumento de la temperatura del aire y la ganancia de calor latente se debe a la adición de vapor de agua y por lo tanto aumentan la humedad.

Los métodos de cálculo que se emplean para determinar las cargas de enfriamiento se basan en lo que recomienda el ASHRAE FUNDAMENTALS HANDBOOK 2009, integrados en el software de cálculo Elite Chvac V7.01.169.

Las ganancias de calor proceden de dos (2) fuentes, las que se generan externas al recinto y las que se generan internamente.

Ganancia a través de la estructura exterior

Son las ganancias de calor por conducción a través de paredes, techo y vidrios que dan al exterior de la edificación.

Ganancia a través de la estructura interior

Es la ganancia de calor que se da a través de los espacios interiores adyacentes sin acondicionamiento de aire hasta los espacios acondicionados a través de divisiones, pisos y cielos rasos.

Radiación solar a través de vidrios

La energía radiante que procede del sol y que pasa a través de superficies transparentes como el vidrio se transforma en ganancia de calor al recinto. Su valor varía con la hora, orientación, el sombreado y el efecto de almacenamiento.

Ganancias de calor de fuentes internas

Se denominan ganancias interiores a las cantidades de calor latente y sensible que se producen en el interior de los locales acondicionados debido a los ocupantes, luces y equipamiento que son los que con frecuencia incrementan significativamente la carga de enfriamiento requerida en los edificios comerciales e institucionales.

4.5.2.7. Ventilación mecánica

Fundamentos

La ventilación mecánica es el mecanismo por el cual se sustituye el aire ambiente de un local considerado inconveniente por su falta de pureza, temperatura inadecuada o humedad excesiva, por otro exterior de mejores características.

Para efectuar una ventilación adecuada debemos atender a lo siguiente:

- Determinar la función a realizar (calor a disipar, tóxicos a diluir, etc.)
- Calcular la cantidad de aire necesaria.
- Establecer el trayecto de circulación del aire.

Tipos de ventilación

Se pueden distinguir dos (2) tipos de ventilación:

Ventilación general, denominada también dilución o renovación ambiental, la cual es la que se practica en un recinto, renovando todo el volumen del aire del mismo por otro de procedencia exterior.

Ventilación localizada, donde se pretende capturar el aire contaminado en el mismo lugar de su producción, evitando que se extienda por el local utilizando campanas de captación.

Ventiladores

Por definición el ventilador es una turbo máquina que transmite energía y genera la presión necesaria para mantener un flujo continuo de aire. El ventilador es un componente esencial en los sistemas de aire acondicionado y ventilación mecánica, ya que se necesitan para distribuir el aire a través de la ductería hasta los recintos.

Los ventiladores se clasifican en dos (2) grupos generales:

Centrífugos

En un ventilador centrífugo la corriente de aire se establece radialmente a través del rodete.

El ventilador centrífugo es uno de los más usados ya que puede mover eficientemente cantidades grandes o pequeñas de aire dentro de una amplia gama de presiones.

Los ventiladores centrífugos se pueden subclasificarse según la forma de sus alabes o aletas en:

Alabes curvados hacia delante, funcionan a velocidad relativamente baja respecto a las otras configuraciones para un mismo caudal, ventilador más pequeño para un servicio dado, empleado para aire limpio.

Curvados hacia atrás, de mayor rendimiento, no se sobrecarga, más silencioso.

Radiales, es auto limpiante, utilizado para transportar partículas sólidas (transporte neumático).

Figura N° 9: Ventilador centrífugo

Fuente: Catálogo Soler & Palau

Axiales

En un ventilador de flujo axial se impulsa el aire a lo largo del eje del ventilador, su diseño permite elevados caudales pero a pequeñas pérdidas de carga.

Figura N° 10: Ventilador axial

Fuente: Catálogo Soler & Palau

La selección más adecuada de un ventilador para una aplicación concreta se debe considerar los siguientes factores:

- Caudal y presión estática nominal.
- Características del motor: monofásico o trifásico.
- Regulación todo-nada, mediante 2-3 velocidades o variador de frecuencia.
- Ruido.
- Fluido a transportar: aire de ventilación, climatización.

4.5.2.8. Chillers

Fundamentos

Los Chillers son equipos de climatización centralizados muy utilizados en grandes instalaciones como edificios de oficinas teniendo la posibilidad de enfriar o calentar según lo requiera la edificación.

El agua helada fluye a través del evaporador del Chiller. El evaporador es un intercambiador de calor donde el agua refrigerada transfiere su calor sensible (la temperatura del agua desciende) al refrigerante como energía latente (el refrigerante se evapora o hierve). El refrigerante luego abandona este calor al exterior a través del condensador del Chiller.

En el caso de un Chiller enfriado por aire, este calor es rechazado al ambiente exterior a través del aire, el cual es forzado a pasar mediante un ventilador por los serpentines del condensador, realizándose de esa manera el intercambio térmico.

Para un Chiller enfriado por agua, el refrigerante entrega su calor a un circuito de agua, denominado circuito de agua de condensación. El agua de condensación fluye a través del condensador del Chiller. El condensador es un intercambiador de calor, en este caso el calor absorbido por el edificio, más el trabajo del compresor, se transfiere del refrigerante (condensando del refrigerante) al agua del condensador (elevando la temperatura del agua).

Componentes de un chiller

Compresor

Los tipos de compresores básicos usados en Chillers son los siguientes:

- Alternativo o reciprocante.
- Rotativo.
- Centrifugo.

Evaporador

Es un intercambiador de calor del tipo casco y tubos, su función es proporcionar una superficie para transferir calor del líquido a enfriar al refrigerante en condiciones de saturación, evaporándolo antes de entrar al compresor.

Condensadores

El condensador es el componente del sistema, en el cual el refrigerante transfiere su calor al aire o al agua, provocando que este se condense antes de pasar a la válvula de expansión termostática.

Dispositivo de expansión

La finalidad de este dispositivo es controlar el suministro adecuado de líquido refrigerante al evaporador.

Figura N° 11: Chiller enfriado por agua

Fuente: Catálogo Daikin

Selección de chillers

La selección de los rangos de temperatura afecta el funcionamiento de la planta de agua helada así como el consumo de energía.

Las clasificaciones de chillers se basan en condiciones estándar ARI, la cual establece parámetros estándar para la clasificación de capacidad de diferentes máquinas. Estos parámetros se establecen en las normas del Instituto Americano de Refrigeración ARI 550/590 (chillers por compresión de vapor).

Para aplicaciones de aire acondicionado las condiciones de diseño ARI se utilizan con frecuencia como condiciones de diseño y son las siguientes:

- Agua helada a la salida del evaporador de 44 ºF.
- Caudal de agua refrigerada de 2.4 USgpm/TON.
- Temperatura de entrada del agua al condensador 85 ºF.
- Caudal de agua del condensador 3.0 USgpm/TON.
- Factor de ensuciamiento del evaporador de 0.0001 h-ft2-F/BTU y del condensador de 0.00025 h-ft2-F/BTU.

El cambio de temperatura en el fluido para el condensador o el evaporador se puede describir usando las siguientes fórmulas:

Carga (BTU/h) = Flujo (USgpm) x (ºFin – ºFsal) x 500

Carga (TON) = Flujo (USgpm) x (ºFin – ºFsal) / 24

Utilizando las condiciones ARI mencionadas y las fórmulas anteriormente expuestas se concluye lo siguiente:

- El cambio de temperatura en el evaporador es de 10 ºF y la temperatura que sale del evaporador es de 54 ºF.

- El cambio de temperatura en el condensador para chillers modernos de alta eficiencia se encuentra en el orden de 9.4 ºF a 3.0 USgpm y la temperatura que sale del condensador es de 94.4 ºF.

4.5.2.9. Torres de enfriamiento

Fundamentos

Las torres de enfriamiento se utilizan junto con chillers enfriados por agua. Una torre de enfriamiento rechaza el calor recogido del edificio más el trabajo de compresión del chiller.

Existen dos (2) tipos de torres de enfriamiento:

- De tiro forzado
- De tiro inducido

El agua del condensador se dispersa a través de la torre por medio de boquillas, luego el agua se recoge en un sumidero que puede ser integral o alejado de la torre.

Selección de la torre de enfriamiento

Las torres de enfriamiento se seleccionarán en base a una temperatura de 75 °F bulbo húmedo, 85 °F de temperatura de agua de suministro y un rango de 10 °F, el caudal manejado por la torre de enfriamiento es de 3 USgpm/TON.

Figura N° 12: Torre de enfriamiento

Fuente: Catálogo Baltimore Air Coil

4.5.2.10. Equipo auxiliar y/o accesorios

Tanque de expansión

La cámara de expansión o también llamado tanque de expansión sirve tanto a una función térmica como hidráulica. La finalidad de un tanque de expansión es la de mantener constante la presión del sistema, debido a la expansión térmica (cambios volumétricos) del agua cuando aumenta su temperatura. El tanque de expansión también proporciona un método para añadir agua al sistema y la presión a la que opera el tanque es el punto de referencia para todo el sistema hidrónico.

Existe una regla que menciona lo siguiente la cual no tiene excepciones: *Un sistema hidráulico, independientemente de lo grande o complejo que sea, solo debe tener un tanque de expansión.*

Los tanques de expansión pueden ser del tipo abierto y cerrado.

Tanque de expansión abierto

Los tanques de expansión abiertos están en comunicación con la atmósfera y situados en el lado de aspiración o succión de la bomba y a un nivel superior de la bomba más elevada de la instalación.

Los tanques abiertos comúnmente utilizados en sistemas antiguos suelen introducir aire en el sistema con la consiguiente corrosión de las tuberías, por lo cual no se recomienda para aplicación en diseños actuales.

Tanque de expansión cerrado

En los tanques de expansión cerrados cuando se expande el agua, llena parcialmente el tanque y se comprime el gas, por esta razón también se les conoce como tanques de compresión. Los tanques de expansión cerrados pueden ser con interfaz aire – agua que contiene un volumen capturado de aire comprimido a veces llamado tanque de acero simple, o de tipo cerrado con diafragma en el que se inserta una membrana flexible entre el aire y el agua (una versión modificada es el llamado “Bladder Tank”), estos tanques se pueden ubicar en cualquier parte del sistema. Generalmente, cuanto menor es la presión del tanque, más pequeño debe ser el tanque. Los tanques de expansión cerrados no están en comunicación con la atmósfera y operan por encima de la presión atmosférica.

El tanque de expansión cerrado con interfaz aire/agua se utiliza en instalaciones de calefacción por agua caliente y en los sistemas de agua de temperatura elevada, debido a que constituyen un buen depósito para almacenar el aire que se libera durante el proceso de calentamiento en la caldera.

El tanque de expansión cerrado con diafragma se utiliza en sistemas de agua fría debido a que el aire está contenido en una “vejiga” de modo que el agua no puede absorberlo del tanque.

Figura N° 13: Tanque de expansión

Fuente: Catálogo Taco

Las ecuaciones para dimensionar las tres (3) configuraciones comunes de tanques de expansión son las siguientes:

Para tanques cerrados con interfaz aire/agua:

$$V_t = V_s \frac{\left[\left(v_2 / v_1\right) - 1\right] - 3\alpha\Delta t}{\left(P_a / P_1\right) - \left(P_a / P_2\right)}$$ ….. [Ec. 01]

Para tanques abiertos con interfaz aire/agua:

$$V_t = 2V_s \left[\left(\frac{v_2}{v_1} - 1\right) - 3\alpha\Delta t\right]$$ ….. [Ec. 02]

Para tanques de diafragma:

$$V_t = V_s \frac{\left[\left(v_2 / v_1\right) - 1\right] - 3\alpha\Delta t}{1 - \left(P_1 / P_2\right)}$$ ….. [Ec. 03]

Donde:

V_t : Volumen del tanque de expansión, ft^3 o m^3.

V_s : Volumen del agua en el sistema, ft^3 o m^3.

t_1 : Temperatura mínima (temperatura de operación para un sistema de agua helada), °F o °C.

t_2 : Temperatura máxima (temperatura máxima del agua helada), °F o °C.

P_a : Presion barométrica local, PSIA o kPa.

P_1 : Presión a la temperatura mínima t_1 (presión del sistema regulado), PSIA o kPa.

P_2: Presión a la temperatura máxima t_2 (una presión máxima aceptable), PSIA o kPa.

v_1: Volumen específico del agua a t_1, ft^3/lbm o m^3/kgm.

v_2: Volumen específico del agua a t_2, ft^3/lbm o m^3/kgm.

α : Coeficiente de expansión térmica lineal para la tubería, °F^{-1} o °C^{-1}

6.5 x 10-6 F-1 (11.7 x 10-6 C-1) para tubo de acero.

9.3 x 10-5 F-1 (16.74 x 10-6 C-1) para tubo de cobre.

Δt : Temperatura máxima menos temperatura mínima, °F o °C.

Para un sistema de agua helada, la temperatura más baja es la temperatura de suministro de agua enfriada de diseño y la temperatura más alta es la temperatura ambiente.

En el punto de conexión del tanque, la presión en los sistemas de tanque cerrado aumenta a medida que aumenta la temperatura del agua.

Filtros

La función de un filtro es la de proteger toda la instalación y sus componentes y/o accesorios. Los filtros deben colocarse en la línea de entrada de las bombas, válvulas de control u otro aparato que deba protegerse.

Un filtro se selecciona para la capacidad del sistema en el punto de la línea donde se ha de colocar. Para proteger los distintos aparatos se debe consultar al fabricante para determinar el grado necesario de protección del filtro.

Termómetros y manómetros

Los termómetros y manómetros se sitúan en el sistema donde se considere importante conocer la temperatura o presión del agua.

Los termómetros se deben elegir para un rango de temperatura comprendido entre -5°C y 100 °C, deben situarse de forma tal que sea fácil su lectura.

Los manómetros se eligen de forma tal que la presión normal corresponda aproximadamente al punto medio de la escala del manómetro.

Las temperaturas y presiones que se consideran importantes son las siguientes:

- Temperatura que entra y sale del evaporador y condensador.
- Presión en la aspiración y descarga de las bombas.

4.5.2.11. Unidades terminales fan coil de agua helada

Fundamentos

Un fan coil o ventiloconvector es el término que hace referencia a un equipo de climatización todo agua constituido por un intercambiador de calor, un ventilador y un filtro. Pueden trabajar bien enfriando o bien calentando el ambiente, según se alimente de agua helada procedente de un chiller o con agua caliente procedente de una caldera.

Para enfriar o calentar el agua, el fan coil requiere de una unidad exterior.

Funcionamiento de un fan coil

La unidad fan coil recibe agua caliente o fría desde la unidad exterior. Un ventilador impulsa el aire y lo hace atravesar por los tubos por los que pasa el agua caliente o fría produciéndose aquí el intercambio térmico. Tras pasar por el filtro, el aire calentado o enfriado sale al exterior climatizando el ambiente.

Al tratarse de un sistema compacto que ocupa un espacio reducido para su instalación, resulta un sistema muy demandado en edificios de uso comercial como edificios de oficinas.

Tipos de fan coil

Según su instalación podemos distinguir dos tipos de fan coil: vertical y horizontal.

Las unidades verticales son fabricadas para ser instaladas en las paredes perimetrales de la zona a climatizar. Suelen ir empotrados y cubiertos por algún tipo de mueble decorativo diseñado específicamente para la unidad.

En cuanto a las unidades horizontales están diseñadas para colocarse principalmente en falsos techos, de forma oculta, junto con un sistema de conductos de aire acondicionado.

Según el número de tubos pueden clasificarse en dos (2) tipos: los de dos tubos y los de cuatro tubos:

Fan coil de dos tubos: Tienen dos tubos un tubo de ida y otro de retorno. Por el tubo puede circular agua fría o caliente en función a la estación del año, proporcionando frío o calor pero no simultáneo.

Fan coil de cuatro tubos: Tienen cuatro tubos dos tubos de ida y dos de retorno. Cada circuito funciona de manera independiente por lo que se puede proporcionar frío y calor de manera simultánea.

Selección de fan coil

Las unidades se deben seleccionar de acuerdo a las siguientes consideraciones:

- Máxima carga de refrigeración correspondiente al local y al aire de ventilación, considerando las cargas de calor sensible y total (sistema de enfriamiento).

- Máxima carga de calefacción del local y del aire de ventilación (sistema de calefacción).

Figura N° 14: Fan coil

Fuente: Catálogo Trane

4.5.2.12. Bombas centrífugas

Fundamentos

Las bombas de tipo centrífugas son los principales motores capaces de crear la presión diferencial necesaria para distribuir y recircular el agua helada a través de un sistema de acondicionamiento de aire. También son empleadas en el circuito de agua de condensación hacia torres de enfriamiento.

Las partes esenciales de una bomba centrífuga son el miembro giratorio (impulsor) y la caja que lo contiene (carcasa o voluta). En una bomba centrífuga el motor hace girar al impulsor o rodete, el cual impulsa el agua, el agua abandona el impulsor con alta energía cinética la cual es convertida en presión estática en la voluta (carcasa) y el difusor de la manera más eficiente posible.

Figura N° 14: Bomba centrífuga

Fuente: Catálogo Bell & Gossett

Tipos de bombas

La mayor parte de bombas centrífugas empleadas en sistemas hidrónicos son bombas de una sola etapa.

Las bombas pueden clasificarse por el tipo de succión en:

- Simple succión (ingresa el agua por un lado del impulsor y se prefieren este tipo de bombas para un uso de hasta 1000 gpm).
- Doble succión (ingresa el agua por ambos lados del impulsor y son preferidas para sistemas de flujo más grandes, típicamente mayores a 1000 gpm).
- Succión negativa (nivel de líquido inferior al de la bomba).
- Succión positiva (nivel de líquido superior al de la bomba).
- Succión a presión (la bomba succiona el líquido de una cámara hermética donde se encuentra ahogada y a donde llega el líquido a presión).

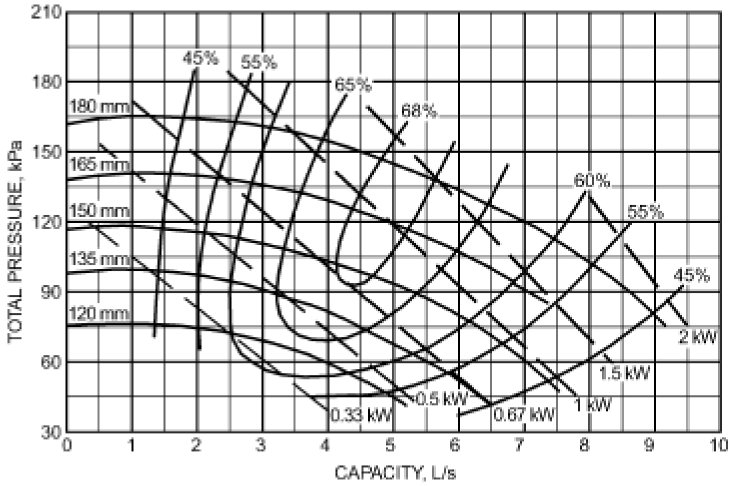
Las bombas se clasifican por su dirección de flujo en:

- Bombas de flujo radial.
- Bombas de flujo mixto.
- Bombas de flujo axial.

Curvas de rendimiento de una bomba centrífuga

El rendimiento de una bomba centrífuga se muestra comúnmente mediante una curva de rendimiento proporcionada por el fabricante (ver Figura 15). Esta figura nos muestra la potencia de la bomba requerida para impulsar un líquido en una gama particular de diámetros y flujos del impulsor.

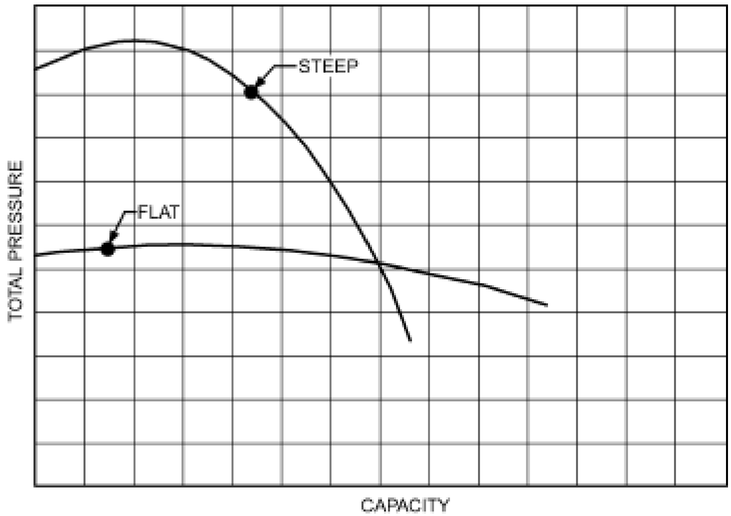
Figura N° 15: Curvas de rendimiento



Fuente: ASHRAE SYSTEMS AND EQUIPMENT 2008

La curva característica de la bomba puede ser descrita como plana o empinada (ver Figura 16). Las bombas con curvas características planas se instalan en sistemas cerrados con válvulas de control de dos vías moduladoras. Las curvas de bombas con características escarpadas o empinadas se instalan en sistemas abiertos, tales como torres de enfriamiento, donde normalmente se desea una mayor presión y un flujo constante.

Figura N° 16: Curvas de rendimiento plano vs empinado

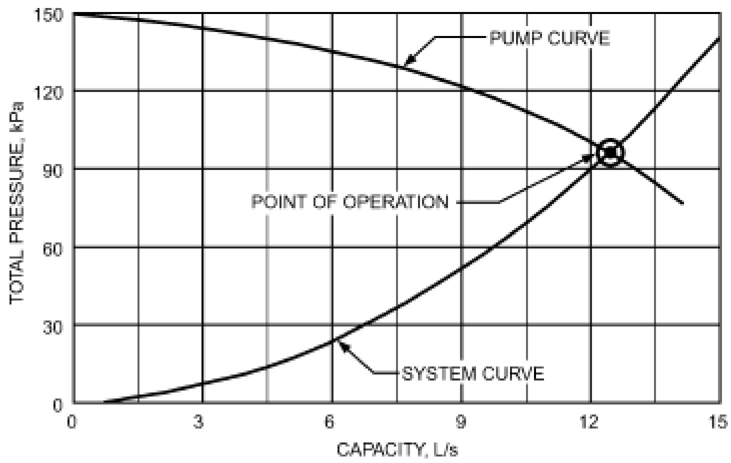


Fuente: ASHRAE SYSTEMS AND EQUIPMENT 2008

Curvas de la bomba y del sistema hidrónico

La curva de la bomba y la curva del sistema se trazan en el mismo gráfico. La intersección de las dos curvas (ver Figura 17) es el punto de funcionamiento del sistema, donde la presión desarrollada de la bomba coincide con la pérdida de presión del sistema.

Figura N° 17: Curvas del sistema y bomba



Fuente: ASHRAE SYSTEMS AND EQUIPMENT 2008

4.5.3. Marco Normativo

Para el desarrollo del presente Informe de Trabajo de Suficiencia Profesional se ha tenido en cuenta las siguientes Normas y Códigos:

- LEED 2009 for Code and Shell Development Rating System.

- Reglamento Nacional de Edificaciones (RNE), norma EM – 030 Instalaciones de Ventilación.

- Reglamento Nacional de Edificaciones (RNE), norma EM – 050 Instalaciones de Climatización.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 15-2016 – Safety Standard for Refrigeration Systems.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 34-2016 – Designation and Safety Classification of Refrigerants.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 55-2013 – Thermal Environmental Conditions for Human Occupancy.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 62.1-2007 – Ventilation for Acceptable Indoor Air Quality.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2007 – Energy Standard for Building Except Low – Rise Residential Buildings.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Handbook Fundamentals – 2013.

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Handbook Systems & Equipment – 2016.

- Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

- Telecommunications Infrastructure Standard for Data Center (TIA STANDARD 942 A – 2014).

- American Standard Association (ASA).

- American Society for Testing Materials (ASTM).

- American Society of Mechanical Engineers (ASME).

- National Fire Protection Association (NFPA).

- Occupational Safety and Health Administration (OSHA).

4.6. Fases del proyecto

El desarrollo del proyecto de ingeniería tuvo un tiempo de tres (3) meses, desde Junio hasta Agosto del 2014, pasando por las siguientes fases:

Tabla Nº 3: Fases del proyecto

FASE I: REQUERIMIENTOS GENERALES DEL PROYECTO	FASE II: CÁLCULO Y SELECCIÓN DE EQUIPOS	FASE III: DISEÑO PRELIMINAR	FASE IV: DISEÑO DEFINITIVO Y SELECCIÓN DE MÁQUINAS HIDRÁULICAS GENERADORAS	FASE V: TÉCNICO – ECONÓMICA
1. Identificación y zonificación de ambientes afines. 2. Parámetros de diseño de ventilación mecánica y aire acondicionado.	1. Cálculo del caudal requerido en la ventilación mecánica. 2. Balanceo de aire exterior. 3. Cálculo de carga térmica. 4. Selección de chillers. 5. Selección de torres de enfriamiento. 6. Selección de intercambiadores de calor.	1. Sistema de acondicionamiento de aire. 2. Sistema de aire viciado e inyección de aire fresco. 3. Sistema de agua helada y de condensado. 4. Esquemas de principio de ventilación mecánica y aire acondicionado.	1. Cálculo de la caída de presión en ductos y tuberías. 2. Selección de fan coil de agua helada y ventiladores. 3. Selección de bombas de agua helada. 4. Planos finales.	1. Listado de equipos y componentes del sistema. 2. Costos del proyecto.

Fuente: Elaboración propia

4.6.1. Fase 1: Requerimientos generales del proyecto

Dentro de la fase 1 se tienen las siguientes actividades, las cuales se detallan a continuación:

- **Identificación y zonificación de ambientes afines**

Se han identificado y zonificado los ambientes de acuerdo a los requerimientos de aire acondicionado y ventilación mecánica:

Aire acondicionado

Las áreas que deben estar climatizadas son las siguientes:

Sótano 6° (Ver plano IM-11)

- ✓ Hall de ascensores.
- ✓ Futura instalación.

Sótanos 5°, 4°, 3° (Ver plano IM-10)

- ✓ Hall de ascensores.

Sótano 2° (Ver plano IM-09)

- ✓ Hall de ascensores.

Sótano 1° (Ver plano IM-08)

- ✓ Hall de ascensores.

Piso 1° (Ver plano IM-07)

- ✓ Local comercial 101.
- ✓ Local comercial 102.
- ✓ Área de proveedores.
- ✓ Hall de ascensores.
- ✓ Cuarto de control.

Piso 2° (Ver plano IM-06)

- ✓ Oficina 201.
- ✓ Oficina 202.
- ✓ Oficina 203.
- ✓ Recepción.
- ✓ Hall de ascensores.

Piso 3°, 4°, 5° (Ver plano IM-05)

- ✓ Oficina [3 – 5]01.
- ✓ Oficina [3 – 5]02.
- ✓ Oficina [3 – 5]03.
- ✓ Hall de ascensores.

Piso 6° (Ver plano IM-04)

- ✓ Oficina 601.
- ✓ Oficina 602.
- ✓ Oficina 603.
- ✓ Hall de ascensores.

Piso 7° (Ver plano IM-03)

- ✓ Oficina 701.
- ✓ Oficina 702.
- ✓ Oficina 703.
- ✓ Hall de ascensores.

Azotea (Ver plano IM-02)

- ✓ Sala de reuniones N° 1.
- ✓ Sala de reuniones N° 2.
- ✓ Hall de ascensores.
- ✓ Vestíbulo.
- ✓ Oficina administrativa.

Ventilación mecánica

Las áreas en las cuales se va a tener una renovación del aire interior son las siguientes:

Nivel cisterna (Ver plano IM-12)

- ✓ Cuarto de bombas.

Sótano 1° (Ver plano IM-08)

- ✓ Vestidores hombres.
- ✓ Vestidores mujeres.

Piso 1° al 7°

- ✓ Servicios higiénicos.

Azotea (Ver plano IM-02)

- ✓ Cuarto de Chillers.
- ✓ Servicios higiénicos.

- **Parámetros de diseño de ventilación mecánica y aire acondicionado**

Parámetros de diseño – aire acondicionado

Como base para realizar los cálculos de carga térmica empleando el software Elite Chvac V7.01.169 se ha tenido en cuenta los datos de temperatura y humedad exteriores proporcionados por el SENAMHI para la ciudad de Lima, y las condiciones de diseño interior que se han tomado en consideración se mencionan a continuación:

Altitud/elevación: 43 pies (13.1 m)
Latitud: 12° 1' S
Longitud: 77° 6' O

Condiciones exteriores máximas en verano:
Temperatura exterior bulbo seco en verano: 85 °F (29.44 °C)
Temperatura exterior bulbo húmedo en verano: 75 °F (23.89 °C)

Condiciones exteriores de aire en invierno:
Temperatura exterior bulbo seco en invierno: 57.1 °F (13.9 °C)

Condiciones interiores de los ambientes:
Temperatura interior bulbo seco: 71.6 °F (22 °C)
Humedad Relativa: 50 – 60 % (no controlada)

Fluctuación:
Temperatura interior bulbo seco: ± 2 °F
Humedad Relativa: No controlada

Número de personas:

Según ambientes de ocupación.

Ganancia de calor sensible y latente:

La ganancia de calor por las personas se compone de dos (2) partes: el calor sensible y el calor latente. Las proporciones de calor sensible y latente varían dependiendo del nivel de actividad de las personas. La tabla 4 extraída del Manual de Diseño ASHRAE FUNDAMENTALS 2017 proporciona los datos siguientes:

Tabla N° 4: Ganancia de calor por ocupantes para diversos tipos de actividad

Table 1 Representative Rates at Which Heat and Moisture Are Given Off by Human Beings in Different States of Activity

		Total Heat, Btu/h		Sensible Heat, Btu/h	Latent Heat, Btu/h	% Sensible Heat that is Radiant[b]	
Degree of Activity	Location	Adult Male	Adjusted, M/F[a]			Low V	High V
Seated at theater	Theater	390	350	245	105	60	27
Seated, very light work	Offices, hotels, apartments	450	400	245	155		
Moderately active office work	Offices, hotels, apartments	475	450	250	200		
Standing, light work; walking	Department store; retail store	550	450	250	200	58	38
Walking, standing	Drug store, bank	550	500	250	250		
Sedentary work	Restaurant[c]	490	550	275	275		
Light bench work	Factory	800	750	275	475		
Moderate dancing	Dance hall	900	850	305	545	49	35
Walking 3 mph; light machine work	Factory	1000	1000	375	625		
Bowling[d]	Bowling alley	1500	1450	580	870		
Heavy work	Factory	1500	1450	580	870	54	19
Heavy machine work; lifting	Factory	1600	1600	635	965		
Athletics	Gymnasium	2000	1800	710	1090		

Fuente: ASHRAE HANDBOOK FUNDAMENTALS 2017

Ganancia de calor por persona – oficinas:

Ganancia sensible: 250 BTU/h por persona

Ganancia latente: 200 BTU/h por persona

Ganancia por iluminación:

Por lo general el alumbrado constituye la fuente principal de ganancia de calor sensible interno, por lo que se necesita realizar una estimación de la ganancia total de calor en el espacio acondicionado. Este calor se emite por radiación, convección y conducción.

Para estimar la ganancia de calor por iluminación se ha referenciado a la tabla 5 (Lighting Power Densities Using Space –by – Space Method) extraída del Manual ASHRAE FUNDAMENTALS 2017 – Capítulo 18 – NONRESIDENTIAL COOLING AND HEATING LOAD CALCULATIONS, a continuación un extracto de dicha tabla:

Tabla N° 5: Densidades de energía por iluminación

Common Space Types[a]	LPD, W/ft^2
Office	
Enclosed	1.11
Open plan	0.98

Fuente: ASHRAE HANDBOOK FUNDAMENTALS 2017

Ganancia por iluminación: 1.11 W/ft^2

Ganancia por equipos:

Para el presente proyecto se ha aplicado un enfoque relativo a oficinas las cuales contienen computadoras, impresoras, copiadores, faxes, etc. La tabla 6 extraída del Manual de Diseño ASHRAE FUNDAMENTALS 2009 proporciona los datos referidos a la ganancia de calor de vatios por pie cuadrado para diferentes tipos de oficinas.

Tabla N° 6: Factores de carga recomendados para diversos tipos de oficinas

Table 11 Recommended Load Factors for Various Types of Offices

Load Density of Office	Load Factor, W/ft^2	Description
Light	0.5	Assumes 167 ft^2/workstation (6 workstations per 1000 ft^2) with computer and monitor at each plus printer and fax. Computer, monitor, and fax diversity 0.67, printer diversity 0.33.
Medium	1	Assumes 125 ft^2/workstation (8 workstations per 1000 ft^2) with computer and monitor at each plus printer and fax. Computer, monitor, and fax diversity 0.75, printer diversity 0.50.
Medium/ Heavy	1.5	Assumes 100 ft^2/workstation (10 workstations per 1000 ft^2) with computer and monitor at each plus printer and fax. Computer and monitor diversity 0.75, printer and fax diversity 0.50.
Heavy	2	Assumes 83 ft^2/workstation (12 workstations per 1000 ft^2) with computer and monitor at each plus printer and fax. Computer and monitor diversity 1.0, printer and fax diversity 0.50.

Source: Wilkins and Hosni (2000).

Fuente: ASHRAE HANDBOOK FUNDAMENTALS 2009

Ganancia por equipamiento de oficinas: 2 W/ft^2

Datos constructivos:

Los coeficientes globales de transferencia de calor (U) de los diferentes elementos constructivos son los siguientes:

Coeficiente de conducción de pared : 0.413 $BTU/h.°F.ft^2$

Coeficiente de conducción de piso : 0.413 $BTU/h.°F.ft^2$

Coeficiente de conducción de techo : 0.29 $BTU/h.°F.ft^2$

Coeficiente de conducción del vidrio : 0.48 $BTU/h.°F.ft^2$

Factor de sombra : 0.65

Parámetros de diseño – ventilación mecánica

Para establecer el número de renovaciones hora en los diversos ambientes del proyecto, se ha tenido en cuenta el Reglamento Nacional de Edificaciones – Norma EM-030, así como recomendaciones de fabricantes y experiencia local (ver tabla N° 7).

Tabla N° 7: Renovaciones hora

TIPO DE LOCAL	RENOVACIONES POR HORA (Cantidad)	TEMPERA-TURA DEL AIRE (°C)	HUMEDAD RELATIVA (%)
Aseos			
- públicos	10-15	15	40-60
- en fábricas	8-10	15	40-60
- en oficinas	5-8	18	40-60
- en viviendas	3-4	20	40-60
Locales de trabajo	3-8	18-20	50-70
Salas de Exposiciones	2-3	15-18	50
Bibliotecas, Archivos	4-8	15-18	40-60
Oficinas	4-8	20	50-60
Duchas	10-15	22-25	70-85
Guardarropas	4-6	15	40-60
Restaurantes	5-10	20	55
Piscinas cubiertas	3-5	22-28	70-80
Aulas	6-8	20	60
Cantinas	6-8	18	55
Grandes almacenes	6-10	20	50-60
Cines y teatros			
- con prohibición de fumar	4-6	20	50-60
- sin prohibición de fumar	5-8	20	50-60
Hospitales			
- Salas de reconocimiento y de tratamiento	3-5	24	30-45
- Salas de hospitalización	2-5	20-22	50-60
- Baños	5-8	22	80-90
- Aseos	8-15	20	40-60

Fuente: Reglamento Nacional de Edificaciones Norma EM-030

Por lo que consideramos lo siguiente:

- ✓ Servicios higiénicos: 20 Renovaciones/h
- ✓ Vestuarios: 10 Renovaciones/h

Para la renovación del aire húmedo en el cuarto de bombas de cisternas se ha considerado lo siguiente en base a experiencia local:

- ✓ Cuarto de bombas: 20 Renovaciones/h

4.6.2. Fase 2: Cálculo y selección de equipos

- **Cálculo del caudal requerido en la ventilación mecánica**

Para ventilar un local por el método de ventilación general lo primero que debemos identificar es el tipo de actividad de los ocupantes del mismo o la función desarrollada en el interior del local, y calcular en base al número de renovaciones hora, esto es, las veces que debe renovarse por hora todo el volumen de aire del recinto.

Los ambientes considerados a ventilar en el proyecto son los servicios higiénicos extrayendo el aire viciado y el cuarto de bombas de cisternas removiendo el aire húmedo indeseable generado.

Para el cálculo del caudal de ventilación se emplea la siguiente ecuación:

$$Q = 0.588 \times V \times R \quad \text{….. [Ec. 04]}$$

Donde:

0.588: Factor de conversión

Q : Caudal (CFM)

V : Volumen del recinto (m^3)

R : Renovaciones hora

Se ha procedido a detallar el cálculo de caudales para el cuarto de bombas de cisternas y para los servicios higiénicos del piso 5°.

Cuarto de bombas de cisternas

Reemplazando los valores en la ecuación (4), se tiene:

Q = 0.588 x (49.5 x 3.15) x 20 = 1835.48 CFM

Servicios higiénicos – piso 5°

Reemplazando los valores en la ecuación (4), se tiene:

Q = 0.588 x (9.70 x 2.46) x 20 = 280.89 CFM

Q = 0.588 x (6.75 x 2.46) x 20 = 195.47 CFM

Q = 0.588 x (9.70 x 2.46) x 20 = 280.89 CFM

Q = 0.588 x (6.75 x 2.46) x 20 = 195.47 CFM

A continuación se tienen las siguientes tablas resumen para los ambientes previamente considerados:

Tabla N° 8: Resultados del caudal de aire de renovación – Cuarto de bombas

Ambiente	Área (m^2)	Altura (m)	Volumen (m^3)	Renovaciones hora	Caudal considerado (CFM)
Cuarto de bombas	49.5	3.15	155.93	20	1836

Fuente: Elaboración propia

Tabla N° 9: Resultados del caudal de aire de renovación – SSHH Piso 5°

Ambiente	Área (m^2)	Altura (m)	Volumen (m^3)	Renovaciones hora	Caudal considerado (CFM)
SSHH Hombres - 502	9.70	2.46	32.98	20	282
SSHH Mujeres - 502	6.75	2.46	22.95	20	196

SSHH Hombres - 503	9.70	2.46	32.98	20	282
SSHH Mujeres - 503	6.75	2.46	22.95	20	196

Fuente: Elaboración propia

De las tablas anteriormente expuestas se tienen los caudales de renovación del aire para los recintos del cuarto de bombas y de los servicios higiénicos para el piso 5° necesarios para lograr un ambiente saludable para las personas, también se observa que los caudales se han aproximado al inmediato superior de modo que se tengan caudales enteros.

El caudal calculado para los demás ambientes se encuentra especificado en los planos.

- **Balanceo de aire exterior**

Antes de realizar los cálculos de carga térmica, primero se debe de determinar el aire exterior mínimo requerido para ser entregado a las manejadoras de aire conjuntamente con un adecuado balance de caudales.

Requerimiento mínimo de aire fresco según ASHRAE Standard 62.1 – 2007

Debido a los requisitos de aire exterior para una calidad aceptable del aire interior que requiere un edificio ecológico, debemos de proveer una adecuada renovación de aire y la consiguiente oxigenación requerida por las personas.

En concordancia con lo establecido en el ASHRAE STANDARD 62.1 – 2007 VENTILATION FOR ACEPTABLE INDOOR AIR QUALITY, se ha considerado una inyección de aire exterior según la siguiente ecuación:

$$V_{bz} = R_p \times P_z + R_a \times A_z \text{ ..... [Ec. 05]}$$

Donde:

V_{bz} : Flujo de aire exterior requerido en la zona.

R_p : Tasa de flujo de aire exterior por persona.

P_z : Número de personas en la zona de ventilación durante el uso.

R_a : Tasa de flujo de aire exterior por unidad de área.

A_z : Área de la zona de ventilación.

Las tasas de flujo de aire exterior por persona y por unidad de área para diferentes ambientes se muestran en el anexo 01.

A continuación se presenta la siguiente tabla resumen del cálculo de aire fresco para los diversos ambientes climatizados del edificio según ASHRAE STANDARD 62.1 – 2007:

Tabla N° 10: Caudales de inyección de aire fresco para el edificio

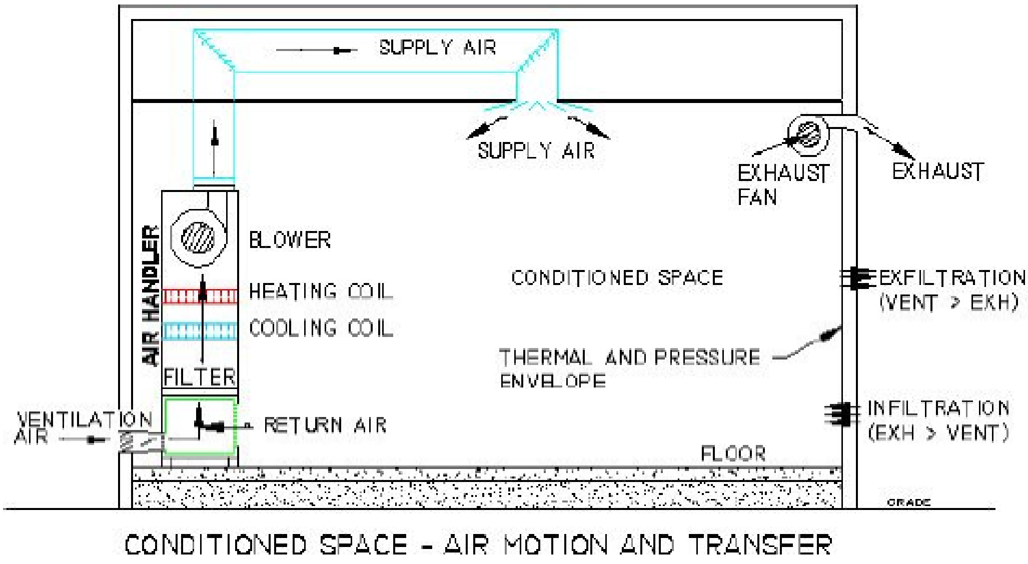
DATOS						CALCULOS		
Ambiente	**Area (m^2)**	**Area (ft^2) (Az)**	**N° Personas (Pz)**	**Factors of Minimun Ventilation Rates**		**Breathing Zone Outdoor Airflow (V_{bz})**	**Factor**	**Aire Fresco**
				Rp	**Ra**			
Hall de Ascensores	24.55 m^2	264.19 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Hall de Ascensores	24.55 m^2	264.19 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Hall de Ascensores	24.55 m^2	264.19 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Hall de Ascensores	24.55 m^2	264.19 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Hall de Ascensores	24.55 m^2	264.19 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Hall de Ascensores	24.55 m^2	264.19 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Recepcion	59.15 m^2	636.48 Pie^2	19.0 Pers	5	0.06	133 CFM	1.3	**175 CFM**
Area de Provedores	37.71 m^2	405.80 Pie^2	8.0 Pers	5	0.06	64 CFM	1.3	**85 CFM**
Cuarto de Control	24.46 m^2	263.18 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
LC 101	223.71 m^2	2,407.15 Pie^2	169.0 Pers	7.5	0.18	1,701 CFM	1.3	**2,210 CFM**
LC 102	268.59 m^2	2,890.01 Pie^2	202.0 Pers	7.5	0.18	2,035 CFM	1.3	**2,645 CFM**
Oficina 201	181.51 m^2	1,953.08 Pie^2	20.0 Pers	5	0.06	217 CFM	1.3	**280 CFM**
Oficina 202	229.79 m^2	2,472.49 Pie^2	25.0 Pers	5	0.06	273 CFM	1.3	**355 CFM**
Oficina 203	217.40 m^2	2,339.24 Pie^2	23.0 Pers	5	0.06	255 CFM	1.3	**330 CFM**
Hall de Ascensores	24.75 m^2	266.29 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Corredor 1	15.20 m^2	163.55 Pie^2	4.0 Pers	5	0.06	30 CFM	1.3	**40 CFM**
Corredor 2	17.69 m^2	190.39 Pie^2	4.0 Pers	5	0.06	31 CFM	1.3	**40 CFM**
Oficina 301	182.18 m^2	1,960.28 Pie^2	20.0 Pers	5	0.06	218 CFM	1.3	**285 CFM**
Oficina 302	237.02 m^2	2,550.38 Pie^2	25.0 Pers	5	0.06	278 CFM	1.3	**360 CFM**
Oficina 303	217.40 m^2	2,339.24 Pie^2	23.0 Pers	5	0.06	255 CFM	1.3	**330 CFM**
Hall de Ascensores	24.75 m^2	266.29 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Corredor 1	15.20 m^2	163.55 Pie^2	4.0 Pers	5	0.06	30 CFM	1.3	**40 CFM**
Corredor 2	17.69 m^2	190.39 Pie^2	4.0 Pers	5	0.06	31 CFM	1.3	**40 CFM**
Oficina 401	182.18 m^2	1,960.28 Pie^2	20.0 Pers	5	0.06	218 CFM	1.3	**285 CFM**
Oficina 402	237.02 m^2	2,550.38 Pie^2	25.0 Pers	5	0.06	278 CFM	1.3	**360 CFM**
Oficina 403	217.40 m^2	2,339.24 Pie^2	23.0 Pers	5	0.06	255 CFM	1.3	**330 CFM**
Hall de Ascensores	24.75 m^2	266.29 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Corredor 1	15.20 m^2	163.55 Pie^2	4.0 Pers	5	0.06	30 CFM	1.3	**40 CFM**
Corredor 2	17.69 m^2	190.39 Pie^2	4.0 Pers	5	0.06	31 CFM	1.3	**40 CFM**
Oficina 501	182.18 m^2	1,960.28 Pie^2	20.0 Pers	5	0.06	218 CFM	1.3	**285 CFM**
Oficina 502	237.02 m^2	2,550.38 Pie^2	25.0 Pers	5	0.06	278 CFM	1.3	**360 CFM**
Oficina 503	217.40 m^2	2,339.24 Pie^2	23.0 Pers	5	0.06	255 CFM	1.3	**330 CFM**
Hall de Ascensores	24.75 m^2	266.29 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Corredor 1	15.20 m^2	163.55 Pie^2	4.0 Pers	5	0.06	30 CFM	1.3	**40 CFM**
Corredor 2	17.69 m^2	190.39 Pie^2	4.0 Pers	5	0.06	31 CFM	1.3	**40 CFM**
Oficina 601	181.51 m^2	1,953.08 Pie^2	20.0 Pers	5	0.06	217 CFM	1.3	**280 CFM**
Oficina 602	237.02 m^2	2,550.38 Pie^2	25.0 Pers	5	0.06	278 CFM	1.3	**360 CFM**
Oficina 603	217.40 m^2	2,339.24 Pie^2	23.0 Pers	5	0.06	255 CFM	1.3	**330 CFM**
Hall de Ascensores	24.75 m^2	266.29 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Corredor 1	15.20 m^2	163.55 Pie^2	4.0 Pers	5	0.06	30 CFM	1.3	**40 CFM**
Corredor 2	17.69 m^2	190.39 Pie^2	4.0 Pers	5	0.06	31 CFM	1.3	**40 CFM**
Oficina 701	186.40 m^2	2,005.71 Pie^2	20.0 Pers	5	0.06	220 CFM	1.3	**285 CFM**
Oficina 702	237.02 m^2	2,550.38 Pie^2	25.0 Pers	5	0.06	278 CFM	1.3	**360 CFM**
Oficina 703	217.40 m^2	2,339.24 Pie^2	23.0 Pers	5	0.06	255 CFM	1.3	**330 CFM**
Hall de Ascensores	24.75 m^2	266.29 Pie^2	5.0 Pers	5	0.06	41 CFM	1.3	**55 CFM**
Corredor 1	15.20 m^2	163.55 Pie^2	4.0 Pers	5	0.06	30 CFM	1.3	**40 CFM**
Corredor 2	17.69 m^2	190.39 Pie^2	4.0 Pers	5	0.06	31 CFM	1.3	**40 CFM**
Sala Reuniones 1	34.45 m^2	370.71 Pie^2	19.0 Pers	5	0.06	117 CFM	1.3	**150 CFM**
Sala Reuniones 2	29.13 m^2	313.45 Pie^2	16.0 Pers	5	0.06	99 CFM	1.3	**130 CFM**
Oficina **Administrador**	7.25 m^2	78.01 Pie^2	2.0 Pers	5	0.06	15 CFM	1.3	**20 CFM**
Hall de Ascensores y **Vestibulo**	76.83 m^2	826.70 Pie^2	16.0 Pers	5	0.06	130 CFM	1.3	**170 CFM**
TOTAL =	**5,069.76 m^2**	**54,550.6 ft^2**	**972 Pers**				**TOTAL =**	**12,615 CFM**

Fuente: Elaboración propia

Caudal de aire extracción

Considerando flujo estacionario o permanente y de acuerdo al principio de conservación de la masa para fluidos incompresibles, se tiene que la suma de los caudales que ingresan a un volumen de control deben ser igual a los caudales que salen.

Figura N° 18: Transferencia y movimiento de aire



Fuente: HVAC Ventilation for Indoor Air Quality – Fred W. Dougherty

Matemáticamente de la Figura N° 18, tenemos lo siguiente:

Para el espacio acondicionado:

Suministro de aire = Retorno de aire + Σ Extracción de aire + Fugas de aire

Para el equipo manejador de aire:

Aire de ventilación + Retorno de aire = Suministro de aire

De ambas ecuaciones tenemos:

Aire de ventilación – Σ Extracción de aire = Fugas de aire

Considerando las fugas de aire despreciables tenemos que:

Aire de ventilación = Σ Extracción de aire

El aire de ventilación mínimo debe escogerse entre el mayor de lo estipulado por el ASHRAE Standard 62.1 y el calculado al sumar los caudales de extracción en el ambiente.

Se procederá a realizar la verificación del balance de caudales para la sala de reuniones N° 1 ubicada en la azotea.

De acuerdo al reporte de carga térmica para la sala de reuniones N° 1 se tiene un caudal de suministro de aire de 1772 CFM y un caudal de inyección de aire fresco según la tabla N° 10 de 150 CFM.

Haciendo un balance de caudales para el fan coil tenemos:

150 CFM + Aire de retorno = 1772 CFM

Aire de retorno = 1622 CFM

Haciendo un balance de aire para el espacio ocupado:

1772 CFM = 1622 CFM + extracción de aire viciado + fugas

Considerando perdidas por infiltración y ex filtración nulas se tiene:

Extracción de aire viciado = 150 CFM

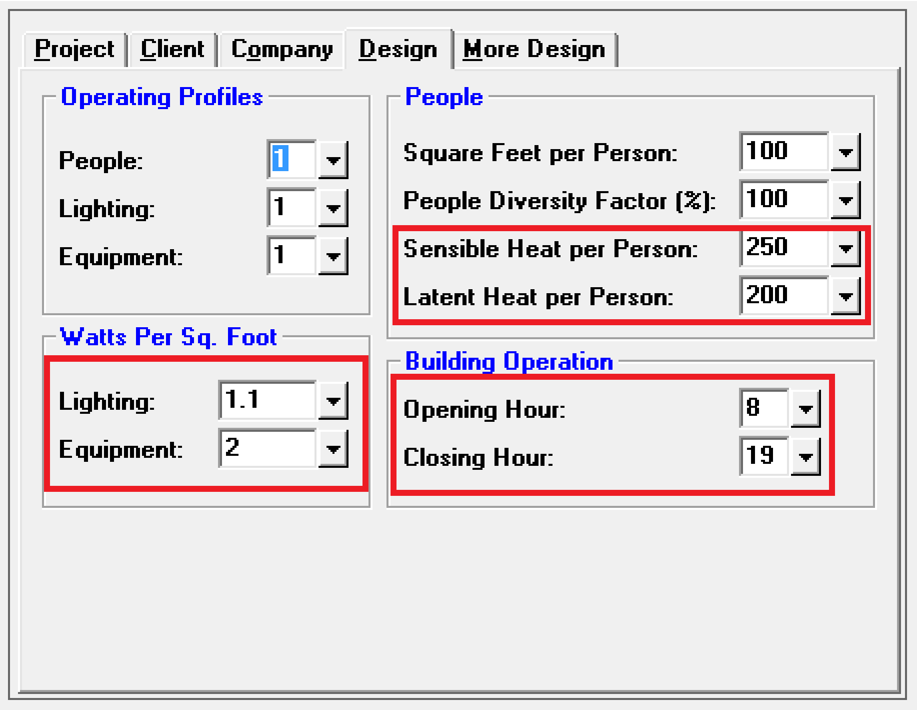
- **Cálculo de carga térmica**

Se ha procedido a calcular la carga térmica de cada uno de los ambientes a acondicionar, empleando para tal efecto el software Elite Chvac V7.01.169 y considerando los parámetros de diseño previamente descritos en la Fase I.

Tomaremos de ejemplo el ingreso de datos para el cálculo de la capacidad del equipo para la sala de reuniones Nº 1 ubicado en la azotea:

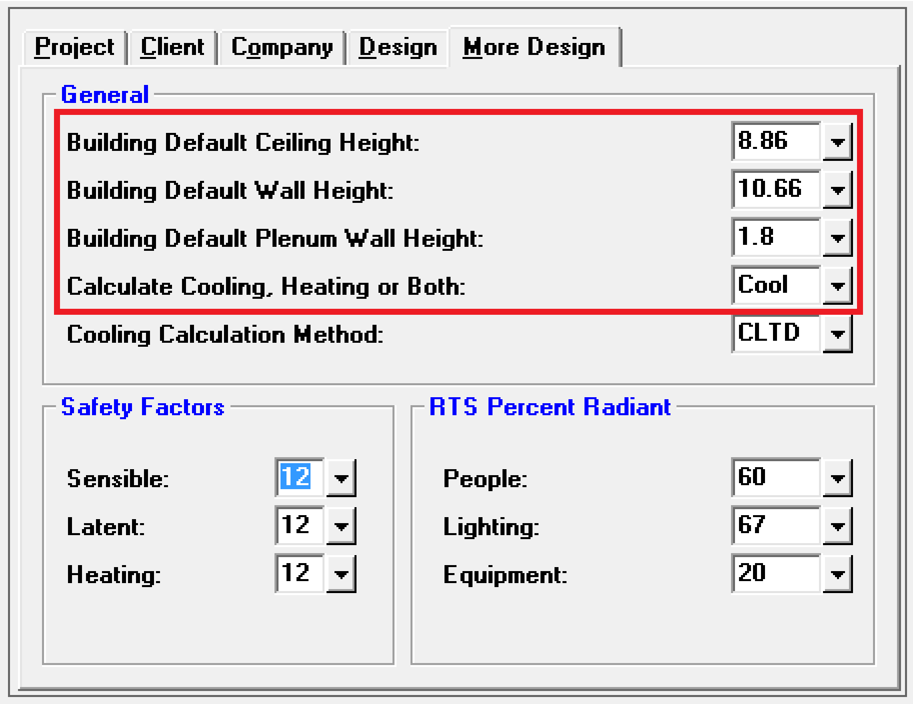
Paso Nº 1: Ingreso de los siguientes parámetros:

- Ganancia por iluminación (1.1 W/ft^2)
- Ganancia por equipos (2.0 W/ft^2)
- Ganancia de calor sensible y latente por persona.
- Horas de operación del edificio (8:00 am – 7:00 pm)

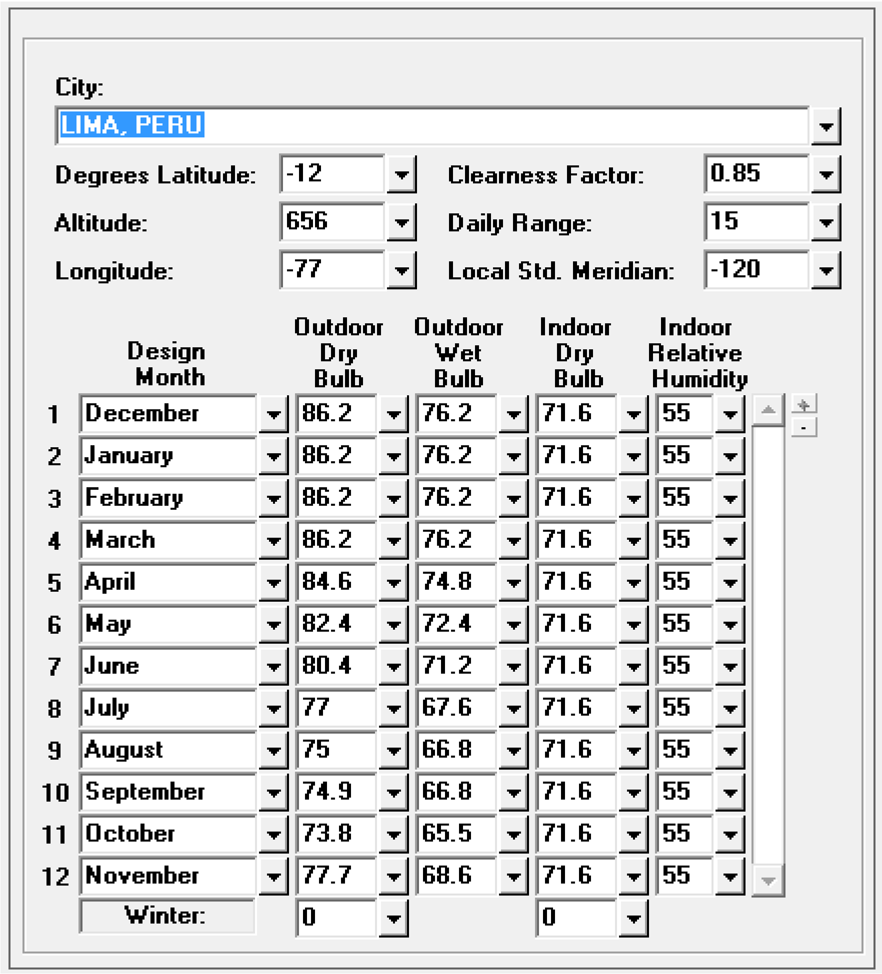


Paso Nº 2: Ingreso de los siguientes parámetros:

- Altura al falso cielo (8.86 ft)
- Altura de piso a techo (10.66 ft)
- Altura del plenum (10.66 – 8.86 = 1.8 ft)
- Calcular "solo enfriamiento".

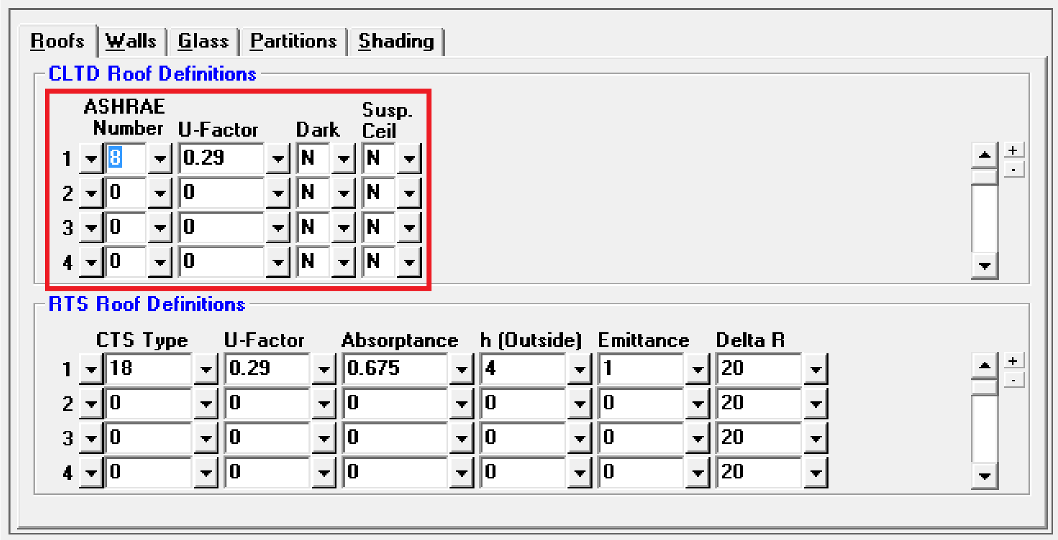


Paso Nº 3: Ingreso de las condiciones interiores (temperatura y humedad) y las condiciones climatológicas exteriores (temperatura de bulbo seco y bulbo húmedo):

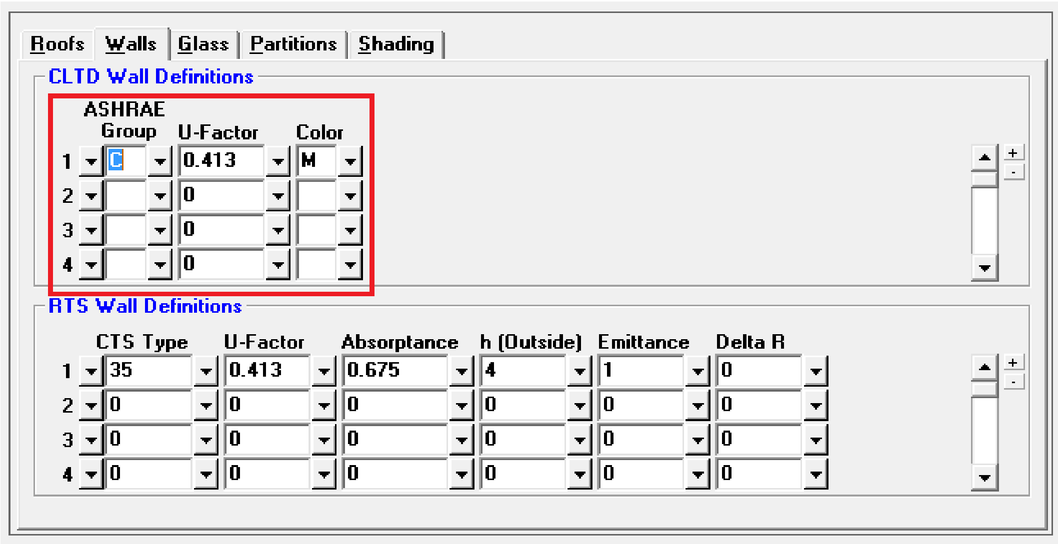


Paso Nº 4: Ingreso de las características constructivas de los materiales que conforman el edificio, se ingresan los coeficientes globales de transferencia de calor (U) de paredes, pisos, techos y ventanas:

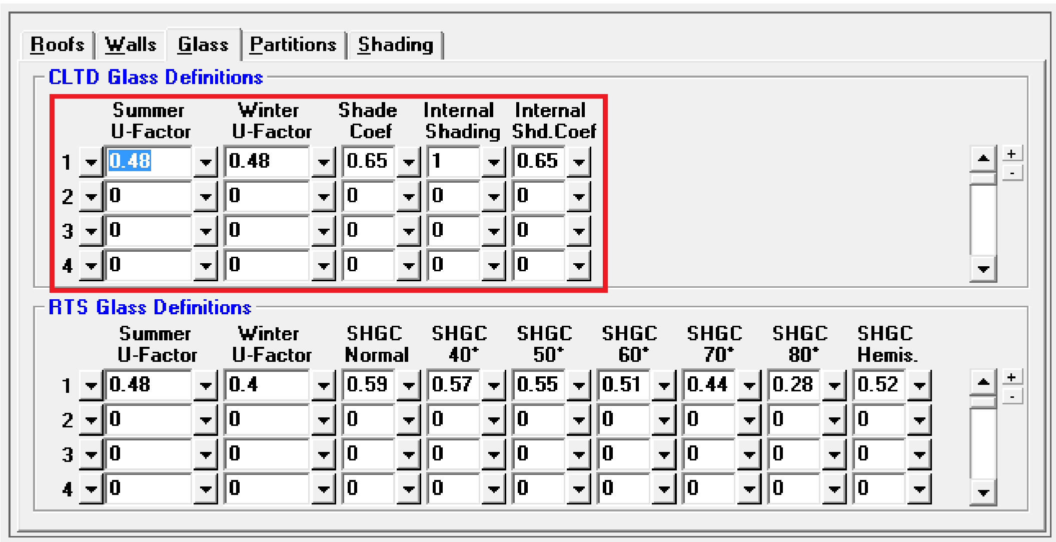
- Techos (ingreso del coeficiente global de transferencia de calor).



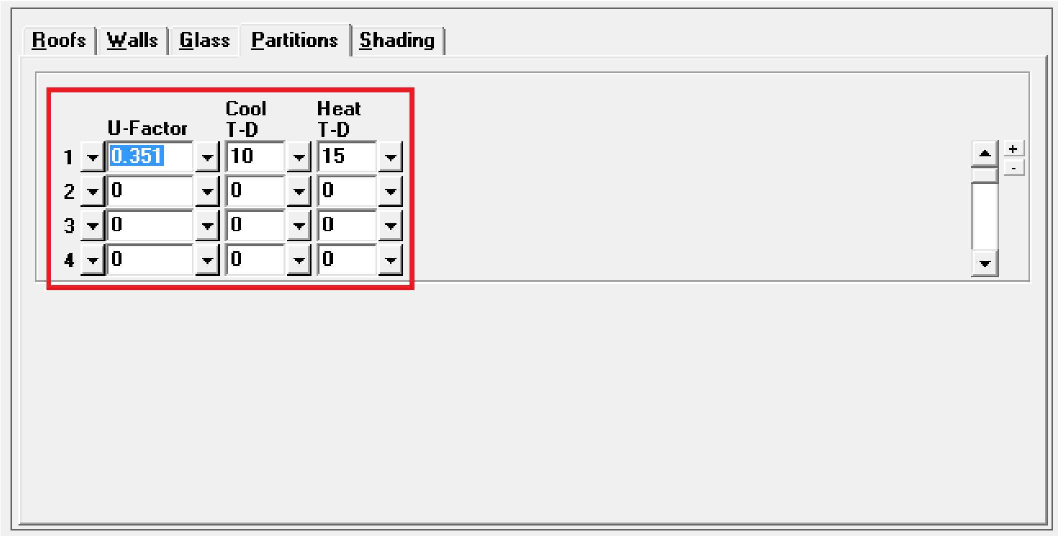
➢ Paredes (ingreso del coeficiente global de transferencia de calor).



➢ Vidrios (ingreso del coeficiente global de transferencia de calor).

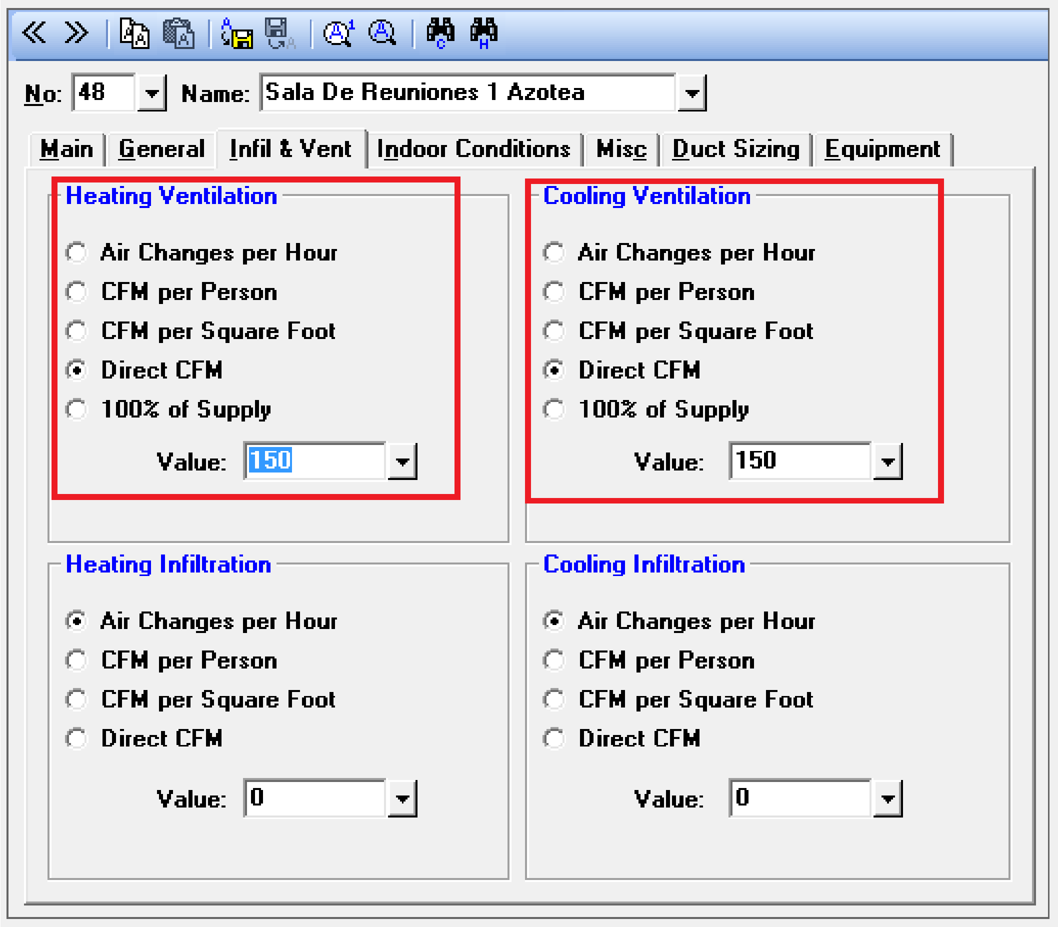


➢ Particiones interiores (ingreso del coeficiente global de transferencia de calor).



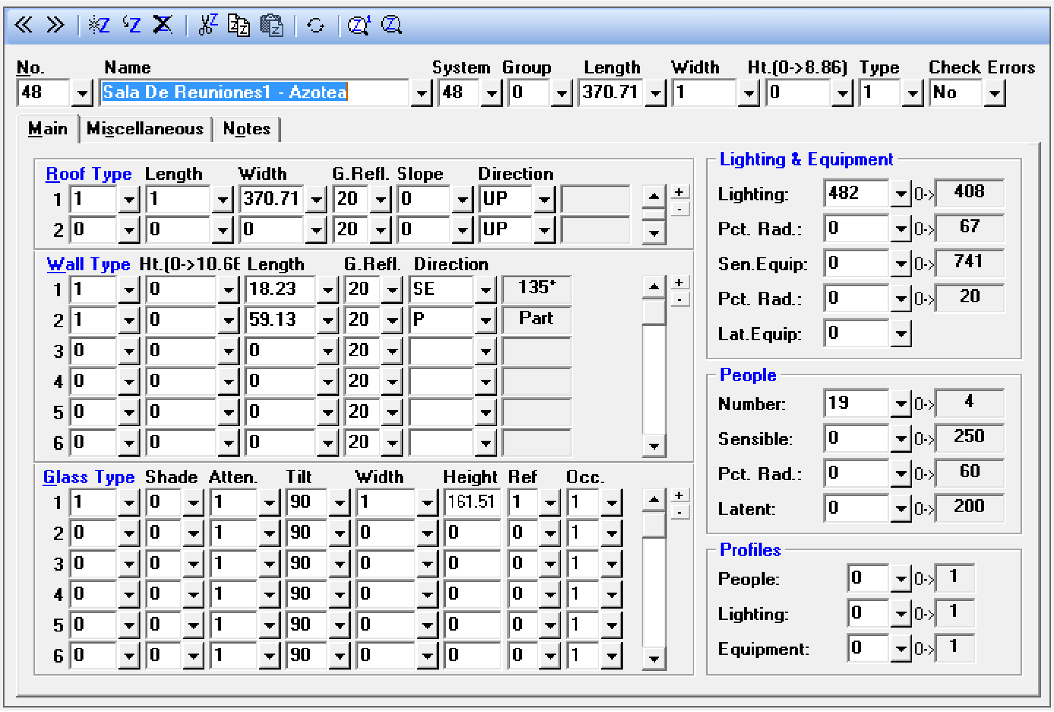
Paso Nº 5: Ingreso de los siguientes parámetros:

➢ Caudal de aire fresco a la manejadora de aire o fan coil.


No: 48
Name: Sala De Reuniones 1 Azotea
Main
General
Infil & Vent
Indoor Conditions
Misc
Duct Sizing
Equipment
Heating Ventilation
Air Changes per Hour
CFM per Person
CFM per Square Foot
Direct CFM
100% of Supply
Value: 150
Cooling Ventilation
Air Changes per Hour
CFM per Person
CFM per Square Foot
Direct CFM
100% of Supply
Value: 150
Heating Infiltration
Air Changes per Hour
CFM per Person
CFM per Square Foot
Direct CFM
Value: 0
Cooling Infiltration
Air Changes per Hour
CFM per Person
CFM per Square Foot
Direct CFM
Value: 0

Paso Nº 6: Ingreso de los siguientes parámetros dados por los planos:

- Dimensiones de piso.
- Dimensiones de techo.
- Dimensiones de paredes y su orientación.
- Dimensiones de vidrios.



La capacidad del equipo (fan coil) según nos arroja el reporte para este ambiente es de 44, 846 BTU/h por lo tanto seleccionamos un fan coil de capacidad nominal de 48,000 BTU/h.

El reporte de carga térmica para todos los ambientes climatizados del edificio de oficinas se muestra en el anexo 02.

- **Selección del chiller**

El reporte de carga térmica del software Elite Chvac nos arroja la capacidad de refrigeración requerida para todo el edificio de 252.86 TR (toneladas de refrigeración).

Por lo tanto seleccionamos dos (2) Chillers de capacidad nominal comercial de 126 TR con las siguientes características:

Tipo: enfriado por agua
Tipo de compresor: tornillo
Eficiencia a plena carga: 0.664 kW/TR
Carga eléctrica: 83.6 kW
Características eléctricas: 380V-3F-60Hz
Refrigerante: R134A
Peso máximo referencial: 3700 Kg

El reporte de selección del chiller brindada por el fabricante YORK se detalla en el anexo 03.

- **Selección de las torres de enfriamiento**

De acuerdo a la sección 4.5.2.9, para la selección de las torres de enfriamiento se debe tener en cuenta los siguientes parámetros:

Capacidad: 126 T.R.
Caudal: 378 GPM (3 USgpm/TR x 126 TR)
Temperatura de bulbo húmedo: 75 °F
Rango de temperatura: 10 °F (85 °F/95 °F)

El reporte de selección de la torre de enfriamiento brindada por el fabricante MESAN se detalla en el anexo 04.

Se procederá a seleccionar el intercambiador de calor y la torre de enfriamiento para el data center el cual tiene una carga térmica de 40 toneladas de refrigeración (TR).

- **Selección de la torre de enfriamiento para el data center**

De acuerdo a la sección 4.5.2.9, para la selección de la torre de enfriamiento se debe tener en cuenta los siguientes parámetros:

Capacidad: 40 T.R.
Caudal: 120 GPM (3 USgpm/TR x 40 TR)
Temperatura de bulbo húmedo: 75 °F
Rango de temperatura: 10 °F (85 °F/95 °F)

El reporte de selección de la torre de enfriamiento para el data center brindada por el fabricante MESAN se detalla en el anexo 05.

- **Selección del intercambiadores de calor para el data center**

De acuerdo a la sección 4.5.2.3, para la selección del intercambiador de calor de placas se debe tener en cuenta los siguientes parámetros.

Flujo: 120 GPM
Rango de Temperatura: 10 °F

El reporte de selección del intercambiador de calor brindada por el fabricante MUELLER se detalla en el anexo 06.

4.6.3. Fase 3: Diseño preliminar

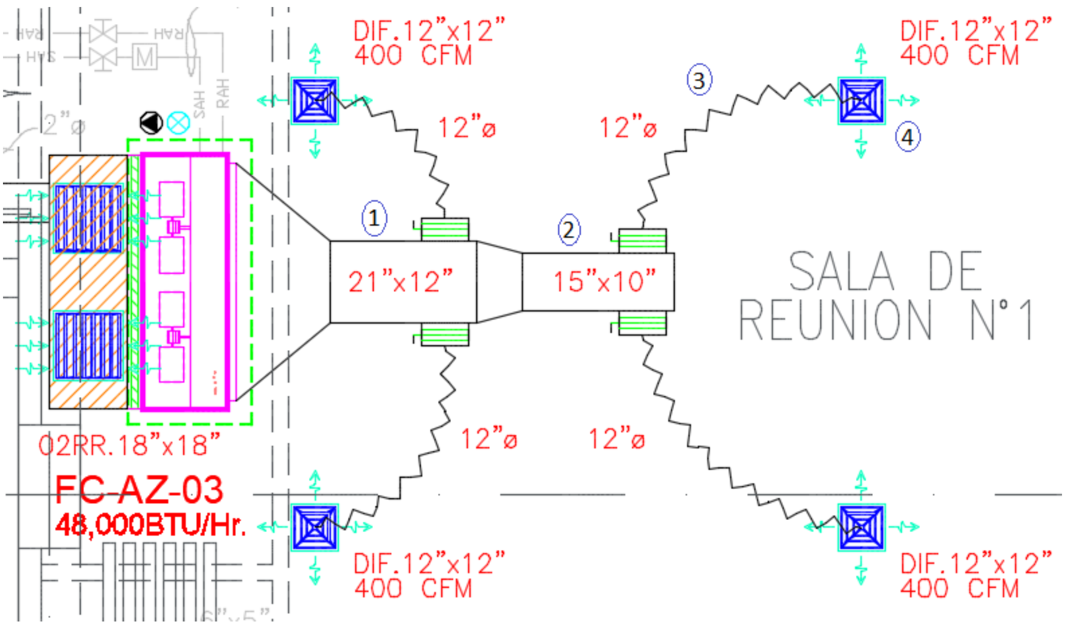
- **Sistema de acondicionamiento aire**

Para el acondicionamiento de los ambientes se ha previsto el uso de “fan coil” de agua helada.

A continuación se realizará el trazado y dimensionamiento de los ductos, mangas flexibles, difusores y rejillas para los siguientes ambientes:

Sala de reunión N° 1 – Azotea

De acuerdo al reporte de carga térmica el equipo FC-AZ-03 es de 48000 BTU/h de capacidad nominal, el cual está insuflando 1600 CFM de aire climatizado.



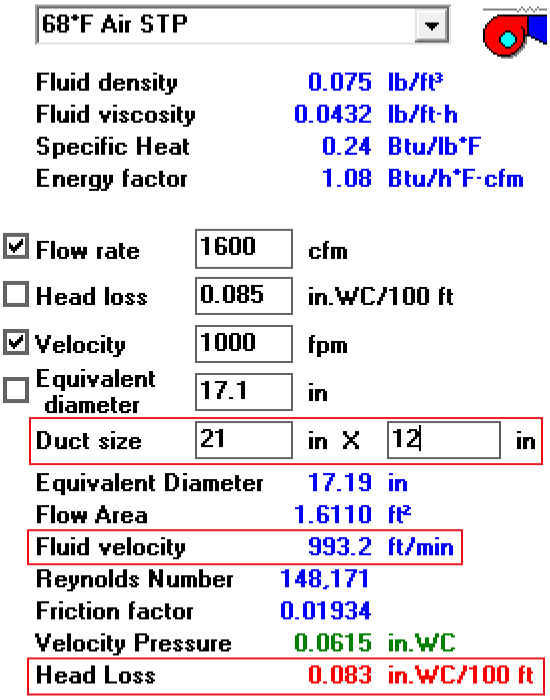
Diseño de ductos

Para el diseño de ductos se ha considerado lo descrito en la sección 4.5.2.4.

Ductos principales

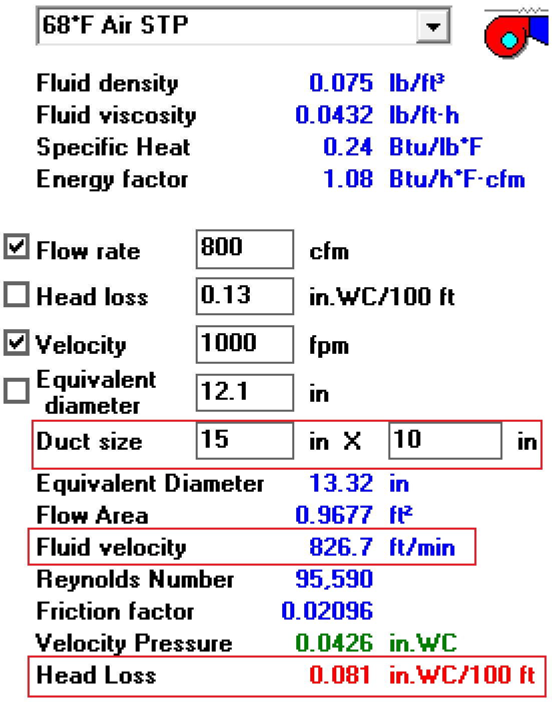
Los ductos principales están identificados a través de (1) y (2).

Para el ducto (1) en el cual fluye 1600 CFM consideramos una caída de presión de 0.08 pulgadas/100ft y una velocidad recomendada máxima de 1300 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos un ducto de 21” x 12”.

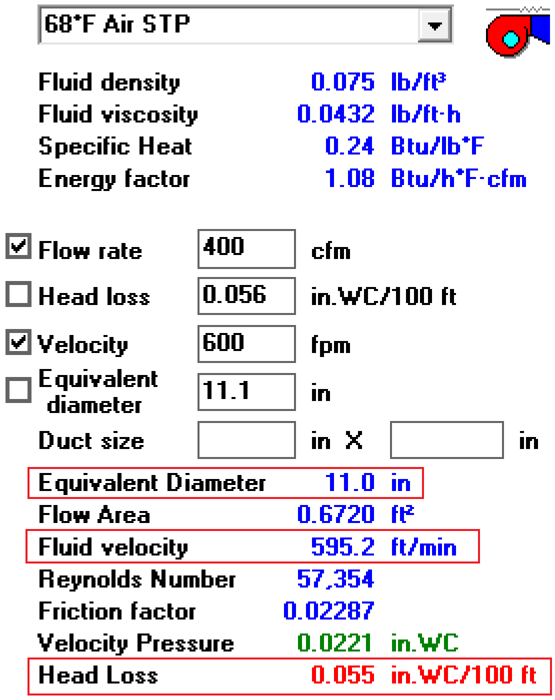
Para el ducto (2) en el cual fluye 800 CFM consideramos una caída de presión de 0.08 pulgadas/100ft y una velocidad recomendada máxima de 1300 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos un ducto de 15” x 10”.

Ductos secundarios

El ducto secundario está identificado a través de (3) que es una manga flexible por el cual está circulando 400 CFM, consideramos una velocidad máxima recomendada de 900 FPM, a través del DuctSizer tenemos:

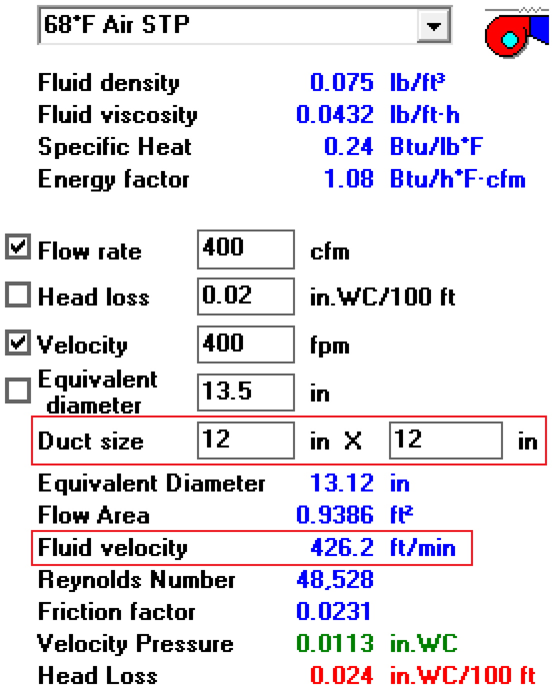


El software nos arroja un diámetro de 11", por lo tanto elegimos una manga flexible comercial de 12".

Diseño de difusores y rejillas

Difusores

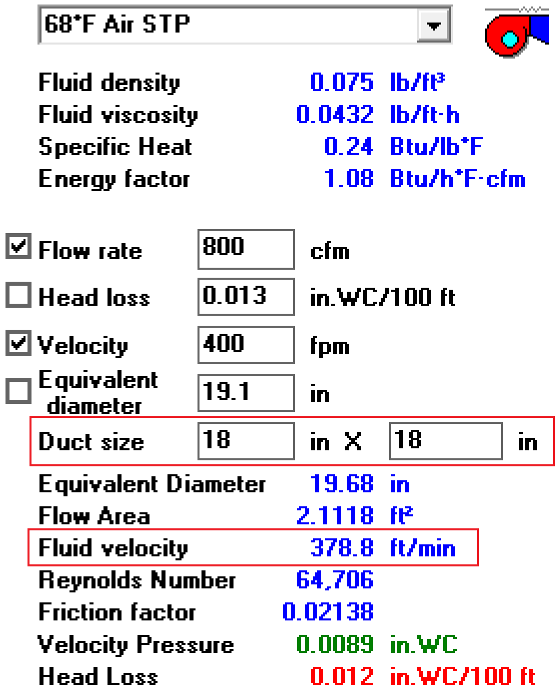
Por cada difusor está fluyendo 400 CFM, considerando una velocidad 400 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos cuatro (4) difusores de 12” x 12”.

Rejillas de retorno

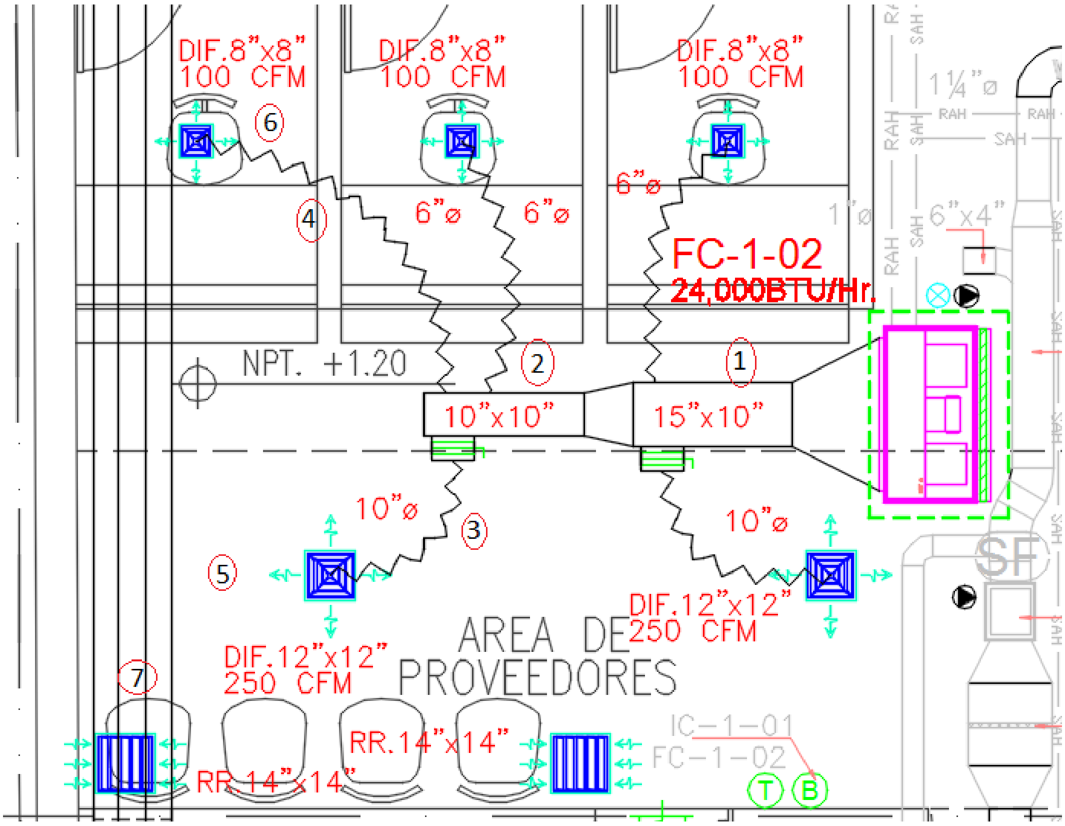
Se ha considerado dos rejillas de retorno, circulando por cada una 800 CFM, considerando una velocidad 400 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos dos (2) rejillas de retorno de 18” x 18”.

Área de proveedores – 1° piso

De acuerdo al reporte de carga térmica el equipo FC-1-02 es de 24000 BTU/h de capacidad nominal, está insuflando 800 CFM de aire climatizado.



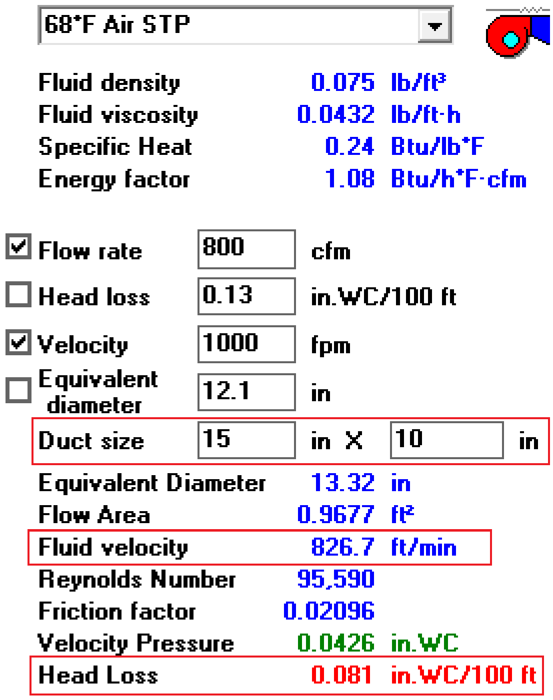
Diseño de ductos

Para el diseño de ductos se ha considerado lo descrito en la sección 4.5.2.4.

Ductos principales

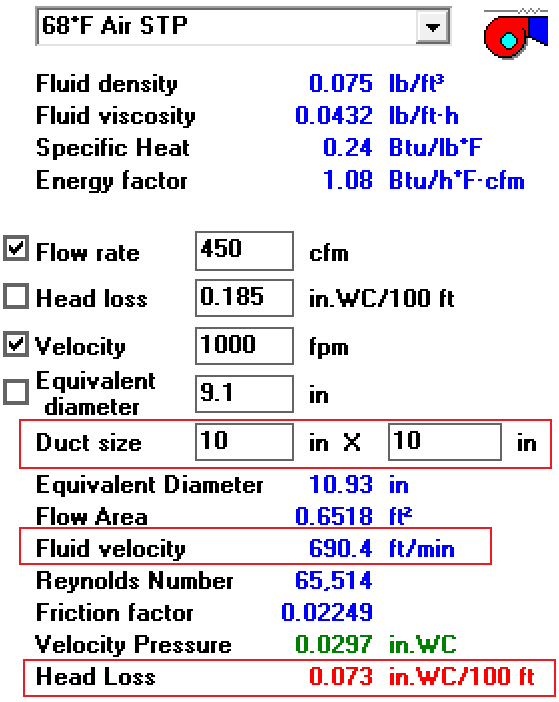
Los ductos principales están identificados a través de (1) y (2).

Para el ducto (1) en el cual fluye 800 CFM consideramos una caída de presión de 0.08 pulgadas/100ft y una velocidad recomendada máxima de 1300 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos un ducto de 15” x 10”.

Para el ducto (2) en el cual fluye 450 CFM consideramos una caída de presión de 0.08 pulgadas/100ft y una velocidad recomendada máxima de 1300 FPM, a través del DuctSizer tenemos:

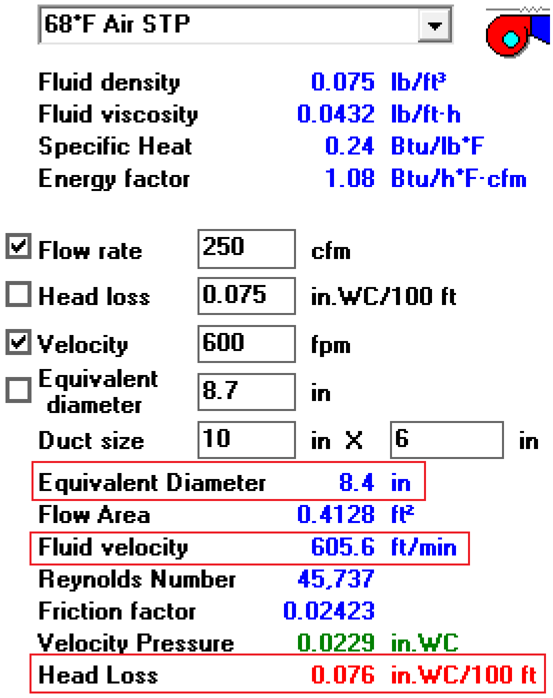


Por lo tanto seleccionamos un ducto de 10” x 10”.

Ductos secundarios

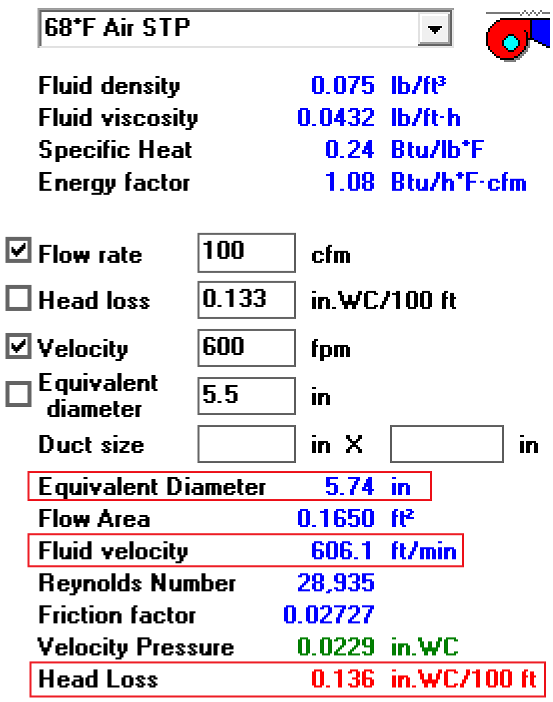
Los ductos secundarios están identificados a través de (3) y (4)

Para (3) que es una manga flexible por el cual está circulando 250 CFM, consideramos una velocidad máxima recomendada de 900 FPM, a través del DuctSizer tenemos:



El software nos arroja un diámetro de 8.4”, por lo tanto elegimos una manga flexible comercial de 10”.

Para (4) que es una manga flexible por el cual está circulando 100 CFM, consideramos una velocidad máxima recomendada de 900 FPM, a través del DuctSizer tenemos:



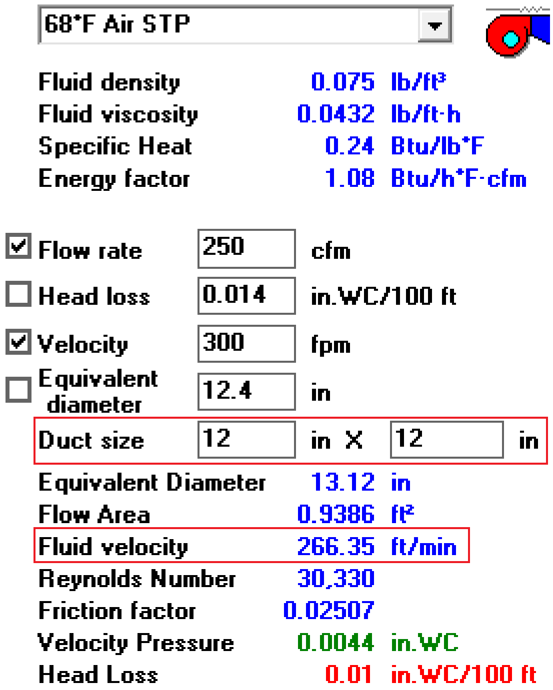
El software nos arroja un diámetro de 5.74”, por lo tanto elegimos una manga flexible comercial de 6”.

Diseño de difusores y rejillas

Difusores

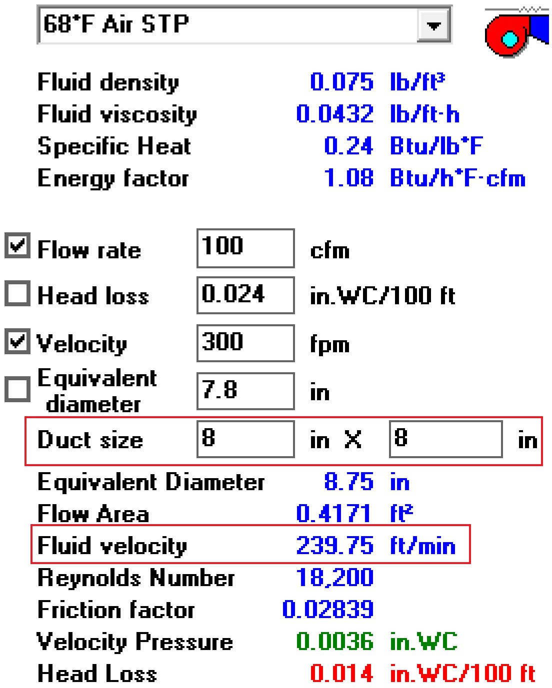
Tenemos dos difusores identificados con (5) y (6), consideramos una velocidad 300 FPM.

Para (5) tenemos un caudal de 250 CFM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos dos (2) difusores de 12” x 12”.

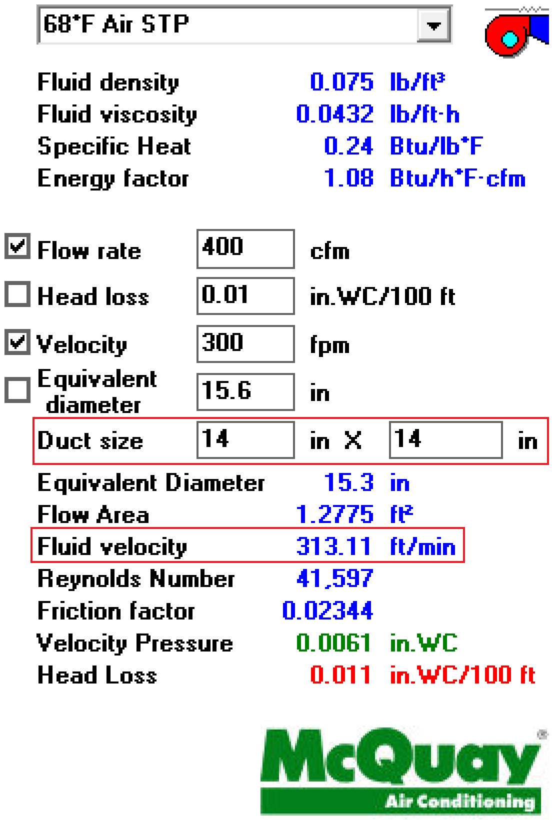
Para (6) tenemos un caudal de 100 CFM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos tres (3) difusores de 8” x 8”.

Rejillas de retorno

Se ha considerado dos rejillas de retorno, identificadas a través de (7), circulando por cada una 400 CFM, considerando una velocidad 300 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos dos (2) rejillas de retorno de 14" x 14".

Para los demás ambientes en los que se tengan fan coil con distribución a través de ductos, difusores y rejillas se realizará el mismo procedimiento.

- **Sistema de aire viciado e inyección de aire fresco**

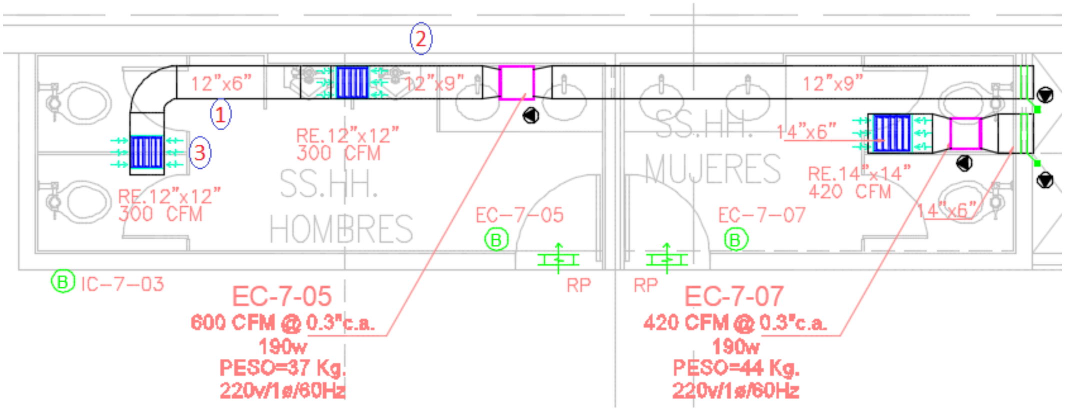
Sistema de aire viciado

Los sistemas de extracción de aire viciado tienen el propósito de direccionar el aire indeseado y perjudicial para la salud de las personas hacia el exterior a través de montantes previstos para dicho fin.

A continuación se realizará el trazado y dimensionamiento de los ductos y rejillas de extracción de aire viciado que sirven a:

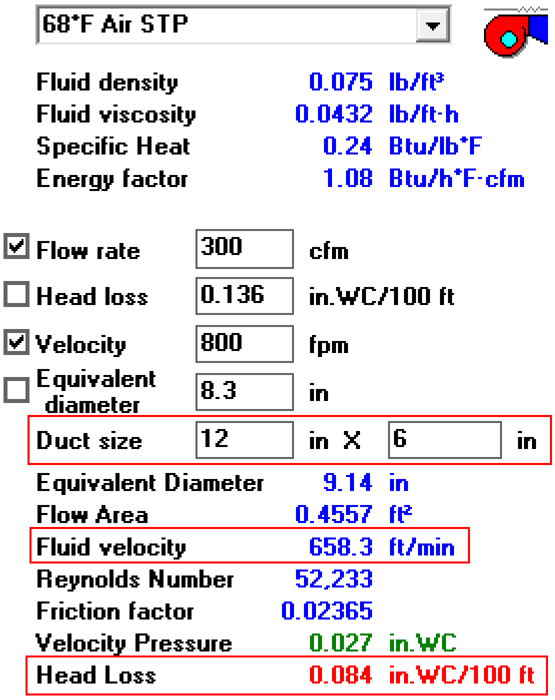
Servicios higiénicos oficina 703 – 7° piso.

En la oficina 703 tenemos los servicios higiénicos para hombres y mujeres, los ventiladores que extraen el aire indeseado lo direccionan a una montante cercana, prevista para dicho fin.



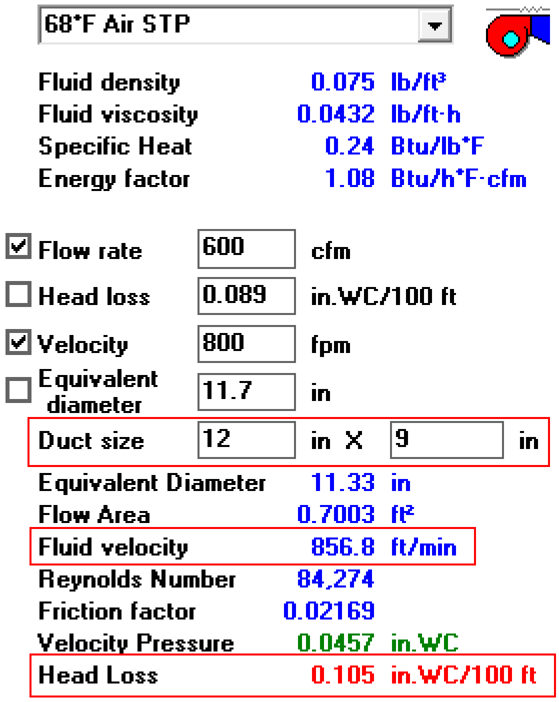
Calculo de ductos para el extractor EC-7-05

Para el ducto que se encuentra descrito con (1) maneja un caudal de 300 CFM, al ser un ducto secundario consideramos una caída de presión de 0.1 pulgadas/100 ft y una velocidad máxima recomendada de 900 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos un ducto de 12” x 6”.

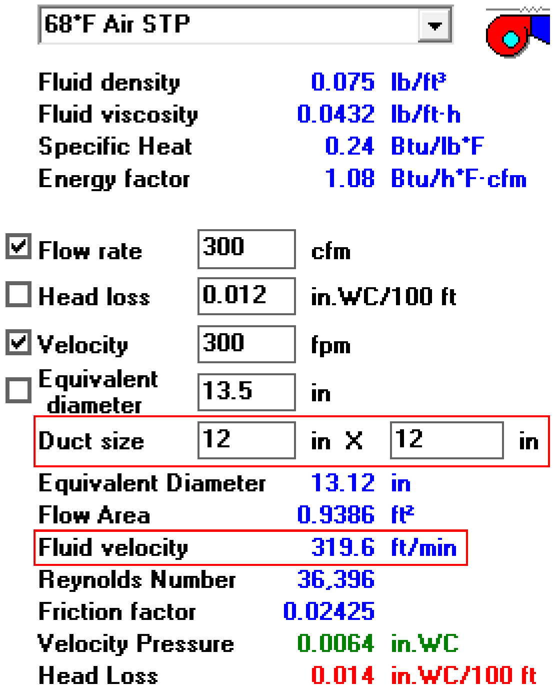
Para el ducto que se encuentra descrito con (2) maneja un caudal de 600 CFM, al ser un ducto secundario consideramos una caída de presión de 0.1 pulgadas/100 ft y una velocidad máxima recomendada de 900 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos un ducto de 12" x 9".

Diseño de rejillas

Para las rejillas que se encuentran descritas con (3) manejan un caudal cada una de 300 CFM, la cual será dimensionada con 300 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos dos (2) rejilla de extracción de 12” x 12”.

Para los demás ambientes en los que se direccionara el aire viciado a una montante prevista para dicho fin se realizará el mismo procedimiento.

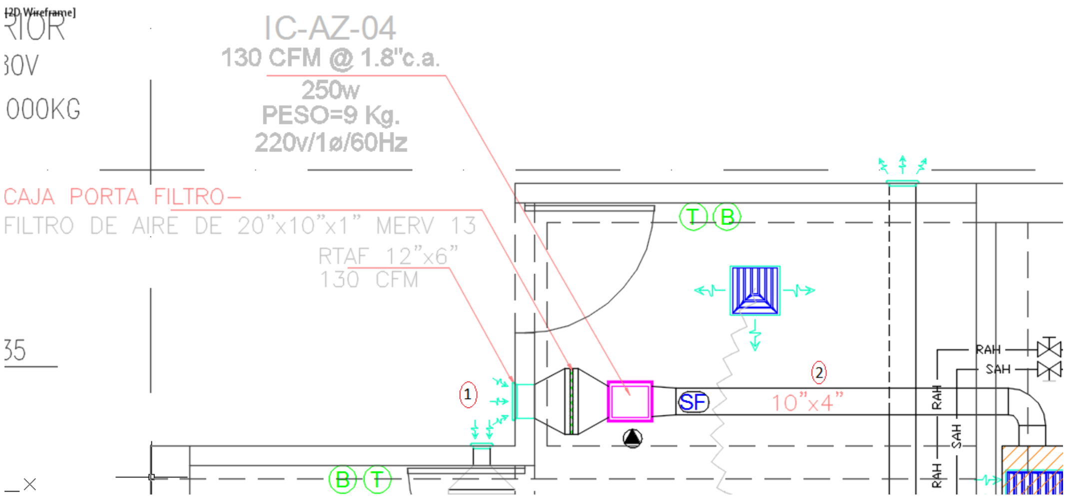
Sistema de inyección aire fresco

La finalidad de la inyección de aire fresco es la de proporcionar una adecuada renovación de aire de cada uno de los ambientes que integran el edificio en función a lo especificado por el ASHRAE Standard 62.1 – 2007.

A continuación se realizará el trazado y dimensionamiento de los ductos y rejillas de inyección de aire fresco que sirven a:

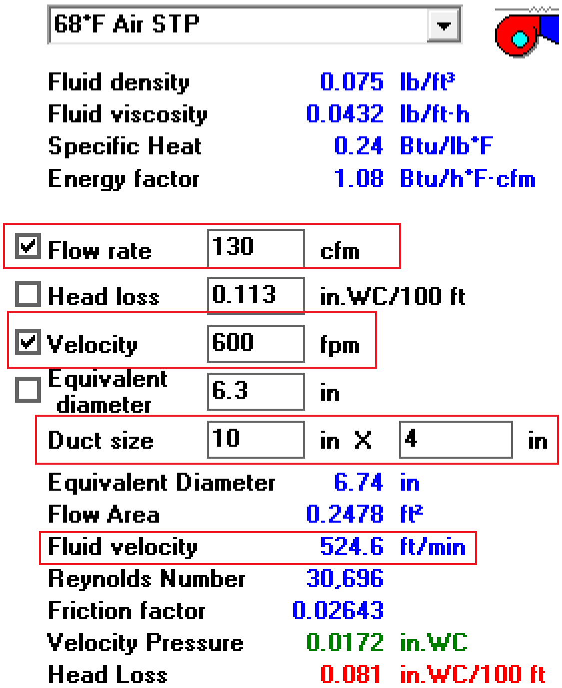
Sala de reuniones N° 2 – Azotea

En la sala de reuniones N° 2 tenemos un ventilador centrífugo inyectando aire fresco a la caja de mezcla del equipo fan coil FC-AZ-04 (ver plano IM-02).



Calculo de ductos para el inyector IC-AZ-04

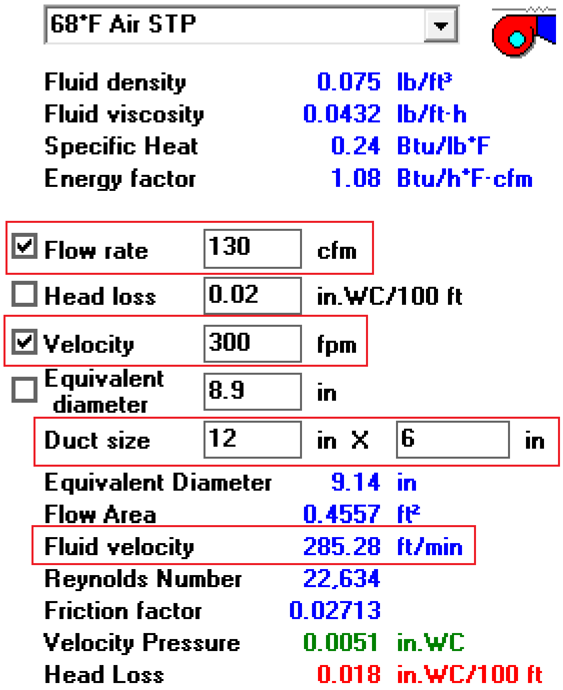
Para el ducto que se encuentra descrito con (2) maneja un caudal de 130 CFM, al ser un ducto secundario consideramos una caída de presión de 0.1 pulgadas/100 ft y una velocidad máxima recomendada de 900 FPM, a través del DuctSizer tenemos:



Por lo tanto seleccionamos un ducto de 10” x 4”.

Diseño de rejilla de toma de aire fresco

Para la rejilla de toma de aire fresco que se encuentra descrita con (1) maneja un caudal de 130 CFM, la cual será dimensionada con 300 FPM, a través del DuctSizer tenemos:



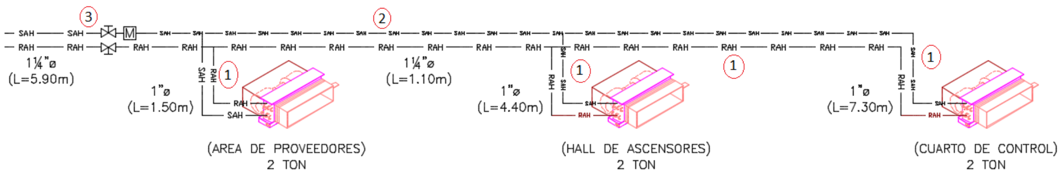
Por lo tanto seleccionamos una rejilla de toma de aire fresco de 12” x 6”.

Para los demás sistema de inyección de aire fresco se realizará el mismo procedimiento.

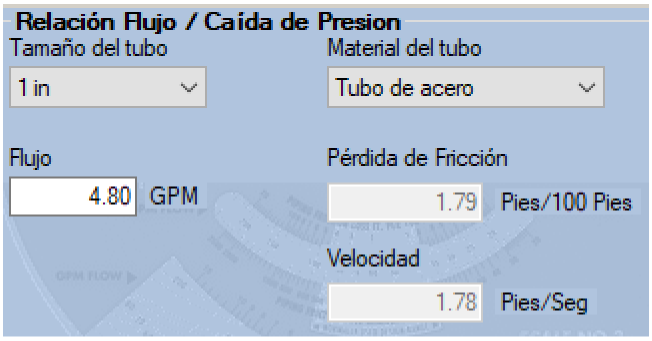
- **Sistema de agua helada y de condensado**

De acuerdo a lo establecido en la sección 4.5.2.5 se procederá a dimensionar las tuberías de agua helada, para ellos utilizaremos el software System Syzer V4.4.

Dimensionaremos la red de tuberías ubicada en el piso 1° que abarca el cuarto de control, hall de ascensores y área de proveedores.

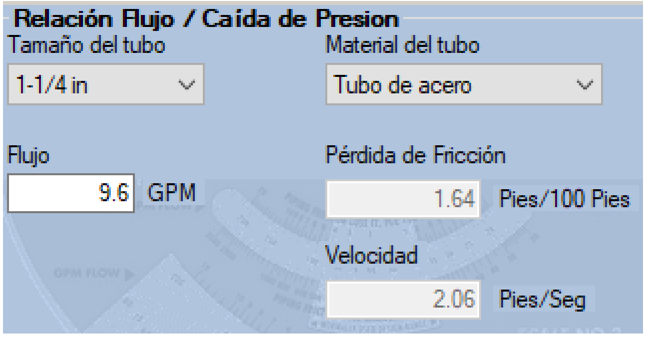


Por la tubería (1) está circulando 2.4 USgpm/TR x 2 TR = 4.8 GPM, del System Syzer tenemos:



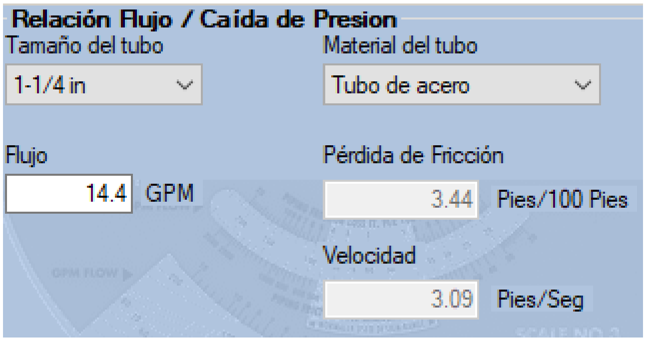
Observamos que una tubería de acero de Ø 1” cumple con los requerimientos caída de presión y velocidad de acuerdo al Manual del ASHRAE Fundamentals 2013.

Por la tubería (2) está circulando 2.4 USgpm/TR x 4 TR = 9.6 GPM, del System Syzer tenemos:



Observamos que una tubería de acero de Ø 1 ¼” cumple con los requerimientos caída de presión y velocidad de acuerdo al Manual del ASHRAE Fundamentals 2013.

Por la tubería (3) está circulando 2.4 USgpm/TR x 6 TR = 14.4 GPM, del System Syzer tenemos:



Observamos que una tubería de acero de Ø 1 ¼” cumple con los requerimientos caída de presión y velocidad de acuerdo al Manual del ASHRAE Fundamentals 2013.

El trazado y dimensionamiento de los circuitos de agua helada y de condensado se hace referencia en los planos IM – 16, IM – 17.

- **Esquemas de principio de ventilación mecánica y aire acondicionado**

Los esquemas de principio se detallan en el plano IM – 18.

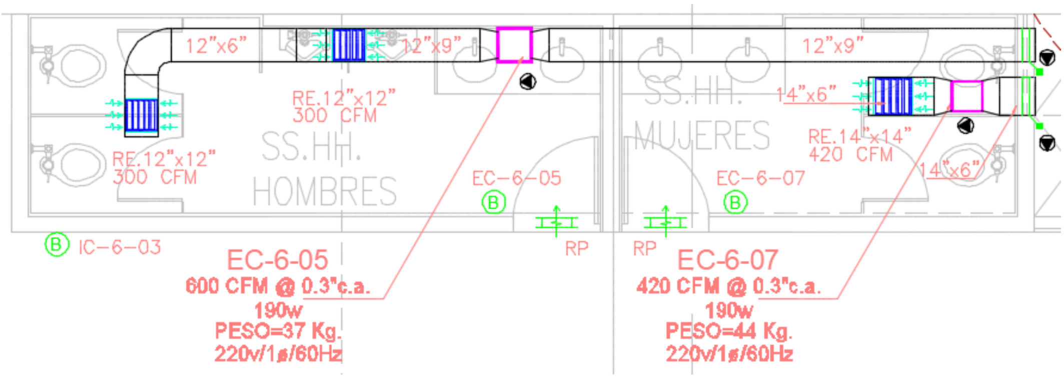
4.6.4. Fase 4: Diseño definitivo y selección de máquinas hidráulicas generadoras

- **Cálculo de la caída de presión en ductos y tuberías**

Caída de presión en ductos

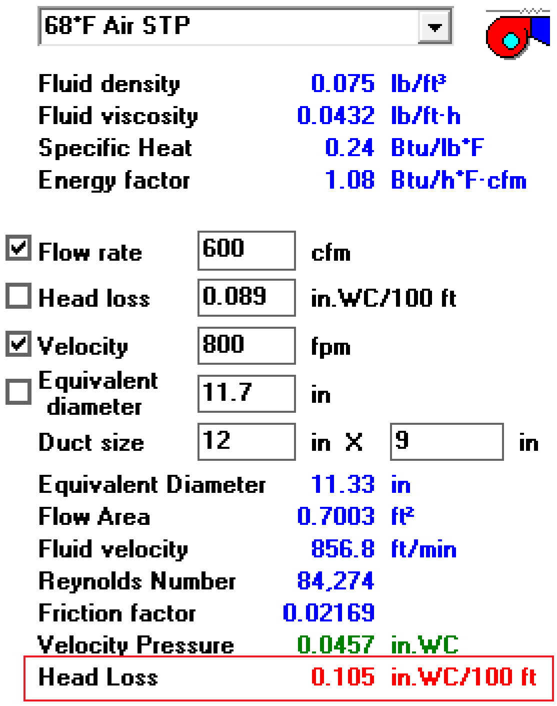
De acuerdo a lo estipulado en la sección 4.5.2.4, se procederá a calcular la caída de presión en ductos para los trazados previamente elaborados:

Caída de presión en el sistema de extracción - Ventilador EC-6-05

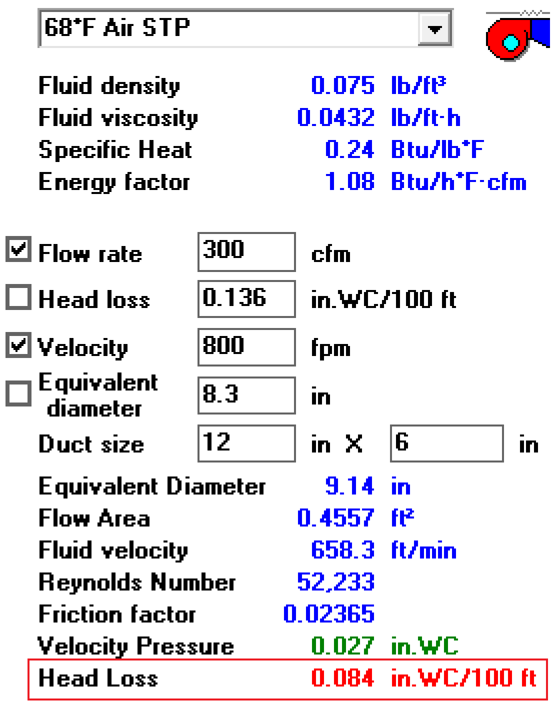


En este caso la ruta crítica sería la de mayor longitud

Para el ducto de 12" x 9" que maneja 600 CFM tenemos una caída de presión de 0.105 in /100ft:



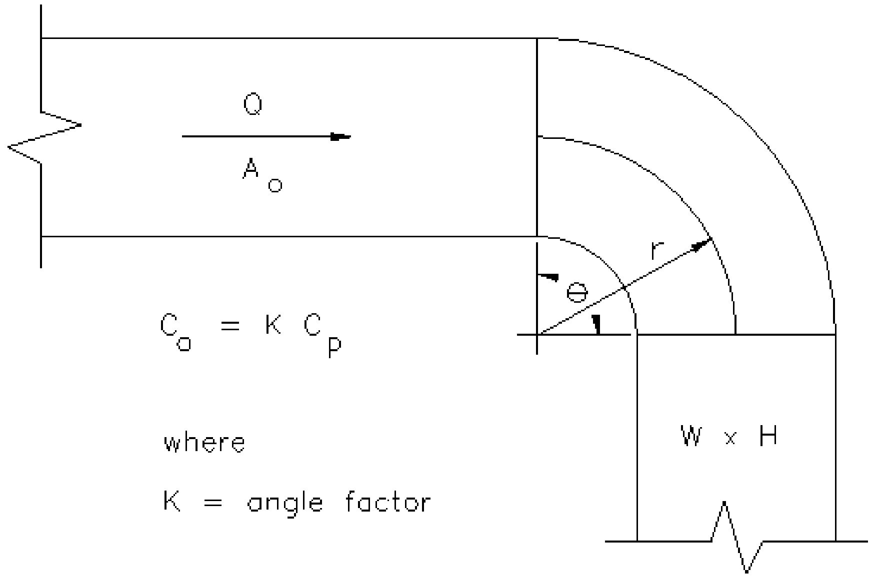
Para el ducto de 12” x 6” que maneja 300 CFM tenemos una caída de presión de 0.084 in /100ft:



La caída de presión en accesorios como un codo, una transición y un dámper cortafuego se calcula a partir del software ***ASHRAE Duct Fitting Database***:

Caída de presión a través del codo:

CR3-1 Elbow, Smooth Radius without Vanes
(Idelchik 1986, Diagram 6-1)

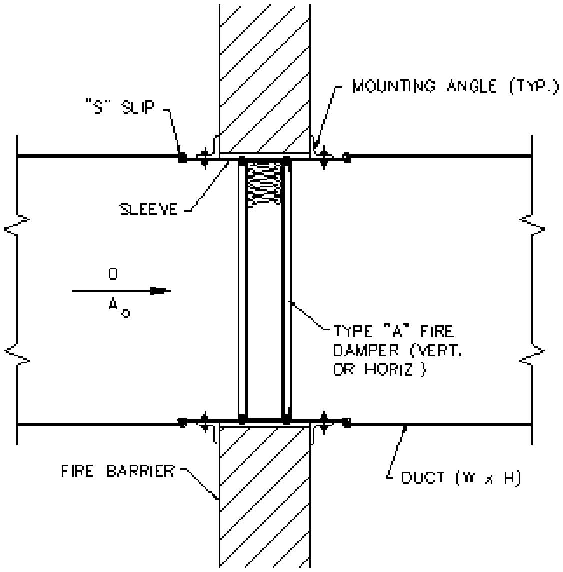


Input		Output	
Width (W, in.)	12	Velocity (Vo, fpm)	**600**
Height (H, in.)	6	Vel Pres at Vo (Pv, in. wg)	**0.02**
Centerline Radius (r, in.)	10.7	Loss Coefficient (Co)	**0.37**
Angle (Theta, deg.)	90	Pressure Loss (in. wg)	**0.01**
Flow Rate (Q, cfm)	300		

Teniendo una caída de presión en el codo de 0.01 in.

Caída de presión a través del dámper cortafuego:

CR9-5 Fire Damper, Curtain Type, Type A

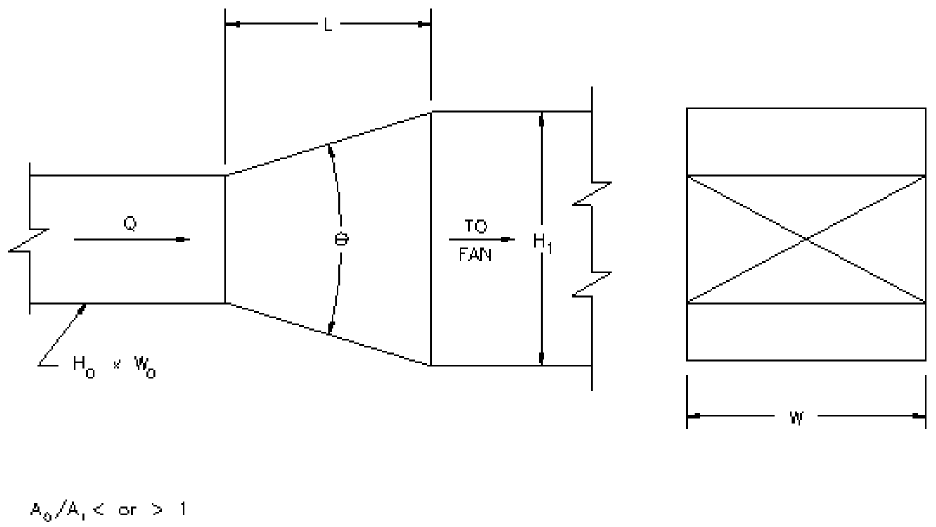


Input		**Output**	
Duct Height (H, in.)	9	Velocity (Vo, fpm)	**800**
Duct Width (W, in.)	12	Vel Pres at Vo (Pv, in. wg)	**0.04**
Flow Rate (Q, cfm)	600	Loss Coefficient (Co)	**0.46**
Calculate		Pressure Loss (in. wg)	**0.02**

Teniendo una caída de presión en el dámper cortafuego de 0.02 in.

Caída de presión a través de la transición:

ER4-1 Transition, Rectangular, Two Sides Parallel, Symmetrical,
Exhaust/Return Systems (Idelchik 1986, Diagram 5-5)



Input		Output	
Height (Ho, in.)	6	Velocity (Vo, fpm)	**600**
Width (W, in.)	12	Velocity (V1, fpm)	**400**
Height (H1, in.)	9	Vel Pres at Vo (Pvo, in. wg)	**0.02**
Length (L, in.)	11	Vel Pres at V1 (Pv1, in. wg)	**0.01**
Flow Rate (Q, cfm)	300	Loss Coefficient (Co)	**0.09**
Calculate		Loss Coefficient (C1)	**0.20**
		Pressure Loss (in. wg)	**0.00**
		Angle (Theta, deg.)	**16**

Teniendo una caída de presión en la transición despreciable.

La caída de presión a través de la rejilla de 12”x 12” lo obtenemos tomando como referencia al fabricante ***KOOL AIR*** la cual considera 5 Pascal ó 0.02 in c.a.

Sumando todas las pérdidas por accesorios y ductos tenemos una caída de presión total de 0.078 in c.a. por lo tanto para fines prácticos tomamos una caída de presión de 0.3 in c.a.

Caída de presión en tuberías

Se procederá a hacer un consolidado de los equipos y/o accesorios que generan caída de presión para los circuitos primario, secundario y de condensado:

Caída de presión – circuito primario

La caída de presión en el circuito de primario se muestra en el cuadro resumen siguiente:

Caída de presión en tuberías	17 ft wg
Caída de presión en accesorios	35 ft wg
Caída de presión en el evaporador	8.0 ft wg
Altura total de la bomba	60 ft wg

Cada bomba primaria maneja 60 ft @ 302 GPM

Caída de presión – circuito secundario

La caída de presión en el circuito de secundario se muestra en el cuadro resumen siguiente:

Caída de presión en tuberías	28 ft wg
Caída de presión en accesorios	55 ft wg
Caída de presión en el fan coil	12 ft wg
Altura total de la bomba	95 ft wg

Cada bomba secundaria maneja 95 ft @ 605 GPM

Caída de presión – circuito de condensado

La caída de presión en el circuito de condensado se muestra en el cuadro resumen siguiente:

Caída de presión en tuberías	12 ft wg
Caída de presión en accesorios	22.9 ft wg
Caída de presión en el condensador	8.4 ft wg
Caída de presión en la torre de enfriamiento	16.7 ft wg
Altura total de la bomba	60 ft wg

Cada bomba de condensado maneja 60 ft @ 378 GPM

- **Selección de fan coil de agua helada y ventiladores**

Selección de fan coil de agua helada

De acuerdo a lo estipulado en la sección 4.5.2.11, la selección y generación de reportes de los fan coil de agua helada se desarrollaron a través del Fabricante CLASSIC AIR CONDITIONERS teniendo en consideración las capacidades de los equipos dadas en el plano IM – 20. Ver anexo 07.

Selección de ventiladores

De acuerdo a lo estipulado en la sección 4.5.2.7, la selección y generación de reportes de los ventiladores se desarrollaron a través del Fabricante GREENHECK teniendo en consideración las capacidades de los equipos dadas en el plano IM – 20. Ver anexo 08.

- **Selección de bombas de agua helada**

De acuerdo a lo estipulado en la sección 4.5.2.12, la selección de electrobombas de agua se desarrollará de acuerdo al circuito que sirven:

El caudal de agua helada manejado por el sistema de circuito primario y secundario estará dado por:

Sistema de bombeo	Carga, T.R.	Cálculo	GPM (ΔT = 10° F)
Primario	126 x 2=252	2.4 GPM/ TON	604.8
Secundario	126 x 2=252	2.4 GPM/ TON	604.8

El caudal de agua manejado por el sistema de condensado será:

Sistema de bombeo	Carga, T.R.	Cálculo	GPM (ΔT = 10° F)
Condensado	126 x 2=252	3.0 GPM/ TON	756

Sistema de bombeo de circuito primario

En el sistema de bombeo primario tenemos 604.8 GPM, por lo cual seleccionamos dos (2) electrobombas de 302 GPM, adicionalmente consideramos una bomba más de respaldo.

Caudal: 302 GPM

Presión: 60 ft

Características eléctricas: 380V-3F-60Hz

La selección de la electrobomba primaria se presenta en el anexo 09 a través de las curvas del fabricante Taco.

Sistema de bombeo de circuito secundario

En el sistema de bombeo secundario tenemos 604.8 GPM, por lo cual seleccionamos una (1) electrobomba de 605 GPM, adicionalmente consideramos una bomba más de respaldo.

Caudal: 605 GPM

Presión: 95 ft

Características eléctricas: 380V-3F-60Hz

La selección de la electrobomba secundaria se presenta en el anexo 10 a través de las curvas del fabricante Taco.

Sistema de bombeo de circuito de condensado

En el sistema de bombeo de condensado tenemos 756 GPM, por lo cual seleccionamos dos (2) electrobombas de 378 GPM, adicionalmente consideramos una bomba más de respaldo.

Caudal: 378 GPM

Presión: 60 ft

Características eléctricas: 380V-3F-60Hz

La selección de la electrobomba de condensado se presenta en el anexo 11 a través de las curvas del fabricante Taco.

- **Planos finales**

El listado de planos finales correspondiente al sistema de aire acondicionado y ventilación mecánica es el siguiente:

Nº DE PLANO	**DESCRIPCIÓN**
IM – 01	CUARTO DE MAQUINAS
IM – 02	AZOTEA
IM – 03	PLANTA 7º PISO
IM – 04	PLANTA 6º PISO
IM – 05	PLANTA TIPICA 3º AL 5º PISO
IM – 06	PLANTA 2º PISO
IM – 07	PLANTA 1º PISO
IM – 08	PLANTA SOTANO 1º
IM – 09	PLANTA SOTANO 2º
IM – 10	PLANTA TIPICA SOTANOS 3º AL 5º
IM – 11	PLANTA SOTANO 6º
IM – 12	NIVEL CISTERNA
IM – 13	BASES FLOTANTES CHILLERS Y BOMBAS
IM – 14	BASES FLOTANTES BOMBAS
IM – 15	ESQUEMAS DE PRINCIPIO DE PRESURIZACION DE ESCALERAS
IM – 16	MONTANTE DE AGUA HELADA
IM – 17	MONTANTE DE AGUA CONDENSADO DE LOS CUARTOS DE SERVIDORES
IM – 18	ESQUEMAS DE PRINCIPIO DE SISTEMA DE AGUA HELADA
IM – 19	ESQUEMAS DE PRINCIPIO ELECTRICO – SISTEMA CHILLER
IM – 20	TABLAS, NOTAS Y LEYENDA

IM – 21	DETALLES
IM – 22	CORTE D-D y 1-1
IM – 23	CORTE C-C

4.6.5. Fase V: Evaluación técnico – económica

Se ha considerado el uso de un sistema de agua helada en comparación a un sistema de volumen de refrigerante variable (VRV) dado que el costo por equipamiento es menor, además de ser un sistema más flexible.

- **Listado de equipos y componentes del sistema**

El listado de equipos del sistema de climatización se encuentra detallado en el plano IM – 20.

- **Costos del proyecto**

Se ha solicitado la cotización a diferentes empresas del entorno para elaborar el presupuesto del proyecto (ver anexo 12), distribuidoras de marcas prestigiosas como son:

- York.
- Taco.
- Mesan Cooling Tower.
- Muller.
- Mason.
- TGM Air Conditioning.
- Soler & Palau.
- Greenheck.
- System Air.

V. CONCLUSIONES Y RECOMENDACIONES

6.1. Conclusiones

- Para el adecuado confort de las personas en el edificio de oficinas se ha hecho necesario el diseño de un sistema de climatización centralizado mediante una planta de agua helada de volumen variable y retorno inverso, de manera que se cumple con los requerimientos de salubridad y buen desempeño laboral de los ocupantes.

- Establecer la rapidez de flujo volumétrico de aire requerido en cada una de las zonas donde aplique ventilación mecánica y las ganancias de calor de fuentes internas y externas donde se requiera aire acondicionado; tomando en consideración la normativas dadas en la sociedad americana de ingenieros de calefacción, refrigeración y aire acondicionado (ASHRAE) y de la directiva en energía y diseño ambiental (LEED) para garantizar las exigencias de confort requeridos.

- La adecuada selección de la capacidad del sistema centralizado chiller queda definido por la evaluación de la carga térmica generada en el edificio y los caudales de ventilación mecánica haciendo efectivo un balance de masa en el volumen de control.

- Para el diseño preliminar del sistema se hace necesario trazar y dimensionar los ductos de ventilación mecánica, aire acondicionado y la tuberías de agua helada y de condensado haciendo uso de los software DuctSizer y el System Syzer.

- Para el diseño definitivo del sistema de aire acondicionado y ventilación mecánica se hace necesario calcular las caídas de presión primaria y secundaria en ductos, tuberías y accesorios haciendo uso de software y hojas de cálculo.

- Para el metrado del sistema de climatización centralizado se hace necesario tener los planos finales, y de ese modo obtener la elaboración final del presupuesto del proyecto.

6.2. Recomendaciones

Se recomienda seguir las pautas establecidas en este informe como base para el diseño de un edificio sustentable, además de los manuales del ASHRAE, LEED, SMACNA, NFPA, así como el Reglamento Nacional de Edificaciones (RNE) para un adecuado diseño de un sistema de climatización centralizado, logrando un adecuado confort y desempeño de los ocupantes.

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VII. ANEXOS Y PLANOS

8.1. Anexos

- Anexo 01: Tasas de flujo de aire exterior de acuerdo a ASHRAE Standard 62.1 – 2007.
- Anexo 02: Reporte de carga térmica del edificio de oficinas.
- Anexo 03: Chiller enfriado por agua – 126 TR.
- Anexo 04: Torre de enfriamiento – 378 GPM.
- Anexo 05: Torre de enfriamiento para data center – 120 GPM.
- Anexo 06: Intercambiador de calor.
- Anexo 07: Fan coil de agua helada.
- Anexo 08: Ventiladores.
- Anexo 09: Electrobomba primaria.
- Anexo 10: Electrobomba secundaria.
- Anexo 11: Electrobomba de condensado.
- Anexo 12: Presupuesto del proyecto.

ANEXO 01

ANSI/ASHRAE Standard 62.1-2007
(Supersedes ANSI/ASHRAE Standard 62.1-2004)
Includes ANSI/ASHRAE Addenda listed in Appendix I

ASHRAE STANDARD

Ventilation for Acceptable Indoor Air Quality

See Appendix I for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, and the American National Standards Institute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site, http://www.ashrae.org, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada).

ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
1791 Tullie Circle NE, Atlanta, GA 30329
www.ashrae.org

TABLE 6-1 MINIMUM VENTILATION RATES IN BREATHING ZONE
(This table is not valid in isolation; it must be used in conjunction with the accompanying notes.)

Occupancy Category	People Outdoor Air Rate R_p		Area Outdoor Air Rate R_a		Notes	Default Values			Air Class
						Occupant Density (see Note 4)	Combined Outdoor Air Rate (see Note 5)		
	cfm/person	L/s·person	cfm/ft^2	L/s·m^2		#/1000 ft^2 or #/100 m^2	cfm/person	L/s·person	
Correctional Facilities									
Cell	5	2.5	0.12	0.6		25	10	4.9	2
Dayroom	5	2.5	0.06	0.3		30	7	3.5	1
Guard stations	5	2.5	0.06	0.3		15	9	4.5	1
Booking/waiting	7.5	3.8	0.06	0.3		50	9	4.4	2
Educational Facilities									
Daycare (through age 4)	10	5	0.18	0.9		25	17	8.6	2
Daycare sickroom	10	5	0.18	0.9		25	17	8.6	3
Classrooms (ages 5–8)	10	5	0.12	0.6		25	15	7.4	1
Classrooms (age 9 plus)	10	5	0.12	0.6		35	13	6.7	1
Lecture classroom	7.5	3.8	0.06	0.3		65	8	4.3	1
Lecture hall (fixed seats)	7.5	3.8	0.06	0.3		150	8	4.0	1
Art classroom	10	5	0.18	0.9		20	19	9.5	2
Science laboratories	10	5	0.18	0.9		25	17	8.6	2
University/college laboratories	10	5	0.18	0.9		25	17	8.6	2
Wood/metal shop	10	5	0.18	0.9		20	19	9.5	2
Computer lab	10	5	0.12	0.6		25	15	7.4	1
Media center	10	5	0.12	0.6	A	25	15	7.4	1
Music/theater/dance	10	5	0.06	0.3		35	12	5.9	1
Multi-use assembly	7.5	3.8	0.06	0.3		100	8	4.1	1
Food and Beverage Service									
Restaurant dining rooms	7.5	3.8	0.18	0.9		70	10	5.1	2
Cafeteria/fast-food dining	7.5	3.8	0.18	0.9		100	9	4.7	2
Bars, cocktail lounges	7.5	3.8	0.18	0.9		100	9	4.7	2
General									
Break rooms	5	2.5	0.06	0.3		25	10	5.1	1
Coffee stations	5	2.5	0.06	0.3		20	11	5.5	1
Conference/meeting	5	2.5	0.06	0.3		50	6	3.1	1
Corridors	–	–	0.06	0.3		–			1
Storage rooms	–	–	0.12	0.6	B	–			1
Hotels, Motels, Resorts, Dormitories									
Bedroom/living room	5	2.5	0.06	0.3		10	11	5.5	1
Barracks sleeping areas	5	2.5	0.06	0.3		20	8	4.0	1
Laundry rooms, central	5	2.5	0.12	0.6		10	17	8.5	2
Laundry rooms within dwelling units	5	2.5	0.12	0.6		10	17	8.5	1
Lobbies/prefunction	7.5	3.8	0.06	0.3		30	10	4.8	1
Multipurpose assembly	5	2.5	0.06	0.3		120	6	2.8	1

TABLE 6-1 MINIMUM VENTILATION RATES IN BREATHING ZONE *(continued)*
(This table is not valid in isolation; it must be used in conjunction with the accompanying notes.)

Occupancy Category	People Outdoor Air Rate R_p		Area Outdoor Air Rate R_a		Notes	Default Values: Occupant Density (see Note 4)	Default Values: Combined Outdoor Air Rate (see Note 5)		Air Class
	cfm/person	L/s·person	cfm/ft^2	L/s·m^2		#/1000 ft^2 or #/100 m^2	cfm/person	L/s·person	
Office Buildings									
Office space	5	2.5	0.06	0.3		5	17	8.5	1
Reception areas	5	2.5	0.06	0.3		30	7	3.5	1
Telephone/data entry	5	2.5	0.06	0.3		60	6	3.0	1
Main entry lobbies	5	2.5	0.06	0.3		10	11	5.5	1
Miscellaneous Spaces									
Bank vaults/safe deposit	5	2.5	0.06	0.3		5	17	8.5	2
Computer (not printing)	5	2.5	0.06	0.3		4	20	10.0	1
Electrical equipment rooms	–	–	0.06	0.3	B	–			1
Elevator machine rooms	–	–	0.12	0.6	B	–			1
Pharmacy (prep. area)	5	2.5	0.18	0.9		10	23	11.5	2
Photo studios	5	2.5	0.12	0.6		10	17	8.5	1
Shipping/receiving	–	–	0.12	0.6	B	–			1
Telephone closets	–	–	0.00	0.0		–			1
Transportation waiting	7.5	3.8	0.06	0.3		100	8	4.1	1
Warehouses	–	–	0.06	0.3	B	–			2
Public Assembly Spaces									
Auditorium seating area	5	2.5	0.06	0.3		150	5	2.7	1
Places of religious worship	5	2.5	0.06	0.3		120	6	2.8	1
Courtrooms	5	2.5	0.06	0.3		70	6	2.9	1
Legislative chambers	5	2.5	0.06	0.3		50	6	3.1	1
Libraries	5	2.5	0.12	0.6		10	17	8.5	1
Lobbies	5	2.5	0.06	0.3		150	5	2.7	1
Museums (children's)	7.5	3.8	0.12	0.6		40	11	5.3	1
Museums/galleries	7.5	3.8	0.06	0.3		40	9	4.6	1
Residential									
Dwelling unit	5	2.5	0.06	0.3	F,G	F			1
Common corridors	–	–	0.06	0.3					1
Retail									
Sales (except as below)	7.5	3.8	0.12	0.6		15	16	7.8	2
Mall common areas	7.5	3.8	0.06	0.3		40	9	4.6	1
Barbershop	7.5	3.8	0.06	0.3		25	10	5.0	2
Beauty and nail salons	20	10	0.12	0.6		25	25	12.4	2
Pet shops (animal areas)	7.5	3.8	0.18	0.9		10	26	12.8	2
Supermarket	7.5	3.8	0.06	0.3		8	15	7.6	1
Coin-operated laundries	7.5	3.8	0.06	0.3		20	11	5.3	2

TABLE 6-1 MINIMUM VENTILATION RATES IN BREATHING ZONE *(continued)*
(This table is not valid in isolation; it must be used in conjunction with the accompanying notes.)

Occupancy Category	People Outdoor Air Rate R_p		Area Outdoor Air Rate R_a		Notes	Default Values			Air Class
						Occupant Density (see Note 4)	Combined Outdoor Air Rate (see Note 5)		
	cfm/person	L/s·person	cfm/ft^2	L/s·m^2		#/1000 ft^2 or #/100 m^2	cfm/person	L/s·person	
Sports and Entertainment									
Sports arena (play area)	–	–	0.30	1.5	E	–			1
Gym, stadium (play area)	–	–	0.30	1.5		30			2
Spectator areas	7.5	3.8	0.06	0.3		150	8	4.0	1
Swimming (pool & deck)	–	–	0.48	2.4	C	–			2
Disco/dance floors	20	10	0.06	0.3		100	21	10.3	1
Health club/aerobics room	20	10	0.06	0.3		40	22	10.8	2
Health club/weight rooms	20	10	0.06	0.3		10	26	13.0	2
Bowling alley (seating)	10	5	0.12	0.6		40	13	6.5	1
Gambling casinos	7.5	3.8	0.18	0.9		120	9	4.6	1
Game arcades	7.5	3.8	0.18	0.9		20	17	8.3	1
Stages, studios	10	5	0.06	0.3	D	70	11	5.4	1

GENERAL NOTES FOR TABLE 6-1

1 **Related requirements:** The rates in this table are based on all other applicable requirements of this standard being met.
2 **Smoking:** This table applies to no-smoking areas. Rates for smoking-permitted spaces must be determined using other methods. See Section 6.2.9 for ventilation requirements in smoking areas.
3 **Air density:** Volumetric airflow rates are based on an air density of 0.075 lb_{da}/ft^3 (1.2 kg_{da}/m^3), which corresponds to dry air at a barometric pressure of 1 atm (101.3 kPa) and an air temperature of 70°F (21°C). Rates may be adjusted for actual density but such adjustment is not required for compliance with this standard.
4 **Default occupant density:** The default occupant density shall be used when actual occupant density is not known.
5 **Default combined outdoor air rate (per person):** This rate is based on the default occupant density.
6 **Unlisted occupancies:** If the occupancy category for a proposed space or zone is not listed, the requirements for the listed occupancy category that is most similar in terms of occupant density, activities and building construction shall be used.
7 **Health-care facilities:** Rates shall be determined in accordance with Appendix E.

ITEM-SPECIFIC NOTES FOR TABLE 6-1

A For high school and college libraries, use values shown for Public Assembly Spaces—Libraries.
B Rate may not be sufficient when stored materials include those having potentially harmful emissions.
C Rate does not allow for humidity control. Additional ventilation or dehumidification may be required to remove moisture.
D Rate does not include special exhaust for stage effects, e.g., dry ice vapors, smoke.
E When combustion equipment is intended to be used on the playing surface, additional dilution ventilation and/or source control shall be provided.
F Default occupancy for dwelling units shall be two persons for studio and one-bedroom units, with one additional person for each additional bedroom.
G Air from one residential dwelling shall not be recirculated or transferred to any other space outside of that dwelling.

ANEXO 02

Edificio De Oficinas Santa Cruz3
HVAC Load Analysis

for

Lima - Perú

Prepared By:

REFRICORP

Lima - Perú
241-0833

domingo, 7 de Enero de 2018

General Project Data Input

General Project Information

Project file name:	CCT Edificio Santa Miguel Ruiz.CHV
Project title:	Edificio De Oficinas Santa Cruz3
Project date:	21 De Febrero 2014
Weather reference city:	LIMA, PERU
Client city:	Lima - Perú
Company name:	REFRICORP
Company city:	Lima - Perú
Company phone:	241-0833

Barometric pressure:	29.219	in.Hg.
Altitude:	656	feet
Latitude:	-12	Degrees
Mean daily temperature range:	15	Degrees
Starting & ending time for HVAC load calculations:	8am - 7pm	
Number of unique zones in this project:	50	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.12	Watts per square foot
Equipment requirements:	2.00	Watts per square foot
People sensible load multiplier:	250	Btuh per person
People latent load multiplier:	200	Btuh per person
Zone sensible safety factor:	12	%
Zone latent safety factor:	12	%
Zone heating safety factor:	12	%
People diversity factor:	100	%
Lighting profile number:	0	
Equipment profile number:	0	
People profile number:	1	
Building default ceiling height:	8.86	feet
Building default wall height:	10.66	feet

Internal Operating Load Profiles (C = 100)

	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr	hr
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
December	86	76	55%	72	58.74	0
January	86	76	55%	72	58.74	0
February	86	76	55%	72	58.74	0
March	86	76	55%	72	58.74	0
April	85	75	55%	72	52.52	-2
May	82	72	55%	72	41.61	-4
June	80	71	55%	72	37.92	-6
July	77	68	55%	72	23.68	-9
August	75	67	55%	72	22.75	-11
September	75	67	55%	72	22.91	-11
October	74	66	55%	72	18.05	-12
November	78	69	55%	72	27.88	-8
Winter	0			0		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	8	0.290	No	No

Master Walls

Wall No.	ASHRAE Group	Wall U-Fac	Wall Color
1	C	0.413	M

Master Partitions

Partition No.	Partition U-Factor	Cool T-D	Heat T-D
1	0.351	10	15

Master Glass

Glass No.	Summer U-Factor	Winter U-Factor	Glass Shd.Coef.	Interior Shading	Interior Shd.Coef
1	0.480	0.480	0.650	1	0.650

Building Summary Loads

Building peaks in March at 4pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	9,026	0	0.00	0	56,730	56,730	1.86
Wall	2,908	0	0.00	0	21,269	21,269	0.70
Glass	10,030	0	0.00	0	512,808	512,808	16.86
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	590,806	590,806	19.42
Lighting	65,386	0	0.00	0	249,880	249,880	8.21
Equipment	109,419	0	0.00	0	418,154	418,154	13.75
People	973	0	0.00	217,846	272,307	490,153	16.11
Partition	65,722	0	0.00	0	258,366	258,366	8.49
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	12,600	0	0.00	476,081	194,898	670,979	22.06
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	0	0	0.00
Blow-Thru Fan	0	0	0.00	0	158,193	158,193	5.20
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	141,633	141,633	4.66
Return Duct	0	0	0.00	0	64,049	64,049	2.11
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	693,926	2,348,287	3,042,213	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	476,081	194,898	670,979	22.06
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Zone Loads	0	0.00	217,846	1,789,514	2,007,360	65.98
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	363,875	363,875	11.96
Building Totals	0	0.00	693,926	2,348,287	3,042,214	100.00

Check Figures		
Total Building Supply Air (based on a 17° TD):	131,853	CFM
Total Building Vent. Air (9.56% of Supply):	12,600	CFM
Total Conditioned Air Space:	54,473	Sq.ft
Supply Air Per Unit Area:	2.4205	CFM/Sq.ft
Area Per Cooling Capacity:	214.9	Sq.ft/Ton
Cooling Capacity Per Area:	0.0047	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	253.52	Tons

Air Handler #1 - Hall Ascensores Sot 6 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Hall Sototano 6	264	0	7,632	1,120	Direct	Direct
	7pm November	5	0	455	0	0	55
		2,341	0.00	1.72	0	0	55
	Zone Peak Totals:	264	0	7,632	1,120		
	Total Zones: 1	5	0	455	0	0	55
	Unique Zones: 1	2,341	0.00	1.72	0	0	55

Air Handler #1 - Hall Ascensores Sot 6 - Total Load Summary

Air Handler Description:	Hall Ascensores Sot 6 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.22 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh			
Infiltration sensible loss:	0 Btuh	0	CFM	
Outside Air sensible loss:	0 Btuh	0	CFM	
Supply Duct sensible loss:	0 Btuh			
Return Duct sensible loss:	0 Btuh			
Return Plenum sensible loss:	0 Btuh			
Total System sensible loss:				0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0	CFM	
Winter Vent Outside Air (0.0% of supply) =		0	CFM	
Zone space sensible gain:	7,632 Btuh			
Infiltration sensible gain:	0 Btuh			
Draw-thru fan sensible gain:	0 Btuh			
Supply duct sensible gain:	489 Btuh			
Reserve sensible gain:	0 Btuh			
Total sensible gain on supply side of coil:				8,121 Btuh
Cooling Supply Air: 8,121 / (.977 X 1.1 X 17) =		455	CFM	
Summer Vent Outside Air (12.1% of supply) =		55	CFM	
Return duct sensible gain:	215 Btuh			
Return plenum sensible gain:	0 Btuh			
Outside air sensible gain:	851 Btuh	55	CFM	
Blow-thru fan sensible gain:	546 Btuh			
Total sensible gain on return side of coil:				1,612 Btuh
Total sensible gain on air handling system:				9,734 Btuh
Zone space latent gain:	1,120 Btuh			
Infiltration latent gain:	0 Btuh			
Outside air latent gain:	2,078 Btuh			
Total latent gain on air handling system:				3,198 Btuh
Total system sensible and latent gain:				12,932 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	455	CFM
Total Air Handler Vent. Air (12.08% of Supply):	55	CFM
Total Conditioned Air Space:	264	Sq.ft
Supply Air Per Unit Area:	1.7241	CFM/Sq.ft
Area Per Cooling Capacity:	245.2	Sq.ft/Ton
Cooling Capacity Per Area:	0.0041	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	1.08	Tons

Air Handler #2 - Hall Ascensores Sot 5 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
2	Hall Sototano 5 7pm November	264 5 2,341	0 0 0.00	7,632 455 1.72	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	264 5 2,341	0 0 0.00	7,632 455 1.72	1,120 0 0	 0 0	 55 55

Air Handler #2 - Hall Ascensores Sot 5 - Total Load Summary

Air Handler Description:	Hall Ascensores Sot 5 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.22 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	7,632 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	489 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,121 Btuh
Cooling Supply Air: 8,121 / (.977 X 1.1 X 17) =		455 CFM	
Summer Vent Outside Air (12.1% of supply) =		55 CFM	
Return duct sensible gain:	215 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	546 Btuh		
Total sensible gain on return side of coil:			1,612 Btuh
Total sensible gain on air handling system:			9,734 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			12,932 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	455 CFM
Total Air Handler Vent. Air (12.08% of Supply):	55 CFM
Total Conditioned Air Space:	264 Sq.ft
Supply Air Per Unit Area:	1.7241 CFM/Sq.ft
Area Per Cooling Capacity:	245.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.08 Tons

Air Handler #3 - Hall Ascensores Sot 4 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
3	Hall Sototano 4 7pm November	264 5 2,341	0 0 0.00	7,632 455 1.72	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	264 5 2,341	0 0 0.00	7,632 455 1.72	1,120 0 0	 0 0	 55 55

Air Handler #3 - Hall Ascensores Sot 4 - Total Load Summary

Air Handler Description:	Hall Ascensores Sot 4 Constant Volume - Sum of Peaks	
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.22 HP	
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan	
Sensible Heat Ratio:	0.88	--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	7,632 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	489 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,121 Btuh
Cooling Supply Air: 8,121 / (.977 X 1.1 X 17) =		455 CFM	
Summer Vent Outside Air (12.1% of supply) =		55 CFM	
Return duct sensible gain:	215 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	546 Btuh		
Total sensible gain on return side of coil:			1,612 Btuh
Total sensible gain on air handling system:			9,734 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			12,932 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	455 CFM
Total Air Handler Vent. Air (12.08% of Supply):	55 CFM
Total Conditioned Air Space:	264 Sq.ft
Supply Air Per Unit Area:	1.7241 CFM/Sq.ft
Area Per Cooling Capacity:	245.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.08 Tons

Air Handler #4 - Hall Ascensores Sot 3 - Summary Loads

Zn No	Description / Zone Peak Time	Area / People / Volume	Htg.Loss / Htg.CFM / CFM/Sqft	Sen.Gain / Clg.CFM / CFM/Sqft	Lat.Gain / S.Exh / W.Exh	Htg.O.A. / Req.CFM / Act.CFM	Clg.O.A. / Req.CFM / Act.CFM
4	Hall Sototano 3	264	0	7,632	1,120	Direct	Direct
	7pm November	5	0	455	0	0	55
		2,341	0.00	1.72	0	0	55
	Zone Peak Totals:	264	0	7,632	1,120		
	Total Zones: 1	5	0	455	0	0	55
	Unique Zones: 1	2,341	0.00	1.72	0	0	55

Air Handler #4 - Hall Ascensores Sot 3 - Total Load Summary

Air Handler Description:	Hall Ascensores Sot 3 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.22 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	7,632 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	489 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,121 Btuh
Cooling Supply Air: 8,121 / (.977 X 1.1 X 17) =		455 CFM	
Summer Vent Outside Air (12.1% of supply) =		55 CFM	
Return duct sensible gain:	215 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	546 Btuh		
Total sensible gain on return side of coil:			1,612 Btuh
Total sensible gain on air handling system:			9,734 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			12,932 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	455 CFM
Total Air Handler Vent. Air (12.08% of Supply):	55 CFM
Total Conditioned Air Space:	264 Sq.ft
Supply Air Per Unit Area:	1.7241 CFM/Sq.ft
Area Per Cooling Capacity:	245.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.08 Tons

Air Handler #5 - Hall Ascensores Sot 2 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
5	Hall Sototano 2	264	0	7,632	1,120	Direct	Direct
	7pm November	5	0	455	0	0	55
		2,341	0.00	1.72	0	0	55
	Zone Peak Totals:	264	0	7,632	1,120		
	Total Zones: 1	5	0	455	0	0	55
	Unique Zones: 1	2,341	0.00	1.72	0	0	55

Air Handler #5 - Hall Ascensores Sot 2 - Total Load Summary

Air Handler Description:	Hall Ascensores Sot 2 Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.22 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.88	--- This system occurs 1 time(s) in the building. ---	

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	7,632 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	489 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,121 Btuh
Cooling Supply Air: 8,121 / (.977 X 1.1 X 17) =		455 CFM	
Summer Vent Outside Air (12.1% of supply) =		55 CFM	
Return duct sensible gain:	215 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	546 Btuh		
Total sensible gain on return side of coil:			1,612 Btuh
Total sensible gain on air handling system:			9,734 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			12,932 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	455 CFM
Total Air Handler Vent. Air (12.08% of Supply):	55 CFM
Total Conditioned Air Space:	264 Sq.ft
Supply Air Per Unit Area:	1.7241 CFM/Sq.ft
Area Per Cooling Capacity:	245.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.08 Tons

Air Handler #6 - Hall Ascensores Sot 1 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
6	Hall Sototano 1	264	0	7,632	1,120	Direct	Direct
	7pm November	5	0	455	0	0	55
		2,341	0.00	1.72	0	0	55
	Zone Peak Totals:	264	0	7,632	1,120		
	Total Zones: 1	5	0	455	0	0	55
	Unique Zones: 1	2,341	0.00	1.72	0	0	55

Air Handler #6 - Hall Ascensores Sot 1 - Total Load Summary

Air Handler Description:	Hall Ascensores Sot 1 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.22 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0	Btuh				
Infiltration sensible loss:	0	Btuh	0	CFM		
Outside Air sensible loss:	0	Btuh	0	CFM		
Supply Duct sensible loss:	0	Btuh				
Return Duct sensible loss:	0	Btuh				
Return Plenum sensible loss:	0	Btuh				
Total System sensible loss:					0	Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =			0	CFM		
Winter Vent Outside Air (0.0% of supply) =			0	CFM		
Zone space sensible gain:	7,632	Btuh				
Infiltration sensible gain:	0	Btuh				
Draw-thru fan sensible gain:	0	Btuh				
Supply duct sensible gain:	489	Btuh				
Reserve sensible gain:	0	Btuh				
Total sensible gain on supply side of coil:					8,121	Btuh
Cooling Supply Air: 8,121 / (.977 X 1.1 X 17) =			455	CFM		
Summer Vent Outside Air (12.1% of supply) =			55	CFM		
Return duct sensible gain:	215	Btuh				
Return plenum sensible gain:	0	Btuh				
Outside air sensible gain:	851	Btuh	55	CFM		
Blow-thru fan sensible gain:	546	Btuh				
Total sensible gain on return side of coil:					1,612	Btuh
Total sensible gain on air handling system:					9,734	Btuh
Zone space latent gain:	1,120	Btuh				
Infiltration latent gain:	0	Btuh				
Outside air latent gain:	2,078	Btuh				
Total latent gain on air handling system:					3,198	Btuh
Total system sensible and latent gain:					12,932	Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	455	CFM
Total Air Handler Vent. Air (12.08% of Supply):	55	CFM
Total Conditioned Air Space:	264	Sq.ft
Supply Air Per Unit Area:	1.7241	CFM/Sq.ft
Area Per Cooling Capacity:	245.2	Sq.ft/Ton
Cooling Capacity Per Area:	0.0041	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	1.08	Tons

Air Handler #7 - Recepcion - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
7	Recepcion	636	0	43,392	4,256	Direct	Direct
	8am December	19	0	2,589	0	0	175
		5,639	0.00	4.07	0	0	175
	Zone Peak Totals:	636	0	43,392	4,256		
	Total Zones: 1	19	0	2,589	0	0	175
	Unique Zones: 1	5,639	0.00	4.07	0	0	175

Air Handler #7 - Recepcion - Total Load Summary

Air Handler Description:	Recepcion Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 1.25 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.92 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	43,392 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	2,782 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			46,174 Btuh
Cooling Supply Air: 46,174 / (.977 X 1.1 X 17) =		2,590 CFM	
Summer Vent Outside Air (6.8% of supply) =		175 CFM	
Return duct sensible gain:	1,297 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	263 Btuh	175 CFM	
Blow-thru fan sensible gain:	3,107 Btuh		
Total sensible gain on return side of coil:			4,667 Btuh
Total sensible gain on air handling system:			50,841 Btuh
Zone space latent gain:	4,256 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	6,744 Btuh		
Total latent gain on air handling system:			11,000 Btuh
Total system sensible and latent gain:			61,840 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	2,590 CFM
Total Air Handler Vent. Air (6.76% of Supply):	175 CFM
Total Conditioned Air Space:	636 Sq.ft
Supply Air Per Unit Area:	4.0685 CFM/Sq.ft
Area Per Cooling Capacity:	123.5 Sq.ft/Ton
Cooling Capacity Per Area:	0.0081 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	5.15 Tons

Air Handler #8 - Sala De Proveedores - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
8	Area De Proveedores	406	0	11,491	1,792	Direct	Direct
	7pm November	8	0	686	0	0	85
		3,595	0.00	1.69	0	0	85
	Zone Peak Totals:	406	0	11,491	1,792		
	Total Zones: 1	8	0	686	0	0	85
	Unique Zones: 1	3,595	0.00	1.69	0	0	85

Air Handler #8 - Sala De Proveedores - Total Load Summary

Air Handler Description:	Sala De Proveedores Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.33 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.87 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	11,491 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	737 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			12,227 Btuh
Cooling Supply Air: 12,227 / (.977 X 1.1 X 17) =		686 CFM	
Summer Vent Outside Air (12.4% of supply) =		85 CFM	
Return duct sensible gain:	323 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	1,315 Btuh	85 CFM	
Blow-thru fan sensible gain:	823 Btuh		
Total sensible gain on return side of coil:			2,460 Btuh
Total sensible gain on air handling system:			14,687 Btuh
Zone space latent gain:	1,792 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	3,212 Btuh		
Total latent gain on air handling system:			5,004 Btuh
Total system sensible and latent gain:			19,691 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	686 CFM
Total Air Handler Vent. Air (12.39% of Supply):	85 CFM
Total Conditioned Air Space:	406 Sq.ft
Supply Air Per Unit Area:	1.6899 CFM/Sq.ft
Area Per Cooling Capacity:	247.3 Sq.ft/Ton
Cooling Capacity Per Area:	0.0040 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.64 Tons

Air Handler #9 - Cuarto De Control - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
9	Cuarto De Control 8am December	263 5 2,332	0 0 0.00	17,507 1,045 3.97	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	263 5 2,332	0 0 0.00	17,507 1,045 3.97	1,120 0 0	 0 0	 55 55

Air Handler #9 - Cuarto De Control - Total Load Summary

Air Handler Description:	Cuarto De Control Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.51 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.94 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	17,507 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	1,122 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			18,630 Btuh
Cooling Supply Air: 18,630 / (.977 X 1.1 X 17) =		1,045 CFM	
Summer Vent Outside Air (5.3% of supply) =		55 CFM	
Return duct sensible gain:	532 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	83 Btuh	55 CFM	
Blow-thru fan sensible gain:	1,254 Btuh		
Total sensible gain on return side of coil:			1,868 Btuh
Total sensible gain on air handling system:			20,497 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,119 Btuh		
Total latent gain on air handling system:			3,239 Btuh
Total system sensible and latent gain:			23,737 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	1,045 CFM
Total Air Handler Vent. Air (5.26% of Supply):	55 CFM
Total Conditioned Air Space:	263 Sq.ft
Supply Air Per Unit Area:	3.9699 CFM/Sq.ft
Area Per Cooling Capacity:	133.0 Sq.ft/Ton
Cooling Capacity Per Area:	0.0075 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.98 Tons

Air Handler #10 - LC-101 Comercio - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
10	Local Comercial 101 8am December	2,407 169 21,327	0 0 0.00	119,300 7,119 2.96	37,856 0 0	Direct 0 0	Direct 2,210 2,210
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,407 169 21,327	0 0 0.00	119,300 7,119 2.96	37,856 0 0	 0 0	 2,210 2,210

Air Handler #10 - LC-101 Comercio - Total Load Summary

Air Handler Description:	LC-101 Comercio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 3.45 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.77 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	2pm in December.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh			
Infiltration sensible loss:	0 Btuh	0	CFM	
Outside Air sensible loss:	0 Btuh	0	CFM	
Supply Duct sensible loss:	0 Btuh			
Return Duct sensible loss:	0 Btuh			
Return Plenum sensible loss:	0 Btuh			
Total System sensible loss:				0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0	CFM	
Winter Vent Outside Air (0.0% of supply) =		0	CFM	
Zone space sensible gain:	106,319 Btuh			
Infiltration sensible gain:	0 Btuh			
Draw-thru fan sensible gain:	0 Btuh			
Supply duct sensible gain:	7,647 Btuh			
Reserve sensible gain:	0 Btuh			
Total sensible gain on supply side of coil:				113,966 Btuh
Cooling Supply Air: 126,948 / (.977 X 1.1 X 17) =		7,119	CFM	
Summer Vent Outside Air (31.0% of supply) =		2,210	CFM	
Return duct sensible gain:	2,637 Btuh			
Return plenum sensible gain:	0 Btuh			
Outside air sensible gain:	34,185 Btuh	2,210	CFM	
Blow-thru fan sensible gain:	8,542 Btuh			
Total sensible gain on return side of coil:				45,363 Btuh
Total sensible gain on air handling system:				159,329 Btuh
Zone space latent gain:	37,856 Btuh			
Infiltration latent gain:	0 Btuh			
Outside air latent gain:	83,503 Btuh			
Total latent gain on air handling system:				121,359 Btuh
Total system sensible and latent gain:				280,688 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	7,119	CFM
Total Air Handler Vent. Air (31.04% of Supply):	2,210	CFM
Total Conditioned Air Space:	2,407	Sq.ft
Supply Air Per Unit Area:	2.9576	CFM/Sq.ft
Area Per Cooling Capacity:	102.9	Sq.ft/Ton
Cooling Capacity Per Area:	0.0097	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	23.39	Tons

Air Handler #11 - LC 102 Comercio - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
11	Local Comercial 102 8am December	2,890 202 25,605	0 0 0.00	134,742 8,041 2.78	45,248 0 0	Direct 0 0	Direct 2,645 2,645
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,890 202 25,605	0 0 0.00	134,742 8,041 2.78	45,248 0 0	 0 0	 2,645 2,645

Air Handler #11 - LC 102 Comercio - Total Load Summary

Air Handler Description:	LC 102 Comercio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 3.89 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.76 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	2pm in December.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	121,698 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	8,637 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			130,335 Btuh
Cooling Supply Air: 143,379 / (.977 X 1.1 X 17) =		8,041 CFM	
Summer Vent Outside Air (32.9% of supply) =		2,645 CFM	
Return duct sensible gain:	2,898 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	40,913 Btuh	2,645 CFM	
Blow-thru fan sensible gain:	9,647 Btuh		
Total sensible gain on return side of coil:			53,459 Btuh
Total sensible gain on air handling system:			183,794 Btuh
Zone space latent gain:	45,248 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	99,939 Btuh		
Total latent gain on air handling system:			145,187 Btuh
Total system sensible and latent gain:			328,981 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	8,041 CFM
Total Air Handler Vent. Air (32.89% of Supply):	2,645 CFM
Total Conditioned Air Space:	2,890 Sq.ft
Supply Air Per Unit Area:	2.7823 CFM/Sq.ft
Area Per Cooling Capacity:	105.4 Sq.ft/Ton
Cooling Capacity Per Area:	0.0095 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	27.42 Tons

Air Handler #12 - Oficina 201 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
12	Oficina 201	1,953	0	86,674	4,375	Direct	Direct
	8am December	20	0	5,172	0	0	280
		17,304	0.00	2.65	0	0	280
	Zone Peak Totals:	1,953	0	86,674	4,375		
	Total Zones: 1	20	0	5,172	0	0	280
	Unique Zones: 1	17,304	0.00	2.65	0	0	280

Air Handler #12 - Oficina 201 - Total Load Summary

Air Handler Description:	Oficina 201 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.50 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	86,674 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,556 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			92,230 Btuh
Cooling Supply Air: 92,230 / (.977 X 1.1 X 17) =		5,172 CFM	
Summer Vent Outside Air (5.4% of supply) =		280 CFM	
Return duct sensible gain:	2,628 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	421 Btuh	280 CFM	
Blow-thru fan sensible gain:	6,206 Btuh		
Total sensible gain on return side of coil:			9,254 Btuh
Total sensible gain on air handling system:			101,485 Btuh
Zone space latent gain:	4,375 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	10,790 Btuh		
Total latent gain on air handling system:			15,165 Btuh
Total system sensible and latent gain:			116,650 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,172 CFM
Total Air Handler Vent. Air (5.41% of Supply):	280 CFM
Total Conditioned Air Space:	1,953 Sq.ft
Supply Air Per Unit Area:	2.6483 CFM/Sq.ft
Area Per Cooling Capacity:	200.9 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	9.72 Tons

Air Handler #13 - Oficina 202 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
13	Oficina 202 8am December	2,472 25 21,906	0 0 0.00	87,216 5,205 2.11	5,538 0 0	Direct 0 0	Direct 355 355
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,472 25 21,906	0 0 0.00	87,216 5,205 2.11	5,538 0 0	 0 0	 355 355

Air Handler #13 - Oficina 202 - Total Load Summary

Air Handler Description:	Oficina 202 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.52 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.94 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	87,216 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,591 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			92,806 Btuh
Cooling Supply Air: 92,806 / (.977 X 1.1 X 17) =		5,205 CFM	
Summer Vent Outside Air (6.8% of supply) =		355 CFM	
Return duct sensible gain:	2,605 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	534 Btuh	355 CFM	
Blow-thru fan sensible gain:	6,244 Btuh		
Total sensible gain on return side of coil:			9,383 Btuh
Total sensible gain on air handling system:			102,189 Btuh
Zone space latent gain:	5,538 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	13,680 Btuh		
Total latent gain on air handling system:			19,218 Btuh
Total system sensible and latent gain:			121,408 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,205 CFM
Total Air Handler Vent. Air (6.82% of Supply):	355 CFM
Total Conditioned Air Space:	2,472 Sq.ft
Supply Air Per Unit Area:	2.1050 CFM/Sq.ft
Area Per Cooling Capacity:	244.4 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.12 Tons

Air Handler #14 - Oficina 203 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
14	Oficicna 203	2,339	0	91,560	5,240	Direct	Direct
	3pm May	23	0	5,464	0	0	330
		20,726	0.00	2.34	0	0	330
	Zone Peak Totals:	2,339	0	91,560	5,240		
	Total Zones: 1	23	0	5,464	0	0	330
	Unique Zones: 1	20,726	0.00	2.34	0	0	330

Air Handler #14 - Oficina 203 - Total Load Summary

Air Handler Description:	Oficina 203 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.64 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	3pm in April.
Outdoor Conditions:	Clg: 85° DB, 75° WB, 117.48 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh			
Infiltration sensible loss:	0 Btuh	0	CFM	
Outside Air sensible loss:	0 Btuh	0	CFM	
Supply Duct sensible loss:	0 Btuh			
Return Duct sensible loss:	0 Btuh			
Return Plenum sensible loss:	0 Btuh			
Total System sensible loss:				0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0	CFM	
Winter Vent Outside Air (0.0% of supply) =		0	CFM	
Zone space sensible gain:	90,064 Btuh			
Infiltration sensible gain:	0 Btuh			
Draw-thru fan sensible gain:	0 Btuh			
Supply duct sensible gain:	5,869 Btuh			
Reserve sensible gain:	0 Btuh			
Total sensible gain on supply side of coil:				95,934 Btuh
Cooling Supply Air: 97,429 / (.977 X 1.1 X 17) =		5,464	CFM	
Summer Vent Outside Air (6.0% of supply) =		330	CFM	
Return duct sensible gain:	2,757 Btuh			
Return plenum sensible gain:	0 Btuh			
Outside air sensible gain:	4,750 Btuh	330	CFM	
Blow-thru fan sensible gain:	6,555 Btuh			
Total sensible gain on return side of coil:				14,063 Btuh
Total sensible gain on air handling system:				109,997 Btuh
Zone space latent gain:	5,240 Btuh			
Infiltration latent gain:	0 Btuh			
Outside air latent gain:	11,444 Btuh			
Total latent gain on air handling system:				16,684 Btuh
Total system sensible and latent gain:				126,680 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,464	CFM
Total Air Handler Vent. Air (6.04% of Supply):	330	CFM
Total Conditioned Air Space:	2,339	Sq.ft
Supply Air Per Unit Area:	2.3358	CFM/Sq.ft
Area Per Cooling Capacity:	221.6	Sq.ft/Ton
Cooling Capacity Per Area:	0.0045	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	10.56	Tons

Air Handler #15 - Hall Ascensores 2do Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
15	Hall Ascensores 2do Piso 7pm November	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	 0 0	 55 55

Air Handler #15 - Hall Ascensores 2do Piso - Total Load Summary

Air Handler Description:	Hall Ascensores 2do Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.23 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	8,026 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	515 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,541 Btuh
Cooling Supply Air: 8,541 / (.977 X 1.1 X 17) =		479 CFM	
Summer Vent Outside Air (11.5% of supply) =		55 CFM	
Return duct sensible gain:	228 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	575 Btuh		
Total sensible gain on return side of coil:			1,653 Btuh
Total sensible gain on air handling system:			10,194 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			13,392 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	479 CFM
Total Air Handler Vent. Air (11.48% of Supply):	55 CFM
Total Conditioned Air Space:	266 Sq.ft
Supply Air Per Unit Area:	1.7988 CFM/Sq.ft
Area Per Cooling Capacity:	238.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0042 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.12 Tons

Air Handler #16 - Corredor 1 2do Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
16	Corredor 1 - 2do Piso	164	0	5,823	896	Direct	Direct
	7pm November	4	0	348	0	0	40
		1,449	0.00	2.12	0	0	40
	Zone Peak Totals:	164	0	5,823	896		
	Total Zones: 1	4	0	348	0	0	40
	Unique Zones: 1	1,449	0.00	2.12	0	0	40

Air Handler #16 - Corredor 1 2do Piso - Total Load Summary

Air Handler Description:	Corredor 1 2do Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.17 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.87 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	5,823 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	373 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			6,197 Btuh
Cooling Supply Air: 6,197 / (.977 X 1.1 X 17) =		348 CFM	
Summer Vent Outside Air (11.5% of supply) =		40 CFM	
Return duct sensible gain:	165 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	417 Btuh		
Total sensible gain on return side of coil:			1,201 Btuh
Total sensible gain on air handling system:			7,398 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			9,805 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	348 CFM
Total Air Handler Vent. Air (11.51% of Supply):	40 CFM
Total Conditioned Air Space:	164 Sq.ft
Supply Air Per Unit Area:	2.1251 CFM/Sq.ft
Area Per Cooling Capacity:	200.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.82 Tons

Air Handler #17 - Corredor 2 2do Psio - Summary Loads

Zn No	Description / Zone Peak Time	Area / People / Volume	Htg.Loss / Htg.CFM / CFM/Sqft	Sen.Gain / Clg.CFM / CFM/Sqft	Lat.Gain / S.Exh / W.Exh	Htg.O.A. / Req.CFM / Act.CFM	Clg.O.A. / Req.CFM / Act.CFM
17	Corredor 2 - 2do Piso	190	0	6,630	896	Direct	Direct
	7pm November	4	0	396	0	0	40
		1,687	0.00	2.08	0	0	40
	Zone Peak Totals:	190	0	6,630	896		
	Total Zones: 1	4	0	396	0	0	40
	Unique Zones: 1	1,687	0.00	2.08	0	0	40

Air Handler #17 - Corredor 2 2do Psio - Total Load Summary

Air Handler Description:	Corredor 2 2do Psio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.19 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.89

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	6,630 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	425 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,055 Btuh
Cooling Supply Air: 7,055 / (.977 X 1.1 X 17) =		396 CFM	
Summer Vent Outside Air (10.1% of supply) =		40 CFM	
Return duct sensible gain:	191 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	475 Btuh		
Total sensible gain on return side of coil:			1,285 Btuh
Total sensible gain on air handling system:			8,340 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			10,747 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	396 CFM
Total Air Handler Vent. Air (10.11% of Supply):	40 CFM
Total Conditioned Air Space:	190 Sq.ft
Supply Air Per Unit Area:	2.0785 CFM/Sq.ft
Area Per Cooling Capacity:	212.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0047 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.90 Tons

Air Handler #18 - Oficina 301 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
18	Oficina 301 8am December	1,960 20 17,368	0 0 0.00	86,527 5,164 2.63	4,391 0 0	Direct 0 0	Direct 285 285
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	1,960 20 17,368	0 0 0.00	86,527 5,164 2.63	4,391 0 0	 0 0	 285 285

Air Handler #18 - Oficina 301 - Total Load Summary

Air Handler Description:	Oficina 301 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.50 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	86,527 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,547 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			92,073 Btuh
Cooling Supply Air: 92,073 / (.977 X 1.1 X 17) =		5,164 CFM	
Summer Vent Outside Air (5.5% of supply) =		285 CFM	
Return duct sensible gain:	2,620 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	429 Btuh	285 CFM	
Blow-thru fan sensible gain:	6,195 Btuh		
Total sensible gain on return side of coil:			9,244 Btuh
Total sensible gain on air handling system:			101,317 Btuh
Zone space latent gain:	4,391 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	10,982 Btuh		
Total latent gain on air handling system:			15,373 Btuh
Total system sensible and latent gain:			116,691 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,164 CFM
Total Air Handler Vent. Air (5.52% of Supply):	285 CFM
Total Conditioned Air Space:	1,960 Sq.ft
Supply Air Per Unit Area:	2.6341 CFM/Sq.ft
Area Per Cooling Capacity:	201.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	9.72 Tons

Air Handler #19 - Oficina 302 - Summary Loads

Zn No	Description / Zone Peak Time	Area / People / Volume	Htg.Loss / Htg.CFM / CFM/Sqft	Sen.Gain / Clg.CFM / CFM/Sqft	Lat.Gain / S.Exh / W.Exh	Htg.O.A. / Req.CFM / Act.CFM	Clg.O.A. / Req.CFM / Act.CFM
19	Oficina 302	2,550	0	88,501	5,713	Direct	Direct
	8am December	26	0	5,281	0	0	360
		22,596	0.00	2.07	0	0	360
	Zone Peak Totals:	2,550	0	88,501	5,713		
	Total Zones: 1	26	0	5,281	0	0	360
	Unique Zones: 1	22,596	0.00	2.07	0	0	360

Air Handler #19 - Oficina 302 - Total Load Summary

Air Handler Description:	Oficina 302 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.56 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.94 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	88,501 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,673 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			94,174 Btuh
Cooling Supply Air: 94,174 / (.977 X 1.1 X 17) =		5,281 CFM	
Summer Vent Outside Air (6.8% of supply) =		360 CFM	
Return duct sensible gain:	2,643 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	541 Btuh	360 CFM	
Blow-thru fan sensible gain:	6,337 Btuh		
Total sensible gain on return side of coil:			9,521 Btuh
Total sensible gain on air handling system:			103,695 Btuh
Zone space latent gain:	5,713 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	13,872 Btuh		
Total latent gain on air handling system:			19,585 Btuh
Total system sensible and latent gain:			123,281 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,281 CFM
Total Air Handler Vent. Air (6.82% of Supply):	360 CFM
Total Conditioned Air Space:	2,550 Sq.ft
Supply Air Per Unit Area:	2.0708 CFM/Sq.ft
Area Per Cooling Capacity:	248.3 Sq.ft/Ton
Cooling Capacity Per Area:	0.0040 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.27 Tons

Air Handler #20 - Oficina 303 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
20	Oficicna 303 3pm May	2,339 23 20,726	0 0 0.00	91,560 5,464 2.34	5,240 0 0	Direct 0 0	Direct 330 330
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,339 23 20,726	0 0 0.00	91,560 5,464 2.34	5,240 0 0	 0 0	 330 330

Air Handler #20 - Oficina 303 - Total Load Summary

Air Handler Description:	Oficina 303 Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.64 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.95		--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	3pm in April.
Outdoor Conditions:	Clg: 85° DB, 75° WB, 117.48 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	90,064 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,869 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			95,934 Btuh
Cooling Supply Air: 97,429 / (.977 X 1.1 X 17) =		5,464 CFM	
Summer Vent Outside Air (6.0% of supply) =		330 CFM	
Return duct sensible gain:	2,757 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	4,750 Btuh	330 CFM	
Blow-thru fan sensible gain:	6,555 Btuh		
Total sensible gain on return side of coil:			14,063 Btuh
Total sensible gain on air handling system:			109,997 Btuh
Zone space latent gain:	5,240 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	11,444 Btuh		
Total latent gain on air handling system:			16,684 Btuh
Total system sensible and latent gain:			126,680 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,464 CFM
Total Air Handler Vent. Air (6.04% of Supply):	330 CFM
Total Conditioned Air Space:	2,339 Sq.ft
Supply Air Per Unit Area:	2.3358 CFM/Sq.ft
Area Per Cooling Capacity:	221.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0045 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.56 Tons

Air Handler #21 - Hall Ascensores 3er Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
21	Hall Ascensores 3er Piso 7pm November	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	 0 0	 55 55

Air Handler #21 - Hall Ascensores 3er Piso - Total Load Summary

Air Handler Description:	Hall Ascensores 3er Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.23 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	8,026 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	515 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,541 Btuh
Cooling Supply Air: 8,541 / (.977 X 1.1 X 17) =		479 CFM	
Summer Vent Outside Air (11.5% of supply) =		55 CFM	
Return duct sensible gain:	228 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	575 Btuh		
Total sensible gain on return side of coil:			1,653 Btuh
Total sensible gain on air handling system:			10,194 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			13,392 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	479 CFM
Total Air Handler Vent. Air (11.48% of Supply):	55 CFM
Total Conditioned Air Space:	266 Sq.ft
Supply Air Per Unit Area:	1.7988 CFM/Sq.ft
Area Per Cooling Capacity:	238.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0042 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.12 Tons

Air Handler #22 - Corredor 1 3er Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
22	Corredor 1 - 3er Piso 7pm November	164 4 1,449	0 0 0.00	5,823 348 2.12	896 0 0	Direct 0 0	Direct 40 40
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	164 4 1,449	0 0 0.00	5,823 348 2.12	896 0 0	 0 0	 40 40

Air Handler #22 - Corredor 1 3er Piso - Total Load Summary

Air Handler Description:	Corredor 1 3er Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.17 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.87 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	5,823 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	373 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			6,197 Btuh
Cooling Supply Air: 6,197 / (.977 X 1.1 X 17) =		348 CFM	
Summer Vent Outside Air (11.5% of supply) =		40 CFM	
Return duct sensible gain:	165 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	417 Btuh		
Total sensible gain on return side of coil:			1,201 Btuh
Total sensible gain on air handling system:			7,398 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			9,805 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	348 CFM
Total Air Handler Vent. Air (11.51% of Supply):	40 CFM
Total Conditioned Air Space:	164 Sq.ft
Supply Air Per Unit Area:	2.1251 CFM/Sq.ft
Area Per Cooling Capacity:	200.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.82 Tons

Air Handler #23 - Corredor 2 3er Psio - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
23	Corredor 2 - 3er Piso 7pm November	190 4 1,687	0 0 0.00	6,630 396 2.08	896 0 0	Direct 0 0	Direct 40 40
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	190 4 1,687	0 0 0.00	6,630 396 2.08	896 0 0	 0 0	 40 40

Air Handler #23 - Corredor 2 3er Psio - Total Load Summary

Air Handler Description:	Corredor 2 3er Psio Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.19 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.89	--- This system occurs 1 time(s) in the building. ---	

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	6,630 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	425 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,055 Btuh
Cooling Supply Air: 7,055 / (.977 X 1.1 X 17) =		396 CFM	
Summer Vent Outside Air (10.1% of supply) =		40 CFM	
Return duct sensible gain:	191 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	475 Btuh		
Total sensible gain on return side of coil:			1,285 Btuh
Total sensible gain on air handling system:			8,340 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			10,747 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	396 CFM
Total Air Handler Vent. Air (10.11% of Supply):	40 CFM
Total Conditioned Air Space:	190 Sq.ft
Supply Air Per Unit Area:	2.0785 CFM/Sq.ft
Area Per Cooling Capacity:	212.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0047 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.90 Tons

Air Handler #24 - Oficina 401 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
24	Oficina 401 8am December	1,960 20 17,368	0 0 0.00	86,527 5,164 2.63	4,391 0 0	Direct 0 0	Direct 285 285
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	1,960 20 17,368	0 0 0.00	86,527 5,164 2.63	4,391 0 0	 0 0	 285 285

Air Handler #24 - Oficina 401 - Total Load Summary

Air Handler Description:	Oficina 401 Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.50 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.95		--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	86,527 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,547 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			92,073 Btuh
Cooling Supply Air: 92,073 / (.977 X 1.1 X 17) =		5,164 CFM	
Summer Vent Outside Air (5.5% of supply) =		285 CFM	
Return duct sensible gain:	2,620 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	429 Btuh	285 CFM	
Blow-thru fan sensible gain:	6,195 Btuh		
Total sensible gain on return side of coil:			9,244 Btuh
Total sensible gain on air handling system:			101,317 Btuh
Zone space latent gain:	4,391 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	10,982 Btuh		
Total latent gain on air handling system:			15,373 Btuh
Total system sensible and latent gain:			116,691 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,164 CFM
Total Air Handler Vent. Air (5.52% of Supply):	285 CFM
Total Conditioned Air Space:	1,960 Sq.ft
Supply Air Per Unit Area:	2.6341 CFM/Sq.ft
Area Per Cooling Capacity:	201.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	9.72 Tons

Air Handler #25 - Oficina 402 - Summary Loads

Zn No	Description / Zone Peak Time	Area / People / Volume	Htg.Loss / Htg.CFM / CFM/Sqft	Sen.Gain / Clg.CFM / CFM/Sqft	Lat.Gain / S.Exh / W.Exh	Htg.O.A. / Req.CFM / Act.CFM	Clg.O.A. / Req.CFM / Act.CFM
25	Oficina 402	2,550	0	88,501	5,713	Direct	Direct
	8am December	26	0	5,281	0	0	360
		22,596	0.00	2.07	0	0	360
	Zone Peak Totals:	2,550	0	88,501	5,713		
	Total Zones: 1	26	0	5,281	0	0	360
	Unique Zones: 1	22,596	0.00	2.07	0	0	360

Air Handler #25 - Oficina 402 - Total Load Summary

Air Handler Description:	Oficina 402 Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.56 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.94		--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	88,501 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,673 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			94,174 Btuh
Cooling Supply Air: 94,174 / (.977 X 1.1 X 17) =		5,281 CFM	
Summer Vent Outside Air (6.8% of supply) =		360 CFM	
Return duct sensible gain:	2,643 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	541 Btuh	360 CFM	
Blow-thru fan sensible gain:	6,337 Btuh		
Total sensible gain on return side of coil:			9,521 Btuh
Total sensible gain on air handling system:			103,695 Btuh
Zone space latent gain:	5,713 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	13,872 Btuh		
Total latent gain on air handling system:			19,585 Btuh
Total system sensible and latent gain:			123,281 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,281 CFM
Total Air Handler Vent. Air (6.82% of Supply):	360 CFM
Total Conditioned Air Space:	2,550 Sq.ft
Supply Air Per Unit Area:	2.0708 CFM/Sq.ft
Area Per Cooling Capacity:	248.3 Sq.ft/Ton
Cooling Capacity Per Area:	0.0040 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.27 Tons

Air Handler #26 - Oficina 403 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
26	Oficicna 403	2,339	0	91,560	5,240	Direct	Direct
	3pm May	23	0	5,464	0	0	330
		20,726	0.00	2.34	0	0	330
	Zone Peak Totals:	2,339	0	91,560	5,240		
	Total Zones: 1	23	0	5,464	0	0	330
	Unique Zones: 1	20,726	0.00	2.34	0	0	330

Air Handler #26 - Oficina 403 - Total Load Summary

Air Handler Description:	Oficina 403 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.64 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	3pm in April.
Outdoor Conditions:	Clg: 85° DB, 75° WB, 117.48 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	90,064 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,869 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			95,934 Btuh
Cooling Supply Air: 97,429 / (.977 X 1.1 X 17) =		5,464 CFM	
Summer Vent Outside Air (6.0% of supply) =		330 CFM	
Return duct sensible gain:	2,757 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	4,750 Btuh	330 CFM	
Blow-thru fan sensible gain:	6,555 Btuh		
Total sensible gain on return side of coil:			14,063 Btuh
Total sensible gain on air handling system:			109,997 Btuh
Zone space latent gain:	5,240 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	11,444 Btuh		
Total latent gain on air handling system:			16,684 Btuh
Total system sensible and latent gain:			126,680 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,464 CFM
Total Air Handler Vent. Air (6.04% of Supply):	330 CFM
Total Conditioned Air Space:	2,339 Sq.ft
Supply Air Per Unit Area:	2.3358 CFM/Sq.ft
Area Per Cooling Capacity:	221.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0045 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.56 Tons

Air Handler #27 - Hall Ascensores 4to Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
27	Hall Ascensores 4to Piso 7pm November	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	 0 0	 55 55

Air Handler #27 - Hall Ascensores 4to Piso - Total Load Summary

Air Handler Description:	Hall Ascensores 4to Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.23 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0	Btuh				
Infiltration sensible loss:	0	Btuh	0	CFM		
Outside Air sensible loss:	0	Btuh	0	CFM		
Supply Duct sensible loss:	0	Btuh				
Return Duct sensible loss:	0	Btuh				
Return Plenum sensible loss:	0	Btuh				
Total System sensible loss:					0	Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =			0	CFM		
Winter Vent Outside Air (0.0% of supply) =			0	CFM		
Zone space sensible gain:	8,026	Btuh				
Infiltration sensible gain:	0	Btuh				
Draw-thru fan sensible gain:	0	Btuh				
Supply duct sensible gain:	515	Btuh				
Reserve sensible gain:	0	Btuh				
Total sensible gain on supply side of coil:					8,541	Btuh
Cooling Supply Air: 8,541 / (.977 X 1.1 X 17) =			479	CFM		
Summer Vent Outside Air (11.5% of supply) =			55	CFM		
Return duct sensible gain:	228	Btuh				
Return plenum sensible gain:	0	Btuh				
Outside air sensible gain:	851	Btuh	55	CFM		
Blow-thru fan sensible gain:	575	Btuh				
Total sensible gain on return side of coil:					1,653	Btuh
Total sensible gain on air handling system:					10,194	Btuh
Zone space latent gain:	1,120	Btuh				
Infiltration latent gain:	0	Btuh				
Outside air latent gain:	2,078	Btuh				
Total latent gain on air handling system:					3,198	Btuh
Total system sensible and latent gain:					13,392	Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	479	CFM
Total Air Handler Vent. Air (11.48% of Supply):	55	CFM
Total Conditioned Air Space:	266	Sq.ft
Supply Air Per Unit Area:	1.7988	CFM/Sq.ft
Area Per Cooling Capacity:	238.6	Sq.ft/Ton
Cooling Capacity Per Area:	0.0042	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	1.12	Tons

Air Handler #28 - Corredor 1 4to Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
28	Corredor 1 - 4to Piso 7pm November	164 4 1,449	0 0 0.00	5,823 348 2.12	896 0 0	Direct 0 0	Direct 40 40
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	164 4 1,449	0 0 0.00	5,823 348 2.12	896 0 0	 0 0	 40 40

Air Handler #28 - Corredor 1 4to Piso - Total Load Summary

Air Handler Description:	Corredor 1 4to Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.17 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.87 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	5,823 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	373 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			6,197 Btuh
Cooling Supply Air: 6,197 / (.977 X 1.1 X 17) =		348 CFM	
Summer Vent Outside Air (11.5% of supply) =		40 CFM	
Return duct sensible gain:	165 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	417 Btuh		
Total sensible gain on return side of coil:			1,201 Btuh
Total sensible gain on air handling system:			7,398 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			9,805 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	348 CFM
Total Air Handler Vent. Air (11.51% of Supply):	40 CFM
Total Conditioned Air Space:	164 Sq.ft
Supply Air Per Unit Area:	2.1251 CFM/Sq.ft
Area Per Cooling Capacity:	200.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.82 Tons

Air Handler #29 - Corredor 2 4to Psio - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
29	Corredor 2 - 4to Piso 7pm November	190 4 1,687	0 0 0.00	6,630 396 2.08	896 0 0	Direct 0 0	Direct 40 40
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	190 4 1,687	0 0 0.00	6,630 396 2.08	896 0 0	 0 0	 40 40

Air Handler #29 - Corredor 2 4to Psio - Total Load Summary

Air Handler Description:	Corredor 2 4to Psio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.19 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.89 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	6,630 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	425 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,055 Btuh
Cooling Supply Air: 7,055 / (.977 X 1.1 X 17) =		396 CFM	
Summer Vent Outside Air (10.1% of supply) =		40 CFM	
Return duct sensible gain:	191 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	475 Btuh		
Total sensible gain on return side of coil:			1,285 Btuh
Total sensible gain on air handling system:			8,340 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			10,747 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	396 CFM
Total Air Handler Vent. Air (10.11% of Supply):	40 CFM
Total Conditioned Air Space:	190 Sq.ft
Supply Air Per Unit Area:	2.0785 CFM/Sq.ft
Area Per Cooling Capacity:	212.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0047 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.90 Tons

Air Handler #30 - Oficina 501 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
30	Oficina 501	1,960	0	86,527	4,391	Direct	Direct
	8am December	20	0	5,164	0	0	285
		17,368	0.00	2.63	0	0	285
	Zone Peak Totals:	1,960	0	86,527	4,391		
	Total Zones: 1	20	0	5,164	0	0	285
	Unique Zones: 1	17,368	0.00	2.63	0	0	285

Air Handler #30 - Oficina 501 - Total Load Summary

Air Handler Description:	Oficina 501 Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.50 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.95	--- This system occurs 1 time(s) in the building. ---	

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	86,527 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,547 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			92,073 Btuh
Cooling Supply Air: 92,073 / (.977 X 1.1 X 17) =		5,164 CFM	
Summer Vent Outside Air (5.5% of supply) =		285 CFM	
Return duct sensible gain:	2,620 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	429 Btuh	285 CFM	
Blow-thru fan sensible gain:	6,195 Btuh		
Total sensible gain on return side of coil:			9,244 Btuh
Total sensible gain on air handling system:			101,317 Btuh
Zone space latent gain:	4,391 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	10,982 Btuh		
Total latent gain on air handling system:			15,373 Btuh
Total system sensible and latent gain:			116,691 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,164 CFM
Total Air Handler Vent. Air (5.52% of Supply):	285 CFM
Total Conditioned Air Space:	1,960 Sq.ft
Supply Air Per Unit Area:	2.6341 CFM/Sq.ft
Area Per Cooling Capacity:	201.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	9.72 Tons

Air Handler #31 - Oficina 502 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
31	Oficina 502 8am December	2,550 26 22,596	0 0 0.00	88,501 5,281 2.07	5,713 0 0	Direct 0 0	Direct 360 360
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,550 26 22,596	0 0 0.00	88,501 5,281 2.07	5,713 0 0	 0 0	 360 360

Air Handler #31 - Oficina 502 - Total Load Summary

Air Handler Description:	Oficina 502 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.56 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.94 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	88,501 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,673 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			94,174 Btuh
Cooling Supply Air: 94,174 / (.977 X 1.1 X 17) =		5,281 CFM	
Summer Vent Outside Air (6.8% of supply) =		360 CFM	
Return duct sensible gain:	2,643 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	541 Btuh	360 CFM	
Blow-thru fan sensible gain:	6,337 Btuh		
Total sensible gain on return side of coil:			9,521 Btuh
Total sensible gain on air handling system:			103,695 Btuh
Zone space latent gain:	5,713 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	13,872 Btuh		
Total latent gain on air handling system:			19,585 Btuh
Total system sensible and latent gain:			123,281 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,281 CFM
Total Air Handler Vent. Air (6.82% of Supply):	360 CFM
Total Conditioned Air Space:	2,550 Sq.ft
Supply Air Per Unit Area:	2.0708 CFM/Sq.ft
Area Per Cooling Capacity:	248.3 Sq.ft/Ton
Cooling Capacity Per Area:	0.0040 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.27 Tons

Air Handler #32 - Oficina 503 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
32	Oficicna 503 3pm May	2,339 23 20,726	0 0 0.00	91,560 5,464 2.34	5,240 0 0	Direct 0 0	Direct 330 330
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,339 23 20,726	0 0 0.00	91,560 5,464 2.34	5,240 0 0	 0 0	 330 330

Air Handler #32 - Oficina 503 - Total Load Summary

Air Handler Description:	Oficina 503 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.64 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	3pm in April.
Outdoor Conditions:	Clg: 85° DB, 75° WB, 117.48 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh			
Infiltration sensible loss:	0 Btuh	0	CFM	
Outside Air sensible loss:	0 Btuh	0	CFM	
Supply Duct sensible loss:	0 Btuh			
Return Duct sensible loss:	0 Btuh			
Return Plenum sensible loss:	0 Btuh			
Total System sensible loss:				0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0	CFM	
Winter Vent Outside Air (0.0% of supply) =		0	CFM	
Zone space sensible gain:	90,064 Btuh			
Infiltration sensible gain:	0 Btuh			
Draw-thru fan sensible gain:	0 Btuh			
Supply duct sensible gain:	5,869 Btuh			
Reserve sensible gain:	0 Btuh			
Total sensible gain on supply side of coil:				95,934 Btuh
Cooling Supply Air: 97,429 / (.977 X 1.1 X 17) =		5,464	CFM	
Summer Vent Outside Air (6.0% of supply) =		330	CFM	
Return duct sensible gain:	2,757 Btuh			
Return plenum sensible gain:	0 Btuh			
Outside air sensible gain:	4,750 Btuh	330	CFM	
Blow-thru fan sensible gain:	6,555 Btuh			
Total sensible gain on return side of coil:				14,063 Btuh
Total sensible gain on air handling system:				109,997 Btuh
Zone space latent gain:	5,240 Btuh			
Infiltration latent gain:	0 Btuh			
Outside air latent gain:	11,444 Btuh			
Total latent gain on air handling system:				16,684 Btuh
Total system sensible and latent gain:				126,680 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,464	CFM
Total Air Handler Vent. Air (6.04% of Supply):	330	CFM
Total Conditioned Air Space:	2,339	Sq.ft
Supply Air Per Unit Area:	2.3358	CFM/Sq.ft
Area Per Cooling Capacity:	221.6	Sq.ft/Ton
Cooling Capacity Per Area:	0.0045	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	10.56	Tons

Air Handler #33 - Hall Ascensores 5to Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
33	Hall Ascensores 5to Piso 7pm November	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	 0 0	 55 55

Air Handler #33 - Hall Ascensores 5to Piso - Total Load Summary

Air Handler Description:	Hall Ascensores 5to Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.23 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	8,026 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	515 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,541 Btuh
Cooling Supply Air: 8,541 / (.977 X 1.1 X 17) =		479 CFM	
Summer Vent Outside Air (11.5% of supply) =		55 CFM	
Return duct sensible gain:	228 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	851 Btuh	55 CFM	
Blow-thru fan sensible gain:	575 Btuh		
Total sensible gain on return side of coil:			1,653 Btuh
Total sensible gain on air handling system:			10,194 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,078 Btuh		
Total latent gain on air handling system:			3,198 Btuh
Total system sensible and latent gain:			13,392 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	479 CFM
Total Air Handler Vent. Air (11.48% of Supply):	55 CFM
Total Conditioned Air Space:	266 Sq.ft
Supply Air Per Unit Area:	1.7988 CFM/Sq.ft
Area Per Cooling Capacity:	238.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0042 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.12 Tons

Air Handler #34 - Corredor 1 5to Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
34	Corredor 1 - 5to Piso	164	0	5,823	896	Direct	Direct
	7pm November	4	0	348	0	0	40
		1,449	0.00	2.12	0	0	40
	Zone Peak Totals:	164	0	5,823	896		
	Total Zones: 1	4	0	348	0	0	40
	Unique Zones: 1	1,449	0.00	2.12	0	0	40

Air Handler #34 - Corredor 1 5to Piso - Total Load Summary

Air Handler Description:	Corredor 1 5to Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.17 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.87 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	5,823 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	373 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			6,197 Btuh
Cooling Supply Air: 6,197 / (.977 X 1.1 X 17) =		348 CFM	
Summer Vent Outside Air (11.5% of supply) =		40 CFM	
Return duct sensible gain:	165 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	417 Btuh		
Total sensible gain on return side of coil:			1,201 Btuh
Total sensible gain on air handling system:			7,398 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			9,805 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	348 CFM
Total Air Handler Vent. Air (11.51% of Supply):	40 CFM
Total Conditioned Air Space:	164 Sq.ft
Supply Air Per Unit Area:	2.1251 CFM/Sq.ft
Area Per Cooling Capacity:	200.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.82 Tons

Air Handler #35 - Corredor 2 5to Psio - Summary Loads

Zn No	Description / Zone Peak Time	Area / People / Volume	Htg.Loss / Htg.CFM / CFM/Sqft	Sen.Gain / Clg.CFM / CFM/Sqft	Lat.Gain / S.Exh / W.Exh	Htg.O.A. / Req.CFM / Act.CFM	Clg.O.A. / Req.CFM / Act.CFM
35	Corredor 2 - 5to Piso	190	0	6,630	896	Direct	Direct
	7pm November	4	0	396	0	0	40
		1,687	0.00	2.08	0	0	40
	Zone Peak Totals:	190	0	6,630	896		
	Total Zones: 1	4	0	396	0	0	40
	Unique Zones: 1	1,687	0.00	2.08	0	0	40

Air Handler #35 - Corredor 2 5to Psio - Total Load Summary

Air Handler Description:	Corredor 2 5to Psio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.19 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.89 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	6,630 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	425 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,055 Btuh
Cooling Supply Air: 7,055 / (.977 X 1.1 X 17) =		396 CFM	
Summer Vent Outside Air (10.1% of supply) =		40 CFM	
Return duct sensible gain:	191 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	475 Btuh		
Total sensible gain on return side of coil:			1,285 Btuh
Total sensible gain on air handling system:			8,340 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			10,747 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	396 CFM
Total Air Handler Vent. Air (10.11% of Supply):	40 CFM
Total Conditioned Air Space:	190 Sq.ft
Supply Air Per Unit Area:	2.0785 CFM/Sq.ft
Area Per Cooling Capacity:	212.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0047 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.90 Tons

Air Handler #36 - Oficina 601 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
36	Oficina 601	1,953	0	86,293	4,375	Direct	Direct
	8am December	20	0	5,150	0	0	285
		17,304	0.00	2.64	0	0	285
	Zone Peak Totals:	1,953	0	86,293	4,375		
	Total Zones: 1	20	0	5,150	0	0	285
	Unique Zones: 1	17,304	0.00	2.64	0	0	285

Air Handler #36 - Oficina 601 - Total Load Summary

Air Handler Description:	Oficina 601 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.49 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	86,293 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,532 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			91,825 Btuh
Cooling Supply Air: 91,825 / (.977 X 1.1 X 17) =		5,150 CFM	
Summer Vent Outside Air (5.5% of supply) =		285 CFM	
Return duct sensible gain:	2,613 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	429 Btuh	285 CFM	
Blow-thru fan sensible gain:	6,178 Btuh		
Total sensible gain on return side of coil:			9,220 Btuh
Total sensible gain on air handling system:			101,044 Btuh
Zone space latent gain:	4,375 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	10,982 Btuh		
Total latent gain on air handling system:			15,357 Btuh
Total system sensible and latent gain:			116,402 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,150 CFM
Total Air Handler Vent. Air (5.53% of Supply):	285 CFM
Total Conditioned Air Space:	1,953 Sq.ft
Supply Air Per Unit Area:	2.6367 CFM/Sq.ft
Area Per Cooling Capacity:	201.3 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	9.70 Tons

Air Handler #37 - Oficina 602 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
37	Oficina 602	2,550	0	88,501	5,713	Direct	Direct
	8am December	26	0	5,281	0	0	360
		22,596	0.00	2.07	0	0	360
	Zone Peak Totals:	2,550	0	88,501	5,713		
	Total Zones: 1	26	0	5,281	0	0	360
	Unique Zones: 1	22,596	0.00	2.07	0	0	360

Air Handler #37 - Oficina 602 - Total Load Summary

Air Handler Description:	Oficina 602 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.56 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.94

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh			
Infiltration sensible loss:	0 Btuh	0	CFM	
Outside Air sensible loss:	0 Btuh	0	CFM	
Supply Duct sensible loss:	0 Btuh			
Return Duct sensible loss:	0 Btuh			
Return Plenum sensible loss:	0 Btuh			
Total System sensible loss:				0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0	CFM	
Winter Vent Outside Air (0.0% of supply) =		0	CFM	
Zone space sensible gain:	88,501 Btuh			
Infiltration sensible gain:	0 Btuh			
Draw-thru fan sensible gain:	0 Btuh			
Supply duct sensible gain:	5,673 Btuh			
Reserve sensible gain:	0 Btuh			
Total sensible gain on supply side of coil:				94,174 Btuh
Cooling Supply Air: 94,174 / (.977 X 1.1 X 17) =		5,281	CFM	
Summer Vent Outside Air (6.8% of supply) =		360	CFM	
Return duct sensible gain:	2,643 Btuh			
Return plenum sensible gain:	0 Btuh			
Outside air sensible gain:	541 Btuh	360	CFM	
Blow-thru fan sensible gain:	6,337 Btuh			
Total sensible gain on return side of coil:				9,521 Btuh
Total sensible gain on air handling system:				103,695 Btuh
Zone space latent gain:	5,713 Btuh			
Infiltration latent gain:	0 Btuh			
Outside air latent gain:	13,872 Btuh			
Total latent gain on air handling system:				19,585 Btuh
Total system sensible and latent gain:				123,281 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,281	CFM
Total Air Handler Vent. Air (6.82% of Supply):	360	CFM
Total Conditioned Air Space:	2,550	Sq.ft
Supply Air Per Unit Area:	2.0708	CFM/Sq.ft
Area Per Cooling Capacity:	248.3	Sq.ft/Ton
Cooling Capacity Per Area:	0.0040	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	10.27	Tons

Air Handler #38 - Oficina 603 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
38	Oficicna 603 3pm May	2,339 23 20,726	0 0 0.00	91,560 5,464 2.34	5,240 0 0	Direct 0 0	Direct 330 330
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,339 23 20,726	0 0 0.00	91,560 5,464 2.34	5,240 0 0	 0 0	 330 330

Air Handler #38 - Oficina 603 - Total Load Summary

Air Handler Description:	Oficina 603 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.64 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	3pm in April.
Outdoor Conditions:	Clg: 85° DB, 75° WB, 117.48 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0	Btuh				
Infiltration sensible loss:	0	Btuh	0	CFM		
Outside Air sensible loss:	0	Btuh	0	CFM		
Supply Duct sensible loss:	0	Btuh				
Return Duct sensible loss:	0	Btuh				
Return Plenum sensible loss:	0	Btuh				
Total System sensible loss:					0	Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =			0	CFM		
Winter Vent Outside Air (0.0% of supply) =			0	CFM		
Zone space sensible gain:	90,064	Btuh				
Infiltration sensible gain:	0	Btuh				
Draw-thru fan sensible gain:	0	Btuh				
Supply duct sensible gain:	5,869	Btuh				
Reserve sensible gain:	0	Btuh				
Total sensible gain on supply side of coil:					95,934	Btuh
Cooling Supply Air: 97,429 / (.977 X 1.1 X 17) =			5,464	CFM		
Summer Vent Outside Air (6.0% of supply) =			330	CFM		
Return duct sensible gain:	2,757	Btuh				
Return plenum sensible gain:	0	Btuh				
Outside air sensible gain:	4,750	Btuh	330	CFM		
Blow-thru fan sensible gain:	6,555	Btuh				
Total sensible gain on return side of coil:					14,063	Btuh
Total sensible gain on air handling system:					109,997	Btuh
Zone space latent gain:	5,240	Btuh				
Infiltration latent gain:	0	Btuh				
Outside air latent gain:	11,444	Btuh				
Total latent gain on air handling system:					16,684	Btuh
Total system sensible and latent gain:					126,680	Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,464	CFM
Total Air Handler Vent. Air (6.04% of Supply):	330	CFM
Total Conditioned Air Space:	2,339	Sq.ft
Supply Air Per Unit Area:	2.3358	CFM/Sq.ft
Area Per Cooling Capacity:	221.6	Sq.ft/Ton
Cooling Capacity Per Area:	0.0045	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	10.56	Tons

Air Handler #39 - Hall Ascensores 6to Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
39	Hall Ascensores 6to Piso 7pm November	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	266 5 2,359	0 0 0.00	8,026 479 1.80	1,120 0 0	 0 0	 55 55

Air Handler #39 - Hall Ascensores 6to Piso - Total Load Summary

Air Handler Description:	Hall Ascensores 6to Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.23 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0	Btuh				
Infiltration sensible loss:	0	Btuh	0	CFM		
Outside Air sensible loss:	0	Btuh	0	CFM		
Supply Duct sensible loss:	0	Btuh				
Return Duct sensible loss:	0	Btuh				
Return Plenum sensible loss:	0	Btuh				
Total System sensible loss:					0	Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =			0	CFM		
Winter Vent Outside Air (0.0% of supply) =			0	CFM		
Zone space sensible gain:	8,026	Btuh				
Infiltration sensible gain:	0	Btuh				
Draw-thru fan sensible gain:	0	Btuh				
Supply duct sensible gain:	515	Btuh				
Reserve sensible gain:	0	Btuh				
Total sensible gain on supply side of coil:					8,541	Btuh
Cooling Supply Air: 8,541 / (.977 X 1.1 X 17) =			479	CFM		
Summer Vent Outside Air (11.5% of supply) =			55	CFM		
Return duct sensible gain:	228	Btuh				
Return plenum sensible gain:	0	Btuh				
Outside air sensible gain:	851	Btuh	55	CFM		
Blow-thru fan sensible gain:	575	Btuh				
Total sensible gain on return side of coil:					1,653	Btuh
Total sensible gain on air handling system:					10,194	Btuh
Zone space latent gain:	1,120	Btuh				
Infiltration latent gain:	0	Btuh				
Outside air latent gain:	2,078	Btuh				
Total latent gain on air handling system:					3,198	Btuh
Total system sensible and latent gain:					13,392	Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	479	CFM
Total Air Handler Vent. Air (11.48% of Supply):	55	CFM
Total Conditioned Air Space:	266	Sq.ft
Supply Air Per Unit Area:	1.7988	CFM/Sq.ft
Area Per Cooling Capacity:	238.6	Sq.ft/Ton
Cooling Capacity Per Area:	0.0042	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	1.12	Tons

Air Handler #40 - Corredor 1 6to Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
40	Corredor 1 - 6to Piso	164	0	5,823	896	Direct	Direct
	7pm November	4	0	348	0	0	40
		1,449	0.00	2.12	0	0	40
	Zone Peak Totals:	164	0	5,823	896		
	Total Zones: 1	4	0	348	0	0	40
	Unique Zones: 1	1,449	0.00	2.12	0	0	40

Air Handler #40 - Corredor 1 6to Piso - Total Load Summary

Air Handler Description:	Corredor 1 6to Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.17 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.87 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	5,823 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	373 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			6,197 Btuh
Cooling Supply Air: 6,197 / (.977 X 1.1 X 17) =		348 CFM	
Summer Vent Outside Air (11.5% of supply) =		40 CFM	
Return duct sensible gain:	165 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	417 Btuh		
Total sensible gain on return side of coil:			1,201 Btuh
Total sensible gain on air handling system:			7,398 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			9,805 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	348 CFM
Total Air Handler Vent. Air (11.51% of Supply):	40 CFM
Total Conditioned Air Space:	164 Sq.ft
Supply Air Per Unit Area:	2.1251 CFM/Sq.ft
Area Per Cooling Capacity:	200.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.82 Tons

Air Handler #41 - Corredor 2 6to Psio - Summary Loads

Zn No	Description / Zone Peak Time	Area / People / Volume	Htg.Loss / Htg.CFM / CFM/Sqft	Sen.Gain / Clg.CFM / CFM/Sqft	Lat.Gain / S.Exh / W.Exh	Htg.O.A. / Req.CFM / Act.CFM	Clg.O.A. / Req.CFM / Act.CFM
41	Corredor 2 - 6to Piso	190	0	6,630	896	Direct	Direct
	7pm November	4	0	396	0	0	40
		1,687	0.00	2.08	0	0	40
	Zone Peak Totals:	190	0	6,630	896		
	Total Zones: 1	4	0	396	0	0	40
	Unique Zones: 1	1,687	0.00	2.08	0	0	40

Air Handler #41 - Corredor 2 6to Psio - Total Load Summary

Air Handler Description:	Corredor 2 6to Psio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.19 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.89 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	4pm in March.
Outdoor Conditions:	Clg: 86° DB, 76° WB, 124.44 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	6,630 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	425 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,055 Btuh
Cooling Supply Air: 7,055 / (.977 X 1.1 X 17) =		396 CFM	
Summer Vent Outside Air (10.1% of supply) =		40 CFM	
Return duct sensible gain:	191 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	619 Btuh	40 CFM	
Blow-thru fan sensible gain:	475 Btuh		
Total sensible gain on return side of coil:			1,285 Btuh
Total sensible gain on air handling system:			8,340 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,511 Btuh		
Total latent gain on air handling system:			2,407 Btuh
Total system sensible and latent gain:			10,747 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	396 CFM
Total Air Handler Vent. Air (10.11% of Supply):	40 CFM
Total Conditioned Air Space:	190 Sq.ft
Supply Air Per Unit Area:	2.0785 CFM/Sq.ft
Area Per Cooling Capacity:	212.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0047 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.90 Tons

Air Handler #42 - Oficina 701 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
42	Oficina 701 8am December	2,006 20 17,771	0 0 0.00	89,789 5,358 2.67	4,493 0 0	Direct 0 0	Direct 285 285
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	2,006 20 17,771	0 0 0.00	89,789 5,358 2.67	4,493 0 0	 0 0	 285 285

Air Handler #42 - Oficina 701 - Total Load Summary

Air Handler Description:	Oficina 701 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.59 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.95 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	89,789 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,756 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			95,545 Btuh
Cooling Supply Air: 95,545 / (.977 X 1.1 X 17) =		5,358 CFM	
Summer Vent Outside Air (5.3% of supply) =		285 CFM	
Return duct sensible gain:	2,725 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	429 Btuh	285 CFM	
Blow-thru fan sensible gain:	6,429 Btuh		
Total sensible gain on return side of coil:			9,582 Btuh
Total sensible gain on air handling system:			105,127 Btuh
Zone space latent gain:	4,493 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	10,982 Btuh		
Total latent gain on air handling system:			15,475 Btuh
Total system sensible and latent gain:			120,602 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,358 CFM
Total Air Handler Vent. Air (5.32% of Supply):	285 CFM
Total Conditioned Air Space:	2,006 Sq.ft
Supply Air Per Unit Area:	2.6715 CFM/Sq.ft
Area Per Cooling Capacity:	199.6 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	10.05 Tons

Air Handler #43 - Oficina 702 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
43	Oficina 702	2,550	0	91,897	5,713	Direct	Direct
	8am December	26	0	5,484	0	0	360
		22,596	0.00	2.15	0	0	360
	Zone Peak Totals:	2,550	0	91,897	5,713		
	Total Zones: 1	26	0	5,484	0	0	360
	Unique Zones: 1	22,596	0.00	2.15	0	0	360

Air Handler #43 - Oficina 702 - Total Load Summary

Air Handler Description:	Oficina 702 Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.65 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.94 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	91,897 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	5,891 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			97,788 Btuh
Cooling Supply Air: 97,788 / (.977 X 1.1 X 17) =		5,484 CFM	
Summer Vent Outside Air (6.6% of supply) =		360 CFM	
Return duct sensible gain:	2,752 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	541 Btuh	360 CFM	
Blow-thru fan sensible gain:	6,580 Btuh		
Total sensible gain on return side of coil:			9,873 Btuh
Total sensible gain on air handling system:			107,661 Btuh
Zone space latent gain:	5,713 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	13,872 Btuh		
Total latent gain on air handling system:			19,585 Btuh
Total system sensible and latent gain:			127,247 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	5,484	CFM
Total Air Handler Vent. Air (6.56% of Supply):	360	CFM
Total Conditioned Air Space:	2,550	Sq.ft
Supply Air Per Unit Area:	2.1503	CFM/Sq.ft
Area Per Cooling Capacity:	240.5	Sq.ft/Ton
Cooling Capacity Per Area:	0.0042	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	10.60	Tons

Air Handler #44 - Oficina 703 - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
44	Oficicna 703	2,339	0	101,806	5,240	Direct	Direct
	4pm April	23	0	6,075	0	0	330
		20,726	0.00	2.60	0	0	330
	Zone Peak Totals:	2,339	0	101,806	5,240		
	Total Zones: 1	23	0	6,075	0	0	330
	Unique Zones: 1	20,726	0.00	2.60	0	0	330

Air Handler #44 - Oficina 703 - Total Load Summary

Air Handler Description:	Oficina 703 Constant Volume - Sum of Peaks		
Supply Air Fan:	Blow-Thru with program estimated horsepower of 2.94 HP		
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan		
Sensible Heat Ratio:	0.95		--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	4pm in April.
Outdoor Conditions:	Clg: 84° DB, 75° WB, 118.22 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	101,806 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	6,526 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			108,332 Btuh
Cooling Supply Air: 108,332 / (.977 X 1.1 X 17) =		6,075 CFM	
Summer Vent Outside Air (5.4% of supply) =		330 CFM	
Return duct sensible gain:	3,086 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	4,750 Btuh	330 CFM	
Blow-thru fan sensible gain:	7,289 Btuh		
Total sensible gain on return side of coil:			15,125 Btuh
Total sensible gain on air handling system:			123,457 Btuh
Zone space latent gain:	5,240 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	11,803 Btuh		
Total latent gain on air handling system:			17,042 Btuh
Total system sensible and latent gain:			140,499 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	6,075 CFM
Total Air Handler Vent. Air (5.43% of Supply):	330 CFM
Total Conditioned Air Space:	2,339 Sq.ft
Supply Air Per Unit Area:	2.5972 CFM/Sq.ft
Area Per Cooling Capacity:	199.8 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	11.71 Tons

Air Handler #45 - Hall Ascensores 7mo Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
45	Hall Ascensores 7mo Piso 7pm March	266 5 2,359	0 0 0.00	10,305 615 2.31	1,120 0 0	Direct 0 0	Direct 55 55
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	266 5 2,359	0 0 0.00	10,305 615 2.31	1,120 0 0	 0 0	 55 55

Air Handler #45 - Hall Ascensores 7mo Piso - Total Load Summary

Air Handler Description:	Hall Ascensores 7mo Piso Constant Volume - Sum of Peaks	
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.30 HP	
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan	
Sensible Heat Ratio:	0.91	--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	7pm in March.
Outdoor Conditions:	Clg: 81° DB, 75° WB, 125.40 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	10,305 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	661 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			10,966 Btuh
Cooling Supply Air: 10,966 / (.977 X 1.1 X 17) =		615 CFM	
Summer Vent Outside Air (8.9% of supply) =		55 CFM	
Return duct sensible gain:	301 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	555 Btuh	55 CFM	
Blow-thru fan sensible gain:	738 Btuh		
Total sensible gain on return side of coil:			1,594 Btuh
Total sensible gain on air handling system:			12,560 Btuh
Zone space latent gain:	1,120 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	2,147 Btuh		
Total latent gain on air handling system:			3,267 Btuh
Total system sensible and latent gain:			15,827 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	615 CFM
Total Air Handler Vent. Air (8.94% of Supply):	55 CFM
Total Conditioned Air Space:	266 Sq.ft
Supply Air Per Unit Area:	2.3096 CFM/Sq.ft
Area Per Cooling Capacity:	201.9 Sq.ft/Ton
Cooling Capacity Per Area:	0.0050 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.32 Tons

Air Handler #46 - Corredor 1 7mo Piso - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
46	Corredor 1 - 7mo Piso	164	0	7,223	896	Direct	Direct
	7pm March	4	0	431	0	0	40
		1,449	0.00	2.64	0	0	40
	Zone Peak Totals:	164	0	7,223	896		
	Total Zones: 1	4	0	431	0	0	40
	Unique Zones: 1	1,449	0.00	2.64	0	0	40

Air Handler #46 - Corredor 1 7mo Piso - Total Load Summary

Air Handler Description:	Corredor 1 7mo Piso Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.21 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.90 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	7pm in March.
Outdoor Conditions:	Clg: 81° DB, 75° WB, 125.40 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	7,223 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	463 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,686 Btuh
Cooling Supply Air: 7,686 / (.977 X 1.1 X 17) =		431 CFM	
Summer Vent Outside Air (9.3% of supply) =		40 CFM	
Return duct sensible gain:	210 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	404 Btuh	40 CFM	
Blow-thru fan sensible gain:	517 Btuh		
Total sensible gain on return side of coil:			1,131 Btuh
Total sensible gain on air handling system:			8,817 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,561 Btuh		
Total latent gain on air handling system:			2,457 Btuh
Total system sensible and latent gain:			11,275 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	431 CFM
Total Air Handler Vent. Air (9.28% of Supply):	40 CFM
Total Conditioned Air Space:	164 Sq.ft
Supply Air Per Unit Area:	2.6357 CFM/Sq.ft
Area Per Cooling Capacity:	174.1 Sq.ft/Ton
Cooling Capacity Per Area:	0.0057 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.94 Tons

Air Handler #47 - Corredor 2 7mo Psio - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
47	Corredor 2 - 7mo Piso 7pm March	190 4 1,687	0 0 0.00	8,260 493 2.59	896 0 0	Direct 0 0	Direct 40 40
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	190 4 1,687	0 0 0.00	8,260 493 2.59	896 0 0	 0 0	 40 40

Air Handler #47 - Corredor 2 7mo Psio - Total Load Summary

Air Handler Description:	Corredor 2 7mo Psio Constant Volume - Sum of Peaks
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.24 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.91 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	7pm in March.
Outdoor Conditions:	Clg: 81° DB, 75° WB, 125.40 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	8,260 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	530 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			8,789 Btuh
Cooling Supply Air: 8,789 / (.977 X 1.1 X 17) =		493 CFM	
Summer Vent Outside Air (8.1% of supply) =		40 CFM	
Return duct sensible gain:	243 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	404 Btuh	40 CFM	
Blow-thru fan sensible gain:	591 Btuh		
Total sensible gain on return side of coil:			1,239 Btuh
Total sensible gain on air handling system:			10,028 Btuh
Zone space latent gain:	896 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	1,561 Btuh		
Total latent gain on air handling system:			2,457 Btuh
Total system sensible and latent gain:			12,485 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	493 CFM
Total Air Handler Vent. Air (8.11% of Supply):	40 CFM
Total Conditioned Air Space:	190 Sq.ft
Supply Air Per Unit Area:	2.5891 CFM/Sq.ft
Area Per Cooling Capacity:	183.0 Sq.ft/Ton
Cooling Capacity Per Area:	0.0055 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	1.04 Tons

Air Handler #48 - Sala De Reuniones 1 Azotea - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
48	Sala De Reuniones1 - Azotea 8am December	371 19 3,284	0 0 0.00	29,685 1,772 4.78	4,256 0 0	Direct 0 0	Direct 150 150
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	371 19 3,284	0 0 0.00	29,685 1,772 4.78	4,256 0 0	 0 0	 150 150

Air Handler #48 - Sala De Reuniones 1 Azotea - Total Load Summary

Air Handler Description:	Sala De Reuniones 1 Azotea Variable Air Volume
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.86 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.88 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	29,685 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	1,903 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			31,588 Btuh
Cooling Supply Air: 31,588 / (.977 X 1.1 X 17) =		1,772 CFM	
Summer Vent Outside Air (8.5% of supply) =		150 CFM	
Return duct sensible gain:	871 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	226 Btuh	150 CFM	
Blow-thru fan sensible gain:	2,125 Btuh		
Total sensible gain on return side of coil:			3,222 Btuh
Total sensible gain on air handling system:			34,810 Btuh
Zone space latent gain:	4,256 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	5,780 Btuh		
Total latent gain on air handling system:			10,036 Btuh
Total system sensible and latent gain:			44,846 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	1,772 CFM
Total Air Handler Vent. Air (8.47% of Supply):	150 CFM
Total Conditioned Air Space:	371 Sq.ft
Supply Air Per Unit Area:	4.7788 CFM/Sq.ft
Area Per Cooling Capacity:	99.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0101 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	3.74 Tons

Air Handler #49 - Sala De Reuniones 2 Azotea - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
49	Sala De Reuniones 2 - Azotea 8am December	313 16 2,777	0 0 0.00	27,002 1,611 5.14	3,584 0 0	Direct 0 0	Direct 130 130
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	313 16 2,777	0 0 0.00	27,002 1,611 5.14	3,584 0 0	 0 0	 130 130

Air Handler #49 - Sala De Reuniones 2 Azotea - Total Load Summary

Air Handler Description:	Sala De Reuniones 2 Azotea Variable Air Volume
Supply Air Fan:	Blow-Thru with program estimated horsepower of 0.78 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.89 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	8am in December.
Outdoor Conditions:	Clg: 74° DB, 73° WB, 122.15 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Zone space sensible gain:	27,002 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	0 Btuh		
Supply duct sensible gain:	1,731 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			28,733 Btuh
Cooling Supply Air: 28,733 / (.977 X 1.1 X 17) =		1,611 CFM	
Summer Vent Outside Air (8.1% of supply) =		130 CFM	
Return duct sensible gain:	796 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	196 Btuh	130 CFM	
Blow-thru fan sensible gain:	1,933 Btuh		
Total sensible gain on return side of coil:			2,924 Btuh
Total sensible gain on air handling system:			31,657 Btuh
Zone space latent gain:	3,584 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	5,010 Btuh		
Total latent gain on air handling system:			8,594 Btuh
Total system sensible and latent gain:			40,251 Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	1,611 CFM
Total Air Handler Vent. Air (8.07% of Supply):	130 CFM
Total Conditioned Air Space:	313 Sq.ft
Supply Air Per Unit Area:	5.1409 CFM/Sq.ft
Area Per Cooling Capacity:	93.4 Sq.ft/Ton
Cooling Capacity Per Area:	0.0107 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	3.35 Tons

Air Handler #50 - Hall Ascensores Azotea - Summary Loads

Zn No	Description Zone Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
50	Hall Ascensores Azotea 5pm December	827 16 7,325	0 0 0.00	37,283 2,225 2.69	3,584 0 0	Direct 0 0	Direct 170 170
	Zone Peak Totals: Total Zones: 1 Unique Zones: 1	827 16 7,325	0 0 0.00	37,283 2,225 2.69	3,584 0 0	 0 0	 170 170

Air Handler #50 - Hall Ascensores Azotea - Total Load Summary

Air Handler Description:	Hall Ascensores Azotea Variable Air Volume
Supply Air Fan:	Blow-Thru with program estimated horsepower of 1.08 HP
Fan Input:	65% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.92

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	5pm in December.
Outdoor Conditions:	Clg: 85° DB, 76° WB, 126.16 grains
Indoor Conditions:	Clg: 72° DB, 55% RH

Summer: Ventilation controls outside air, ----- Winter: Exhaust controls outside air.

Zone Space sensible loss:	0	Btuh				
Infiltration sensible loss:	0	Btuh	0	CFM		
Outside Air sensible loss:	0	Btuh	0	CFM		
Supply Duct sensible loss:	0	Btuh				
Return Duct sensible loss:	0	Btuh				
Return Plenum sensible loss:	0	Btuh				
Total System sensible loss:					0	Btuh
Heating Supply Air: 0 / (.977 X 1.08 X 0) =			0	CFM		
Winter Vent Outside Air (0.0% of supply) =			0	CFM		
Zone space sensible gain:	37,283	Btuh				
Infiltration sensible gain:	0	Btuh				
Draw-thru fan sensible gain:	0	Btuh				
Supply duct sensible gain:	2,390	Btuh				
Reserve sensible gain:	0	Btuh				
Total sensible gain on supply side of coil:					39,673	Btuh
Cooling Supply Air: 39,673 / (.977 X 1.1 X 17) =			2,225	CFM		
Summer Vent Outside Air (7.6% of supply) =			170	CFM		
Return duct sensible gain:	1,104	Btuh				
Return plenum sensible gain:	0	Btuh				
Outside air sensible gain:	2,264	Btuh	170	CFM		
Blow-thru fan sensible gain:	2,669	Btuh				
Total sensible gain on return side of coil:					6,038	Btuh
Total sensible gain on air handling system:					45,711	Btuh
Zone space latent gain:	3,584	Btuh				
Infiltration latent gain:	0	Btuh				
Outside air latent gain:	6,608	Btuh				
Total latent gain on air handling system:					10,192	Btuh
Total system sensible and latent gain:					55,903	Btuh

Check Figures

Total Air Handler Supply Air (based on a 17° TD):	2,225	CFM
Total Air Handler Vent. Air (7.64% of Supply):	170	CFM
Total Conditioned Air Space:	827	Sq.ft
Supply Air Per Unit Area:	2.6914	CFM/Sq.ft
Area Per Cooling Capacity:	177.5	Sq.ft/Ton
Cooling Capacity Per Area:	0.0056	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	4.66	Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 1-Hall Sototano 6 peaks (sensible) in November at 7pm, Air Handler 1 (Hall Ascensores Sot 6), Group 0, 264.2 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	737.2152		10/15	0.351	2,588		5.265	3,881
Lights-Prof=0	344	1.000			1,174			
Equipment-Prof=0	528	1.000			1,803	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					6,814	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,632	1,120		0
Zone 2-Hall Sototano 5 peaks (sensible) in November at 7pm, Air Handler 2 (Hall Ascensores Sot 5), Group 0, 264.2 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	737.2152		10/15	0.351	2,588		5.265	3,881
Lights-Prof=0	344	1.000			1,174			
Equipment-Prof=0	528	1.000			1,803	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					6,814	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,632	1,120		0
Zone 3-Hall Sototano 4 peaks (sensible) in November at 7pm, Air Handler 3 (Hall Ascensores Sot 4), Group 0, 264.2 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	737.2152		10/15	0.351	2,588		5.265	3,881
Lights-Prof=0	344	1.000			1,174			
Equipment-Prof=0	528	1.000			1,803	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					6,814	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,632	1,120		0
Zone 4-Hall Sototano 3 peaks (sensible) in November at 7pm, Air Handler 4 (Hall Ascensores Sot 3), Group 0, 264.2 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	737.2152		10/15	0.351	2,588		5.265	3,881
Lights-Prof=0	344	1.000			1,174			
Equipment-Prof=0	528	1.000			1,803	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					6,814	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,632	1,120		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 5-Hall Sototano 2 peaks (sensible) in November at 7pm, Air Handler 5 (Hall Ascensores Sot 2), Group 0, 264.2 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	737.2152		10/15	0.351	2,588		5.265	3,881
Lights-Prof=0	344	1.000			1,174			
Equipment-Prof=0	528	1.000			1,803	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					6,814	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,632	1,120		0
Zone 6-Hall Sototano 1 peaks (sensible) in November at 7pm, Air Handler 6 (Hall Ascensores Sot 1), Group 0, 264.2 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	737.2152		10/15	0.351	2,588		5.265	3,881
Lights-Prof=0	344	1.000			1,174			
Equipment-Prof=0	528	1.000			1,803	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					6,814	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,632	1,120		0
Zone 7-Recepcion peaks (sensible) in December at 8am, Air Handler 7 (Recepcion), Group 0, 636.5 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	108	0.83	11.7	0.413	522		0.000	0
Partition-2-1	1431.432		10/15	0.351	5,024		5.265	7,536
Gls-SE-1-90-Tran	232.7	1.000	0	0.480	11		0.000	0
0%S-0-WS-Solar	232.7	0.650	190	0.740	21,267			
Lights-Prof=0	828	1.000			2,825			
Equipment-Prof=0	1,273	1.000			4,344	0		
People-Prof=1	19.0	1.000			4,750	3,800		
Sub-total					38,743	3,800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					43,392	4,256		0
Zone 8-Area De Proveedores peaks (sensible) in November at 7pm, Air Handler 8 (Sala De Proveedores), Group 0, 405.8 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	1122.336		10/15	0.351	3,939		5.265	5,909
Lights-Prof=0	454	1.000			1,551			
Equipment-Prof=0	812	1.000			2,769	0		
People-Prof=1	8.0	1.000			2,000	1,600		
Sub-total					10,260	1,600		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					11,491	1,792		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 9-Cuarto De Control peaks (sensible) in December at 8am, Air Handler 9 (Cuarto De Control), Group 0, 263.2 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	115	0.83	11.7	0.413	558		0.000	0
Partition-2-1	647.0928		10/15	0.351	2,271		5.265	3,407
Gls-SE-1-90-Tran	74.4	1.000	0	0.480	4		0.000	0
0%S-0-WS-Solar	74.4	0.650	190	0.740	6,802			
Lights-Prof=0	391	1.000			1,334			
Equipment-Prof=0	1,000	1.000			3,412	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					15,631	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					17,507	1,120		0
Zone 10-Local Comercial 101 peaks (sensible) in December at 8am, Air Handler 10 (LC-101 Comercio), Group 0, 2,407.2 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	100	0.83	11.7	0.413	482		0.000	0
Partition-2-1	3978.201		10/15	0.351	13,963		5.265	20,945
Gls-SE-1-90-Tran	215.0	1.000	0	0.480	10		0.000	0
0%S-0-WS-Solar	215.0	0.650	190	0.740	19,644			
Lights-Prof=0	4,027	1.000			13,741			
Equipment-Prof=0	4,814	1.000			16,427	0		
People-Prof=1	169.0	1.000			42,250	33,800		
Sub-total					106,518	33,800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					119,300	37,856		0
Zone 11-Local Comercial 102 peaks (sensible) in December at 8am, Air Handler 11 (LC 102 Comercio), Group 0, 2,890.0 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	100	0.83	11.7	0.413	484		0.000	0
Partition-2-1	3804.149		10/15	0.351	13,353		5.265	20,029
Gls-SE-1-90-Tran	216.0	1.000	0	0.480	10		0.000	0
0%S-0-WS-Solar	216.0	0.650	190	0.740	19,738			
Lights-Prof=0	4,835	1.000			16,498			
Equipment-Prof=0	5,780	1.000			19,722	0		
People-Prof=1	202.0	1.000			50,500	40,400		
Sub-total					120,305	40,400		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					134,742	45,248		0
Zone 12-Oficina 201 peaks (sensible) in December at 8am, Air Handler 12 (Oficina 201), Group 0, 1,953.1 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	94	0.83	11.7	0.413	456		0.000	0
Partition-2-1	2553.709		10/15	0.351	8,964		5.265	13,445
Gls-SE-1-90-Tran	462.5	1.000	0	0.480	22		0.000	0
0%S-0-WS-Solar	462.5	0.650	190	0.740	42,272			

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Lights-Prof=0	2,187	1.000			7,464			
Equipment-Prof=0	3,906	1.000			13,328	0		
People-Prof=1	19.5	1.000			4,883	3,906		
Sub-total					77,388	3,906		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					86,674	4,375		0

Zone 13-Oficina 202 peaks (sensible) in December at 8am, Air Handler 13 (Oficina 202), Group 0, 2,472.5 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-SE-C-M	86	0.83	11.7	0.413	414		0.000	0
Partition-2-1	1849.084		10/15	0.351	6,490		5.265	9,735
Gls-SE-1-90-Tran	420.7	1.000	0	0.480	20		0.000	0
0%S-0-WS-Solar	420.7	0.650	190	0.740	38,443			
Lights-Prof=0	2,769	1.000			9,449			
Equipment-Prof=0	4,945	1.000			16,873	0		
People-Prof=1	24.7	1.000			6,181	4,945		
Sub-total					77,871	4,945		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					87,216	5,538		0

Zone 14-Oficicna 203 peaks (sensible) in May at 3pm, Air Handler 14 (Oficina 203), Group 0, 2,339.2 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-NW-C-M	85	0.83	11.7	0.413	407		0.000	0
Partition-2-1	1890.871		10/15	0.351	6,637		5.265	9,955
Gls-NW-1-90-Tran	415.3	1.000	10	0.480	2,053		0.000	0
0%S-0-WS-Solar	415.3	0.650	187	0.830	41,901			
Lights-Prof=0	2,620	1.000			8,940			
Equipment-Prof=0	4,678	1.000			15,964	0		
People-Prof=1	23.4	1.000			5,848	4,678		
Sub-total					81,750	4,678		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					91,560	5,240		0

Zone 15-Hall Ascensores 2do Piso peaks (sensible) in November at 7pm, Air Handler 15 (Hall Ascensores 2do Piso), Group 0, 266.3 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	831.48		10/15	0.351	2,918		5.265	4,378
Lights-Prof=0	346	1.000			1,181			
Equipment-Prof=0	533	1.000			1,817	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					7,166	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					8,026	1,120		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 16-Corredor 1 - 2do Piso peaks (sensible) in November at 7pm, Air Handler 16 (Corredor 1 2do Piso), Group 0, 163.6 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	671.3668		10/15	0.351	2,356		5.265	3,535
Lights-Prof=0	213	1.000			727			
Equipment-Prof=0	327	1.000			1,116	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,199	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					5,823	896		0
Zone 17-Corredor 2 - 2do Piso peaks (sensible) in November at 7pm, Air Handler 17 (Corredor 2 2do Psio), Group 0, 190.4 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	790.439		10/15	0.351	2,774		5.265	4,162
Lights-Prof=0	248	1.000			846			
Equipment-Prof=0	381	1.000			1,299	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,920	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					6,630	896		0
Zone 18-Oficina 301 peaks (sensible) in December at 8am, Air Handler 18 (Oficina 301), Group 0, 1,960.3 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	94	0.83	11.7	0.413	453		0.000	0
Wall-2-SW-C-M	32	0.83	14.2	0.413	185		0.000	0
Wall-3-NW-C-M	32	0.83	6.7	0.413	89		0.000	0
Partition-4-1	1712.955		10/15	0.351	6,012		5.265	9,019
Gls-SE-1-90-Tran	460.2	1.000	0	0.480	22		0.000	0
0%S-0-WS-Solar	460.2	0.650	190	0.740	42,056			
Gls-SW-1-90-Tran	105.1	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	105.1	0.650	190	0.140	1,816			
Gls-NW-1-90-Tran	106.5	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	106.5	0.650	87	0.140	843			
Lights-Prof=0	2,196	1.000			7,491			
Equipment-Prof=0	3,921	1.000			13,378	0		
People-Prof=1	19.6	1.000			4,901	3,921		
Sub-total					77,256	3,921		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					86,527	4,391		0
Zone 19-Oficina 302 peaks (sensible) in December at 8am, Air Handler 19 (Oficina 302), Group 0, 2,550.4 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	86	0.83	11.7	0.413	414		0.000	0
Partition-2-1	1884.368		10/15	0.351	6,614		5.265	9,921
Gls-SE-1-90-Tran	420.7	1.000	0	0.480	20		0.000	0
0%S-0-WS-Solar	420.7	0.650	190	0.740	38,443			

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Lights-Prof=0	2,856	1.000			9,747			
Equipment-Prof=0	5,101	1.000			17,405	0		
People-Prof=1	25.5	1.000			6,376	5,101		
Sub-total					79,019	5,101		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					88,501	5,713		0

Zone 20-Oficicna 303 peaks (sensible) in May at 3pm, Air Handler 20 (Oficina 303), Group 0, 2,339.2 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-NW-C-M	85	0.83	11.7	0.413	407		0.000	0
Partition-2-1	1890.871		10/15	0.351	6,637		5.265	9,955
Gls-NW-1-90-Tran	415.3	1.000	10	0.480	2,053		0.000	0
0%S-0-WS-Solar	415.3	0.650	187	0.830	41,901			
Lights-Prof=0	2,620	1.000			8,940			
Equipment-Prof=0	4,678	1.000			15,964	0		
People-Prof=1	23.4	1.000			5,848	4,678		
Sub-total					81,750	4,678		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					91,560	5,240		0

Zone 21-Hall Ascensores 3er Piso peaks (sensible) in November at 7pm, Air Handler 21 (Hall Ascensores 3er Piso), Group 0, 266.3 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	831.48		10/15	0.351	2,918		5.265	4,378
Lights-Prof=0	346	1.000			1,181			
Equipment-Prof=0	533	1.000			1,817	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					7,166	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					8,026	1,120		0

Zone 22-Corredor 1 - 3er Piso peaks (sensible) in November at 7pm, Air Handler 22 (Corredor 1 3er Piso), Group 0, 163.6 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	671.3668		10/15	0.351	2,356		5.265	3,535
Lights-Prof=0	213	1.000			727			
Equipment-Prof=0	327	1.000			1,116	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,199	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					5,823	896		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 23-Corredor 2 - 3er Piso peaks (sensible) in November at 7pm, Air Handler 23 (Corredor 2 3er Psio), Group 0, 190.4 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	790.439		10/15	0.351	2,774		5.265	4,162
Lights-Prof=0	248	1.000			846			
Equipment-Prof=0	381	1.000			1,299	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,920	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					6,630	896		0
Zone 24-Oficina 401 peaks (sensible) in December at 8am, Air Handler 24 (Oficina 401), Group 0, 1,960.3 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	94	0.83	11.7	0.413	453		0.000	0
Wall-2-SW-C-M	32	0.83	14.2	0.413	185		0.000	0
Wall-3-NW-C-M	32	0.83	6.7	0.413	89		0.000	0
Partition-4-1	1712.955		10/15	0.351	6,012		5.265	9,019
Gls-SE-1-90-Tran	460.2	1.000	0	0.480	22		0.000	0
0%S-0-WS-Solar	460.2	0.650	190	0.740	42,056			
Gls-SW-1-90-Tran	105.1	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	105.1	0.650	190	0.140	1,816			
Gls-NW-1-90-Tran	106.5	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	106.5	0.650	87	0.140	843			
Lights-Prof=0	2,196	1.000			7,491			
Equipment-Prof=0	3,921	1.000			13,378	0		
People-Prof=1	19.6	1.000			4,901	3,921		
Sub-total					77,256	3,921		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					86,527	4,391		0
Zone 25-Oficina 402 peaks (sensible) in December at 8am, Air Handler 25 (Oficina 402), Group 0, 2,550.4 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	86	0.83	11.7	0.413	414		0.000	0
Partition-2-1	1884.368		10/15	0.351	6,614		5.265	9,921
Gls-SE-1-90-Tran	420.7	1.000	0	0.480	20		0.000	0
0%S-0-WS-Solar	420.7	0.650	190	0.740	38,443			
Lights-Prof=0	2,856	1.000			9,747			
Equipment-Prof=0	5,101	1.000			17,405	0		
People-Prof=1	25.5	1.000			6,376	5,101		
Sub-total					79,019	5,101		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					88,501	5,713		0
Zone 26-Oficicna 403 peaks (sensible) in May at 3pm, Air Handler 26 (Oficina 403), Group 0, 2,339.2 x 1.0, Construction Type: 1 (Light)								
Wall-1-NW-C-M	85	0.83	11.7	0.413	407		0.000	0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-2-1	1890.871		10/15	0.351	6,637		5.265	9,955
Gls-NW-1-90-Tran	415.3	1.000	10	0.480	2,053		0.000	0
0%S-0-WS-Solar	415.3	0.650	187	0.830	41,901			
Lights-Prof=0	2,620	1.000			8,940			
Equipment-Prof=0	4,678	1.000			15,964	0		
People-Prof=1	23.4	1.000			5,848	4,678		
Sub-total					81,750	4,678		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					91,560	5,240		0

Zone 27-Hall Ascensores 4to Piso peaks (sensible) in November at 7pm, Air Handler 27 (Hall Ascensores 4to Piso), Group 0, 266.3 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	831.48		10/15	0.351	2,918		5.265	4,378
Lights-Prof=0	346	1.000			1,181			
Equipment-Prof=0	533	1.000			1,817	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					7,166	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					8,026	1,120		0

Zone 28-Corredor 1 - 4to Piso peaks (sensible) in November at 7pm, Air Handler 28 (Corredor 1 4to Piso), Group 0, 163.6 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	671.3668		10/15	0.351	2,356		5.265	3,535
Lights-Prof=0	213	1.000			727			
Equipment-Prof=0	327	1.000			1,116	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,199	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					5,823	896		0

Zone 29-Corredor 2 - 4to Piso peaks (sensible) in November at 7pm, Air Handler 29 (Corredor 2 4to Psio), Group 0, 190.4 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	790.439		10/15	0.351	2,774		5.265	4,162
Lights-Prof=0	248	1.000			846			
Equipment-Prof=0	381	1.000			1,299	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,920	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					6,630	896		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Zone 30-Oficina 501 peaks (sensible) in December at 8am, Air Handler 30 (Oficina 501), Group 0, 1,960.3 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-SE-C-M	94	0.83	11.7	0.413	453		0.000	0
Wall-2-SW-C-M	32	0.83	14.2	0.413	185		0.000	0
Wall-3-NW-C-M	32	0.83	6.7	0.413	89		0.000	0
Partition-4-1	1712.955		10/15	0.351	6,012		5.265	9,019
Gls-SE-1-90-Tran	460.2	1.000	0	0.480	22		0.000	0
0%S-0-WS-Solar	460.2	0.650	190	0.740	42,056			
Gls-SW-1-90-Tran	105.1	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	105.1	0.650	190	0.140	1,816			
Gls-NW-1-90-Tran	106.5	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	106.5	0.650	87	0.140	843			
Lights-Prof=0	2,196	1.000			7,491			
Equipment-Prof=0	3,921	1.000			13,378	0		
People-Prof=1	19.6	1.000			4,901	3,921		
Sub-total					77,256	3,921		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					86,527	4,391		0

Zone 31-Oficina 502 peaks (sensible) in December at 8am, Air Handler 31 (Oficina 502), Group 0, 2,550.4 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-SE-C-M	86	0.83	11.7	0.413	414		0.000	0
Partition-2-1	1884.368		10/15	0.351	6,614		5.265	9,921
Gls-SE-1-90-Tran	420.7	1.000	0	0.480	20		0.000	0
0%S-0-WS-Solar	420.7	0.650	190	0.740	38,443			
Lights-Prof=0	2,856	1.000			9,747			
Equipment-Prof=0	5,101	1.000			17,405	0		
People-Prof=1	25.5	1.000			6,376	5,101		
Sub-total					79,019	5,101		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					88,501	5,713		0

Zone 32-Oficicna 503 peaks (sensible) in May at 3pm, Air Handler 32 (Oficina 503), Group 0, 2,339.2 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-NW-C-M	85	0.83	11.7	0.413	407		0.000	0
Partition-2-1	1890.871		10/15	0.351	6,637		5.265	9,955
Gls-NW-1-90-Tran	415.3	1.000	10	0.480	2,053		0.000	0
0%S-0-WS-Solar	415.3	0.650	187	0.830	41,901			
Lights-Prof=0	2,620	1.000			8,940			
Equipment-Prof=0	4,678	1.000			15,964	0		
People-Prof=1	23.4	1.000			5,848	4,678		
Sub-total					81,750	4,678		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					91,560	5,240		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 33-Hall Ascensores 5to Piso peaks (sensible) in November at 7pm, Air Handler 33 (Hall Ascensores 5to Piso), Group 0, 266.3 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	831.48		10/15	0.351	2,918		5.265	4,378
Lights-Prof=0	346	1.000			1,181			
Equipment-Prof=0	533	1.000			1,817	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					7,166	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					8,026	1,120		0
Zone 34-Corredor 1 - 5to Piso peaks (sensible) in November at 7pm, Air Handler 34 (Corredor 1 5to Piso), Group 0, 163.6 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	671.3668		10/15	0.351	2,356		5.265	3,535
Lights-Prof=0	213	1.000			727			
Equipment-Prof=0	327	1.000			1,116	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,199	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					5,823	896		0
Zone 35-Corredor 2 - 5to Piso peaks (sensible) in November at 7pm, Air Handler 35 (Corredor 2 5to Psio), Group 0, 190.4 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	790.439		10/15	0.351	2,774		5.265	4,162
Lights-Prof=0	248	1.000			846			
Equipment-Prof=0	381	1.000			1,299	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,920	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					6,630	896		0
Zone 36-Oficina 601 peaks (sensible) in December at 8am, Air Handler 36 (Oficina 601), Group 0, 1,953.1 x 1.0, Construction Type: 1 (Light)								
Wall-1-SE-C-M	94	0.83	11.7	0.413	453		0.000	0
Wall-2-SW-C-M	32	0.83	14.2	0.413	185		0.000	0
Wall-3-NW-C-M	32	0.83	6.7	0.413	89		0.000	0
Partition-4-1	1680.442		10/15	0.351	5,898		5.265	8,848
Gls-SE-1-90-Tran	460.2	1.000	0	0.480	22		0.000	0
0%S-0-WS-Solar	460.2	0.650	190	0.740	42,056			
Gls-SW-1-90-Tran	105.1	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	105.1	0.650	190	0.140	1,816			
Gls-NW-1-90-Tran	106.5	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	106.5	0.650	87	0.140	843			
Lights-Prof=0	2,187	1.000			7,464			
Equipment-Prof=0	3,906	1.000			13,328	0		
People-Prof=1	19.5	1.000			4,883	3,906		

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Sub-total					77,047	3,906		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					86,293	4,375		0

Zone 37-Oficina 602 peaks (sensible) in December at 8am, Air Handler 37 (Oficina 602), Group 0, 2,550.4 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-SE-C-M	86	0.83	11.7	0.413	414		0.000	0
Partition-2-1	1884.368		10/15	0.351	6,614		5.265	9,921
Gls-SE-1-90-Tran	420.7	1.000	0	0.480	20		0.000	0
0%S-0-WS-Solar	420.7	0.650	190	0.740	38,443			
Lights-Prof=0	2,856	1.000			9,747			
Equipment-Prof=0	5,101	1.000			17,405	0		
People-Prof=1	25.5	1.000			6,376	5,101		
Sub-total					79,019	5,101		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					88,501	5,713		0

Zone 38-Oficicna 603 peaks (sensible) in May at 3pm, Air Handler 38 (Oficina 603), Group 0, 2,339.2 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-1-NW-C-M	85	0.83	11.7	0.413	407		0.000	0
Partition-2-1	1890.871		10/15	0.351	6,637		5.265	9,955
Gls-NW-1-90-Tran	415.3	1.000	10	0.480	2,053		0.000	0
0%S-0-WS-Solar	415.3	0.650	187	0.830	41,901			
Lights-Prof=0	2,620	1.000			8,940			
Equipment-Prof=0	4,678	1.000			15,964	0		
People-Prof=1	23.4	1.000			5,848	4,678		
Sub-total					81,750	4,678		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					91,560	5,240		0

Zone 39-Hall Ascensores 6to Piso peaks (sensible) in November at 7pm, Air Handler 39 (Hall Ascensores 6to Piso), Group 0, 266.3 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Partition-1-1	831.48		10/15	0.351	2,918		5.265	4,378
Lights-Prof=0	346	1.000			1,181			
Equipment-Prof=0	533	1.000			1,817	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					7,166	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					8,026	1,120		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 40-Corredor 1 - 6to Piso peaks (sensible) in November at 7pm, Air Handler 40 (Corredor 1 6to Piso), Group 0, 163.6 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	671.3668		10/15	0.351	2,356		5.265	3,535
Lights-Prof=0	213	1.000			727			
Equipment-Prof=0	327	1.000			1,116	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,199	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					5,823	896		0
Zone 41-Corredor 2 - 6to Piso peaks (sensible) in November at 7pm, Air Handler 41 (Corredor 2 6to Psio), Group 0, 190.4 x 1.0, Construction Type: 1 (Light)								
Partition-1-1	790.439		10/15	0.351	2,774		5.265	4,162
Lights-Prof=0	248	1.000			846			
Equipment-Prof=0	381	1.000			1,299	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					5,920	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					6,630	896		0
Zone 42-Oficina 701 peaks (sensible) in December at 8am, Air Handler 42 (Oficina 701), Group 0, 2,005.7 x 1.0, Construction Type: 1 (Light)								
Roof-1-8-No.Clg-L	2,006	0.50	4.1	0.290	2,385		0.000	0
Wall-1-SE-C-M	94	0.83	11.7	0.413	454		0.000	0
Wall-2-SW-C-M	32	0.83	14.2	0.413	185		0.000	0
Wall-3-NW-C-M	32	0.83	6.7	0.413	89		0.000	0
Partition-4-1	1677.351		10/15	0.351	5,888		5.265	8,831
Gls-SE-1-90-Tran	460.8	1.000	0	0.480	22		0.000	0
0%S-0-WS-Solar	460.8	0.650	190	0.740	42,111			
Gls-SW-1-90-Tran	105.1	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	105.1	0.650	190	0.140	1,816			
Gls-NW-1-90-Tran	106.5	1.000	0	0.480	5		0.000	0
0%S-0-WS-Solar	106.5	0.650	87	0.140	843			
Lights-Prof=0	2,246	1.000			7,665			
Equipment-Prof=0	4,011	1.000			13,688	0		
People-Prof=1	20.1	1.000			5,014	4,011		
Sub-total					80,169	4,011		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					89,789	4,493		0
Zone 43-Oficina 702 peaks (sensible) in December at 8am, Air Handler 43 (Oficina 702), Group 0, 2,550.4 x 1.0, Construction Type: 1 (Light)								
Roof-1-8-No.Clg-L	2,550	0.50	4.1	0.290	3,032		0.000	0
Wall-1-SE-C-M	86	0.83	11.7	0.413	414		0.000	0
Partition-2-1	1884.368		10/15	0.351	6,614		5.265	9,921

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Gls-SE-1-90-Tran	420.7	1.000	0	0.480	20		0.000	0
0%S-0-WS-Solar	420.7	0.650	190	0.740	38,443			
Lights-Prof=0	2,856	1.000			9,747			
Equipment-Prof=0	5,101	1.000			17,405	0		
People-Prof=1	25.5	1.000			6,376	5,101		
Sub-total					82,051	5,101		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					91,897	5,713		0

Zone 44-Oficicna 703 peaks (sensible) in April at 4pm, Air Handler 44 (Oficina 703), Group 0, 2,339.2 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Roof-1-8-No.Clg-L	2,339	0.50	16.8	0.290	11,363		0.000	0
Wall-1-NW-C-M	85	0.83	14.7	0.413	513		0.000	0
Partition-2-1	1890.871		10/15	0.351	6,637		5.265	9,955
Gls-NW-1-90-Tran	415.3	1.000	13	0.480	2,492		0.000	0
0%S-0-WS-Solar	415.3	0.650	179	0.810	39,142			
Lights-Prof=0	2,620	1.000			8,940			
Equipment-Prof=0	4,678	1.000			15,964	0		
People-Prof=1	23.4	1.000			5,848	4,678		
Sub-total					90,898	4,678		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					101,806	5,240		0

Zone 45-Hall Ascensores 7mo Piso peaks (sensible) in March at 7pm, Air Handler 45 (Hall Ascensores 7mo Piso), Group 0, 266.3 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Roof-1-8-No.Clg-L	266	0.50	26.4	0.290	2,035		0.000	0
Partition-1-1	831.48		10/15	0.351	2,918		5.265	4,378
Lights-Prof=0	346	1.000			1,181			
Equipment-Prof=0	533	1.000			1,817	0		
People-Prof=1	5.0	1.000			1,250	1,000		
Sub-total					9,201	1,000		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					10,305	1,120		0

Zone 46-Corredor 1 - 7mo Piso peaks (sensible) in March at 7pm, Air Handler 46 (Corredor 1 7mo Piso), Group 0, 163.6 x 1.0, Construction Type: 1 (Light)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Roof-1-8-No.Clg-L	164	0.50	26.4	0.290	1,250		0.000	0
Partition-1-1	671.3668		10/15	0.351	2,356		5.265	3,535
Lights-Prof=0	213	1.000			727			
Equipment-Prof=0	327	1.000			1,116	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					6,449	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					7,223	896		0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Zone 47-Corredor 2 - 7mo Piso peaks (sensible) in March at 7pm, Air Handler 47 (Corredor 2 7mo Psio), Group 0, 190.4 x 1.0, Construction Type: 1 (Light)								
Roof-1-8-No.Clg-L	190	0.50	26.4	0.290	1,455		0.000	0
Partition-1-1	790.439		10/15	0.351	2,774		5.265	4,162
Lights-Prof=0	248	1.000			846			
Equipment-Prof=0	381	1.000			1,299	0		
People-Prof=1	4.0	1.000			1,000	800		
Sub-total					7,375	800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					8,260	896		0
Zone 48-Sala De Reuniones1 - Azotea peaks (sensible) in December at 8am, Air Handler 48 (Sala De Reuniones 1 Azotea), Group 0, 370.7 x 1.0, Construction Type: 1 (Light)								
Roof-1-8-No.Clg-L	371	0.50	4.1	0.290	441		0.000	0
Wall-1-SE-C-M	33	0.83	11.7	0.413	159		0.000	0
Partition-2-1	630.3258		10/15	0.351	2,212		5.265	3,319
Gls-SE-1-90-Tran	161.5	1.000	0	0.480	8		0.000	0
0%S-0-WS-Solar	161.5	0.650	190	0.740	14,760			
Lights-Prof=0	482	1.000			1,645			
Equipment-Prof=0	741	1.000			2,530	0		
People-Prof=1	19.0	1.000			4,750	3,800		
Sub-total					26,505	3,800		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					29,685	4,256		0
Zone 49-Sala De Reuniones 2 - Azotea peaks (sensible) in December at 8am, Air Handler 49 (Sala De Reuniones 2 Azotea), Group 0, 313.5 x 1.0, Construction Type: 1 (Light)								
Roof-1-8-No.Clg-L	313	0.50	4.1	0.290	373		0.000	0
Wall-1-SE-C-M	32	0.83	11.7	0.413	155		0.000	0
Wall-2-NE-C-M	175	0.83	4.2	0.413	308		0.000	0
Partition-3-1	392.3946		10/15	0.351	1,377		5.265	2,066
Gls-SE-1-90-Tran	157.1	1.000	0	0.480	8		0.000	0
0%S-0-WS-Solar	157.1	0.650	190	0.740	14,357			
Lights-Prof=0	408	1.000			1,392			
Equipment-Prof=0	627	1.000			2,139	0		
People-Prof=1	16.0	1.000			4,000	3,200		
Sub-total					24,109	3,200		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					27,002	3,584		0
Zone 50-Hall Ascensores Azotea peaks (sensible) in December at 5pm, Air Handler 50 (Hall Ascensores Azotea), Group 0, 826.7 x 1.0, Construction Type: 1 (Light)								
Roof-1-8-No.Clg-L	827	0.50	22.6	0.290	5,418		0.000	0
Wall-1-SE-C-M	16	0.83	21.7	0.413	142		0.000	0
Wall-2-NE-C-M	65	0.83	18.4	0.413	493		0.000	0

Zone Detailed Loads (At Zone Peak Times) (cont'd)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Wall-3-SW-C-M	264	0.83	15.9	0.413	1,733		0.000	0
Partition-4-1	1866.353		10/15	0.351	6,551		5.265	9,826
Gls-SE-1-90-Tran	78.2	1.000	13	0.480	491		0.000	0
0%S-0-WS-Solar	78.2	0.650	190	0.160	1,544			
Gls-NE-1-90-Tran	29.1	1.000	13	0.480	183		0.000	0
0%S-0-WS-Solar	29.1	0.650	87	0.180	296			
Gls-SW-1-90-Tran	29.1	1.000	13	0.480	183		0.000	0
0%S-0-WS-Solar	29.1	0.650	190	0.820	2,942			
Lights-Prof=0	1,076	1.000			3,671			
Equipment-Prof=0	1,653	1.000			5,642	0		
People-Prof=1	16.0	1.000			4,000	3,200		
Sub-total					33,289	3,200		0
Safety factors:					+12%	+12%		+12%
					---------	---------		---------
Total w/ safety factors:					37,283	3,584		0

Air System #1 (Hall Ascensores Sot 6) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.245		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			489	1.000	27
Zone Loads	1,120	3.703	7,632	15.599	428
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,121	71.600	455
Return Air Duct			215	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.979	851	1.678	
Blow-Thru Fan			546	1.117	
Entering Coil Condition	3,198	71.928	9,734	74.895	455

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH = 0.977 x 1.10 x 455 x (74.895 - 55.000) = 9,734 Btuh
TLH = 0.977 x 0.68 x 455 x (71.928 - 61.245) = 3,231 Btuh

SUM = 12,965 Btuh
GTH = 0.977 x 4.50 x 455 x (29.221 - 22.698) = 13,055 Btuh
Total System Load = 12,932 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM = 13,055 / (10.00 x 500) = 2.6 GPM
Heating GPM = 0 / (20.00 x 500) = 0.0 GPM
Steam Req. = 0 / 970 = 0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.90	
Wet bulb temperature:	63.61	
Relative humidity:	54.43	
Enthalpy:	29.22	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	53.83	
Relative humidity:	92.98	
Enthalpy:	22.70	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #2 (Hall Ascensores Sot 5) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.245		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			489	1.000	27
Zone Loads	1,120	3.703	7,632	15.599	428
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,121	71.600	455
Return Air Duct			215	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.979	851	1.678	
Blow-Thru Fan			546	1.117	
Entering Coil Condition	3,198	71.928	9,734	74.895	455

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH = 0.977 x 1.10 x 455 x (74.895 - 55.000) = 9,734 Btuh
TLH = 0.977 x 0.68 x 455 x (71.928 - 61.245) = 3,231 Btuh

SUM = 12,965 Btuh
GTH = 0.977 x 4.50 x 455 x (29.221 - 22.698) = 13,055 Btuh
Total System Load = 12,932 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM = 13,055 / (10.00 x 500) = 2.6 GPM
Heating GPM = 0 / (20.00 x 500) = 0.0 GPM
Steam Req. = 0 / 970 = 0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.90
Wet bulb temperature:	63.61
Relative humidity:	54.43
Enthalpy:	29.22 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	53.83
Relative humidity:	92.98
Enthalpy:	22.70 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #3 (Hall Ascensores Sot 4) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.245		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			489	1.000	27
Zone Loads	1,120	3.703	7,632	15.599	428
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,121	71.600	455
Return Air Duct			215	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.979	851	1.678	
Blow-Thru Fan			546	1.117	
Entering Coil Condition	3,198	71.928	9,734	74.895	455

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	455	x (	74.895	-	55.000	) =	9,734 Btuh
TLH	=	0.977	x	0.68	x	455	x (	71.928	-	61.245	) =	3,231 Btuh

SUM	=											12,965 Btuh
GTH	=	0.977	x	4.50	x	455	x (	29.221	-	22.698	) =	13,055 Btuh
Total System Load											=	12,932 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,055	/ (	10.00	x	500	)	=	2.6	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.90		Dry bulb temperature:	.00
Wet bulb temperature:	63.61			
Relative humidity:	54.43			
Enthalpy:	29.22	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.83			
Relative humidity:	92.98			
Enthalpy:	22.70	Btu/lbm		

Air System #4 (Hall Ascensores Sot 3) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.245		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			489	1.000	27
Zone Loads	1,120	3.703	7,632	15.599	428
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,121	71.600	455
Return Air Duct			215	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.979	851	1.678	
Blow-Thru Fan			546	1.117	
Entering Coil Condition	3,198	71.928	9,734	74.895	455

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	455	x (	74.895	-	55.000	) =	9,734	Btuh
TLH	=	0.977	x	0.68	x	455	x (	71.928	-	61.245	) =	3,231	Btuh

SUM	=											12,965	Btuh
GTH	=	0.977	x	4.50	x	455	x (	29.221	-	22.698	) =	13,055	Btuh
Total System Load											=	12,932	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,055	/ (	10.00	x	500	)	=	2.6	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.90	
Wet bulb temperature:	63.61	
Relative humidity:	54.43	
Enthalpy:	29.22	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	53.83	
Relative humidity:	92.98	
Enthalpy:	22.70	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #5 (Hall Ascensores Sot 2) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.245		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			489	1.000	27
Zone Loads	1,120	3.703	7,632	15.599	428
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,121	71.600	455
Return Air Duct			215	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.979	851	1.678	
Blow-Thru Fan			546	1.117	
Entering Coil Condition	3,198	71.928	9,734	74.895	455

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	455	x (	74.895	-	55.000	) =	9,734 Btuh
TLH	=	0.977	x	0.68	x	455	x (	71.928	-	61.245	) =	3,231 Btuh

SUM	=											12,965 Btuh
GTH	=	0.977	x	4.50	x	455	x (	29.221	-	22.698	) =	13,055 Btuh
Total System Load											=	12,932 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,055	/ (	10.00	x	500	)	=	2.6 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.90
Wet bulb temperature:	63.61
Relative humidity:	54.43
Enthalpy:	29.22 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	53.83
Relative humidity:	92.98
Enthalpy:	22.70 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #6 (Hall Ascensores Sot 1) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.245		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			489	1.000	27
Zone Loads	1,120	3.703	7,632	15.599	428
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,121	71.600	455
Return Air Duct			215	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.979	851	1.678	
Blow-Thru Fan			546	1.117	
Entering Coil Condition	3,198	71.928	9,734	74.895	455

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH = 0.977 x 1.10 x 455 x (74.895 - 55.000) = 9,734 Btuh
TLH = 0.977 x 0.68 x 455 x (71.928 - 61.245) = 3,231 Btuh

SUM = 12,965 Btuh
GTH = 0.977 x 4.50 x 455 x (29.221 - 22.698) = 13,055 Btuh
Total System Load = 12,932 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM = 13,055 / (10.00 x 500) = 2.6 GPM
Heating GPM = 0 / (20.00 x 500) = 0.0 GPM
Steam Req. = 0 / 970 = 0.0 lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.90		Dry bulb temperature:	.00
Wet bulb temperature:	63.61			
Relative humidity:	54.43			
Enthalpy:	29.22	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.83			
Relative humidity:	92.98			
Enthalpy:	22.70	Btu/lbm		

Air System #7 (Recepcion) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		62.474		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			2,782	1.000	156
Zone Loads	4,256	2.475	43,392	15.600	2,433
Sensible Reserve			0	0.000	0
Zone Condition	4,256	64.949	46,174	71.600	2,590
Return Air Duct			1,297	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 175 CFM	6,744	3.693	263	0.061	
Blow-Thru Fan			3,107	1.117	
Entering Coil Condition	11,000	68.642	50,841	73.278	2,590

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	2,590	x (	73.278	-	55.000	) = 50,842 Btuh
TLH	=	0.977	x	0.68	x	2,590	x (	68.642	-	62.474	) = 10,607 Btuh
											----------
SUM	=										61,448 Btuh
GTH	=	0.977	x	4.50	x	2,590	x (	28.312	-	22.889	) = 61,709 Btuh
Total System Load											= 61,840 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	61,709	/ (	10.00	x	500	)	=	12.3 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	73.28	
Wet bulb temperature:	62.37	
Relative humidity:	54.88	
Enthalpy:	28.31	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	54.14	
Relative humidity:	94.83	
Enthalpy:	22.89	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #8 (Sala De Proveedores) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.013		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			737	1.000	41
Zone Loads	1,792	3.935	11,491	15.599	644
Sensible Reserve			0	0.000	0
Zone Condition	1,792	64.949	12,227	71.600	686
Return Air Duct			323	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 85 CFM	3,212	7.164	1,315	1.723	
Blow-Thru Fan			823	1.117	
Entering Coil Condition	5,004	72.113	14,687	74.940	686

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	686	x (	74.940	-	55.000	) =	14,688	Btuh
TLH	=	0.977	x	0.68	x	686	x (	72.113	-	61.013	) =	5,054	Btuh

SUM	=											19,743	Btuh
GTH	=	0.977	x	4.50	x	686	x (	29.261	-	22.662	) =	19,883	Btuh
Total System Load											=	19,691	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	19,883	/ (	10.00	x	500	)	=	4.0	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.94		Dry bulb temperature:	.00
Wet bulb temperature:	63.66			
Relative humidity:	54.49			
Enthalpy:	29.26	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.77			
Relative humidity:	92.64			
Enthalpy:	22.66	Btu/lbm		

Air System #9 (Cuarto De Control) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.231		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			1,122	1.000	63
Zone Loads	1,120	1.614	17,507	15.599	982
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.845	18,630	71.600	1,045
Return Air Duct			532	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,119	2.882	83	0.047	
Blow-Thru Fan			1,254	1.117	
Entering Coil Condition	3,239	67.727	20,497	73.264	1,045

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	1,045	x (	73.264	-	55.000	) =	20,498	Btuh
TLH	=	0.977	x	0.68	x	1,045	x (	67.727	-	63.231	) =	3,120	Btuh
												----------	
SUM	=											23,618	Btuh
GTH	=	0.977	x	4.50	x	1,045	x (	28.166	-	23.006	) =	23,687	Btuh
Total System Load											=	23,737	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	23,687	/ (	10.00	x	500	)	=	4.7	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	73.26		Dry bulb temperature:	.00
Wet bulb temperature:	62.17			
Relative humidity:	54.18			
Enthalpy:	28.17	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	54.33			
Relative humidity:	95.97			
Enthalpy:	23.01	Btu/lbm		

Air System #10 (LC-101 Comercio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		56.945		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			7,647	1.000	429
Zone Loads	37,856	8.008	119,300	15.600	6,690
Sensible Reserve			0	0.000	0
Zone Condition	37,856	64.952	126,948	71.600	7,119
Return Air Duct			2,637	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 2,210 CFM	83,503	17.941	34,185	4.315	
Blow-Thru Fan			8,542	1.117	
Entering Coil Condition	121,359	82.893	172,311	77.532	7,119

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	7,119	x (	77.532	-	55.000	) = 172,311 Btuh
TLH	=	0.977	x	0.68	x	7,119	x (	82.893	-	56.945	) = 122,672 Btuh
											----------
SUM	=										294,984 Btuh
GTH	=	0.977	x	4.50	x	7,119	x (	31.582	-	22.031	) = 298,786 Btuh
Total System Load											= 280,688 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	298,786	/ (	10.00	x	500	)	=	59.8 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	77.53		Dry bulb temperature:	.00
Wet bulb temperature:	66.67			
Relative humidity:	57.33			
Enthalpy:	31.58	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	52.73			
Relative humidity:	86.55			
Enthalpy:	22.03	Btu/lbm		

Air System #11 (LC 102 Comercio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		56.475		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			8,637	1.000	484
Zone Loads	45,248	8.474	134,742	15.600	7,556
Sensible Reserve			0	0.000	0
Zone Condition	45,248	64.950	143,379	71.600	8,041
Return Air Duct			2,898	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 2,645 CFM	99,939	19.012	40,913	4.572	
Blow-Thru Fan			9,647	1.117	
Entering Coil Condition	145,187	83.962	196,838	77.789	8,041

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	8,041	x (	77.789	-	55.000	) =	196,839 Btuh
TLH	=	0.977	x	0.68	x	8,041	x (	83.962	-	56.475	) =	146,764 Btuh
												----------
SUM	=											343,602 Btuh
GTH	=	0.977	x	4.50	x	8,041	x (	31.812	-	21.959	) =	348,175 Btuh
Total System Load											=	328,981 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	348,175	/ (	10.00	x	500	)	=	69.6 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	77.79	
Wet bulb temperature:	66.95	
Relative humidity:	57.56	
Enthalpy:	31.81	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	52.60	
Relative humidity:	85.83	
Enthalpy:	21.96	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #12 (Oficina 201) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.592		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,556	1.000	312
Zone Loads	4,375	1.274	86,674	15.600	4,861
Sensible Reserve			0	0.000	0
Zone Condition	4,375	64.866	92,230	71.600	5,172
Return Air Duct			2,628	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 280 CFM	10,790	2.963	421	0.049	
Blow-Thru Fan			6,206	1.117	
Entering Coil Condition	15,165	67.829	101,485	73.266	5,172

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,172	x (	73.266	-	55.000	) =	101,485 Btuh
TLH	=	0.977	x	0.68	x	5,172	x (	67.829	-	63.592	) =	14,551 Btuh
												----------
SUM	=											116,037 Btuh
GTH	=	0.977	x	4.50	x	5,172	x (	28.182	-	23.062	) =	116,361 Btuh
Total System Load											=	116,650 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	116,361	/ (	10.00	x	500	)	=	23.3	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 73.27
Wet bulb temperature: 62.19
Relative humidity: 54.25
Enthalpy: 28.18 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.42
Relative humidity: 96.49
Enthalpy: 23.06 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #13 (Oficina 202) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.243		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,591	1.000	314
Zone Loads	5,538	1.602	87,216	15.600	4,891
Sensible Reserve			0	0.000	0
Zone Condition	5,538	64.846	92,806	71.600	5,205
Return Air Duct			2,605	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 355 CFM	13,680	3.735	534	0.061	
Blow-Thru Fan			6,244	1.117	
Entering Coil Condition	19,218	68.580	102,189	73.278	5,205

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,205	x (	73.278	-	55.000	) =	102,190 Btuh
TLH	=	0.977	x	0.68	x	5,205	x (	68.580	-	63.243	) =	18,445 Btuh
												----------
SUM	=											120,635 Btuh
GTH	=	0.977	x	4.50	x	5,205	x (	28.302	-	23.008	) =	121,081 Btuh
Total System Load											=	121,408 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	121,081	/ (	10.00	x	500	)	=	24.2 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 73.28
Wet bulb temperature: 62.35
Relative humidity: 54.82
Enthalpy: 28.30 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.33
Relative humidity: 96.00
Enthalpy: 23.01 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #14 (Oficina 203) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.411		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,869	1.000	329
Zone Loads	5,240	1.444	91,560	15.600	5,135
Sensible Reserve			0	0.000	0
Zone Condition	5,240	64.855	97,429	71.600	5,464
Return Air Duct			2,757	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 330 CFM	11,444	3.214	4,750	0.779	
Blow-Thru Fan			6,555	1.117	
Entering Coil Condition	16,684	68.069	111,492	73.996	5,464

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,464	x (	73.996	-	55.000	) =	111,492 Btuh
TLH	=	0.977	x	0.68	x	5,464	x (	68.069	-	63.411	) =	16,901 Btuh
												----------
SUM	=											128,393 Btuh
GTH	=	0.977	x	4.50	x	5,464	x (	28.398	-	23.034	) =	128,780 Btuh
Total System Load											=	126,680 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	128,780	/ (	10.00	x	500	)	=	25.8	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.00	
Wet bulb temperature:	62.49	
Relative humidity:	53.14	
Enthalpy:	28.40	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	54.38	
Relative humidity:	96.25	
Enthalpy:	23.03	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #15 (Hall Ascensores 2do Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.427		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			515	1.000	29
Zone Loads	1,120	3.521	8,026	15.599	450
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,541	71.600	479
Return Air Duct			228	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.637	851	1.596	
Blow-Thru Fan			575	1.117	
Entering Coil Condition	3,198	71.585	10,194	74.813	479

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	479	x (	74.813	-	55.000	) =	10,195	Btuh
TLH	=	0.977	x	0.68	x	479	x (	71.585	-	61.427	) =	3,231	Btuh

SUM	=											13,426	Btuh
GTH	=	0.977	x	4.50	x	479	x (	29.147	-	22.727	) =	13,515	Btuh
Total System Load											=	13,392	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,515	/ (	10.00	x	500	)	=	2.7	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.81		Dry bulb temperature:	.00
Wet bulb temperature:	63.51			
Relative humidity:	54.33			
Enthalpy:	29.15	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.88			
Relative humidity:	93.29			
Enthalpy:	22.73	Btu/lbm		

Air System #16 (Corredor 1 2do Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.066		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			373	1.000	21
Zone Loads	896	3.882	5,823	15.598	327
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	6,197	71.600	348
Return Air Duct			165	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	6.652	619	1.600	
Blow-Thru Fan			417	1.117	
Entering Coil Condition	2,407	71.600	7,398	74.817	348

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	348	x (	74.817	-	55.000	) =	7,398	Btuh
TLH	=	0.977	x	0.68	x	348	x (	71.600	-	61.066	) =	2,431	Btuh

SUM	=											9,830	Btuh
GTH	=	0.977	x	4.50	x	348	x (	29.150	-	22.671	) =	9,897	Btuh
Total System Load											=	9,805	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	9,897	/ (	10.00	x	500	)	=	2.0	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.82		Dry bulb temperature:	.00
Wet bulb temperature:	63.52			
Relative humidity:	54.34			
Enthalpy:	29.15	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.78			
Relative humidity:	92.74			
Enthalpy:	22.67	Btu/lbm		

Air System #17 (Corredor 2 2do Psio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.538		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			425	1.000	24
Zone Loads	896	3.410	6,630	15.598	372
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	7,055	71.600	396
Return Air Duct			191	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	5.842	619	1.405	
Blow-Thru Fan			475	1.117	
Entering Coil Condition	2,407	70.791	8,340	74.622	396

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	396	x (	74.622	-	55.000	) =	8,341 Btuh
TLH	=	0.977	x	0.68	x	396	x (	70.791	-	61.538	) =	2,431 Btuh

SUM	=											10,772 Btuh
GTH	=	0.977	x	4.50	x	396	x (	28.976	-	22.744	) =	10,838 Btuh
Total System Load											=	10,747 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	10,838	/ (	10.00	x	500	)	=	2.2 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.62	
Wet bulb temperature:	63.28	
Relative humidity:	54.07	
Enthalpy:	28.98	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	53.90	
Relative humidity:	93.41	
Enthalpy:	22.74	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #18 (Oficina 301) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.585		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,547	1.000	311
Zone Loads	4,391	1.281	86,527	15.600	4,853
Sensible Reserve			0	0.000	0
Zone Condition	4,391	64.865	92,073	71.600	5,164
Return Air Duct			2,620	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 285 CFM	10,982	3.021	429	0.050	
Blow-Thru Fan			6,195	1.117	
Entering Coil Condition	15,373	67.886	101,317	73.267	5,164

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,164	x (	73.267	-	55.000	) =	101,318 Btuh
TLH	=	0.977	x	0.68	x	5,164	x (	67.886	-	63.585	) =	14,749 Btuh
												----------
SUM	=											116,067 Btuh
GTH	=	0.977	x	4.50	x	5,164	x (	28.191	-	23.061	) =	116,398 Btuh
Total System Load											=	116,691 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	116,398	/ (	10.00	x	500	)	=	23.3 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	73.27	
Wet bulb temperature:	62.20	
Relative humidity:	54.31	
Enthalpy:	28.19	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	54.42	
Relative humidity:	96.49	
Enthalpy:	23.06	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #19 (Oficina 302) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.215		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,673	1.000	318
Zone Loads	5,713	1.629	88,501	15.600	4,963
Sensible Reserve			0	0.000	0
Zone Condition	5,713	64.844	94,174	71.600	5,281
Return Air Duct			2,643	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 360 CFM	13,872	3.732	541	0.061	
Blow-Thru Fan			6,337	1.117	
Entering Coil Condition	19,585	68.576	103,695	73.278	5,281

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,281	x (	73.278	-	55.000	) =	103,696	Btuh
TLH	=	0.977	x	0.68	x	5,281	x (	68.576	-	63.215	) =	18,802	Btuh
												----------	
SUM	=											122,498	Btuh
GTH	=	0.977	x	4.50	x	5,281	x (	28.302	-	23.004	) =	122,953	Btuh
Total System Load											=	123,281	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	122,953	/ (	10.00	x	500	)	=	24.6	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	73.28	
Wet bulb temperature:	62.35	
Relative humidity:	54.82	
Enthalpy:	28.30	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	54.32	
Relative humidity:	95.94	
Enthalpy:	23.00	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #20 (Oficina 303) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.411		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,869	1.000	329
Zone Loads	5,240	1.444	91,560	15.600	5,135
Sensible Reserve			0	0.000	0
Zone Condition	5,240	64.855	97,429	71.600	5,464
Return Air Duct			2,757	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 330 CFM	11,444	3.214	4,750	0.779	
Blow-Thru Fan			6,555	1.117	
Entering Coil Condition	16,684	68.069	111,492	73.996	5,464

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,464	x (	73.996	-	55.000	) =	111,492 Btuh
TLH	=	0.977	x	0.68	x	5,464	x (	68.069	-	63.411	) =	16,901 Btuh
												----------
SUM	=											128,393 Btuh
GTH	=	0.977	x	4.50	x	5,464	x (	28.398	-	23.034	) =	128,780 Btuh
Total System Load											=	126,680 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	128,780	/ (	10.00	x	500	)	=	25.8 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 74.00
Wet bulb temperature: 62.49
Relative humidity: 53.14
Enthalpy: 28.40 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.38
Relative humidity: 96.25
Enthalpy: 23.03 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #21 (Hall Ascensores 3er Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.427		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			515	1.000	29
Zone Loads	1,120	3.521	8,026	15.599	450
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,541	71.600	479
Return Air Duct			228	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.637	851	1.596	
Blow-Thru Fan			575	1.117	
Entering Coil Condition	3,198	71.585	10,194	74.813	479

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	479	x (	74.813	-	55.000	) =	10,195 Btuh
TLH	=	0.977	x	0.68	x	479	x (	71.585	-	61.427	) =	3,231 Btuh

SUM	=											13,426 Btuh
GTH	=	0.977	x	4.50	x	479	x (	29.147	-	22.727	) =	13,515 Btuh
Total System Load											=	13,392 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,515	/ (	10.00	x	500	)	=	2.7 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.81
Wet bulb temperature:	63.51
Relative humidity:	54.33
Enthalpy:	29.15 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	53.88
Relative humidity:	93.29
Enthalpy:	22.73 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #22 (Corredor 1 3er Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.066		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			373	1.000	21
Zone Loads	896	3.882	5,823	15.598	327
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	6,197	71.600	348
Return Air Duct			165	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	6.652	619	1.600	
Blow-Thru Fan			417	1.117	
Entering Coil Condition	2,407	71.600	7,398	74.817	348

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	348	x (	74.817	-	55.000	) = 7,398 Btuh
TLH	=	0.977	x	0.68	x	348	x (	71.600	-	61.066	) = 2,431 Btuh

SUM	=										9,830 Btuh
GTH	=	0.977	x	4.50	x	348	x (	29.150	-	22.671	) = 9,897 Btuh
Total System Load											= 9,805 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	9,897	/ (	10.00	x	500	)	=	2.0	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 74.82
Wet bulb temperature: 63.52
Relative humidity: 54.34
Enthalpy: 29.15 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 53.78
Relative humidity: 92.74
Enthalpy: 22.67 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #23 (Corredor 2 3er Psio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.538		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			425	1.000	24
Zone Loads	896	3.410	6,630	15.598	372
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	7,055	71.600	396
Return Air Duct			191	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	5.842	619	1.405	
Blow-Thru Fan			475	1.117	
Entering Coil Condition	2,407	70.791	8,340	74.622	396

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	396	x (	74.622	-	55.000	) =	8,341 Btuh
TLH	=	0.977	x	0.68	x	396	x (	70.791	-	61.538	) =	2,431 Btuh

SUM	=											10,772 Btuh
GTH	=	0.977	x	4.50	x	396	x (	28.976	-	22.744	) =	10,838 Btuh
Total System Load											=	10,747 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	10,838	/ (	10.00	x	500	)	=	2.2	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	74.62	Dry bulb temperature:	.00
Wet bulb temperature:	63.28		
Relative humidity:	54.07		
Enthalpy:	28.98 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	53.90		
Relative humidity:	93.41		
Enthalpy:	22.74 Btu/lbm		

Air System #24 (Oficina 401) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.585		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,547	1.000	311
Zone Loads	4,391	1.281	86,527	15.600	4,853
Sensible Reserve			0	0.000	0
Zone Condition	4,391	64.865	92,073	71.600	5,164
Return Air Duct			2,620	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 285 CFM	10,982	3.021	429	0.050	
Blow-Thru Fan			6,195	1.117	
Entering Coil Condition	15,373	67.886	101,317	73.267	5,164

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,164	x (	73.267	-	55.000	) = 101,318 Btuh
TLH	=	0.977	x	0.68	x	5,164	x (	67.886	-	63.585	) = 14,749 Btuh
											----------
SUM	=										116,067 Btuh
GTH	=	0.977	x	4.50	x	5,164	x (	28.191	-	23.061	) = 116,398 Btuh
Total System Load											= 116,691 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	116,398	/ (	10.00	x	500	)	=	23.3 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	73.27
Wet bulb temperature:	62.20
Relative humidity:	54.31
Enthalpy:	28.19 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	54.42
Relative humidity:	96.49
Enthalpy:	23.06 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #25 (Oficina 402) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.215		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,673	1.000	318
Zone Loads	5,713	1.629	88,501	15.600	4,963
Sensible Reserve			0	0.000	0
Zone Condition	5,713	64.844	94,174	71.600	5,281
Return Air Duct			2,643	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 360 CFM	13,872	3.732	541	0.061	
Blow-Thru Fan			6,337	1.117	
Entering Coil Condition	19,585	68.576	103,695	73.278	5,281

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,281	x (	73.278	-	55.000	) =	103,696 Btuh
TLH	=	0.977	x	0.68	x	5,281	x (	68.576	-	63.215	) =	18,802 Btuh
												----------
SUM	=											122,498 Btuh
GTH	=	0.977	x	4.50	x	5,281	x (	28.302	-	23.004	) =	122,953 Btuh
Total System Load											=	123,281 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	122,953	/ (	10.00	x	500	)	=	24.6 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	73.28	Dry bulb temperature:	.00
Wet bulb temperature:	62.35		
Relative humidity:	54.82		
Enthalpy:	28.30 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	54.32		
Relative humidity:	95.94		
Enthalpy:	23.00 Btu/lbm		

Air System #26 (Oficina 403) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.411		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,869	1.000	329
Zone Loads	5,240	1.444	91,560	15.600	5,135
Sensible Reserve			0	0.000	0
Zone Condition	5,240	64.855	97,429	71.600	5,464
Return Air Duct			2,757	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 330 CFM	11,444	3.214	4,750	0.779	
Blow-Thru Fan			6,555	1.117	
Entering Coil Condition	16,684	68.069	111,492	73.996	5,464

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,464	x (	73.996	-	55.000	) =	111,492	Btuh
TLH	=	0.977	x	0.68	x	5,464	x (	68.069	-	63.411	) =	16,901	Btuh
												----------	
SUM	=											128,393	Btuh
GTH	=	0.977	x	4.50	x	5,464	x (	28.398	-	23.034	) =	128,780	Btuh
Total System Load											=	126,680	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	128,780	/ (	10.00	x	500	)	=	25.8	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.00		Dry bulb temperature:	.00
Wet bulb temperature:	62.49			
Relative humidity:	53.14			
Enthalpy:	28.40	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	54.38			
Relative humidity:	96.25			
Enthalpy:	23.03	Btu/lbm		

Air System #27 (Hall Ascensores 4to Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.427		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			515	1.000	29
Zone Loads	1,120	3.521	8,026	15.599	450
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,541	71.600	479
Return Air Duct			228	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.637	851	1.596	
Blow-Thru Fan			575	1.117	
Entering Coil Condition	3,198	71.585	10,194	74.813	479

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	479	x (	74.813	-	55.000	) =	10,195 Btuh
TLH	=	0.977	x	0.68	x	479	x (	71.585	-	61.427	) =	3,231 Btuh

SUM	=											13,426 Btuh
GTH	=	0.977	x	4.50	x	479	x (	29.147	-	22.727	) =	13,515 Btuh
Total System Load											=	13,392 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,515	/ (	10.00	x	500	)	=	2.7 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	74.81	Dry bulb temperature:	.00
Wet bulb temperature:	63.51		
Relative humidity:	54.33		
Enthalpy:	29.15 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	53.88		
Relative humidity:	93.29		
Enthalpy:	22.73 Btu/lbm		

Air System #28 (Corredor 1 4to Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.066		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			373	1.000	21
Zone Loads	896	3.882	5,823	15.598	327
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	6,197	71.600	348
Return Air Duct			165	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	6.652	619	1.600	
Blow-Thru Fan			417	1.117	
Entering Coil Condition	2,407	71.600	7,398	74.817	348

General Psychrometric Equations Used In Analysis:

PR	=	(Barometric pressure of site / Standard ASHRAE pressure of 29.921)			
TSH	=	PR x	1.10	x CFM x (DB entering - DB leaving)	
TLH	=	PR x	0.68	x CFM x (Grains entering - Grains leaving)	
GTH	=	PR x	4.50	x CFM x (Enthalpy entering - Enthalpy leaving)	

TSH	=	0.977	x	1.10	x	348	x (	74.817	-	55.000	) =	7,398	Btuh
TLH	=	0.977	x	0.68	x	348	x (	71.600	-	61.066	) =	2,431	Btuh

SUM	=											9,830	Btuh
GTH	=	0.977	x	4.50	x	348	x (	29.150	-	22.671	) =	9,897	Btuh
Total System Load											=	9,805	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	9,897	/ (	10.00	x	500	)	=	2.0	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.82		Dry bulb temperature:	.00
Wet bulb temperature:	63.52			
Relative humidity:	54.34			
Enthalpy:	29.15	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.78			
Relative humidity:	92.74			
Enthalpy:	22.67	Btu/lbm		

Air System #29 (Corredor 2 4to Psio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.538		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			425	1.000	24
Zone Loads	896	3.410	6,630	15.598	372
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	7,055	71.600	396
Return Air Duct			191	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	5.842	619	1.405	
Blow-Thru Fan			475	1.117	
Entering Coil Condition	2,407	70.791	8,340	74.622	396

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	396	x (	74.622	-	55.000	) =	8,341	Btuh
TLH	=	0.977	x	0.68	x	396	x (	70.791	-	61.538	) =	2,431	Btuh

SUM	=											10,772	Btuh
GTH	=	0.977	x	4.50	x	396	x (	28.976	-	22.744	) =	10,838	Btuh
Total System Load											=	10,747	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	10,838	/ (	10.00	x	500	)	=	2.2	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	74.62		Dry bulb temperature:	.00
Wet bulb temperature:	63.28			
Relative humidity:	54.07			
Enthalpy:	28.98	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.90			
Relative humidity:	93.41			
Enthalpy:	22.74	Btu/lbm		

Air System #30 (Oficina 501) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.585		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,547	1.000	311
Zone Loads	4,391	1.281	86,527	15.600	4,853
Sensible Reserve			0	0.000	0
Zone Condition	4,391	64.865	92,073	71.600	5,164
Return Air Duct			2,620	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 285 CFM	10,982	3.021	429	0.050	
Blow-Thru Fan			6,195	1.117	
Entering Coil Condition	15,373	67.886	101,317	73.267	5,164

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,164	x (	73.267	-	55.000	) =	101,318 Btuh
TLH	=	0.977	x	0.68	x	5,164	x (	67.886	-	63.585	) =	14,749 Btuh
												----------
SUM	=											116,067 Btuh
GTH	=	0.977	x	4.50	x	5,164	x (	28.191	-	23.061	) =	116,398 Btuh
Total System Load											=	116,691 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	116,398	/ (	10.00	x	500	)	=	23.3 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 73.27
Wet bulb temperature: 62.20
Relative humidity: 54.31
Enthalpy: 28.19 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.42
Relative humidity: 96.49
Enthalpy: 23.06 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #31 (Oficina 502) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.215		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,673	1.000	318
Zone Loads	5,713	1.629	88,501	15.600	4,963
Sensible Reserve			0	0.000	0
Zone Condition	5,713	64.844	94,174	71.600	5,281
Return Air Duct			2,643	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 360 CFM	13,872	3.732	541	0.061	
Blow-Thru Fan			6,337	1.117	
Entering Coil Condition	19,585	68.576	103,695	73.278	5,281

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,281	x (	73.278	-	55.000	) =	103,696 Btuh
TLH	=	0.977	x	0.68	x	5,281	x (	68.576	-	63.215	) =	18,802 Btuh
												----------
SUM	=											122,498 Btuh
GTH	=	0.977	x	4.50	x	5,281	x (	28.302	-	23.004	) =	122,953 Btuh
Total System Load											=	123,281 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	122,953	/ (	10.00	x	500	)	=	24.6 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 73.28
Wet bulb temperature: 62.35
Relative humidity: 54.82
Enthalpy: 28.30 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.32
Relative humidity: 95.94
Enthalpy: 23.00 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #32 (Oficina 503) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.411		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,869	1.000	329
Zone Loads	5,240	1.444	91,560	15.600	5,135
Sensible Reserve			0	0.000	0
Zone Condition	5,240	64.855	97,429	71.600	5,464
Return Air Duct			2,757	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 330 CFM	11,444	3.214	4,750	0.779	
Blow-Thru Fan			6,555	1.117	
Entering Coil Condition	16,684	68.069	111,492	73.996	5,464

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,464	x (	73.996	-	55.000	) =	111,492 Btuh
TLH	=	0.977	x	0.68	x	5,464	x (	68.069	-	63.411	) =	16,901 Btuh
												----------
SUM	=											128,393 Btuh
GTH	=	0.977	x	4.50	x	5,464	x (	28.398	-	23.034	) =	128,780 Btuh
Total System Load											=	126,680 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	128,780	/ (	10.00	x	500	)	=	25.8 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	74.00	Dry bulb temperature:	.00
Wet bulb temperature:	62.49		
Relative humidity:	53.14		
Enthalpy:	28.40 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	54.38		
Relative humidity:	96.25		
Enthalpy:	23.03 Btu/lbm		

Air System #33 (Hall Ascensores 5to Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.427		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			515	1.000	29
Zone Loads	1,120	3.521	8,026	15.599	450
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,541	71.600	479
Return Air Duct			228	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.637	851	1.596	
Blow-Thru Fan			575	1.117	
Entering Coil Condition	3,198	71.585	10,194	74.813	479

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	479	x (	74.813	-	55.000	) =	10,195	Btuh
TLH	=	0.977	x	0.68	x	479	x (	71.585	-	61.427	) =	3,231	Btuh

SUM	=											13,426	Btuh
GTH	=	0.977	x	4.50	x	479	x (	29.147	-	22.727	) =	13,515	Btuh
Total System Load											=	13,392	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,515	/ (	10.00	x	500	)	=	2.7	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	74.81	Dry bulb temperature:	.00
Wet bulb temperature:	63.51		
Relative humidity:	54.33		
Enthalpy:	29.15 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	53.88		
Relative humidity:	93.29		
Enthalpy:	22.73 Btu/lbm		

Air System #34 (Corredor 1 5to Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.066		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			373	1.000	21
Zone Loads	896	3.882	5,823	15.598	327
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	6,197	71.600	348
Return Air Duct			165	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	6.652	619	1.600	
Blow-Thru Fan			417	1.117	
Entering Coil Condition	2,407	71.600	7,398	74.817	348

General Psychrometric Equations Used In Analysis:

PR	=	(Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH	=	PR x 1.10 x CFM x (DB entering - DB leaving)
TLH	=	PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH	=	PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	348	x (	74.817	-	55.000	) =	7,398	Btuh
TLH	=	0.977	x	0.68	x	348	x (	71.600	-	61.066	) =	2,431	Btuh

SUM	=											9,830	Btuh
GTH	=	0.977	x	4.50	x	348	x (	29.150	-	22.671	) =	9,897	Btuh
Total System Load											=	9,805	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	9,897	/ (	10.00	x	500	)	=	2.0	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.82	
Wet bulb temperature:	63.52	
Relative humidity:	54.34	
Enthalpy:	29.15	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	53.78	
Relative humidity:	92.74	
Enthalpy:	22.67	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #35 (Corredor 2 5to Psio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.538		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			425	1.000	24
Zone Loads	896	3.410	6,630	15.598	372
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	7,055	71.600	396
Return Air Duct			191	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	5.842	619	1.405	
Blow-Thru Fan			475	1.117	
Entering Coil Condition	2,407	70.791	8,340	74.622	396

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	396	x (	74.622	-	55.000	) =	8,341 Btuh
TLH	=	0.977	x	0.68	x	396	x (	70.791	-	61.538	) =	2,431 Btuh

SUM	=											10,772 Btuh
GTH	=	0.977	x	4.50	x	396	x (	28.976	-	22.744	) =	10,838 Btuh
Total System Load											=	10,747 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	10,838	/ (	10.00	x	500	)	=	2.2 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.62
Wet bulb temperature:	63.28
Relative humidity:	54.07
Enthalpy:	28.98 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	53.90
Relative humidity:	93.41
Enthalpy:	22.74 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #36 (Oficina 601) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.586		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,532	1.000	310
Zone Loads	4,375	1.279	86,293	15.600	4,839
Sensible Reserve			0	0.000	0
Zone Condition	4,375	64.866	91,825	71.600	5,150
Return Air Duct			2,613	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 285 CFM	10,982	3.029	429	0.050	
Blow-Thru Fan			6,178	1.117	
Entering Coil Condition	15,357	67.895	101,044	73.267	5,150

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,150	x (	73.267	-	55.000	) =	101,045	Btuh
TLH	=	0.977	x	0.68	x	5,150	x (	67.895	-	63.586	) =	14,733	Btuh
												----------	
SUM	=											115,778	Btuh
GTH	=	0.977	x	4.50	x	5,150	x (	28.192	-	23.061	) =	116,109	Btuh
Total System Load											=	116,402	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	116,109	/ (	10.00	x	500	)	=	23.2	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	73.27		Dry bulb temperature:	.00
Wet bulb temperature:	62.21			
Relative humidity:	54.32			
Enthalpy:	28.19	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	54.42			
Relative humidity:	96.49			
Enthalpy:	23.06	Btu/lbm		

Air System #37 (Oficina 602) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.215		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,673	1.000	318
Zone Loads	5,713	1.629	88,501	15.600	4,963
Sensible Reserve			0	0.000	0
Zone Condition	5,713	64.844	94,174	71.600	5,281
Return Air Duct			2,643	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 360 CFM	13,872	3.732	541	0.061	
Blow-Thru Fan			6,337	1.117	
Entering Coil Condition	19,585	68.576	103,695	73.278	5,281

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,281	x (	73.278	-	55.000	) =	103,696	Btuh
TLH	=	0.977	x	0.68	x	5,281	x (	68.576	-	63.215	) =	18,802	Btuh
												----------	
SUM	=											122,498	Btuh
GTH	=	0.977	x	4.50	x	5,281	x (	28.302	-	23.004	) =	122,953	Btuh
Total System Load											=	123,281	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	122,953	/ (	10.00	x	500	)	=	24.6	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 73.28
Wet bulb temperature: 62.35
Relative humidity: 54.82
Enthalpy: 28.30 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.32
Relative humidity: 95.94
Enthalpy: 23.00 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #38 (Oficina 603) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.411		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,869	1.000	329
Zone Loads	5,240	1.444	91,560	15.600	5,135
Sensible Reserve			0	0.000	0
Zone Condition	5,240	64.855	97,429	71.600	5,464
Return Air Duct			2,757	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 330 CFM	11,444	3.214	4,750	0.779	
Blow-Thru Fan			6,555	1.117	
Entering Coil Condition	16,684	68.069	111,492	73.996	5,464

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,464	x (	73.996	-	55.000	) =	111,492 Btuh
TLH	=	0.977	x	0.68	x	5,464	x (	68.069	-	63.411	) =	16,901 Btuh
												----------
SUM	=											128,393 Btuh
GTH	=	0.977	x	4.50	x	5,464	x (	28.398	-	23.034	) =	128,780 Btuh
Total System Load											=	126,680 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	128,780	/ (	10.00	x	500	)	=	25.8	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	74.00	Dry bulb temperature:	.00
Wet bulb temperature:	62.49		
Relative humidity:	53.14		
Enthalpy:	28.40 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	54.38		
Relative humidity:	96.25		
Enthalpy:	23.03 Btu/lbm		

Air System #39 (Hall Ascensores 6to Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.427		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			515	1.000	29
Zone Loads	1,120	3.521	8,026	15.599	450
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.948	8,541	71.600	479
Return Air Duct			228	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,078	6.637	851	1.596	
Blow-Thru Fan			575	1.117	
Entering Coil Condition	3,198	71.585	10,194	74.813	479

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	479	x (	74.813	-	55.000	) =	10,195	Btuh
TLH	=	0.977	x	0.68	x	479	x (	71.585	-	61.427	) =	3,231	Btuh

SUM	=											13,426	Btuh
GTH	=	0.977	x	4.50	x	479	x (	29.147	-	22.727	) =	13,515	Btuh
Total System Load											=	13,392	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	13,515	/ (	10.00	x	500	)	=	2.7	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.81	
Wet bulb temperature:	63.51	
Relative humidity:	54.33	
Enthalpy:	29.15	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	53.88	
Relative humidity:	93.29	
Enthalpy:	22.73	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #40 (Corredor 1 6to Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.066		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			373	1.000	21
Zone Loads	896	3.882	5,823	15.598	327
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	6,197	71.600	348
Return Air Duct			165	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	6.652	619	1.600	
Blow-Thru Fan			417	1.117	
Entering Coil Condition	2,407	71.600	7,398	74.817	348

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH = 0.977 x 1.10 x 348 x (74.817 - 55.000) = 7,398 Btuh
TLH = 0.977 x 0.68 x 348 x (71.600 - 61.066) = 2,431 Btuh

SUM = 9,830 Btuh
GTH = 0.977 x 4.50 x 348 x (29.150 - 22.671) = 9,897 Btuh
Total System Load = 9,805 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM = 9,897 / (10.00 x 500) = 2.0 GPM
Heating GPM = 0 / (20.00 x 500) = 0.0 GPM
Steam Req. = 0 / 970 = 0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.82
Wet bulb temperature:	63.52
Relative humidity:	54.34
Enthalpy:	29.15 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	53.78
Relative humidity:	92.74
Enthalpy:	22.67 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #41 (Corredor 2 6to Psio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.538		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			425	1.000	24
Zone Loads	896	3.410	6,630	15.598	372
Sensible Reserve			0	0.000	0
Zone Condition	896	64.948	7,055	71.600	396
Return Air Duct			191	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,511	5.842	619	1.405	
Blow-Thru Fan			475	1.117	
Entering Coil Condition	2,407	70.791	8,340	74.622	396

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	396	x (	74.622	-	55.000	) =	8,341	Btuh
TLH	=	0.977	x	0.68	x	396	x (	70.791	-	61.538	) =	2,431	Btuh

SUM	=											10,772	Btuh
GTH	=	0.977	x	4.50	x	396	x (	28.976	-	22.744	) =	10,838	Btuh
Total System Load											=	10,747	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	10,838	/ (	10.00	x	500	)	=	2.2	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.62	
Wet bulb temperature:	63.28	
Relative humidity:	54.07	
Enthalpy:	28.98	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	53.90	
Relative humidity:	93.41	
Enthalpy:	22.74	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #42 (Oficina 701) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.604		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,756	1.000	323
Zone Loads	4,493	1.263	89,789	15.600	5,035
Sensible Reserve			0	0.000	0
Zone Condition	4,493	64.867	95,545	71.600	5,358
Return Air Duct			2,725	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 285 CFM	10,982	2.911	429	0.048	
Blow-Thru Fan			6,429	1.117	
Entering Coil Condition	15,475	67.778	105,127	73.265	5,358

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,358	x (	73.265	-	55.000	) =	105,127 Btuh
TLH	=	0.977	x	0.68	x	5,358	x (	67.778	-	63.604	) =	14,851 Btuh
												----------
SUM	=											119,978 Btuh
GTH	=	0.977	x	4.50	x	5,358	x (	28.174	-	23.064	) =	120,307 Btuh
Total System Load											=	120,602 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	120,307	/ (	10.00	x	500	)	=	24.1	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 73.26
Wet bulb temperature: 62.18
Relative humidity: 54.22
Enthalpy: 28.17 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.42
Relative humidity: 96.53
Enthalpy: 23.06 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #43 (Oficina 702) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.280		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			5,891	1.000	330
Zone Loads	5,713	1.569	91,897	15.600	5,154
Sensible Reserve			0	0.000	0
Zone Condition	5,713	64.848	97,788	71.600	5,484
Return Air Duct			2,752	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 360 CFM	13,872	3.594	541	0.059	
Blow-Thru Fan			6,580	1.117	
Entering Coil Condition	19,585	68.442	107,661	73.276	5,484

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	5,484	x (	73.276	-	55.000	) =	107,662 Btuh
TLH	=	0.977	x	0.68	x	5,484	x (	68.442	-	63.280	) =	18,801 Btuh
												----------
SUM	=											126,463 Btuh
GTH	=	0.977	x	4.50	x	5,484	x (	28.280	-	23.014	) =	126,912 Btuh
Total System Load											=	127,247 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	126,912	/ (	10.00	x	500	)	=	25.4 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	73.28
Wet bulb temperature:	62.32
Relative humidity:	54.72
Enthalpy:	28.28 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	54.34
Relative humidity:	96.06
Enthalpy:	23.01 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #44 (Oficina 703) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		63.566		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			6,526	1.000	366
Zone Loads	5,240	1.299	101,806	15.600	5,709
Sensible Reserve			0	0.000	0
Zone Condition	5,240	64.864	108,332	71.600	6,075
Return Air Duct			3,086	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 330 CFM	11,803	2.890	4,750	0.701	
Blow-Thru Fan			7,289	1.117	
Entering Coil Condition	17,042	67.754	123,457	73.918	6,075

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	6,075	x (	73.918	-	55.000	) = 123,457 Btuh
TLH	=	0.977	x	0.68	x	6,075	x (	67.754	-	63.566	) = 16,899 Btuh
											----------
SUM	=										140,356 Btuh
GTH	=	0.977	x	4.50	x	6,075	x (	28.329	-	23.058	) = 140,727 Btuh
Total System Load											= 140,499 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	140,727	/ (	10.00	x	500	)	=	28.1 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	73.92	Dry bulb temperature:	.00
Wet bulb temperature:	62.40		
Relative humidity:	53.04		
Enthalpy:	28.33 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	54.41		
Relative humidity:	96.46		
Enthalpy:	23.06 Btu/lbm		

Air System #45 (Hall Ascensores 7mo Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		62.207		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			661	1.000	37
Zone Loads	1,120	2.742	10,305	15.599	578
Sensible Reserve			0	0.000	0
Zone Condition	1,120	64.949	10,966	71.600	615
Return Air Duct			301	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 55 CFM	2,147	5.337	555	0.796	
Blow-Thru Fan			738	1.117	
Entering Coil Condition	3,267	70.286	12,560	74.013	615

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	615	x (	74.013	-	55.000	) =	12,561 Btuh
TLH	=	0.977	x	0.68	x	615	x (	70.286	-	62.207	) =	3,300 Btuh

SUM	=											15,860 Btuh
GTH	=	0.977	x	4.50	x	615	x (	28.748	-	22.848	) =	15,948 Btuh
Total System Load											=	15,827 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	15,948	/ (	10.00	x	500	)	=	3.2 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature: 74.01
Wet bulb temperature: 62.97
Relative humidity: 54.80
Enthalpy: 28.75 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature: .00

Leaving Cooling Coil Conditions

Dry bulb temperature: 55.00
Wet bulb temperature: 54.07
Relative humidity: 94.46
Enthalpy: 22.85 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature: .00

Air System #46 (Corredor 1 7mo Piso) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.820		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			463	1.000	26
Zone Loads	896	3.130	7,223	15.599	405
Sensible Reserve			0	0.000	0
Zone Condition	896	64.950	7,686	71.600	431
Return Air Duct			210	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,561	5.538	404	0.826	
Blow-Thru Fan			517	1.117	
Entering Coil Condition	2,457	70.487	8,817	74.043	431

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	431	x (	74.043	-	55.000	) =	8,818 Btuh
TLH	=	0.977	x	0.68	x	431	x (	70.487	-	61.820	) =	2,481 Btuh

SUM	=											11,299 Btuh
GTH	=	0.977	x	4.50	x	431	x (	28.787	-	22.788	) =	11,365 Btuh
Total System Load											=	11,275 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	11,365	/ (	10.00	x	500	)	=	2.3 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	74.04
Wet bulb temperature:	63.02
Relative humidity:	54.89
Enthalpy:	28.79 Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	.00

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00
Wet bulb temperature:	53.97
Relative humidity:	93.84
Enthalpy:	22.79 Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	.00

Air System #47 (Corredor 2 7mo Psio) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		62.212		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			530	1.000	30
Zone Loads	896	2.737	8,260	15.599	463
Sensible Reserve			0	0.000	0
Zone Condition	896	64.949	8,789	71.600	493
Return Air Duct			243	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 40 CFM	1,561	4.843	404	0.722	
Blow-Thru Fan			591	1.117	
Entering Coil Condition	2,457	69.792	10,028	73.939	493

General Psychrometric Equations Used In Analysis:

PR	=	(Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH	=	PR x 1.10 x CFM x (DB entering - DB leaving)
TLH	=	PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH	=	PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	493	x (	73.939	-	55.000	) =	10,028 Btuh
TLH	=	0.977	x	0.68	x	493	x (	69.792	-	62.212	) =	2,481 Btuh

SUM	=											12,510 Btuh
GTH	=	0.977	x	4.50	x	493	x (	28.653	-	22.848	) =	12,574 Btuh
Total System Load											=	12,485 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	12,574	/ (	10.00	x	500	)	=	2.5 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	73.94	Dry bulb temperature:	.00
Wet bulb temperature:	62.84		
Relative humidity:	54.57		
Enthalpy:	28.65 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	54.07		
Relative humidity:	94.46		
Enthalpy:	22.85 Btu/lbm		

Air System #48 (Sala De Reuniones 1 Azotea) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.331		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			1,903	1.000	107
Zone Loads	4,256	3.618	29,685	15.600	1,665
Sensible Reserve			0	0.000	0
Zone Condition	4,256	64.949	31,588	71.600	1,772
Return Air Duct			871	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 150 CFM	5,780	4.627	226	0.076	
Blow-Thru Fan			2,125	1.117	
Entering Coil Condition	10,036	69.576	34,810	73.293	1,772

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	1,772	x (	73.293	-	55.000	) =	34,811	Btuh
TLH	=	0.977	x	0.68	x	1,772	x (	69.576	-	61.331	) =	9,699	Btuh
												----------	
SUM	=											44,510	Btuh
GTH	=	0.977	x	4.50	x	1,772	x (	28.462	-	22.712	) =	44,761	Btuh
Total System Load											=	44,846	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	44,761	/ (	10.00	x	500	)	=	9.0	GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	970				=	0.0	lb./hr

Entering Cooling Coil Conditions			Entering Heating Coil Conditions	
Dry bulb temperature:	73.29		Dry bulb temperature:	.00
Wet bulb temperature:	62.57			
Relative humidity:	55.58			
Enthalpy:	28.46	Btu/lbm		

Leaving Cooling Coil Conditions			Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00		Dry bulb temperature:	.00
Wet bulb temperature:	53.85			
Relative humidity:	93.10			
Enthalpy:	22.71	Btu/lbm		

Air System #49 (Sala De Reuniones 2 Azotea) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		61.599		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			1,731	1.000	97
Zone Loads	3,584	3.349	27,002	15.600	1,514
Sensible Reserve			0	0.000	0
Zone Condition	3,584	64.948	28,733	71.600	1,611
Return Air Duct			796	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 130 CFM	5,010	4.409	196	0.073	
Blow-Thru Fan			1,933	1.117	
Entering Coil Condition	8,594	69.357	31,657	73.290	1,611

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	1,611	x (	73.290	-	55.000	) =	31,658 Btuh
TLH	=	0.977	x	0.68	x	1,611	x (	69.357	-	61.599	) =	8,302 Btuh
												----------
SUM	=											39,959 Btuh
GTH	=	0.977	x	4.50	x	1,611	x (	28.426	-	22.753	) =	40,172 Btuh
Total System Load											=	40,251 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	40,172	/ (	10.00	x	500	)	=	8.0 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	73.29	Dry bulb temperature:	.00
Wet bulb temperature:	62.53		
Relative humidity:	55.42		
Enthalpy:	28.43 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	53.92		
Relative humidity:	93.53		
Enthalpy:	22.75 Btu/lbm		

Air System #50 (Hall Ascensores Azotea) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		62.523		55.000	
Draw-Thru Fan			0	0.000	0
Misc Load on Supply Side			0	0.000	0
Supply Air Duct			2,390	1.000	134
Zone Loads	3,584	2.426	37,283	15.600	2,091
Sensible Reserve			0	0.000	0
Zone Condition	3,584	64.949	39,673	71.600	2,225
Return Air Duct			1,104	0.500	
Return Air Plenum			0	0.000	
Misc Load on Return Side			0	0.000	
Vent Air 170 CFM	6,608	4.542	2,264	0.986	
Blow-Thru Fan			2,669	1.117	
Entering Coil Condition	10,192	69.490	45,711	74.203	2,225

General Psychrometric Equations Used In Analysis:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.977	x	1.10	x	2,225	x (	74.203	-	55.000	) =	45,894 Btuh
TLH	=	0.977	x	0.68	x	2,225	x (	69.490	-	62.523	) =	10,294 Btuh
												----------
SUM	=											56,188 Btuh
GTH	=	0.977	x	4.50	x	2,225	x (	28.670	-	22.897	) =	56,452 Btuh
Total System Load											=	55,903 Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

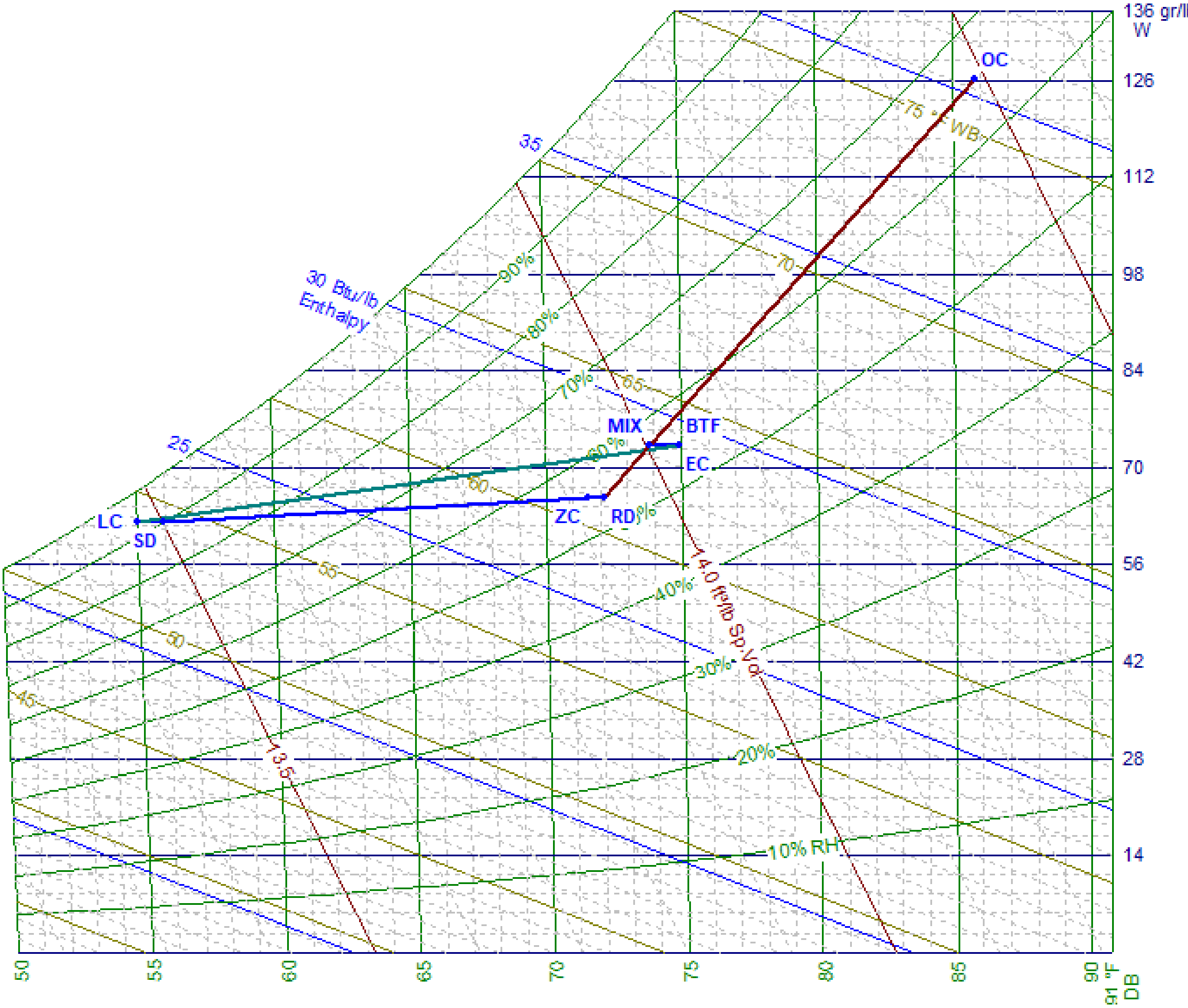
Cooling GPM	=	56,452	/ (	10.00	x	500	)	=	11.3 GPM
Heating GPM	=	0	/ (	20.00	x	500	)	=	0.0 GPM
Steam Req.	=	0	/	970				=	0.0 lb./hr

Entering Cooling Coil Conditions		Entering Heating Coil Conditions	
Dry bulb temperature:	74.20	Dry bulb temperature:	.00
Wet bulb temperature:	62.86		
Relative humidity:	53.84		
Enthalpy:	28.67 Btu/lbm		

Leaving Cooling Coil Conditions		Leaving Heating Coil Conditions	
Dry bulb temperature:	55.00	Dry bulb temperature:	.00
Wet bulb temperature:	54.15		
Relative humidity:	94.89		
Enthalpy:	22.90 Btu/lbm		

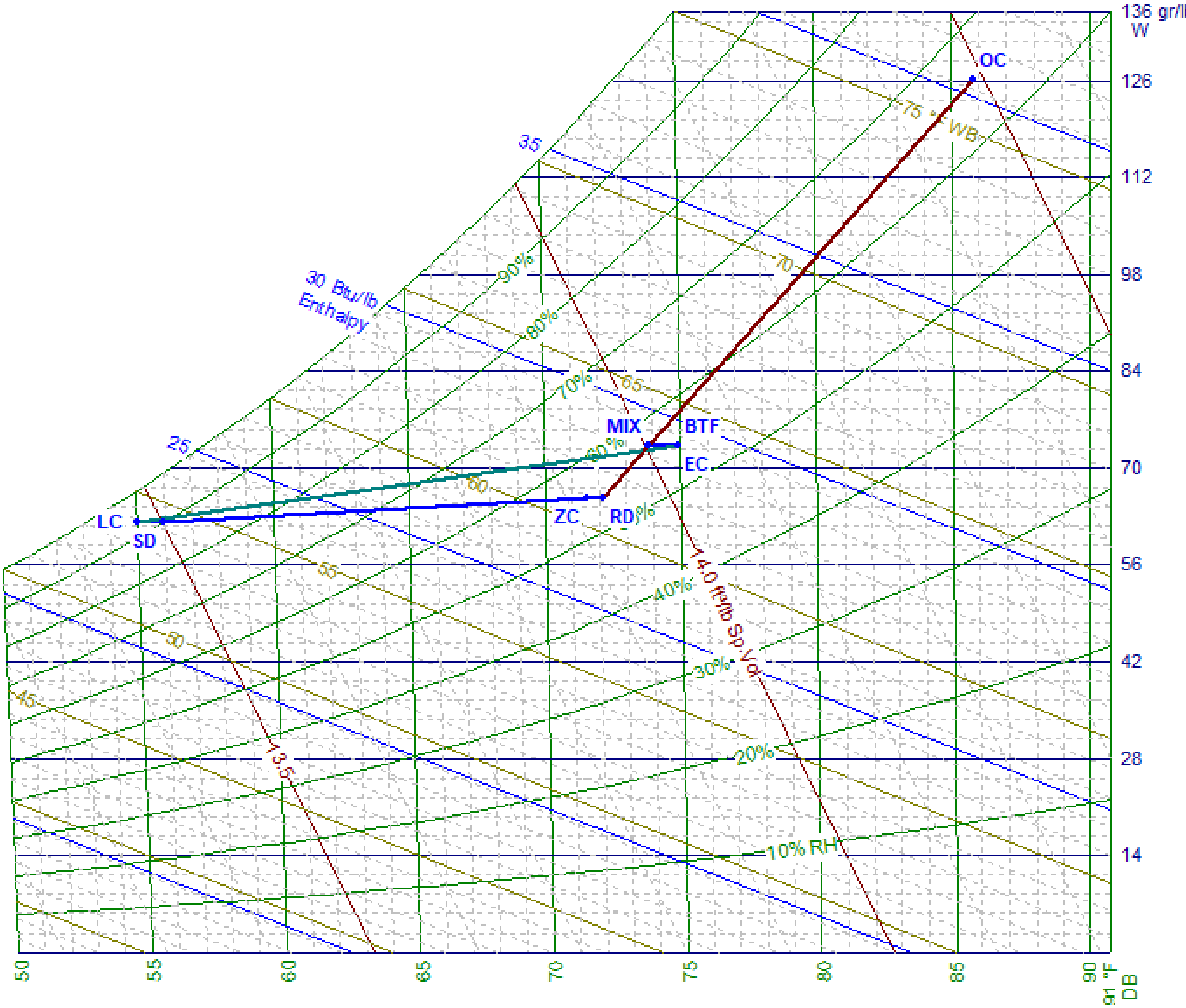
Air System #1 (Hall Ascensores Sot 6) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



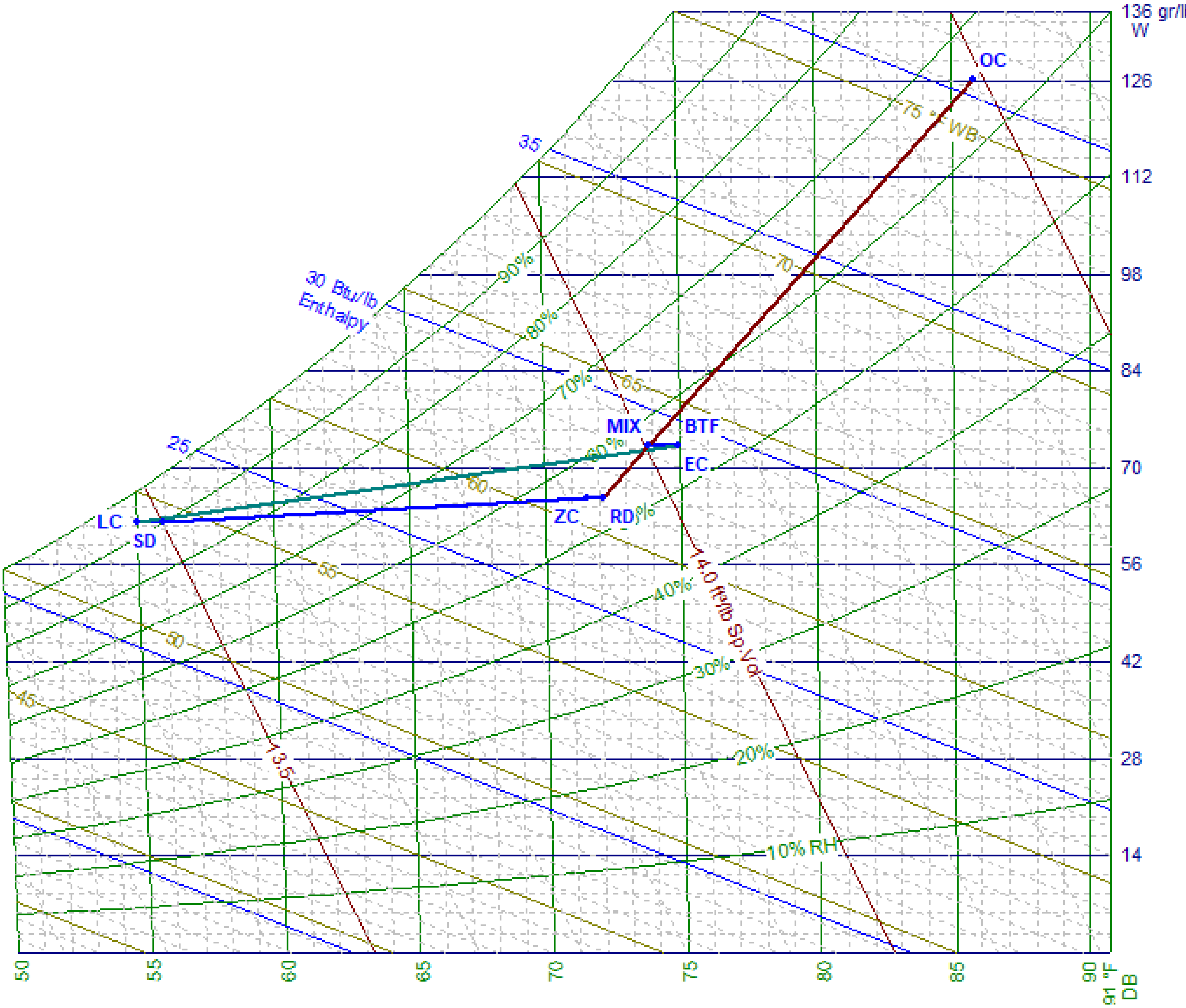
Air System #2 (Hall Ascensores Sot 5) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



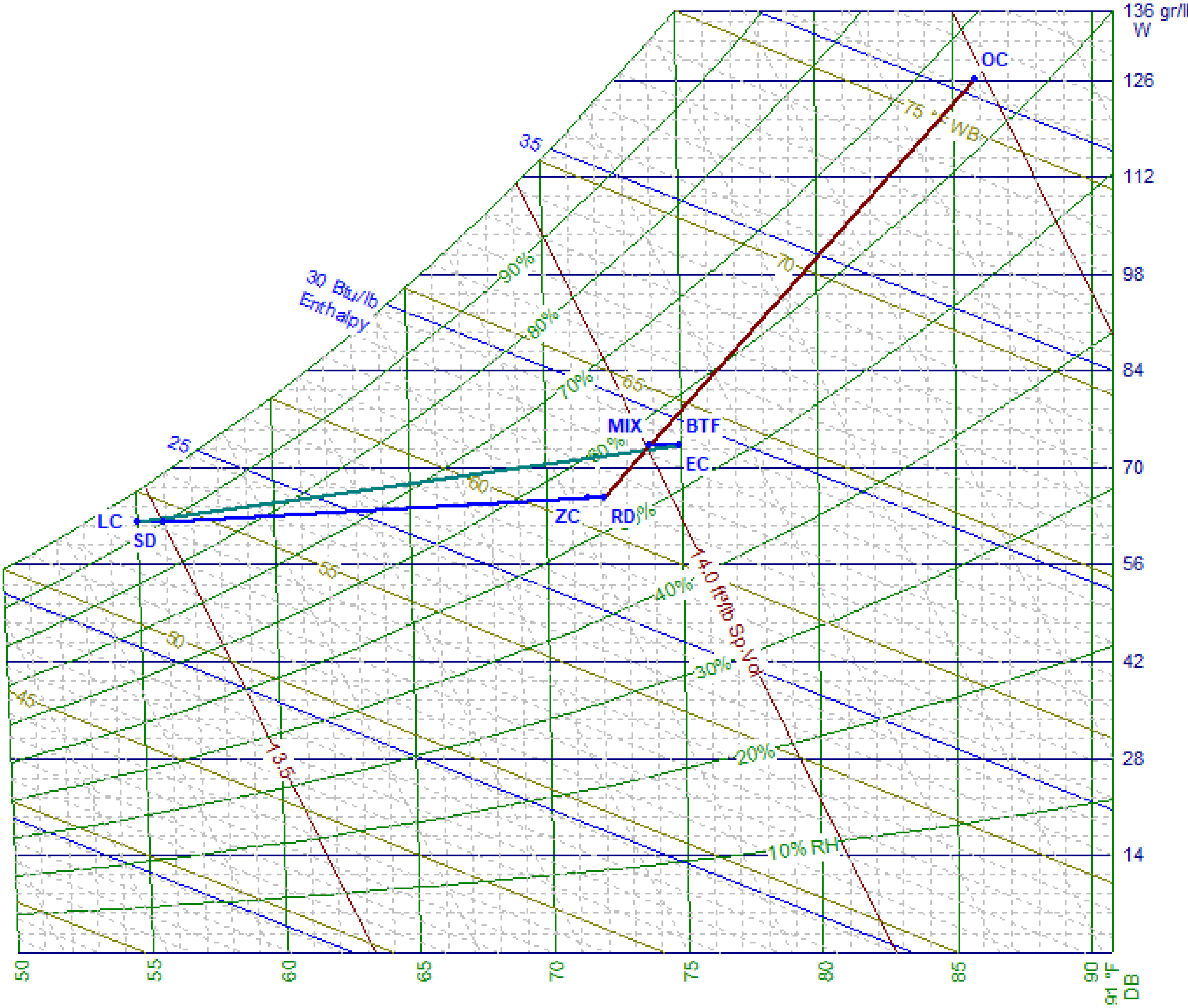
Air System #3 (Hall Ascensores Sot 4) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



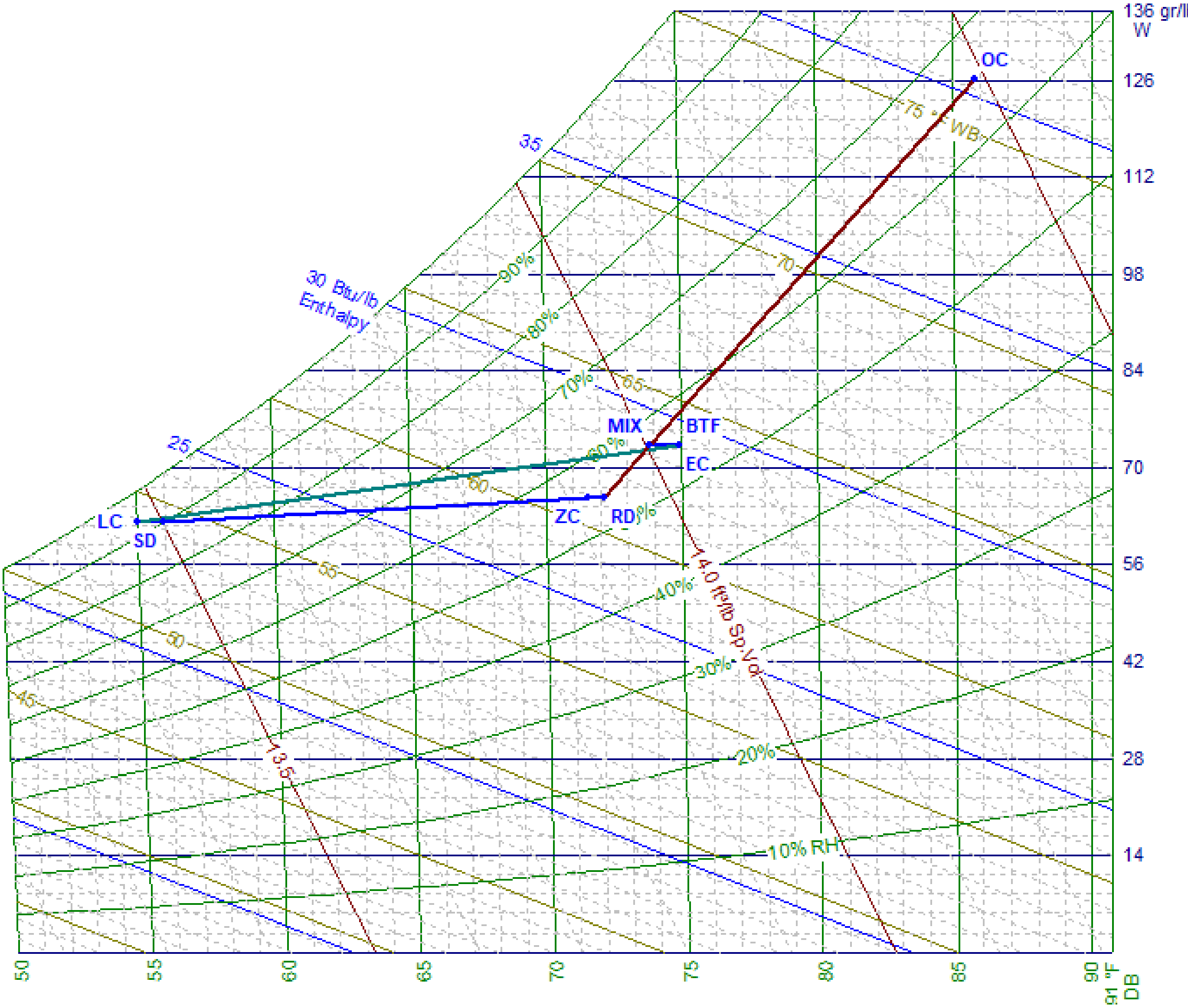
Air System #4 (Hall Ascensores Sot 3) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



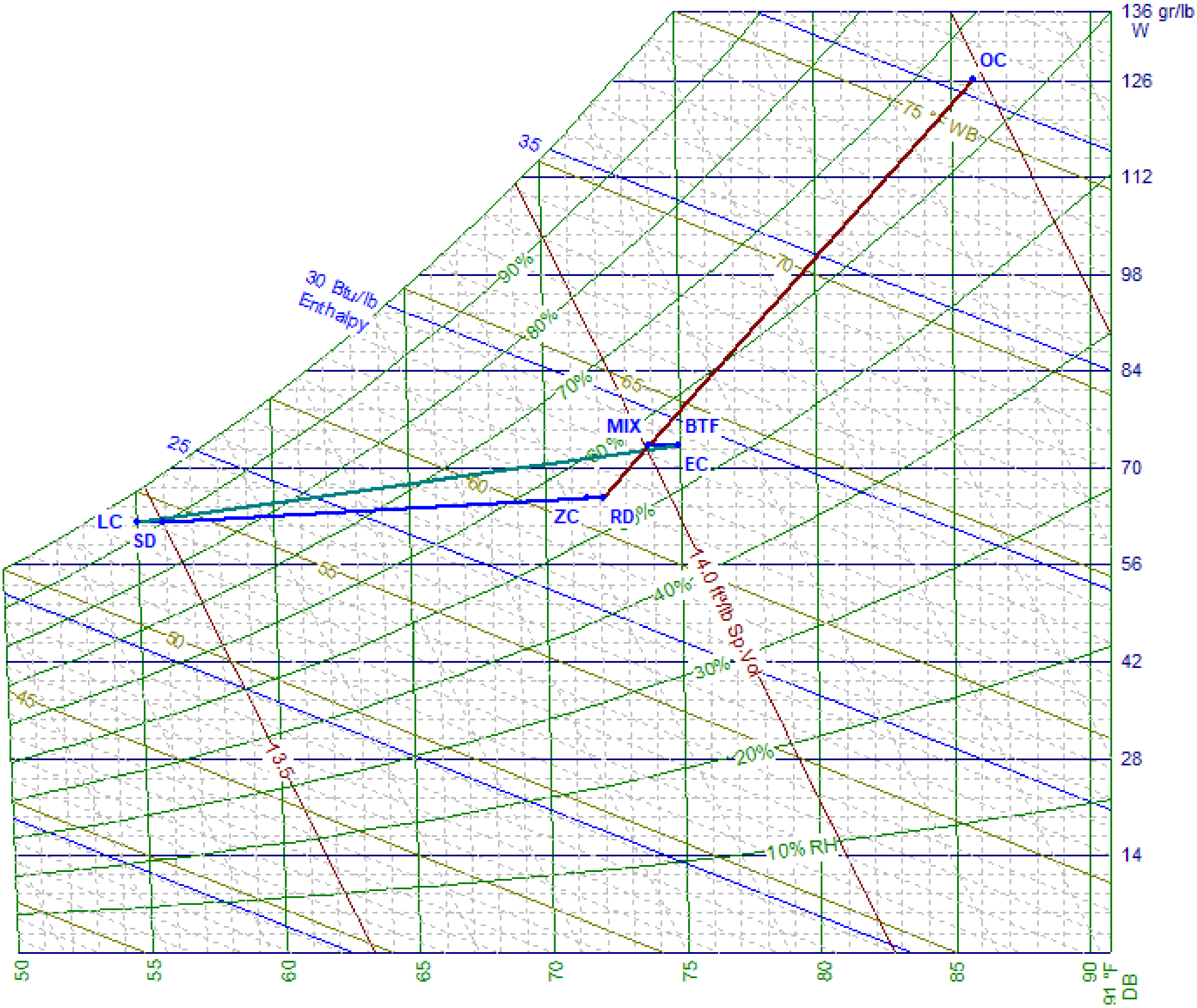
Air System #5 (Hall Ascensores Sot 2) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



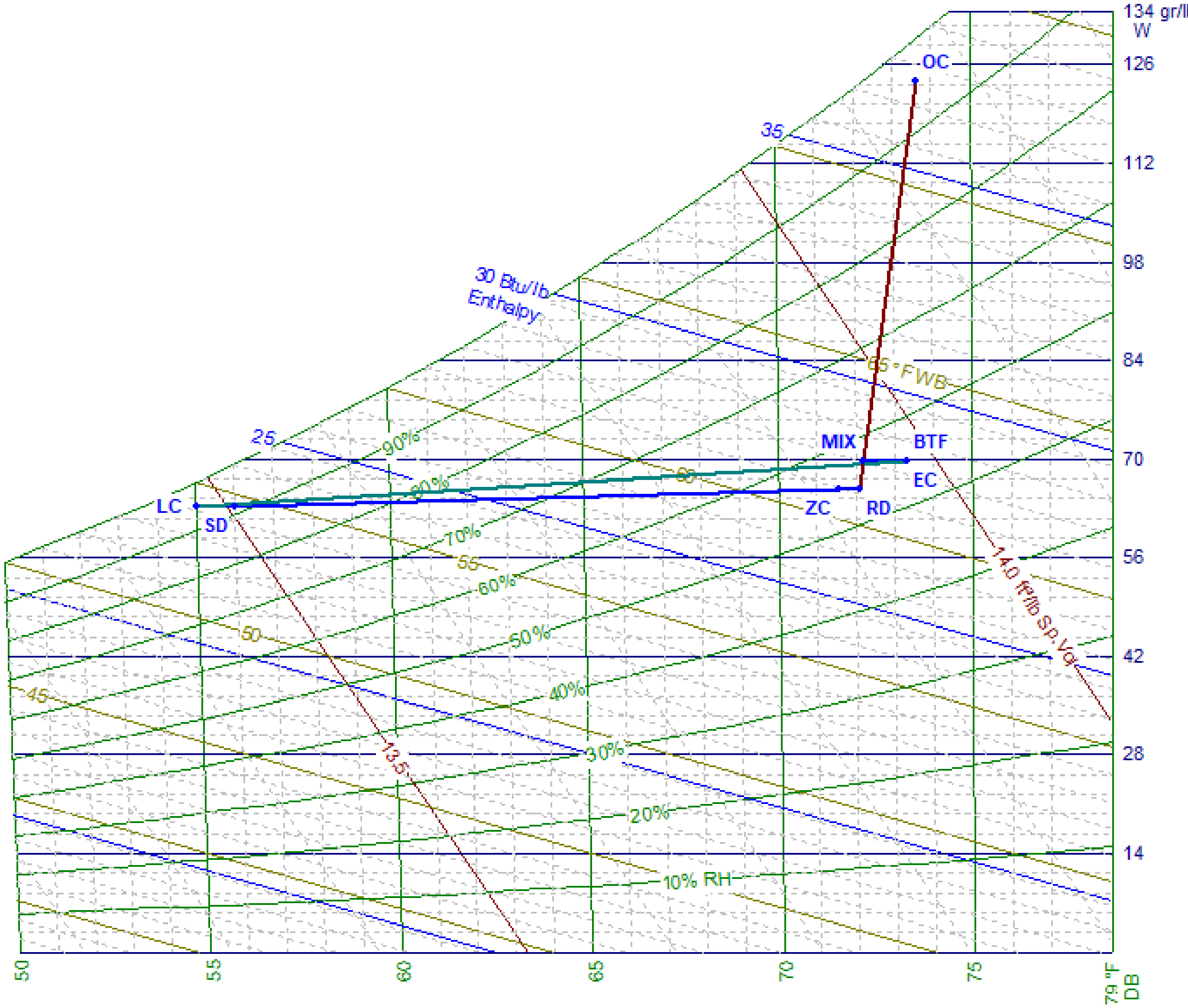
Air System #6 (Hall Ascensores Sot 1) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



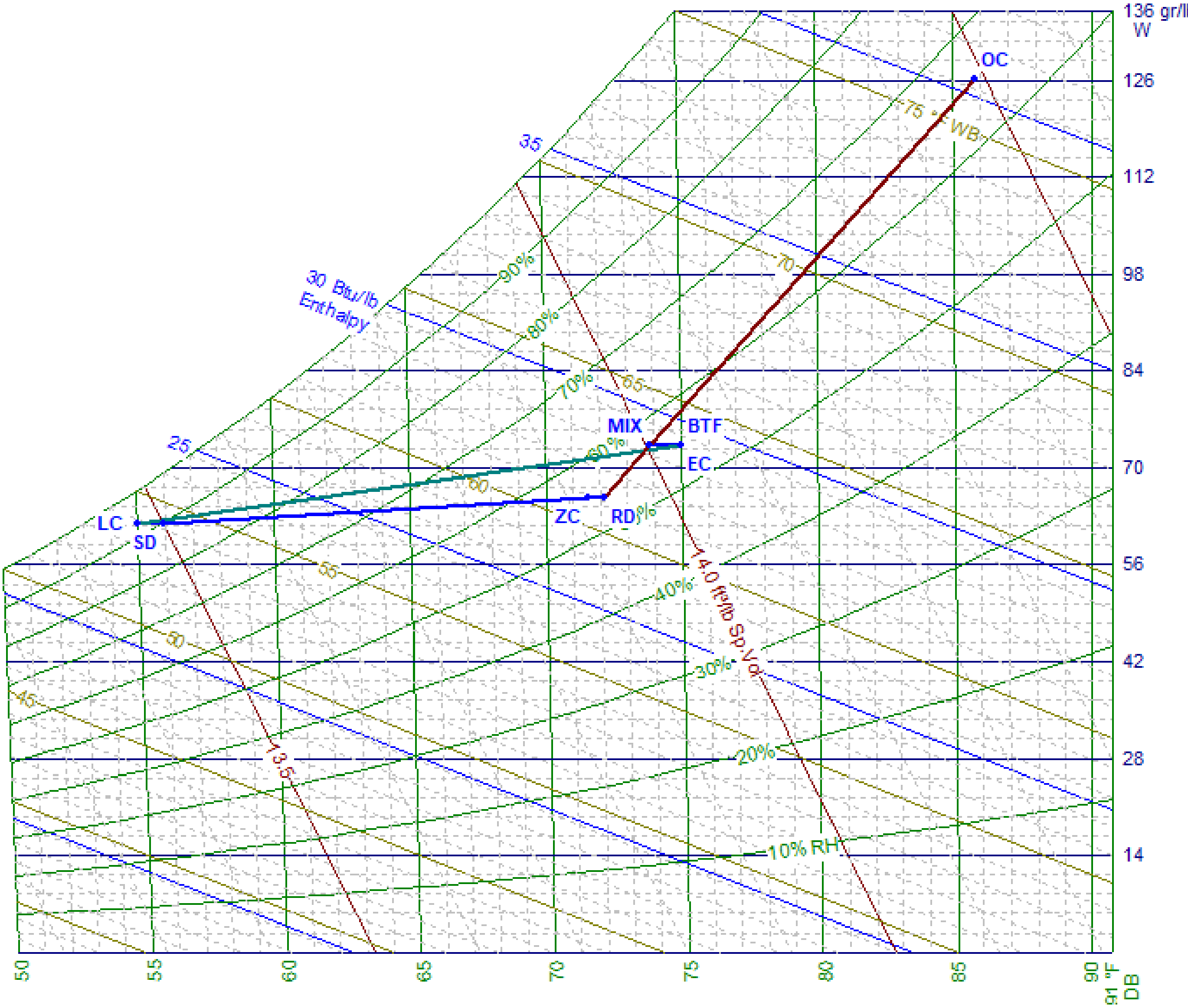
Air System #7 (Recepcion) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



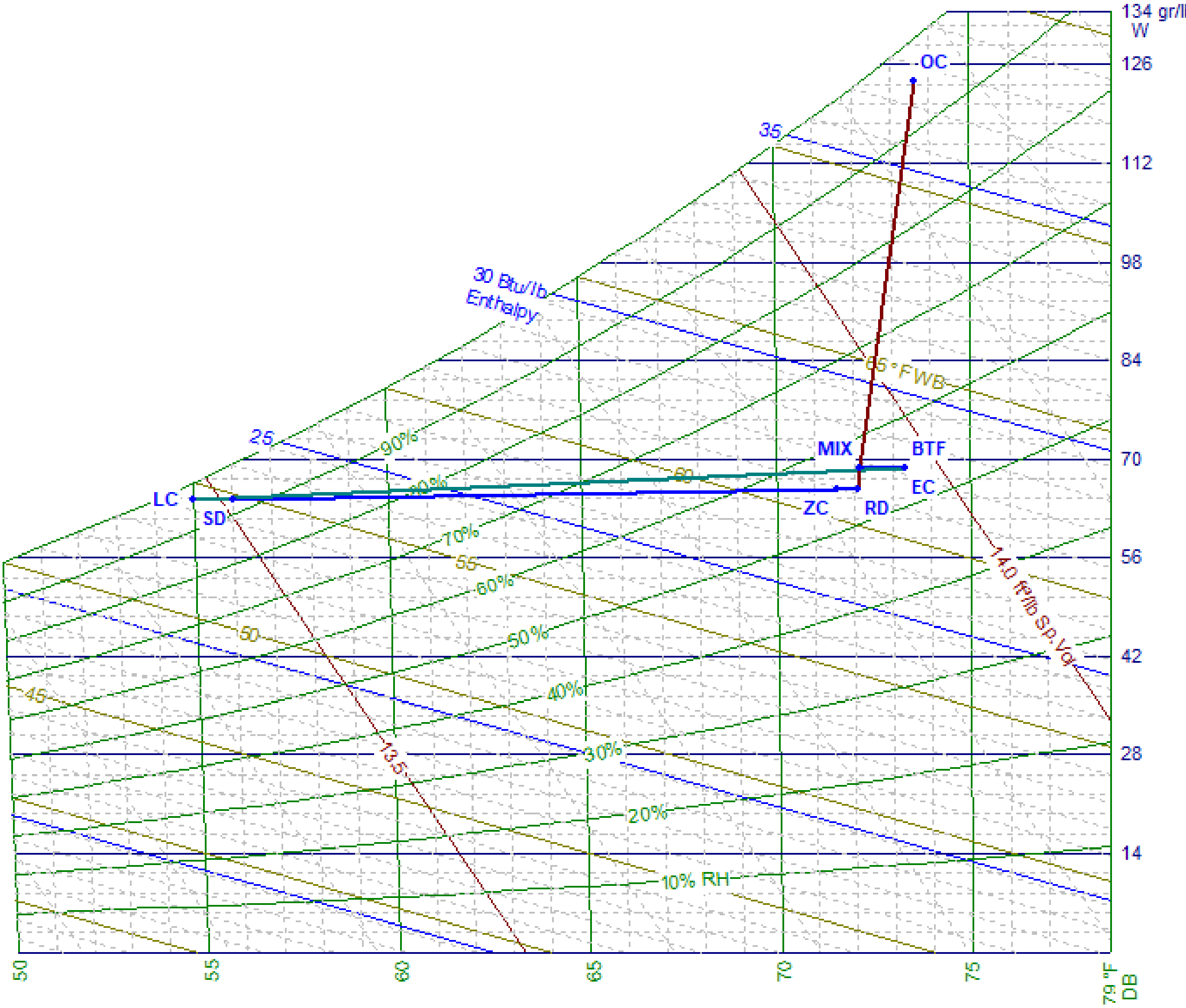
Air System #8 (Sala De Proveedores) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



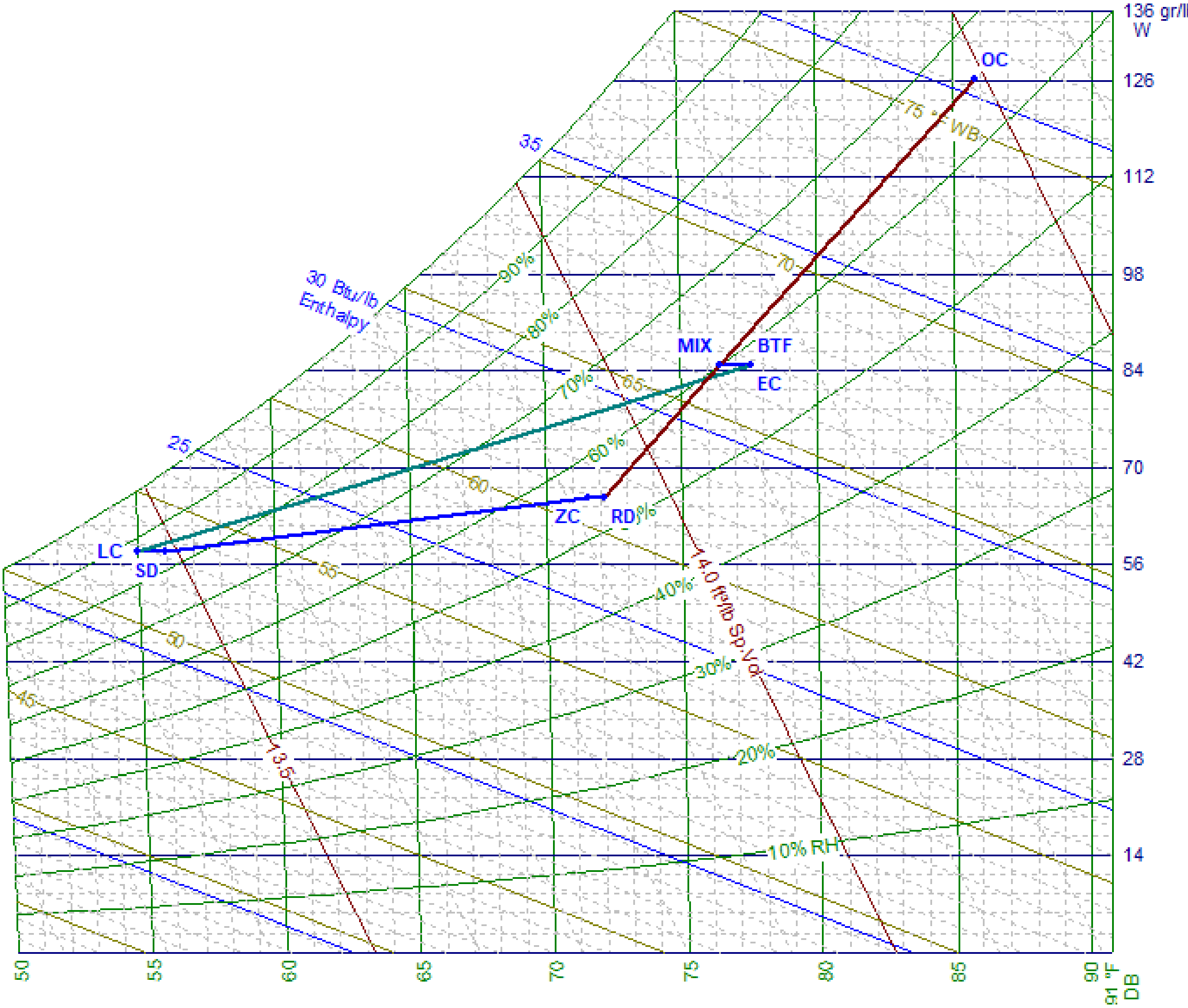
Air System #9 (Cuarto De Control) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



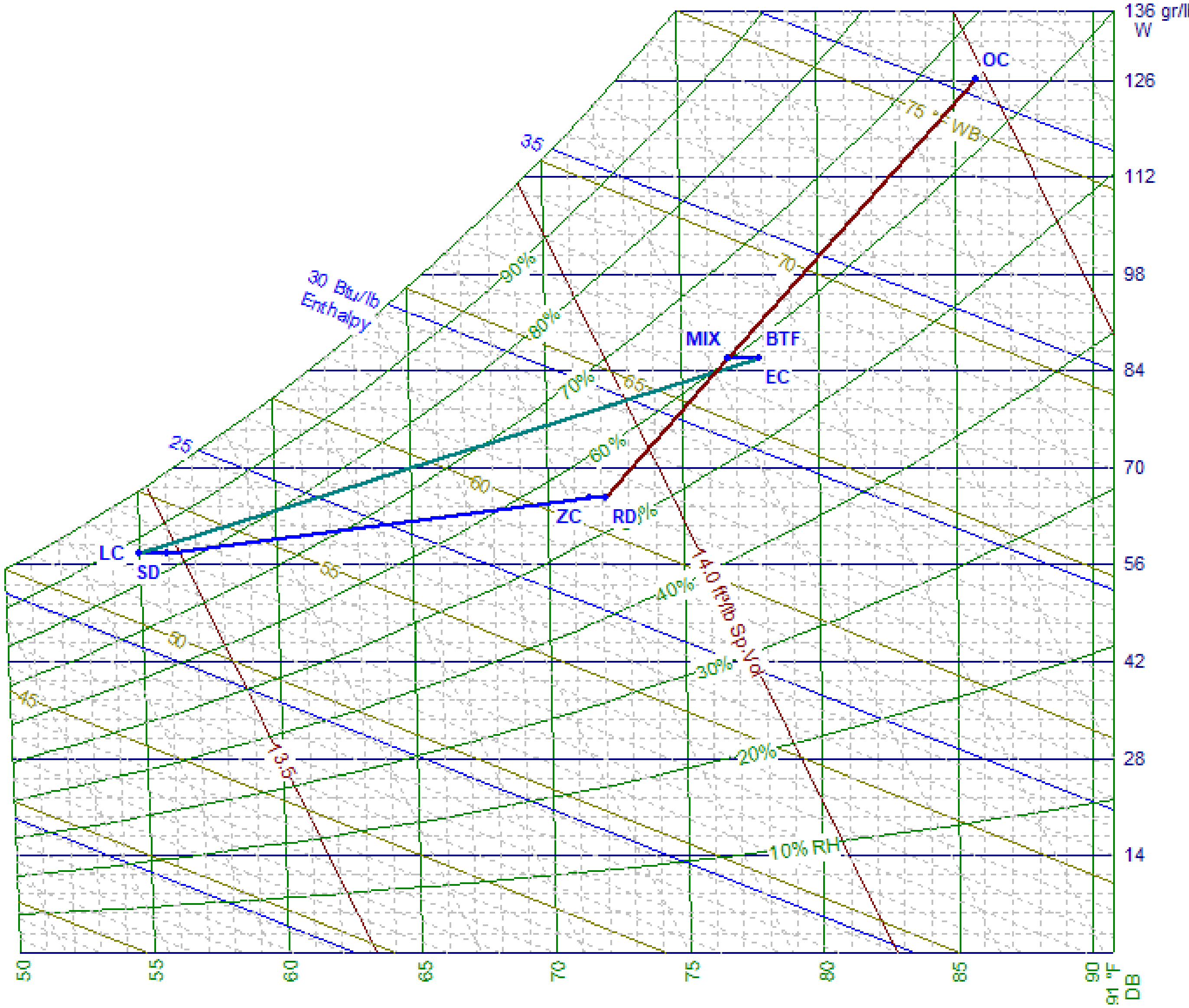
Air System #10 (LC-101 Comercio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



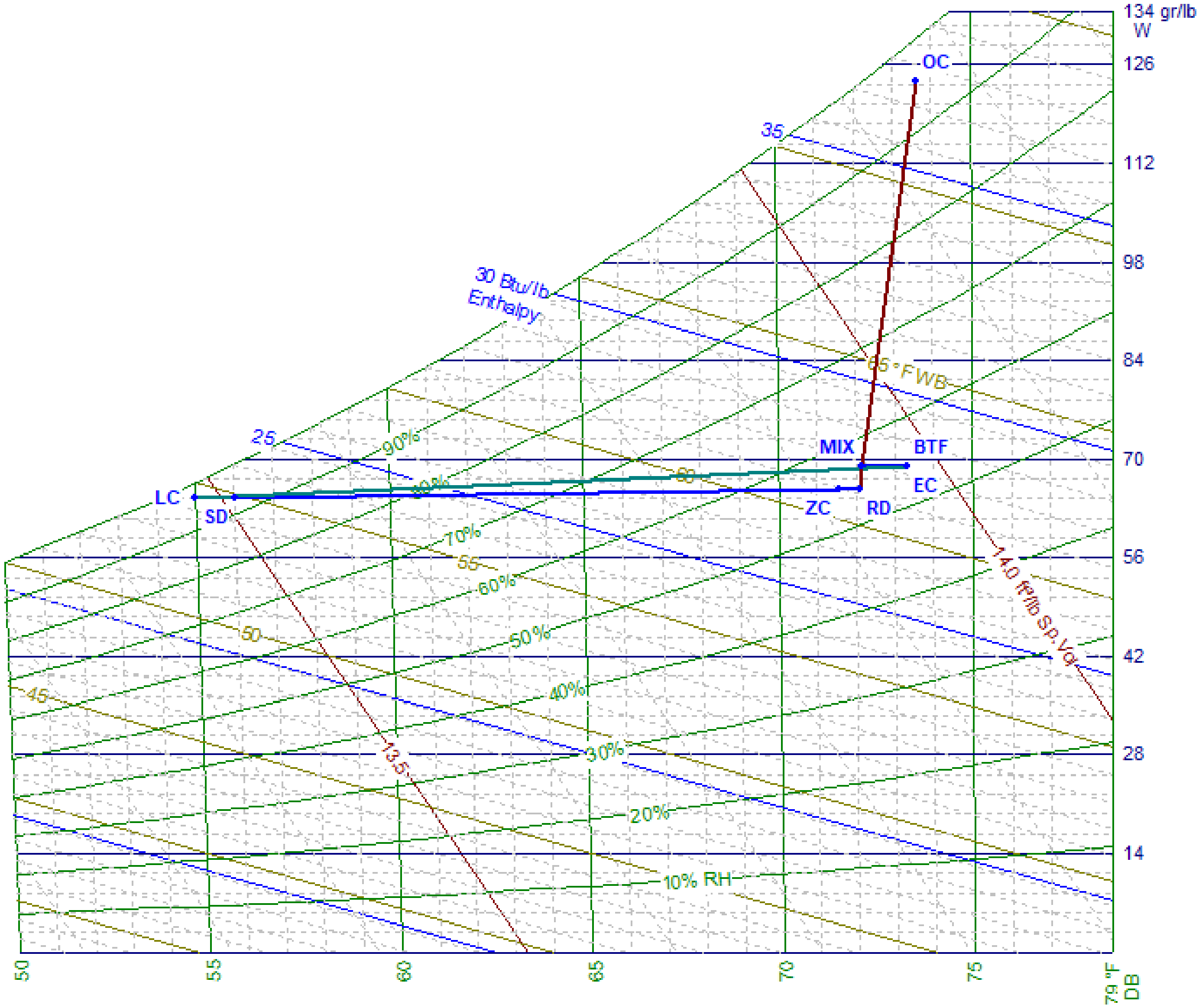
Air System #11 (LC 102 Comercio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



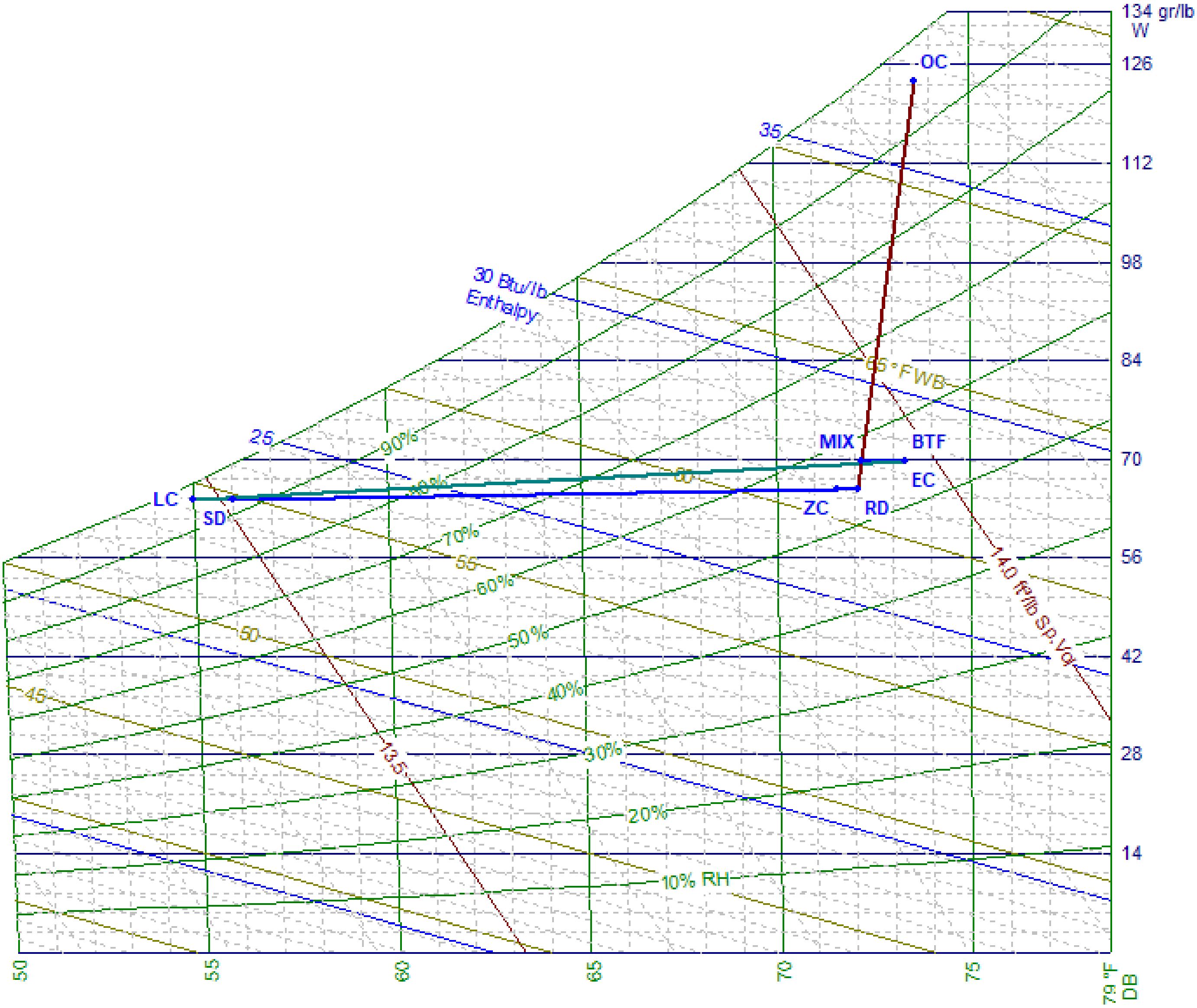
Air System #12 (Oficina 201) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



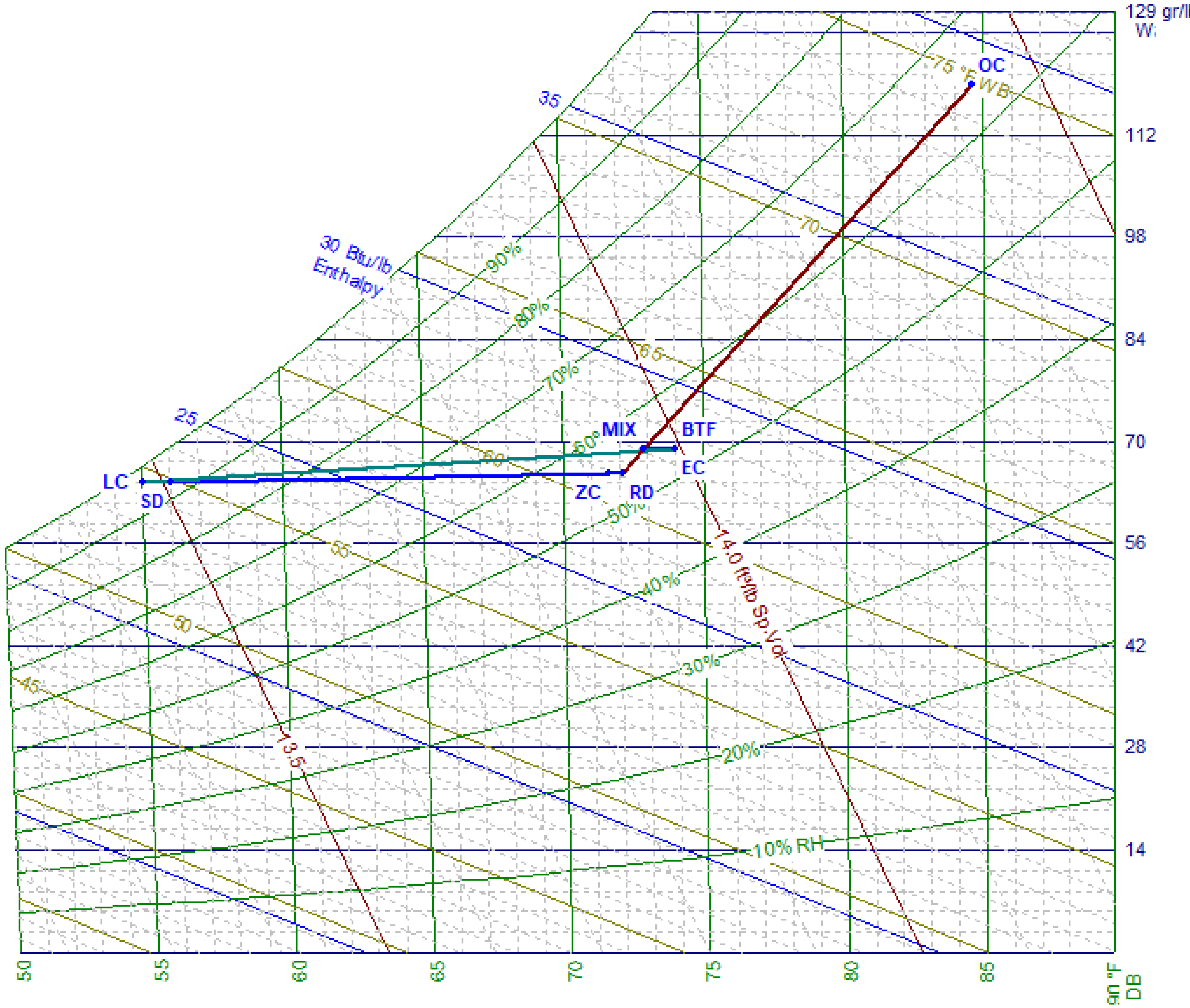
Air System #13 (Oficina 202) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



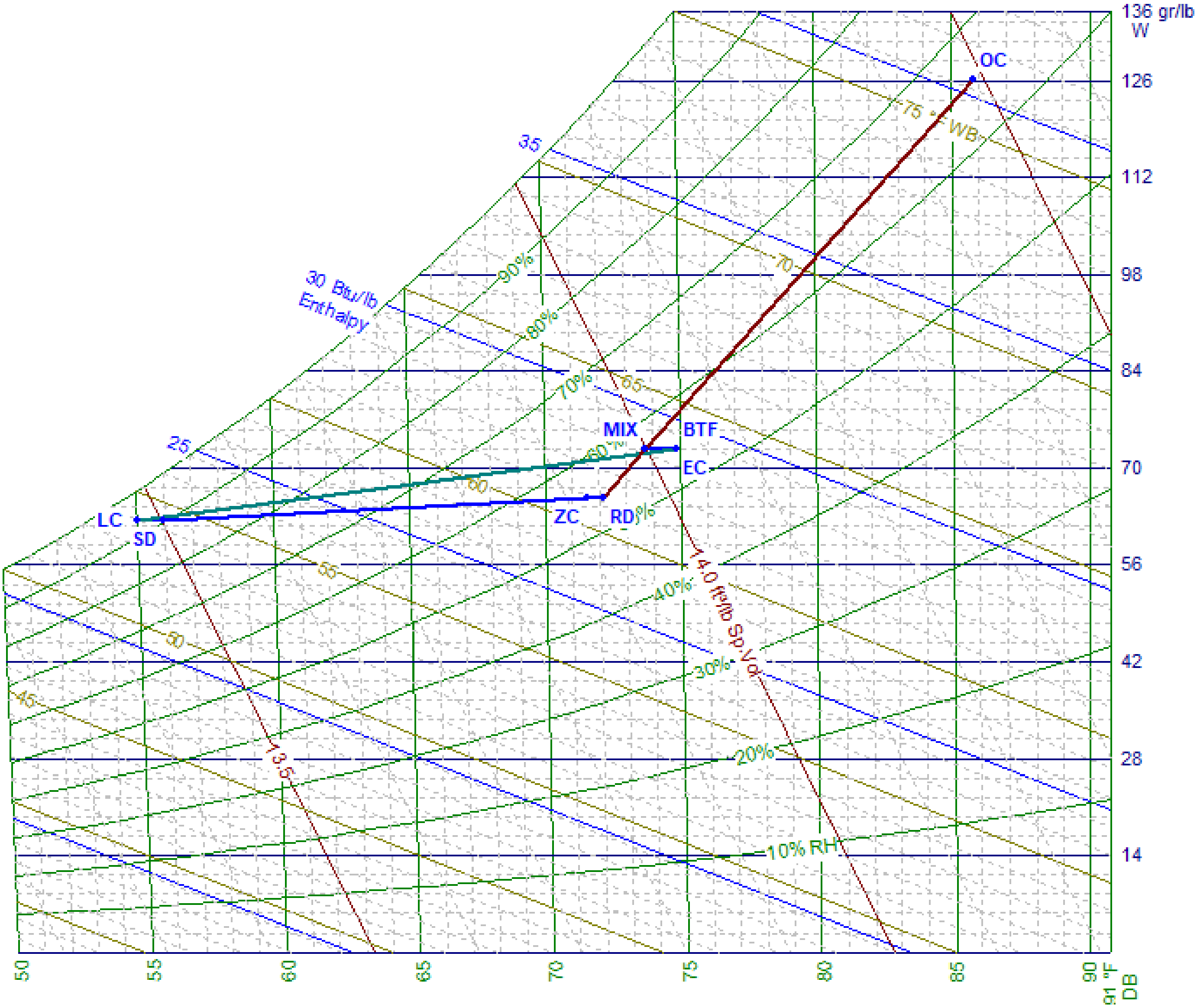
Air System #14 (Oficina 203) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



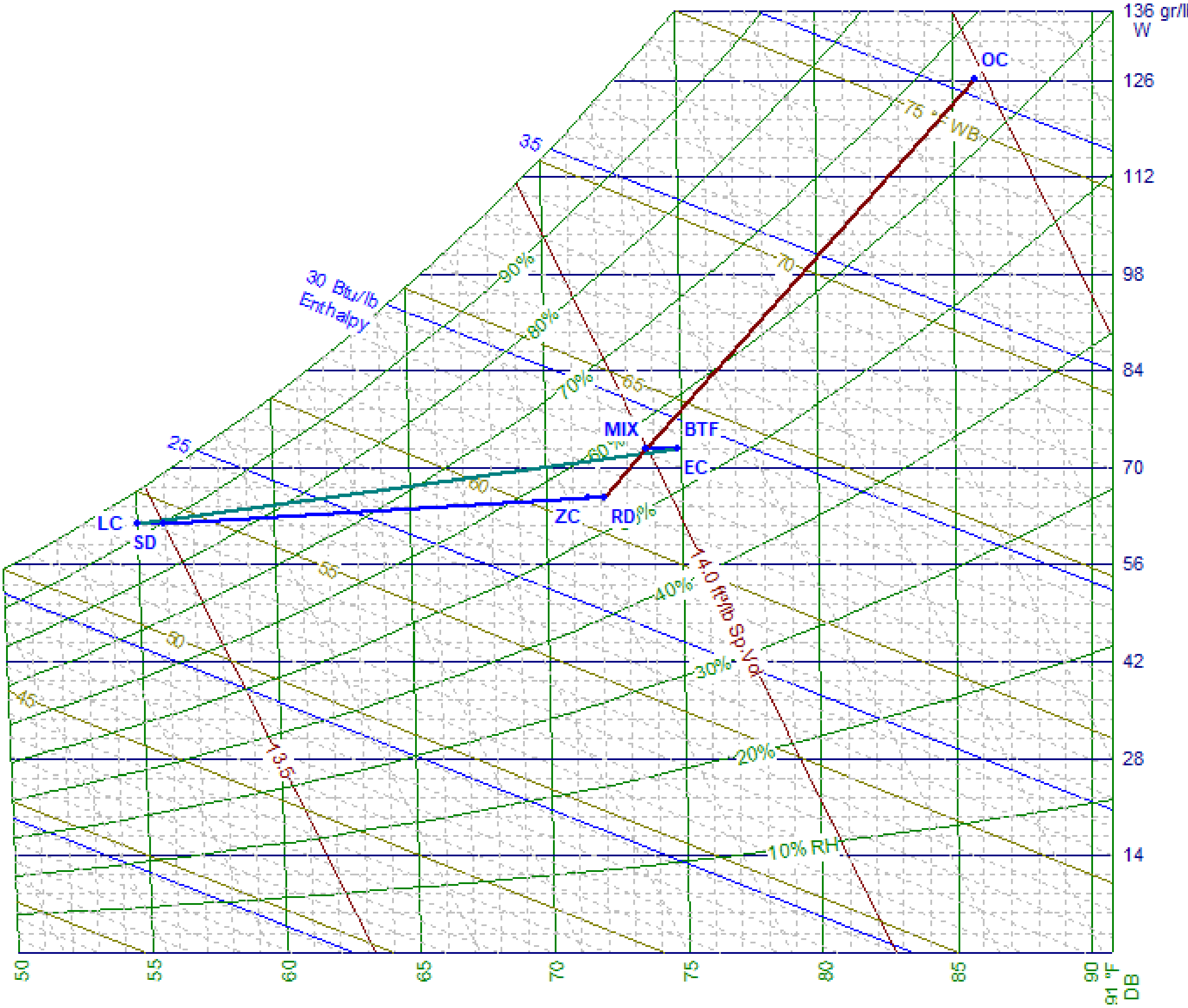
Air System #15 (Hall Ascensores 2do Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



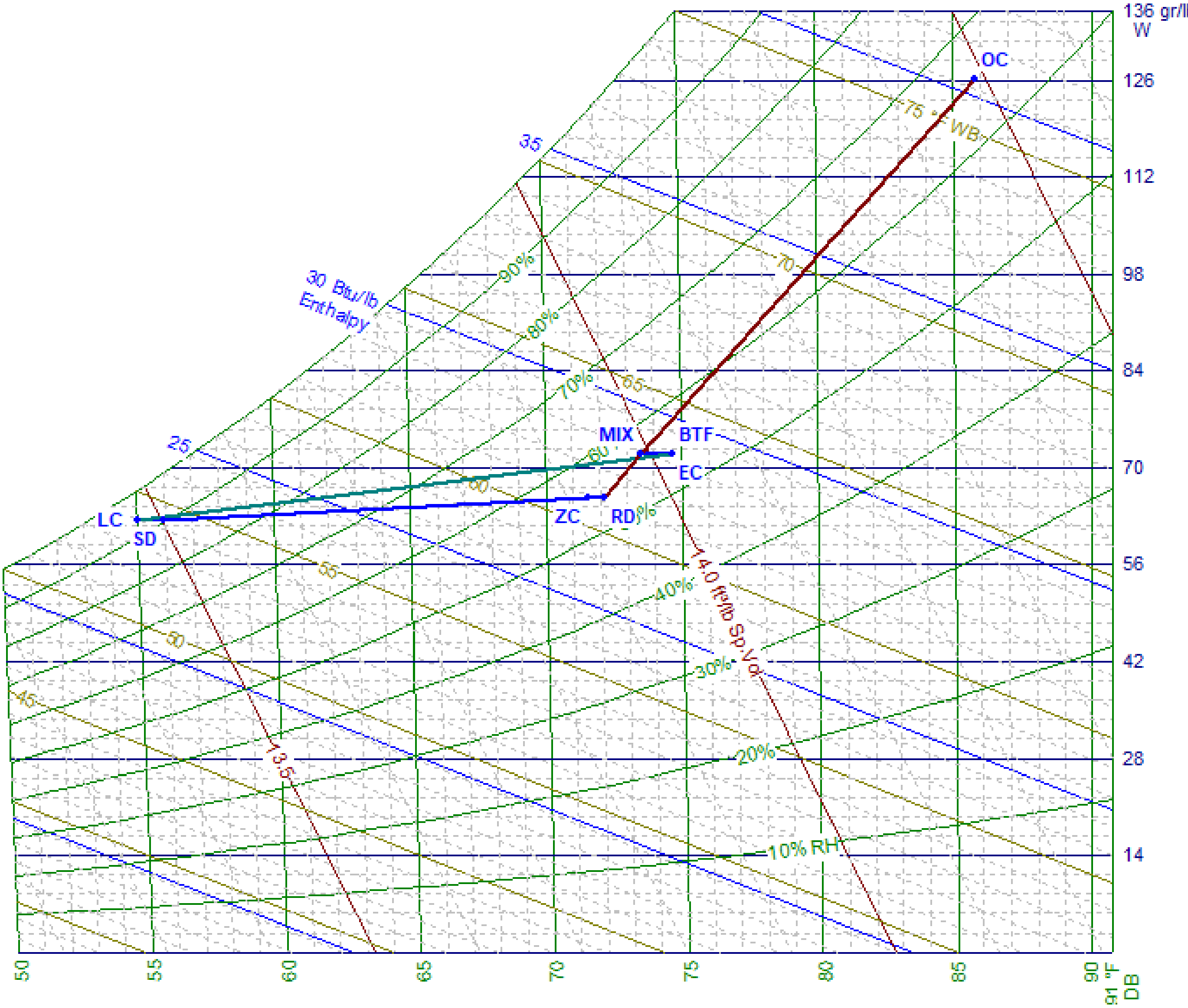
Air System #16 (Corredor 1 2do Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



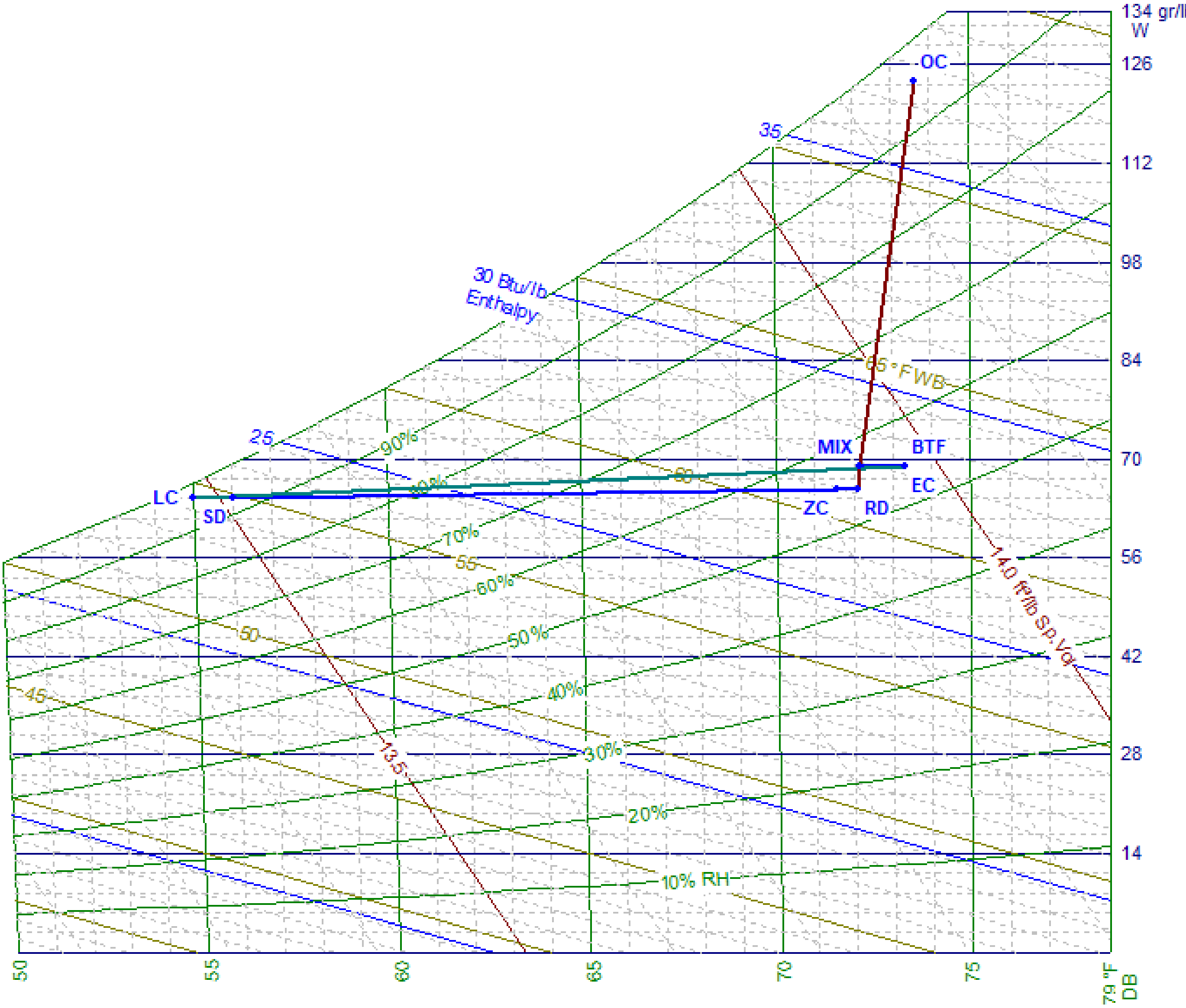
Air System #17 (Corredor 2 2do Psio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



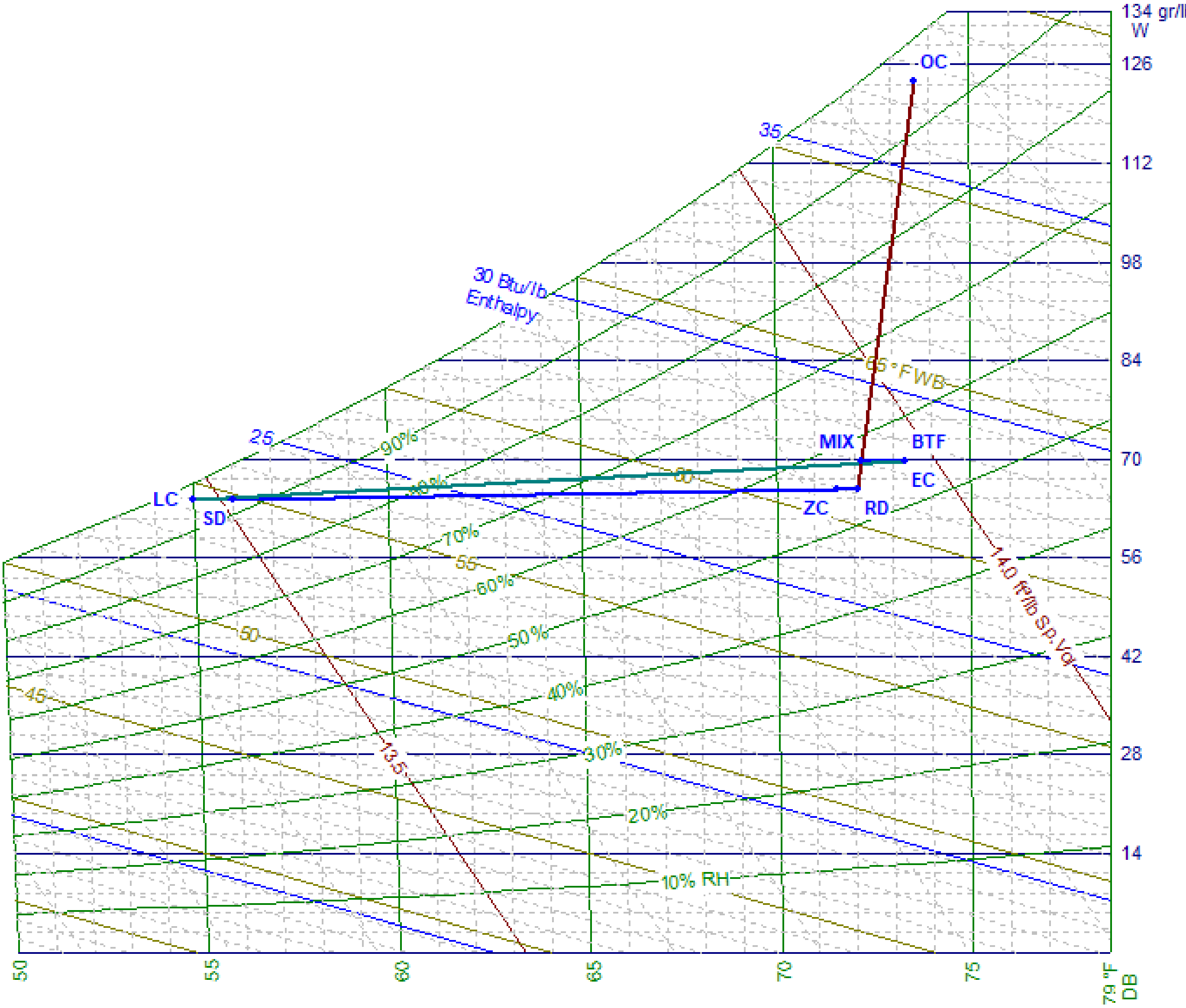
Air System #18 (Oficina 301) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



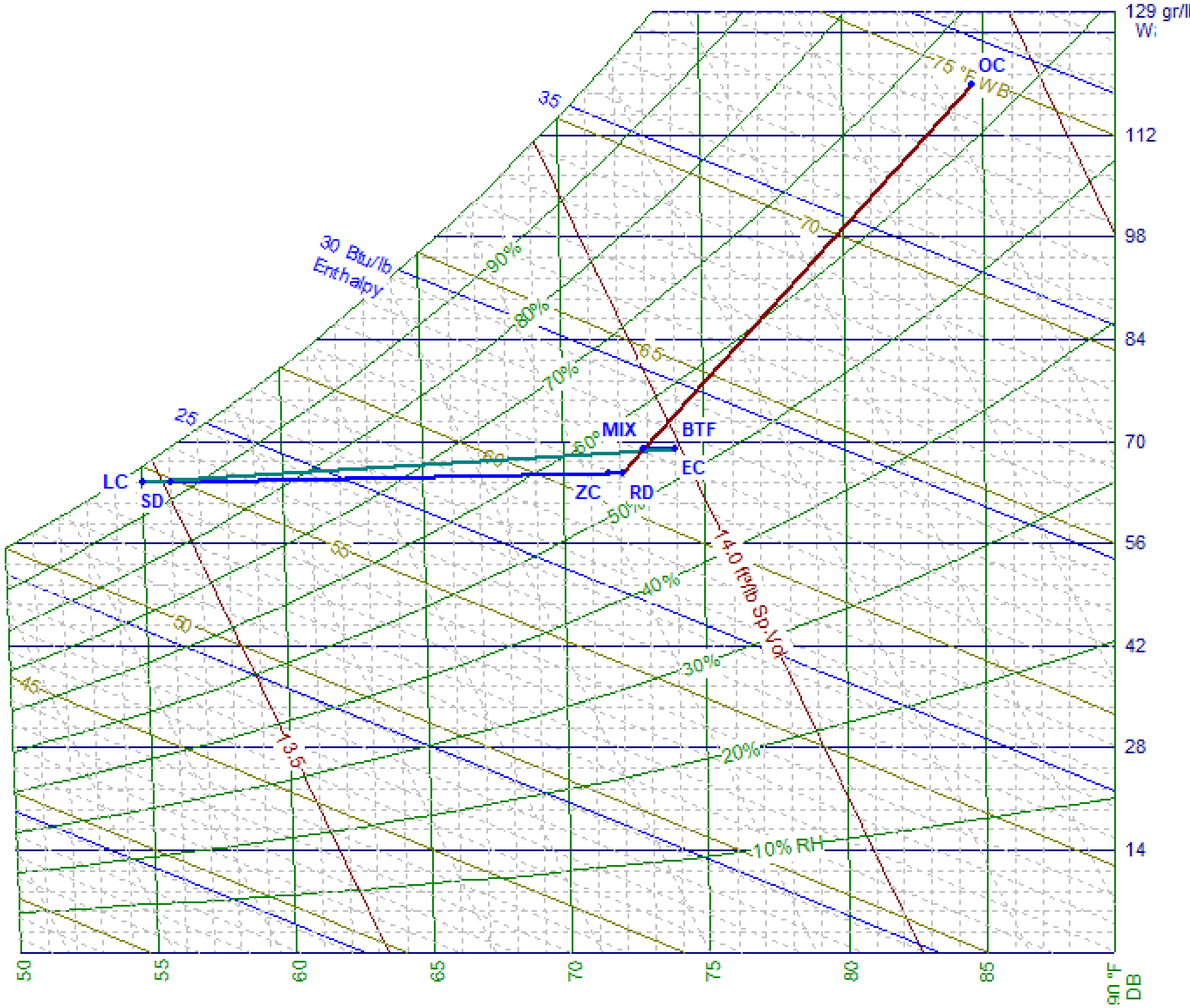
Air System #19 (Oficina 302) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



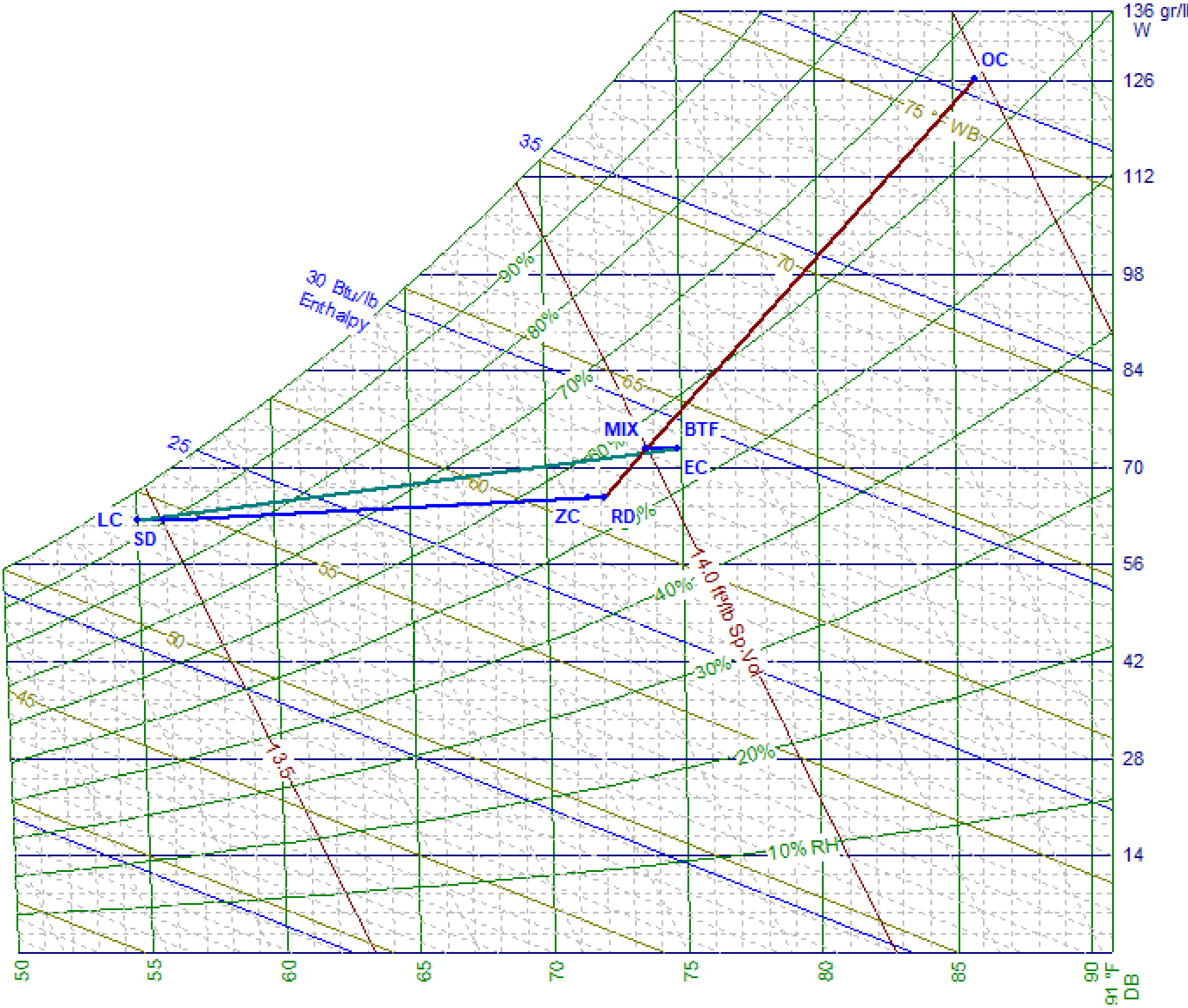
Air System #20 (Oficina 303) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



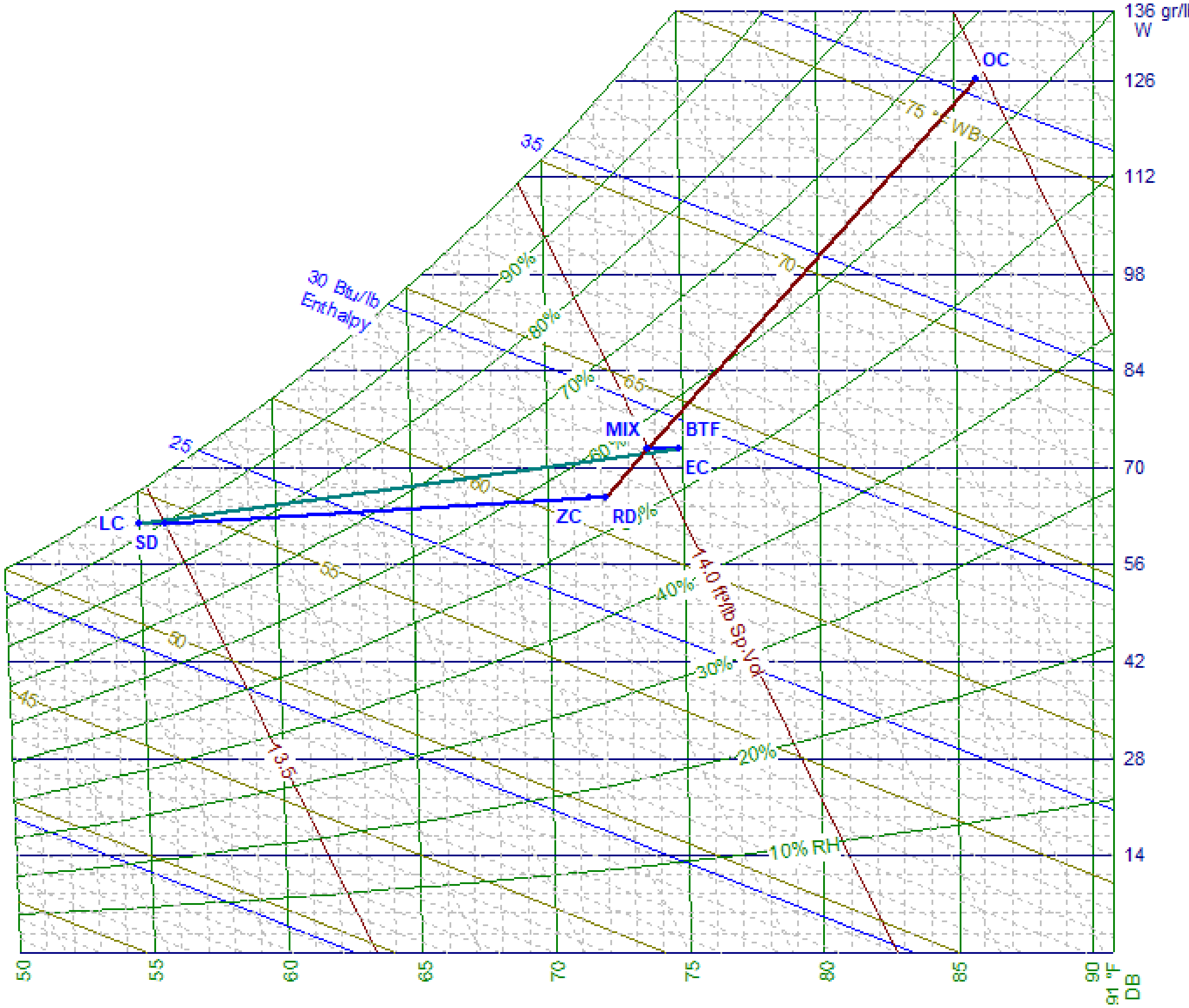
Air System #21 (Hall Ascensores 3er Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



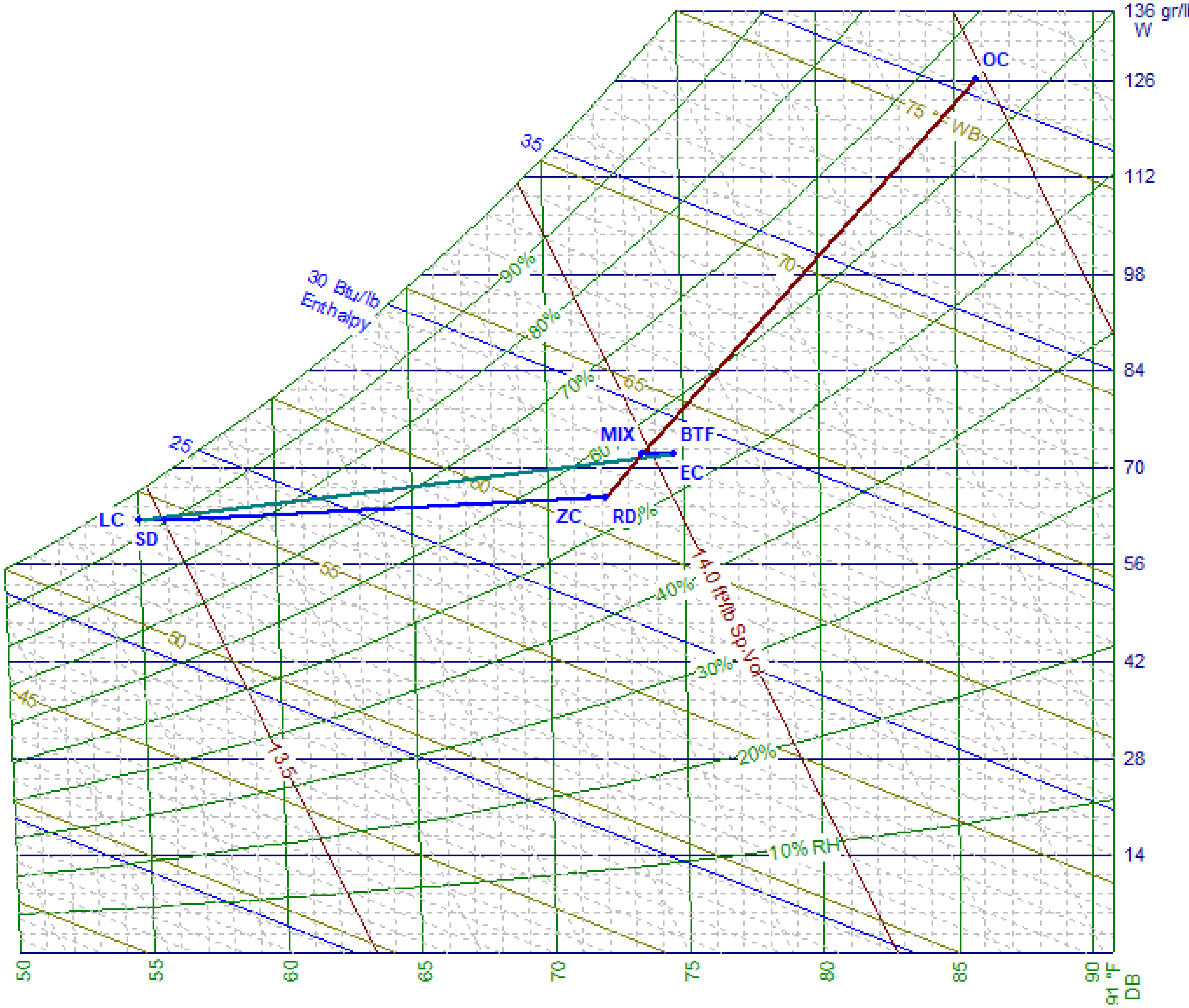
Air System #22 (Corredor 1 3er Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



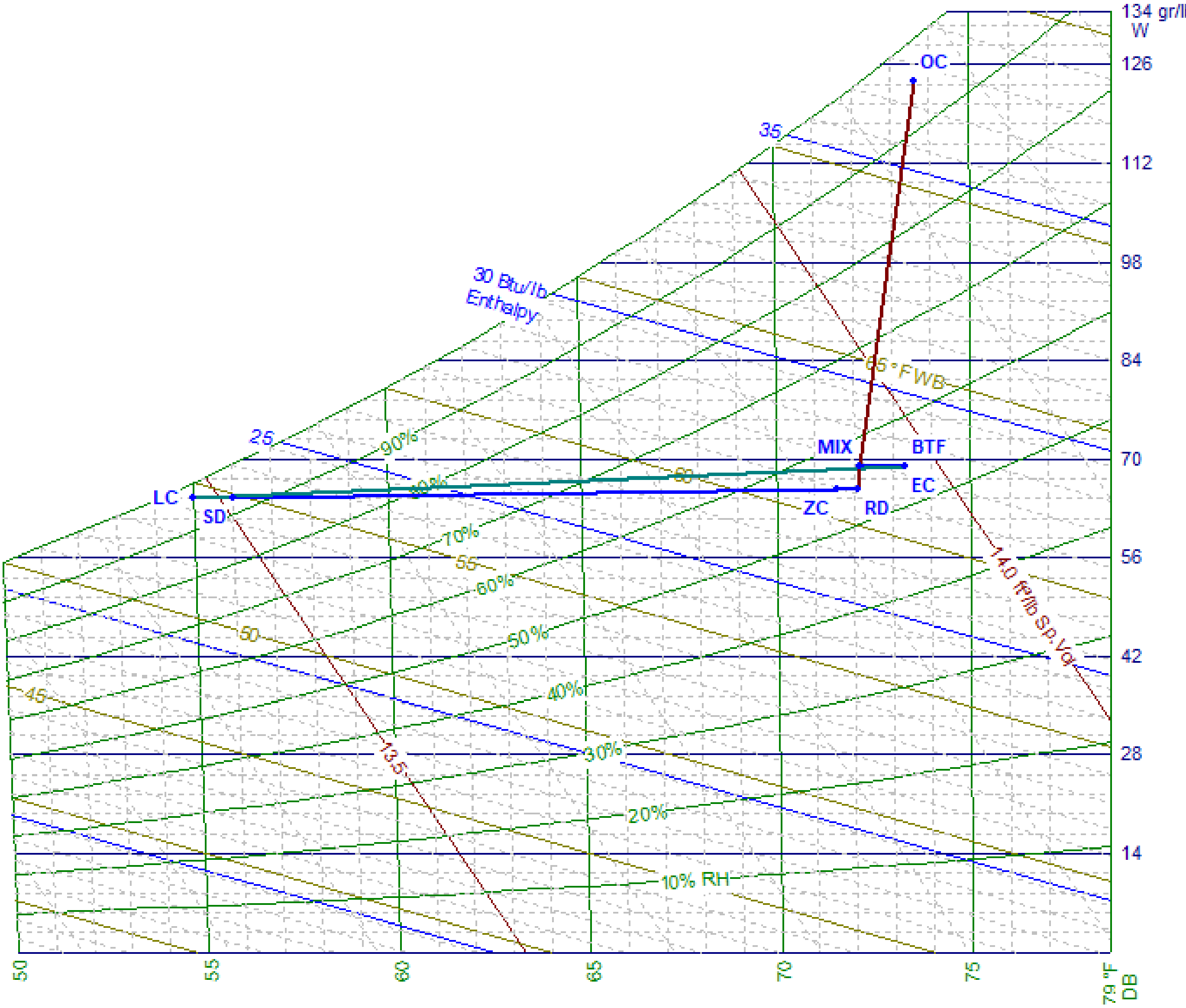
Air System #23 (Corredor 2 3er Psio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



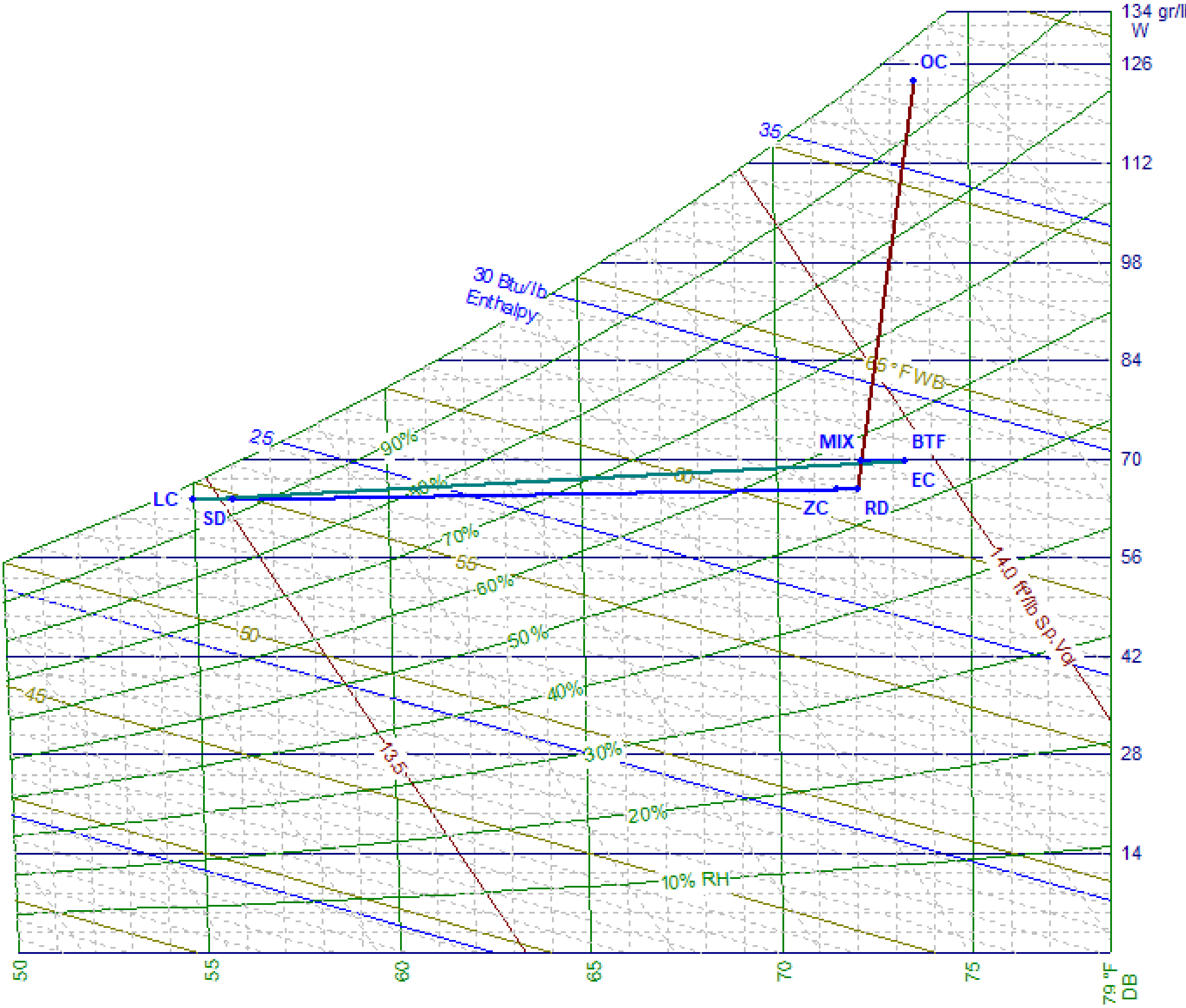
Air System #24 (Oficina 401) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



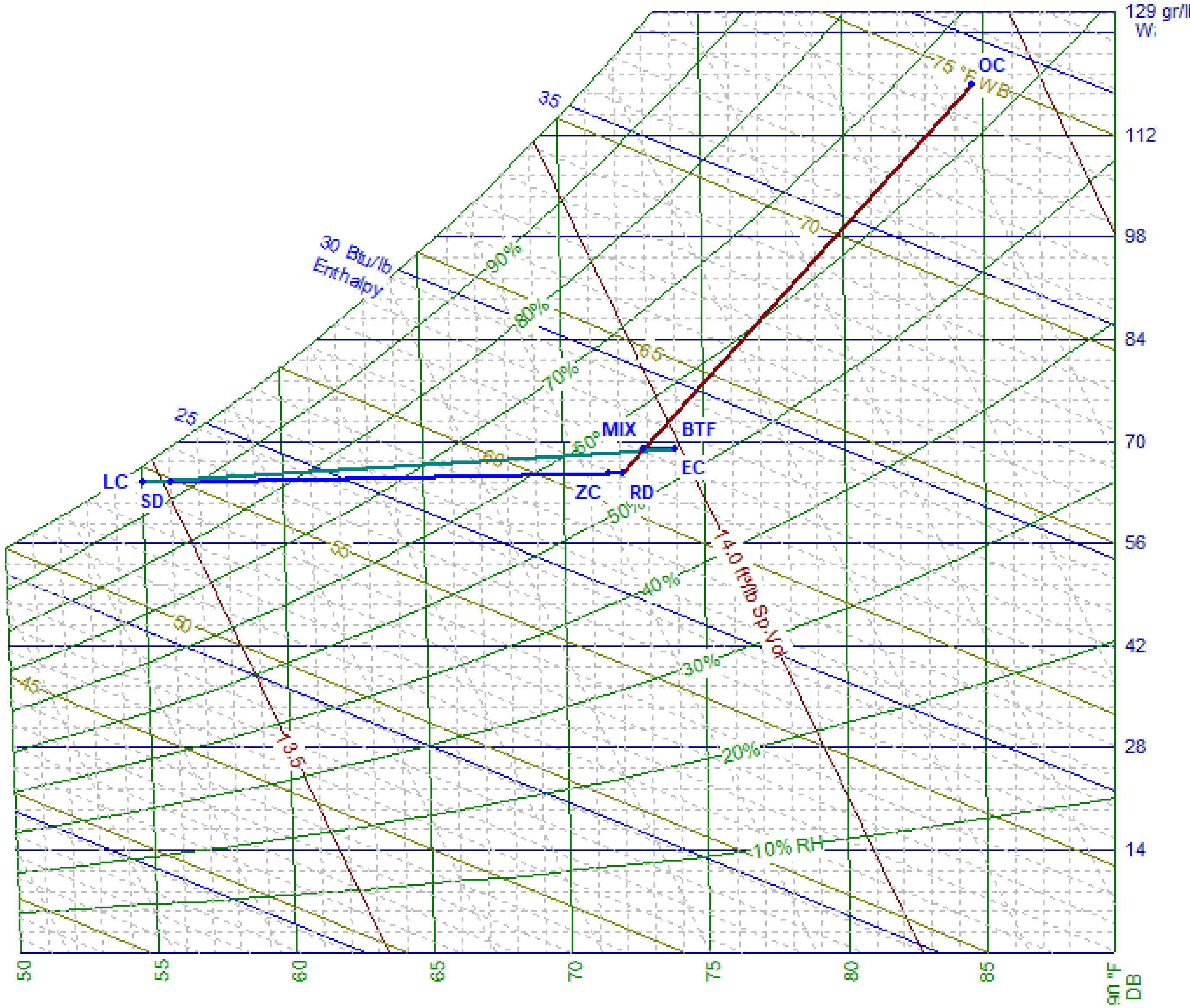
Air System #25 (Oficina 402) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



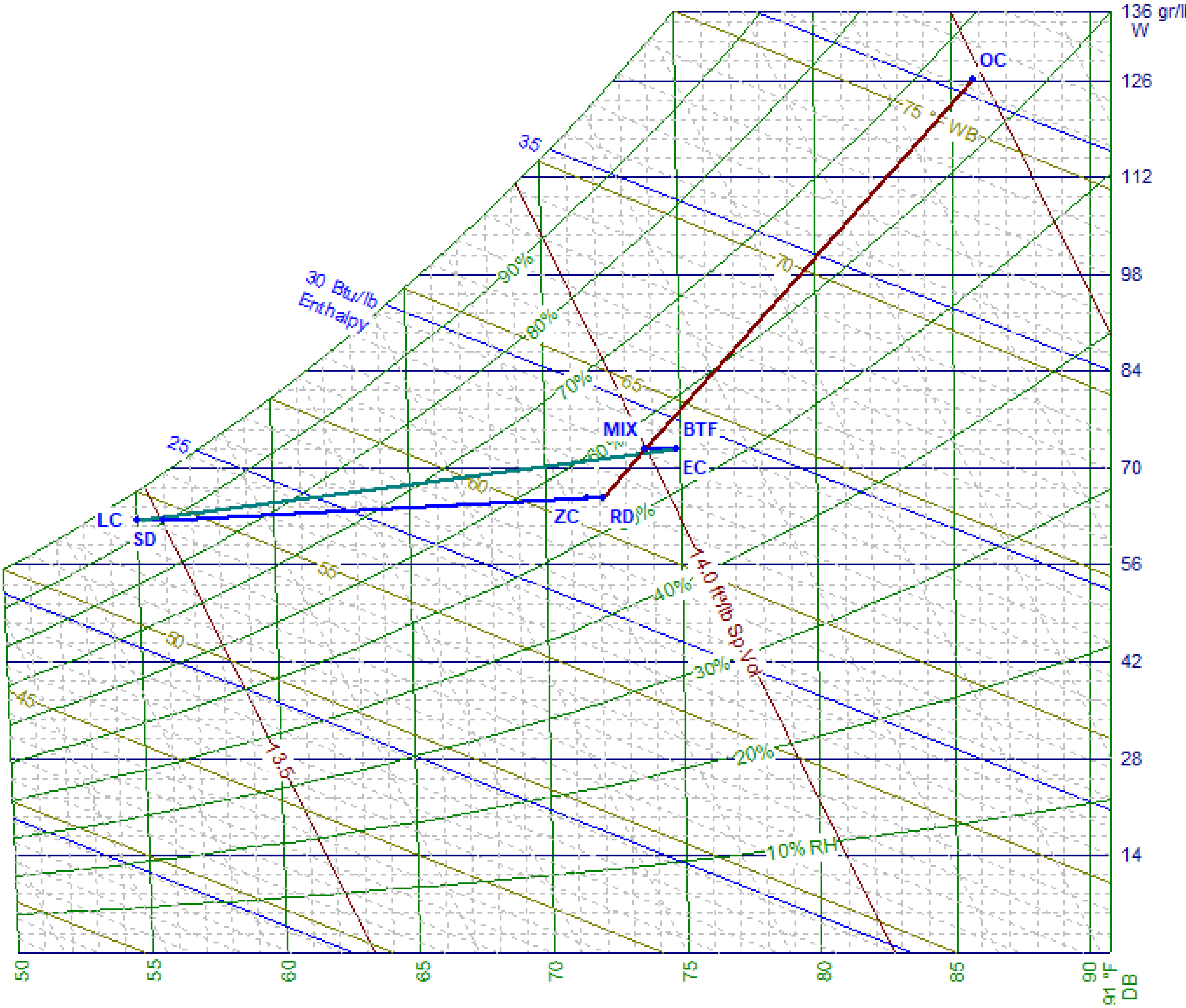
Air System #26 (Oficina 403) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



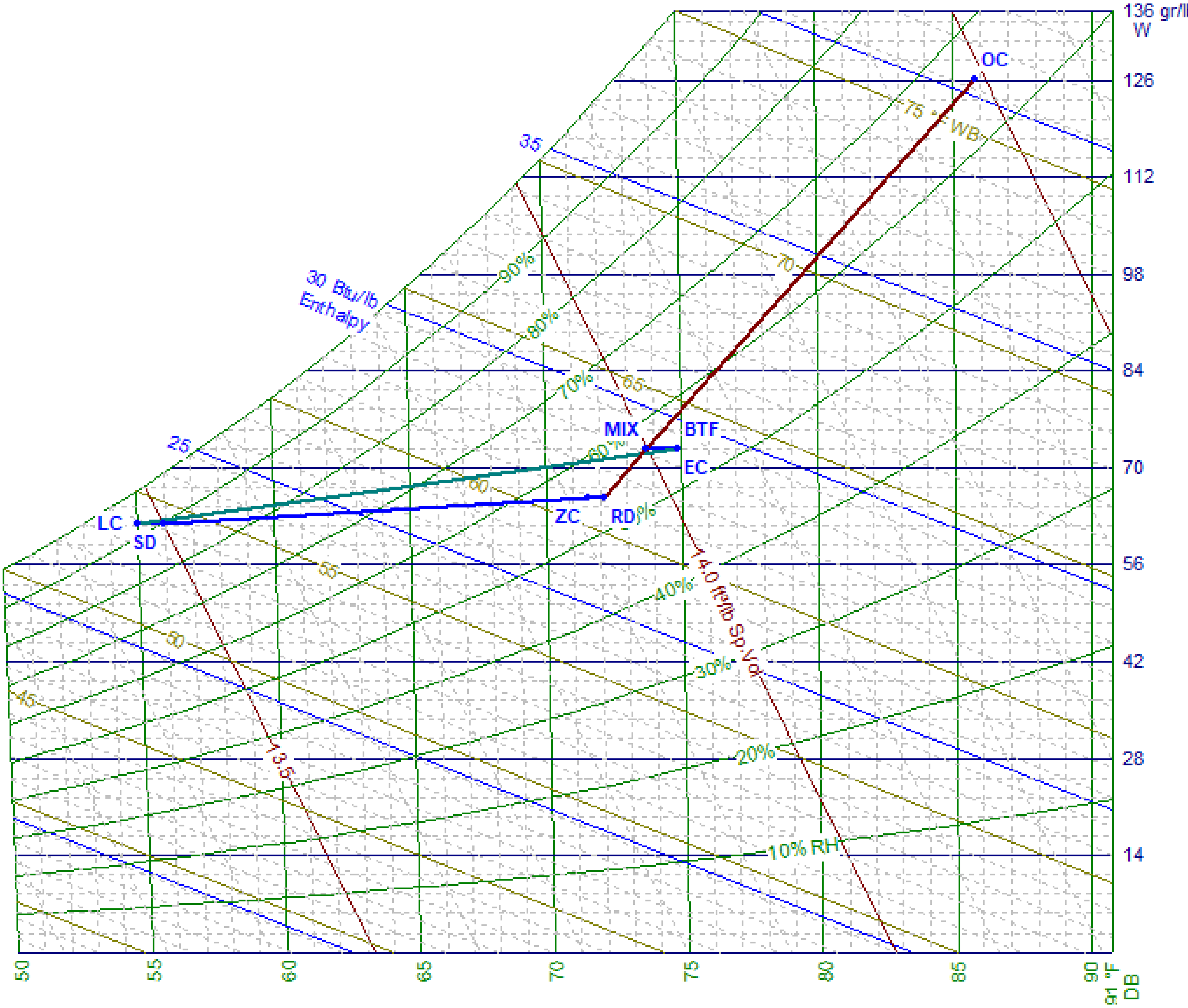
Air System #27 (Hall Ascensores 4to Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



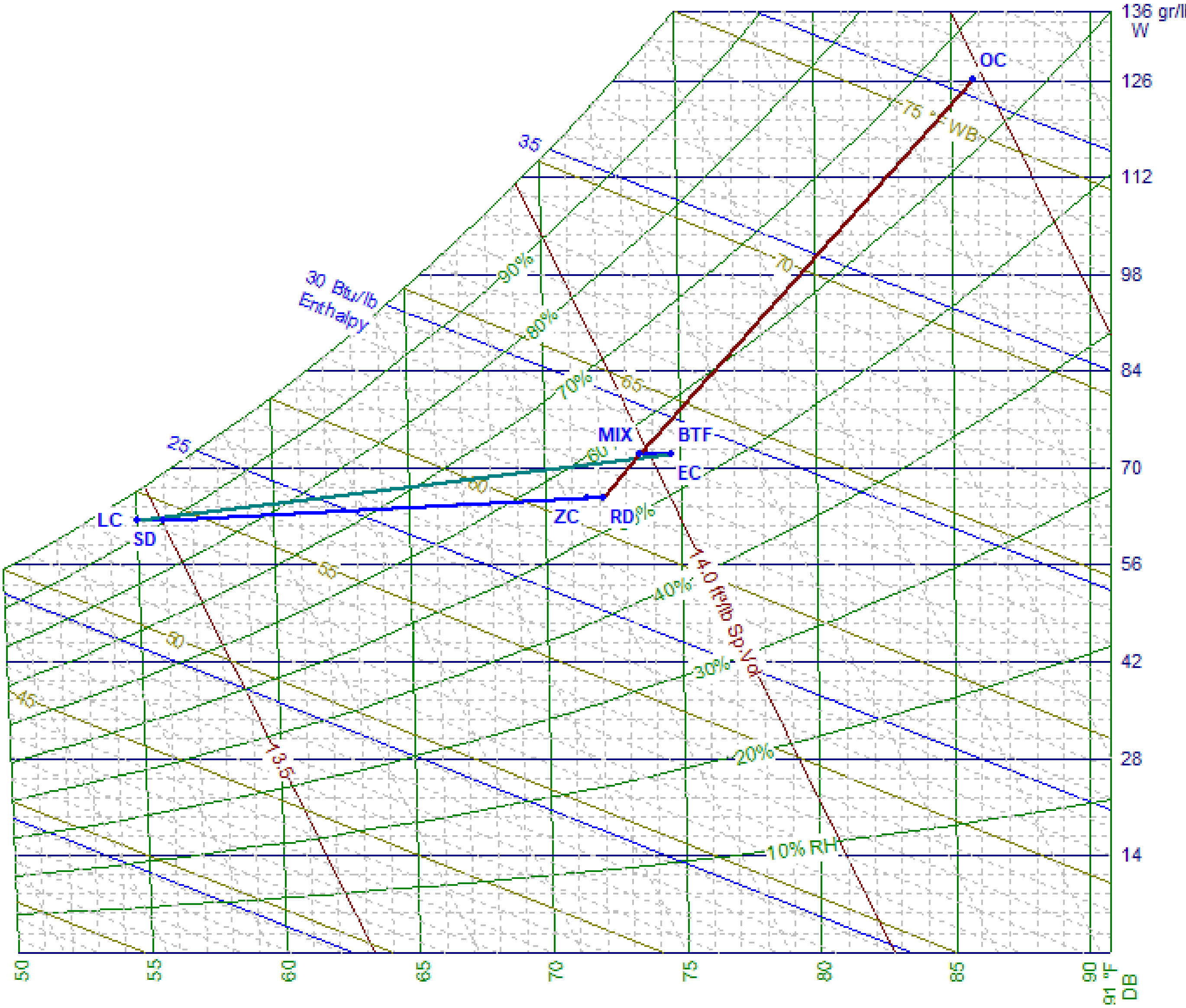
Air System #28 (Corredor 1 4to Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



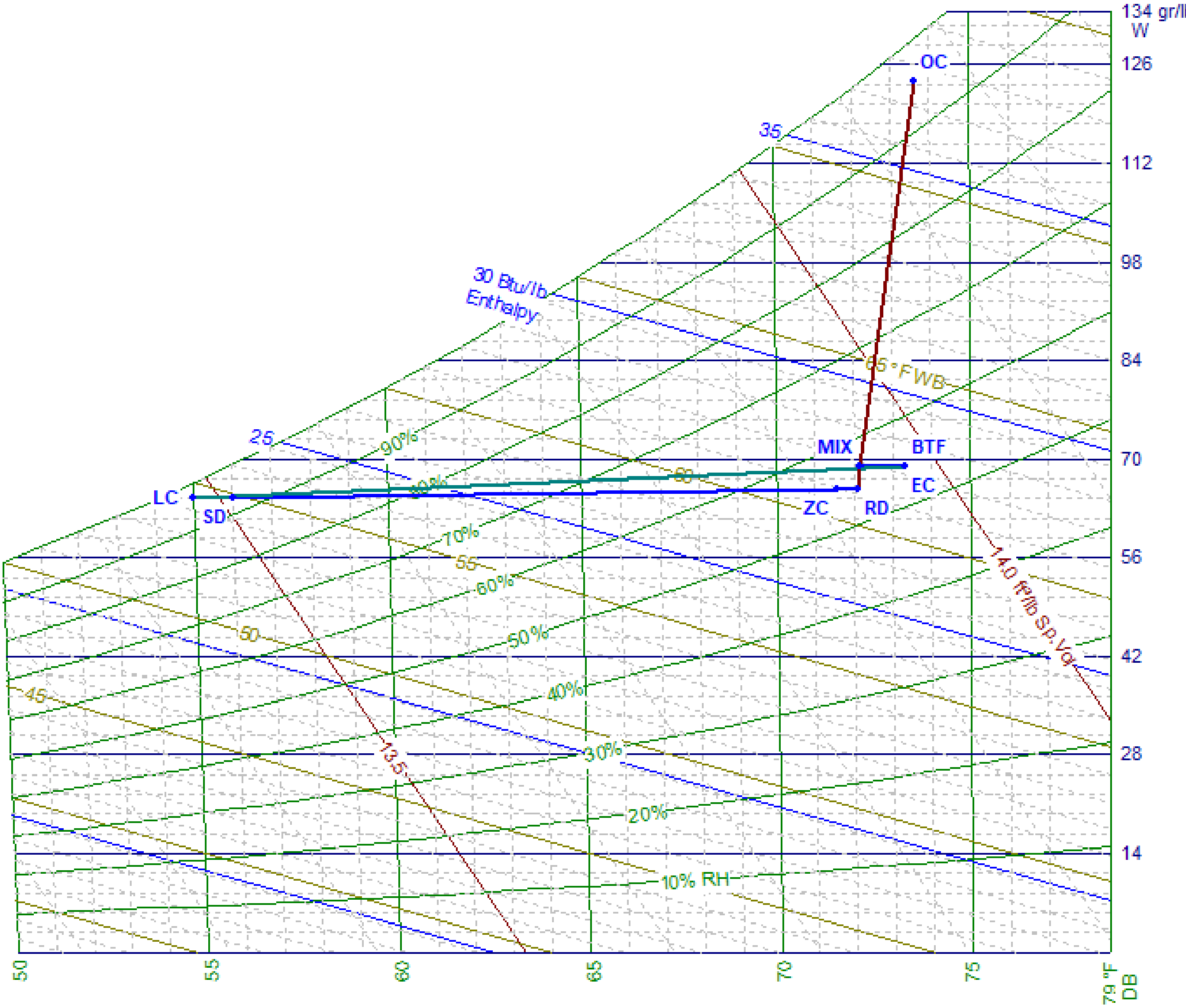
Air System #29 (Corredor 2 4to Psio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



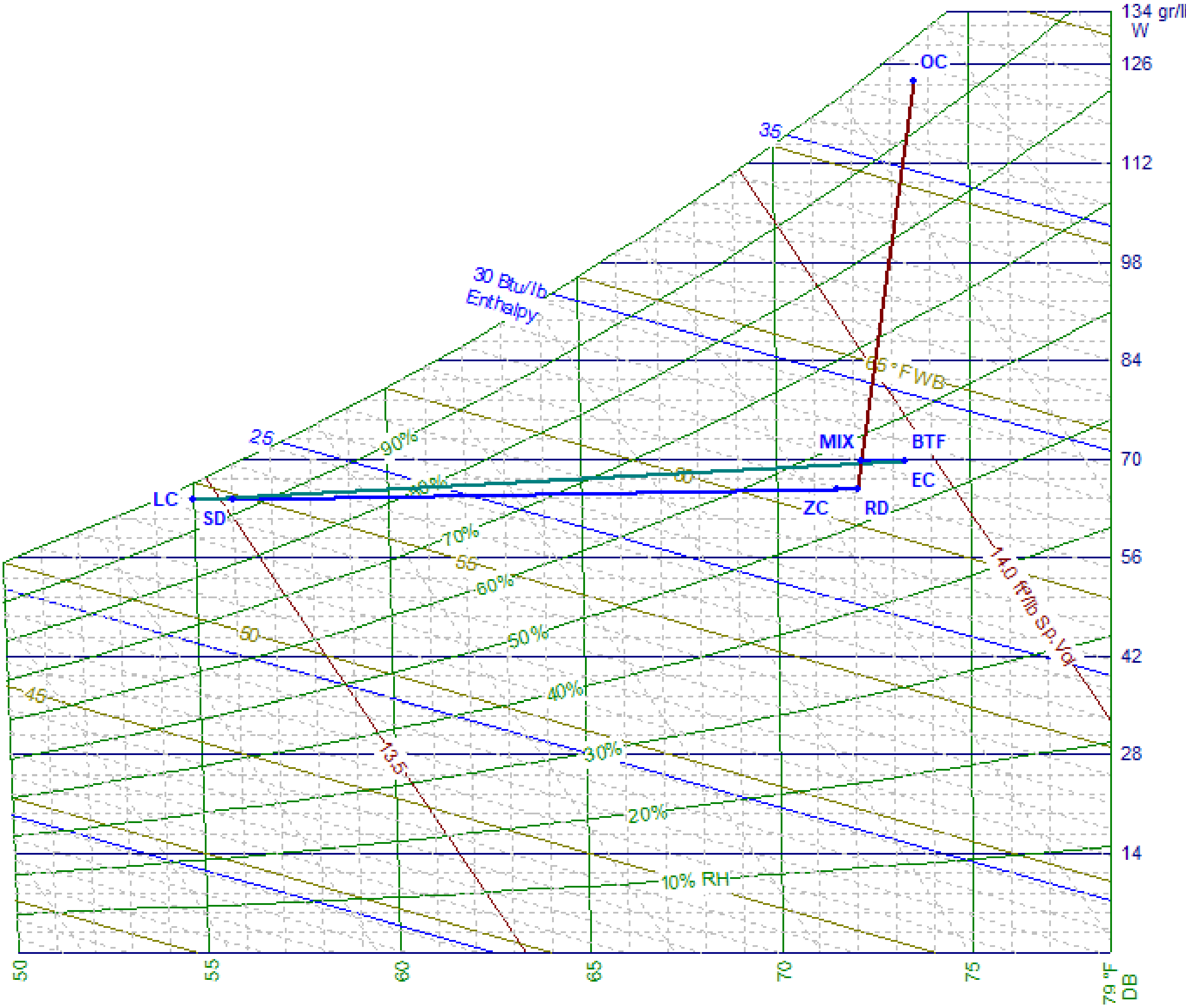
Air System #30 (Oficina 501) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



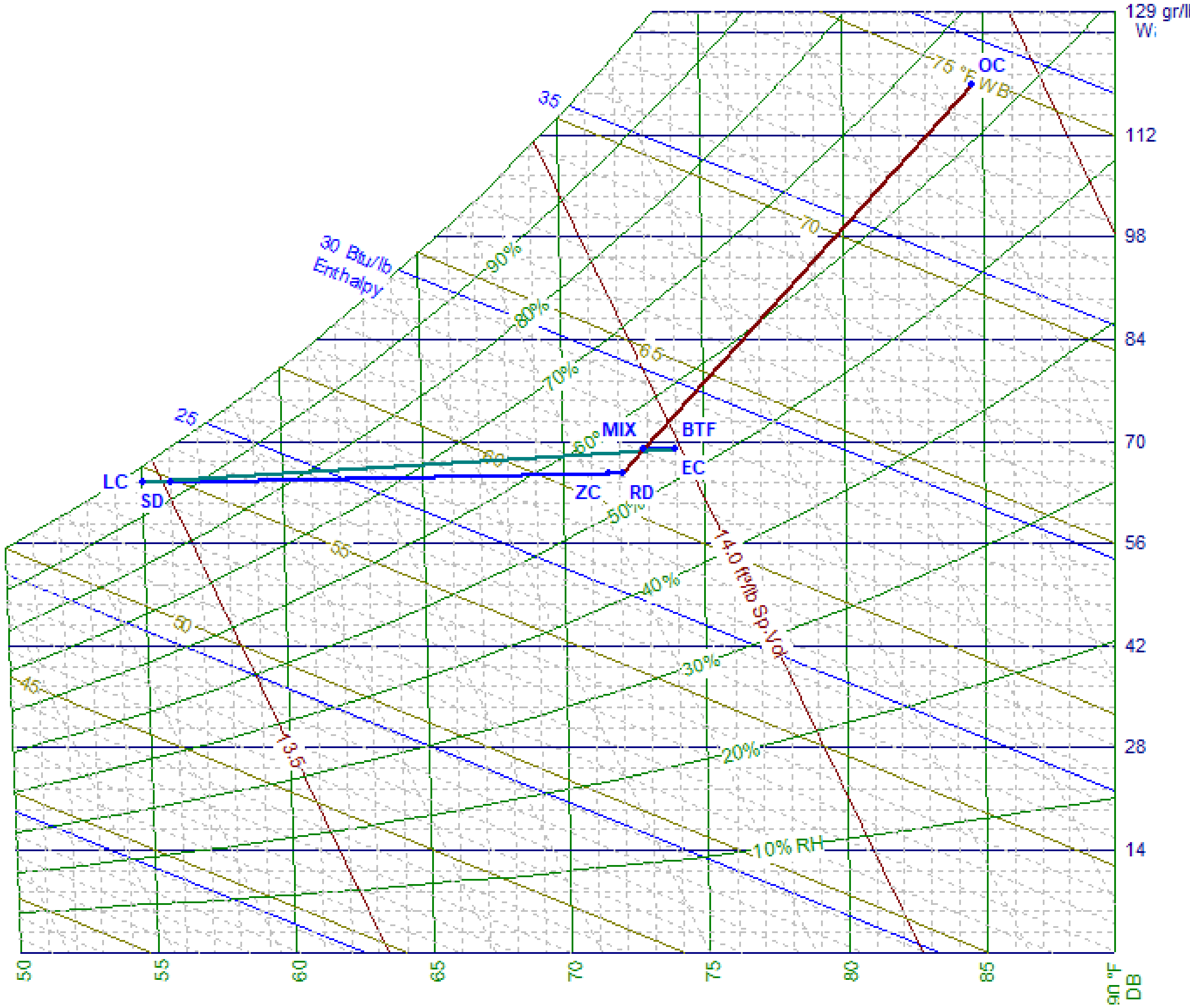
Air System #31 (Oficina 502) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



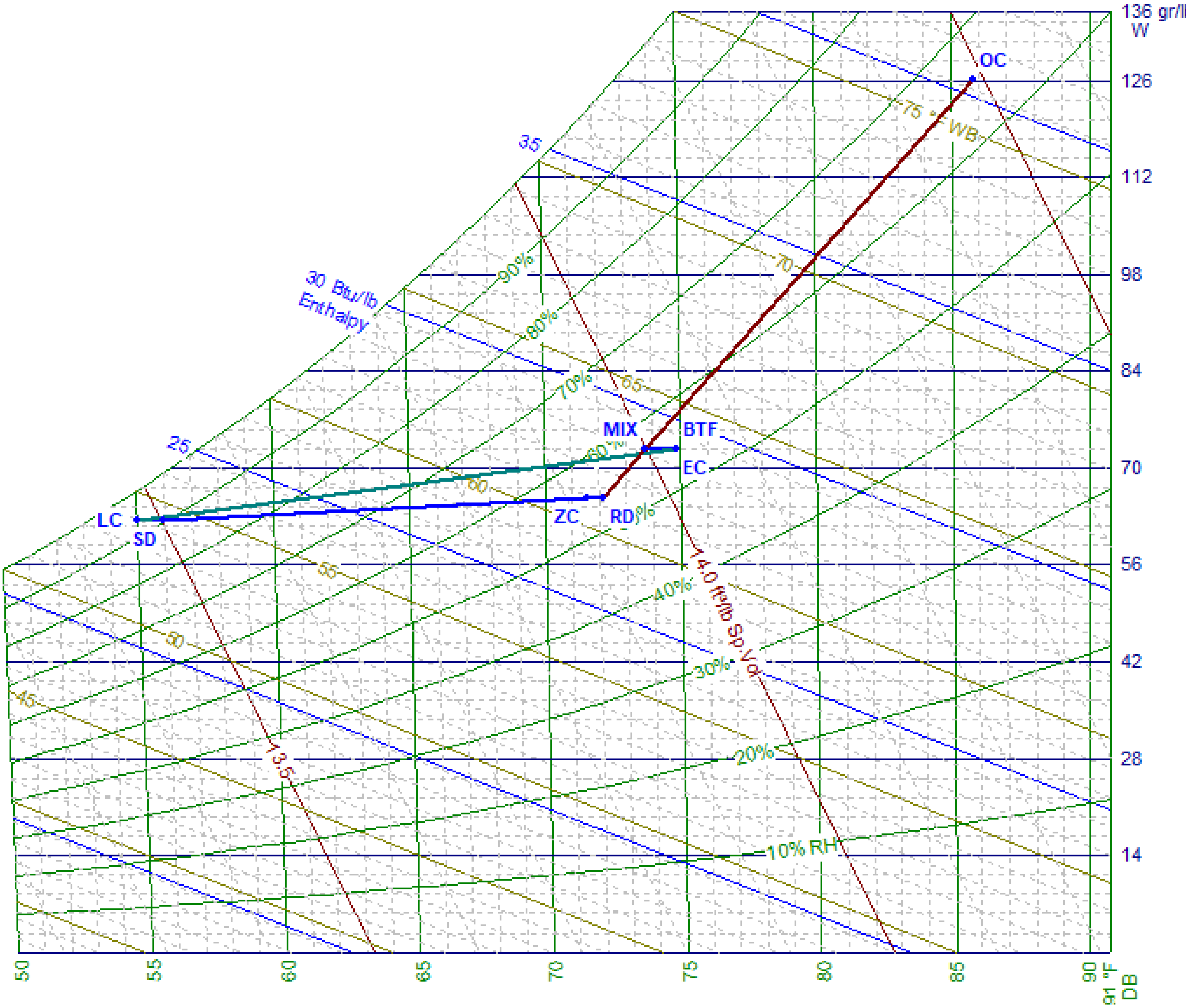
Air System #32 (Oficina 503) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



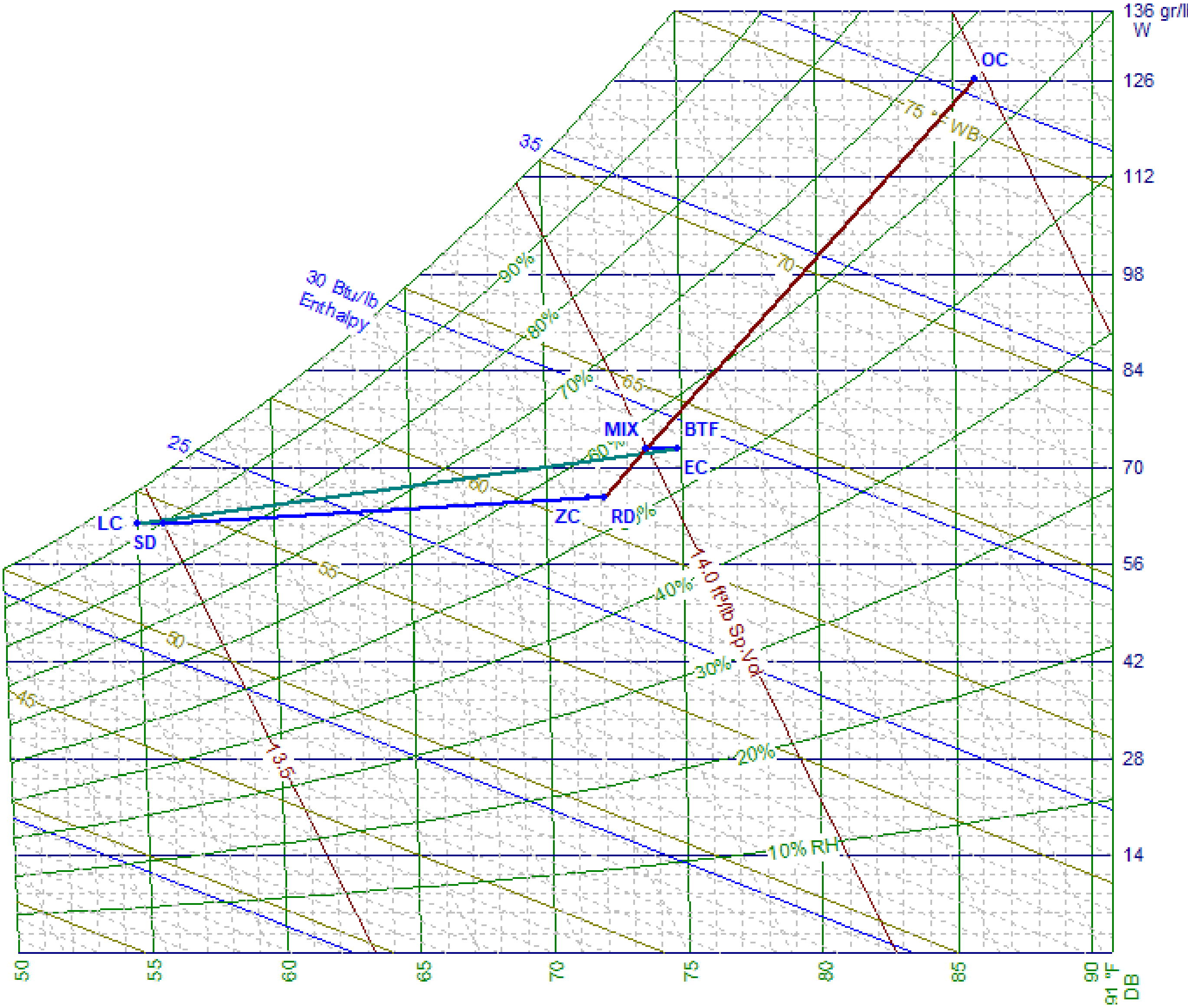
Air System #33 (Hall Ascensores 5to Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



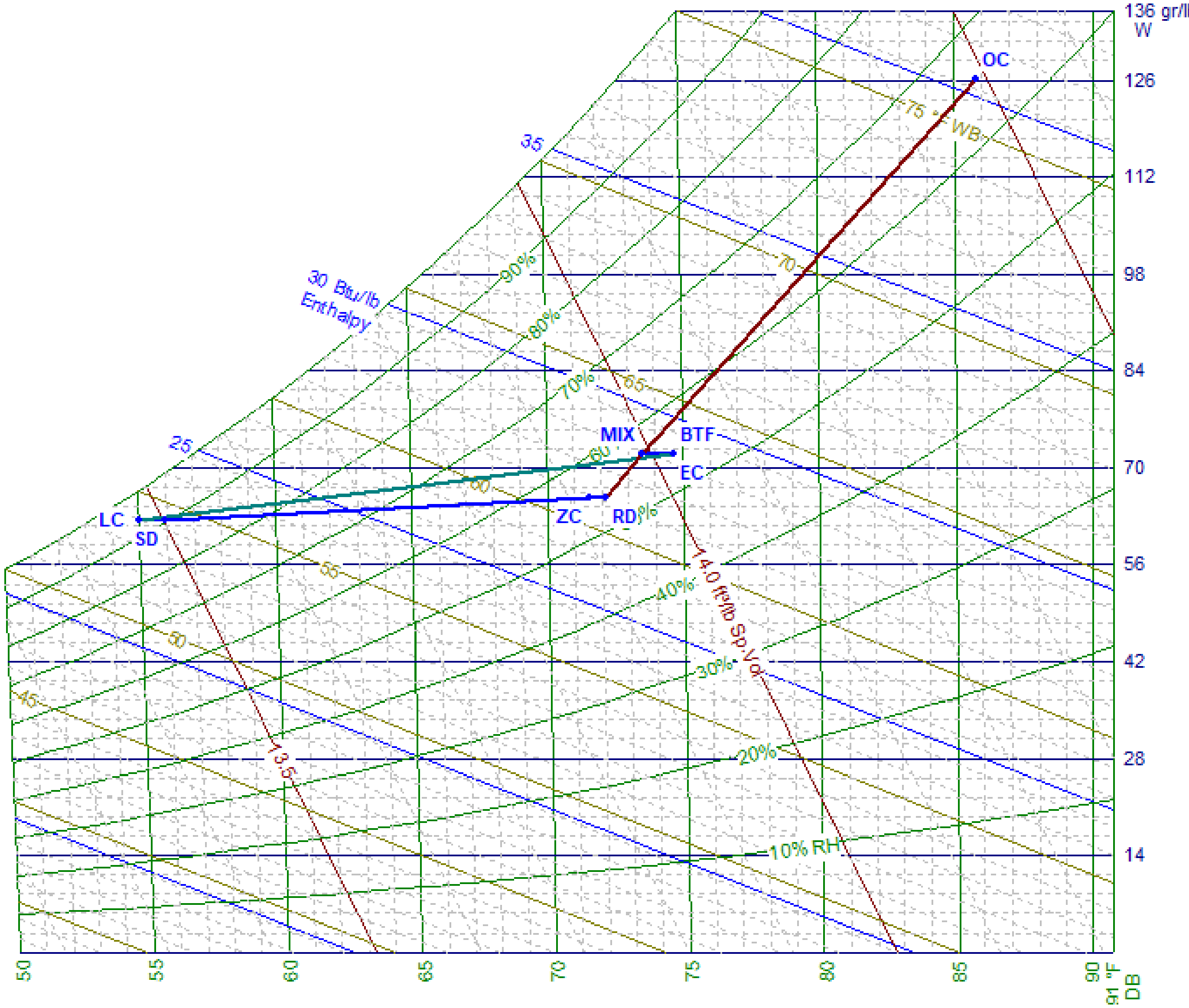
Air System #34 (Corredor 1 5to Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



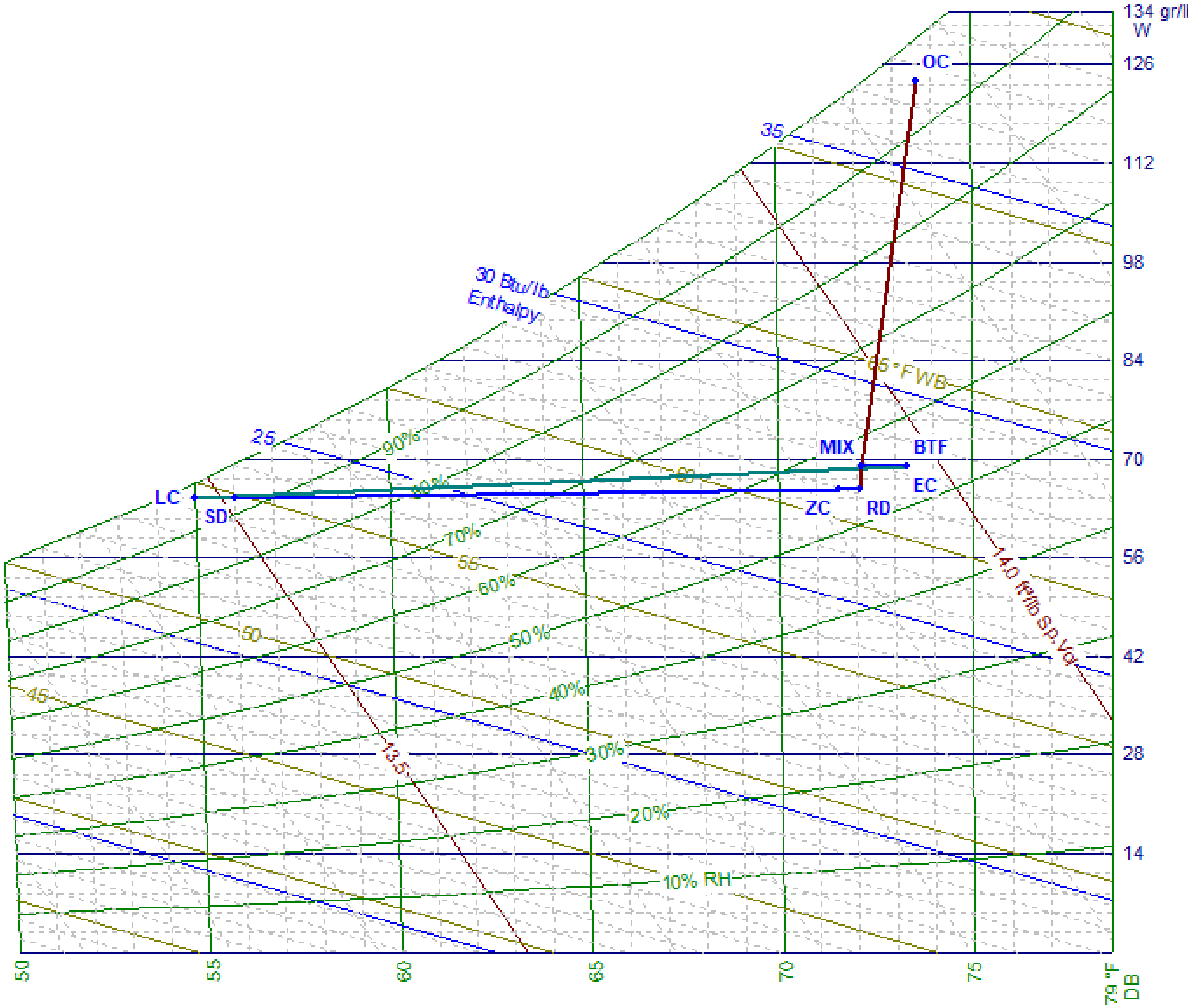
Air System #35 (Corredor 2 5to Psio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



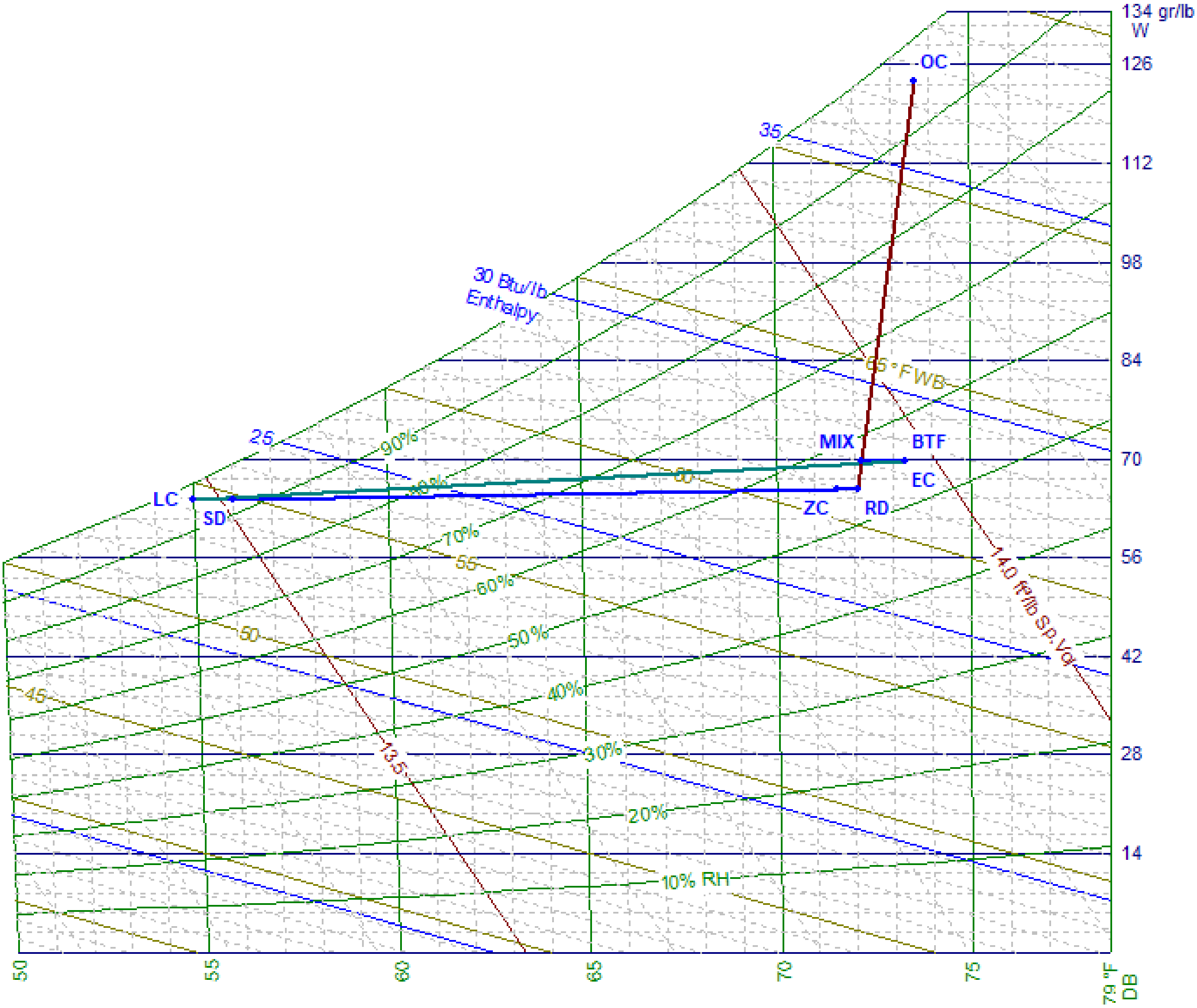
Air System #36 (Oficina 601) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



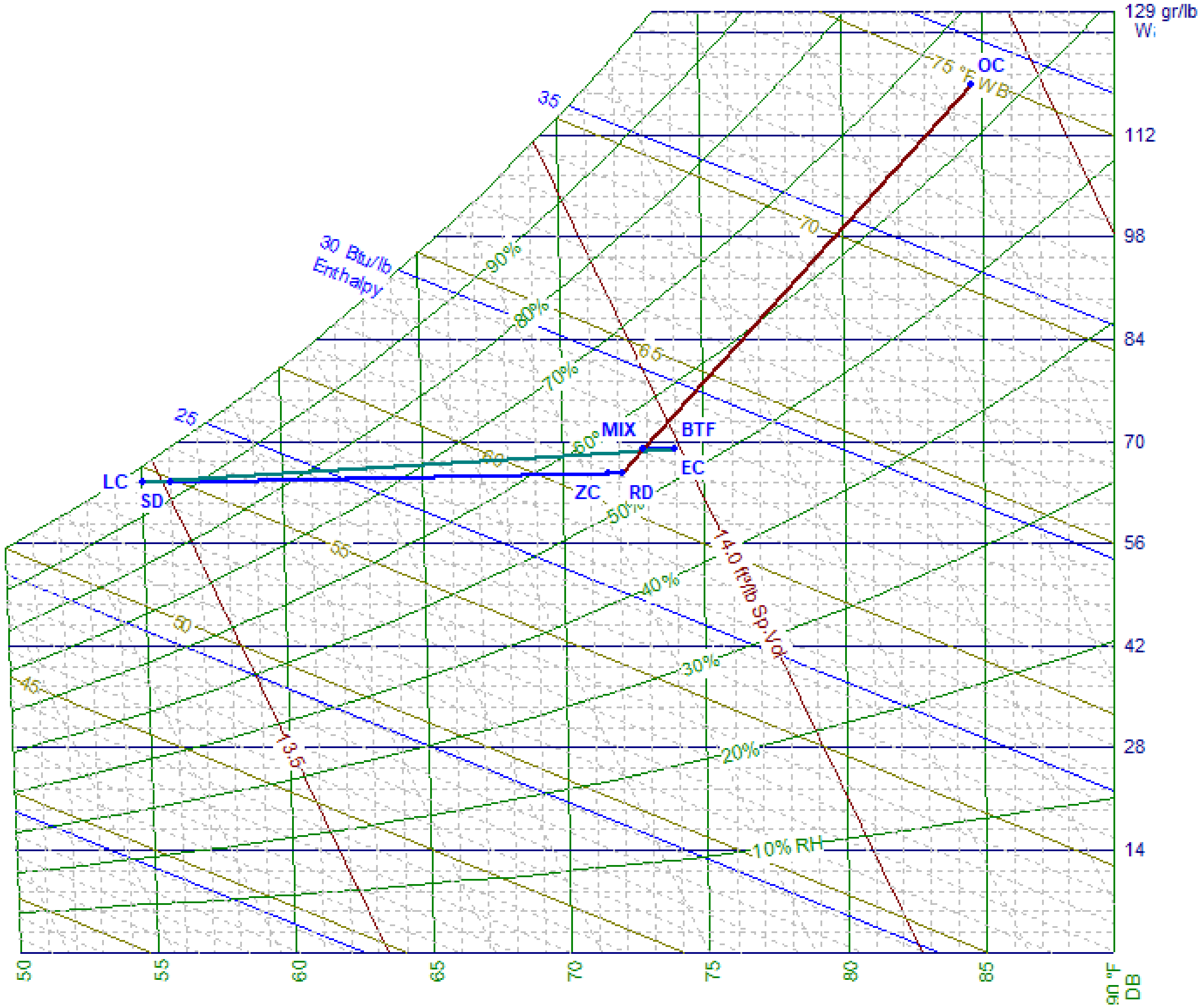
Air System #37 (Oficina 602) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



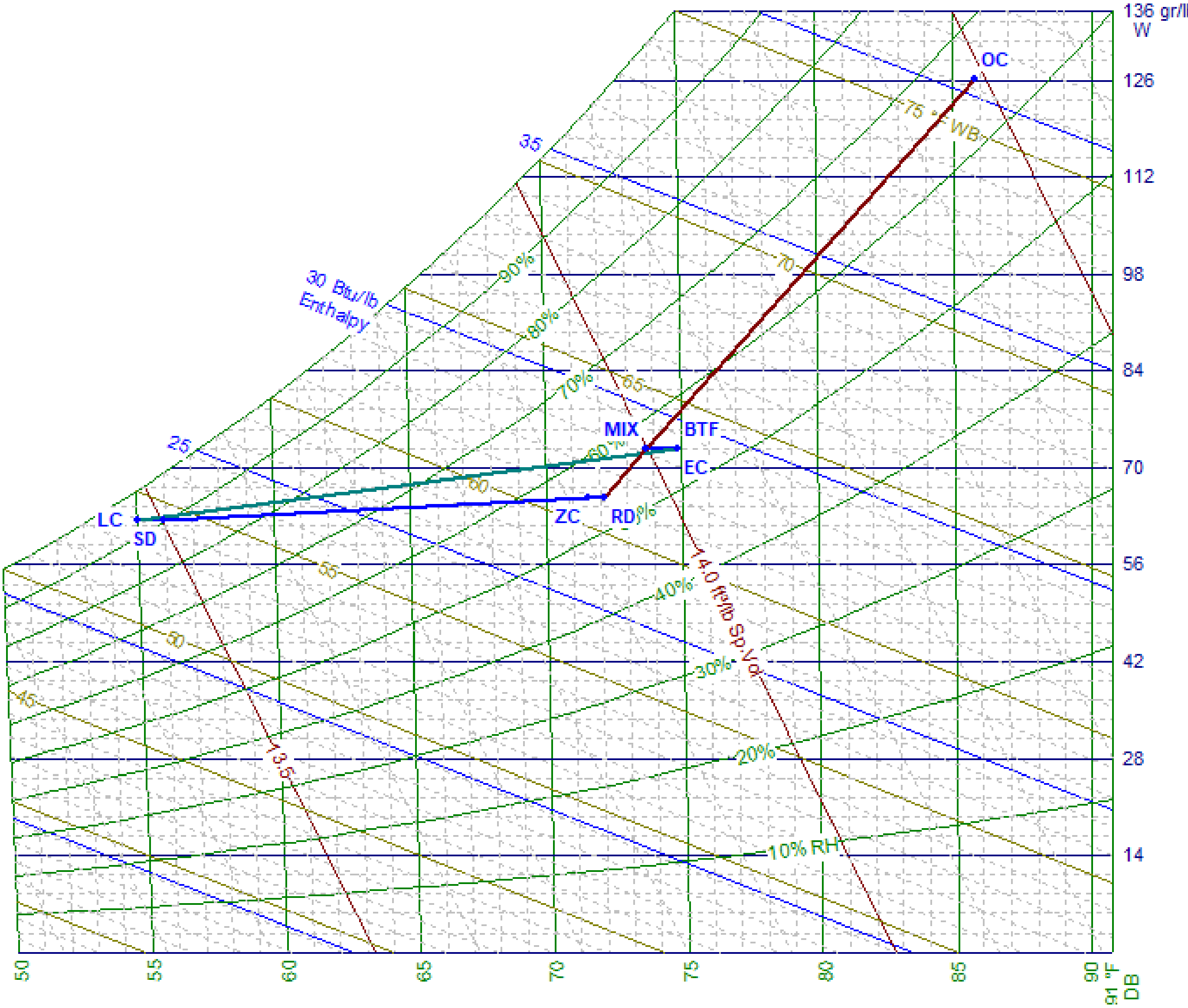
Air System #38 (Oficina 603) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



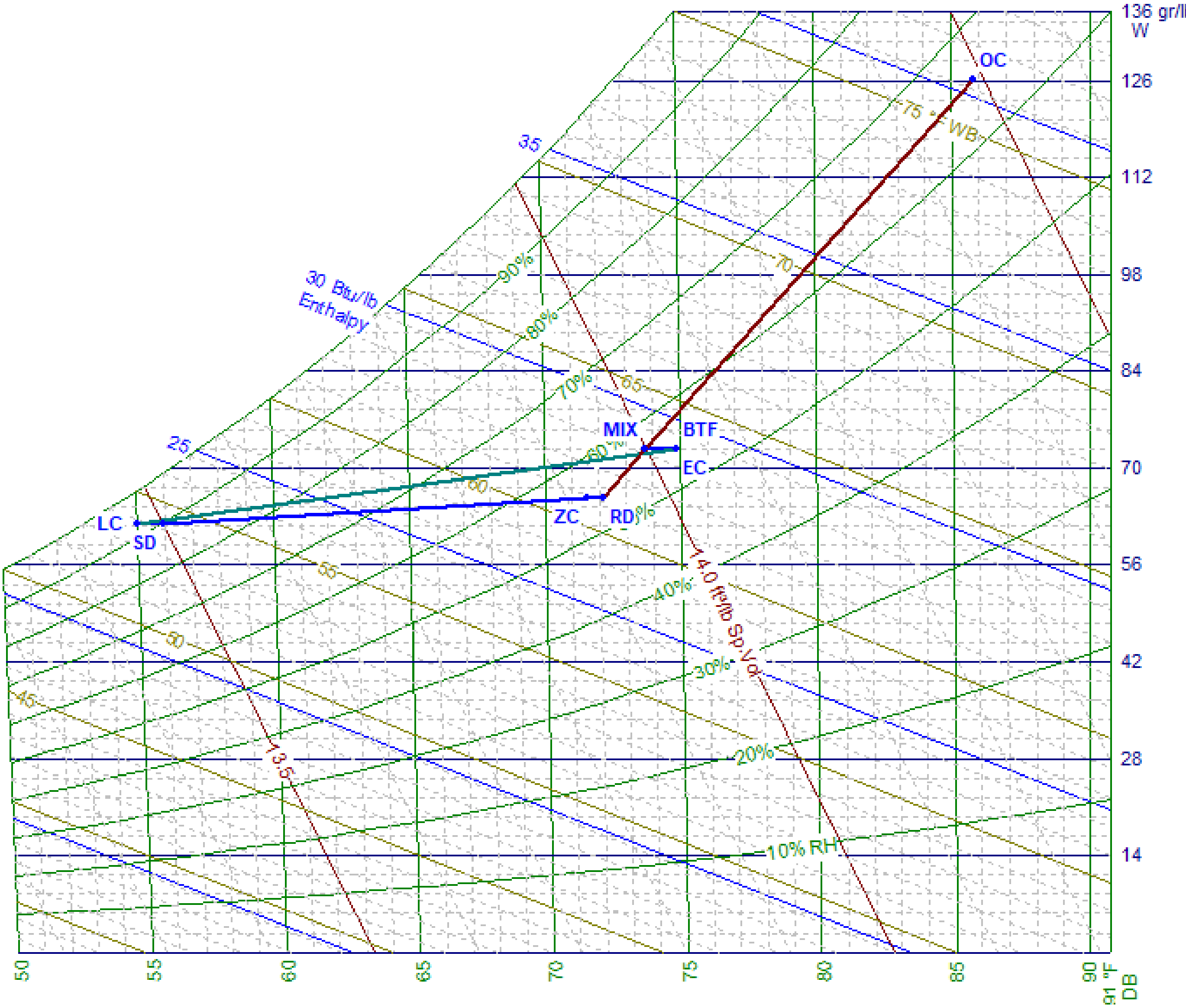
Air System #39 (Hall Ascensores 6to Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



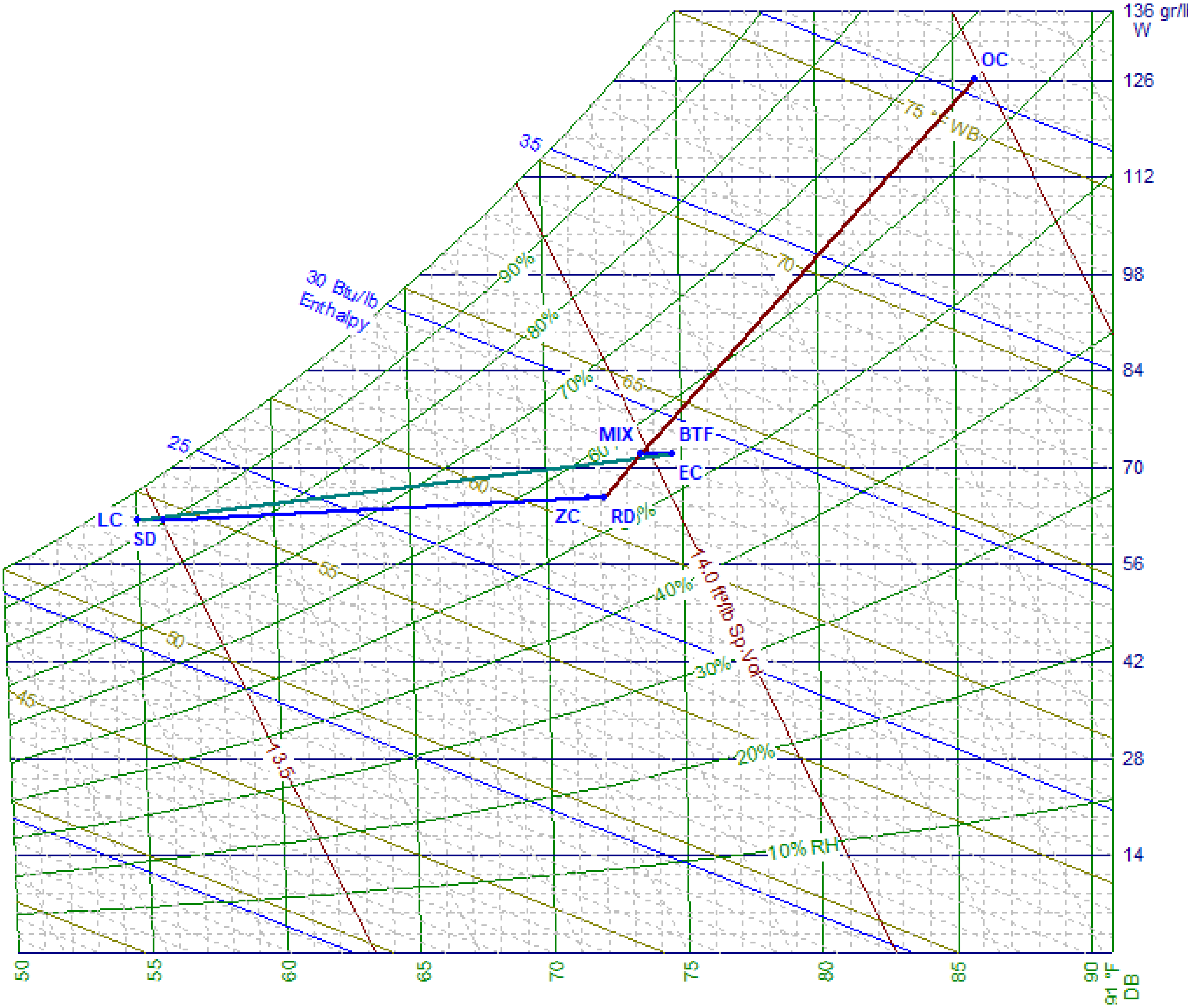
Air System #40 (Corredor 1 6to Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



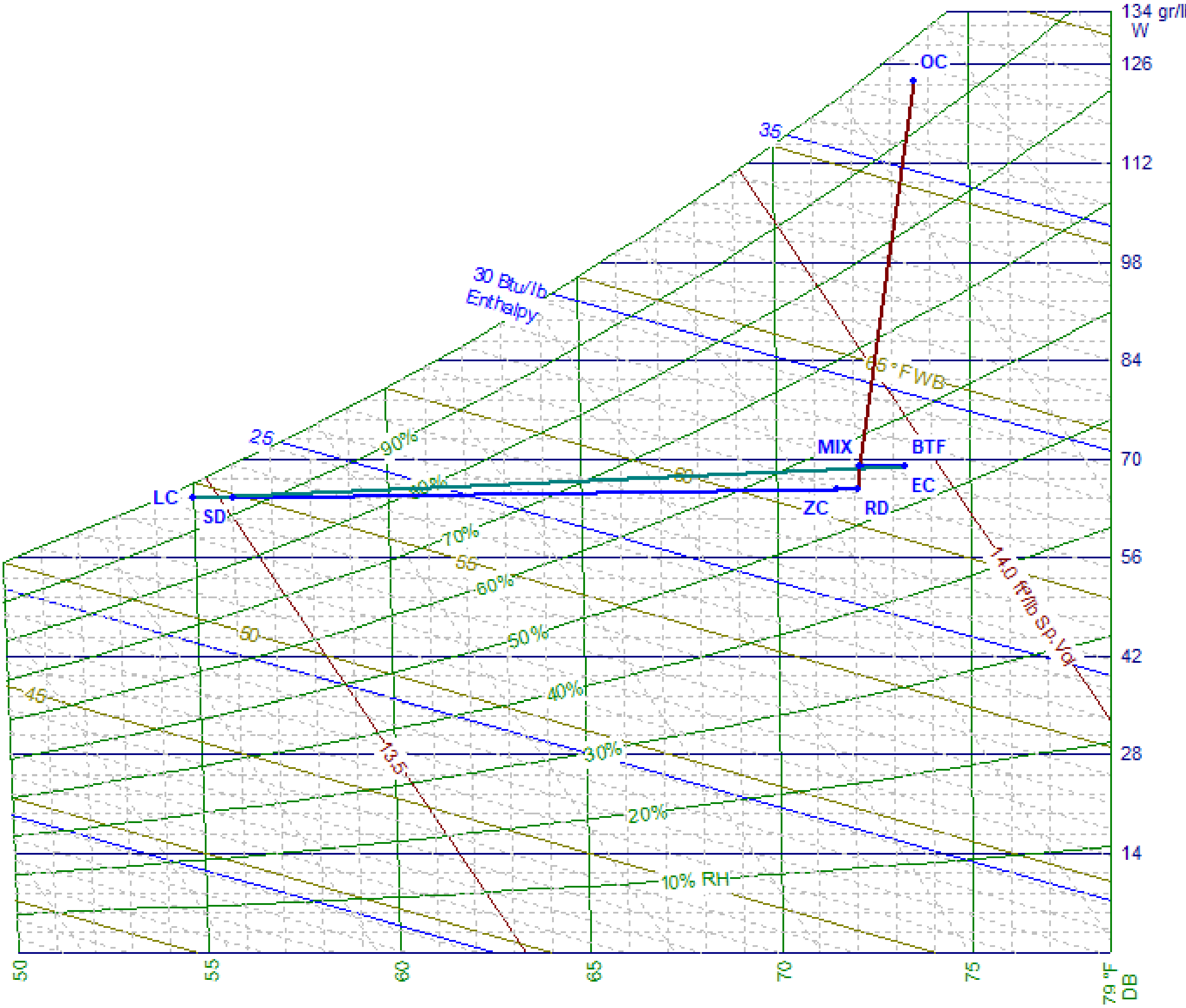
Air System #41 (Corredor 2 6to Psio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



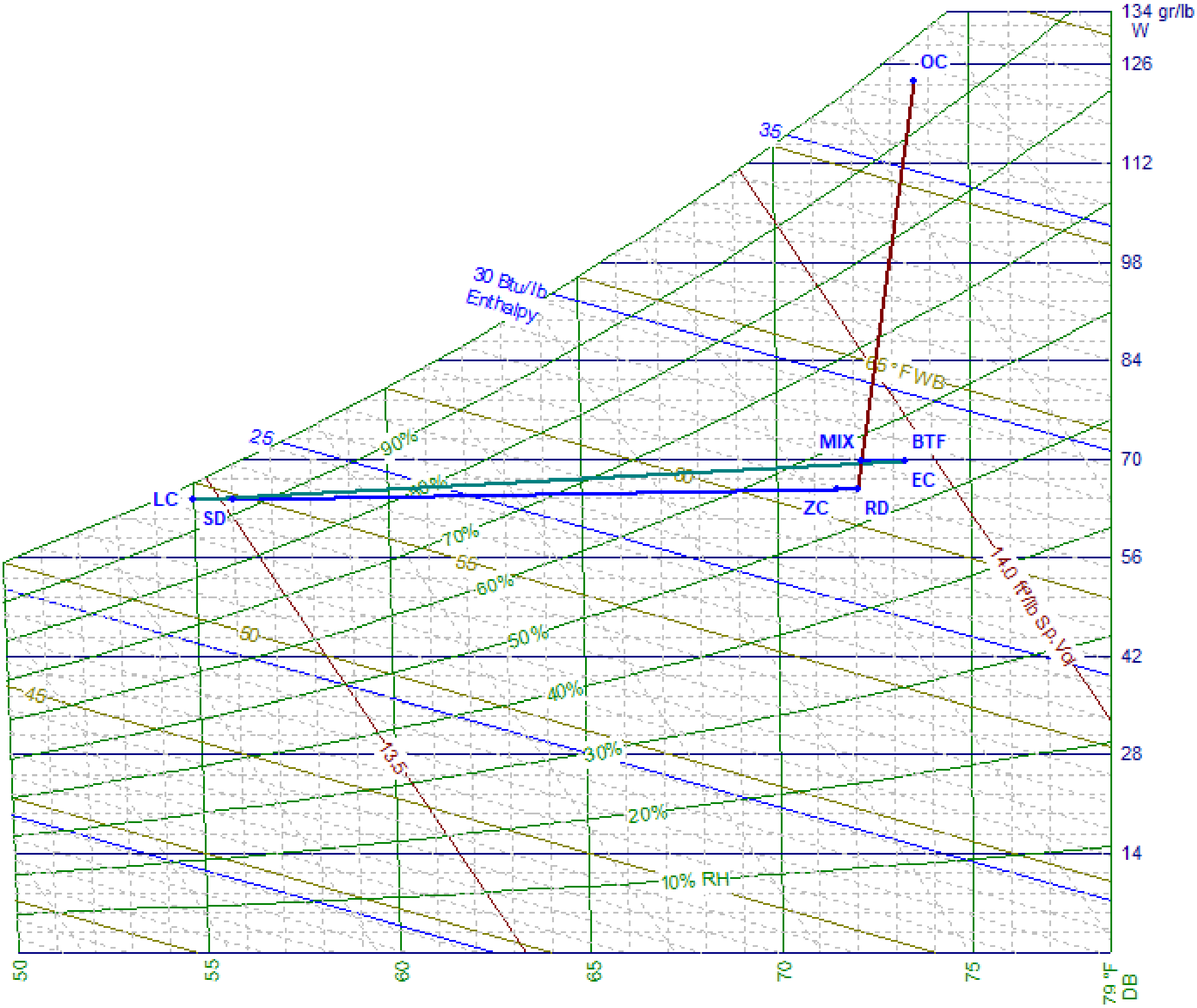
Air System #42 (Oficina 701) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



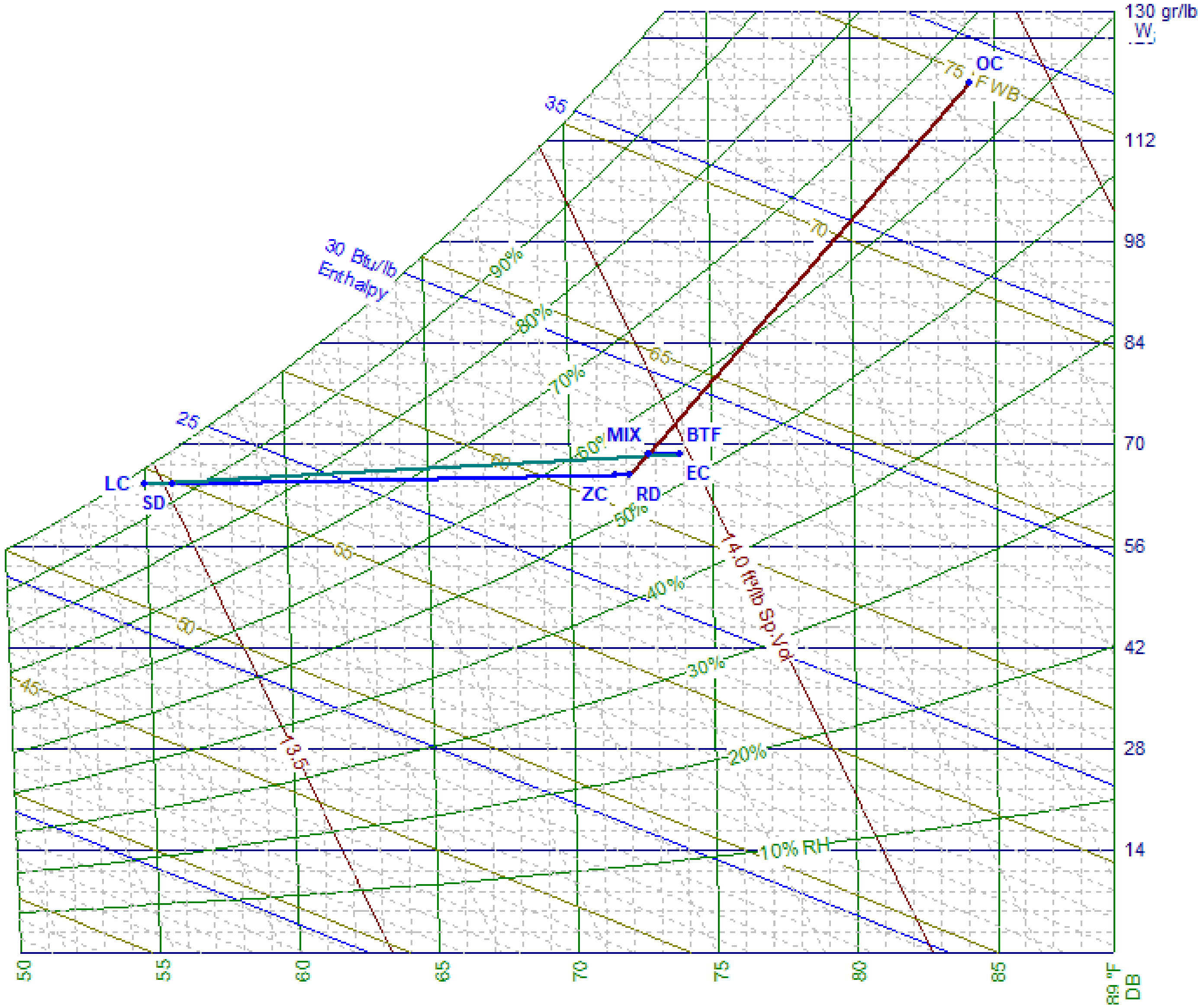
Air System #43 (Oficina 702) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



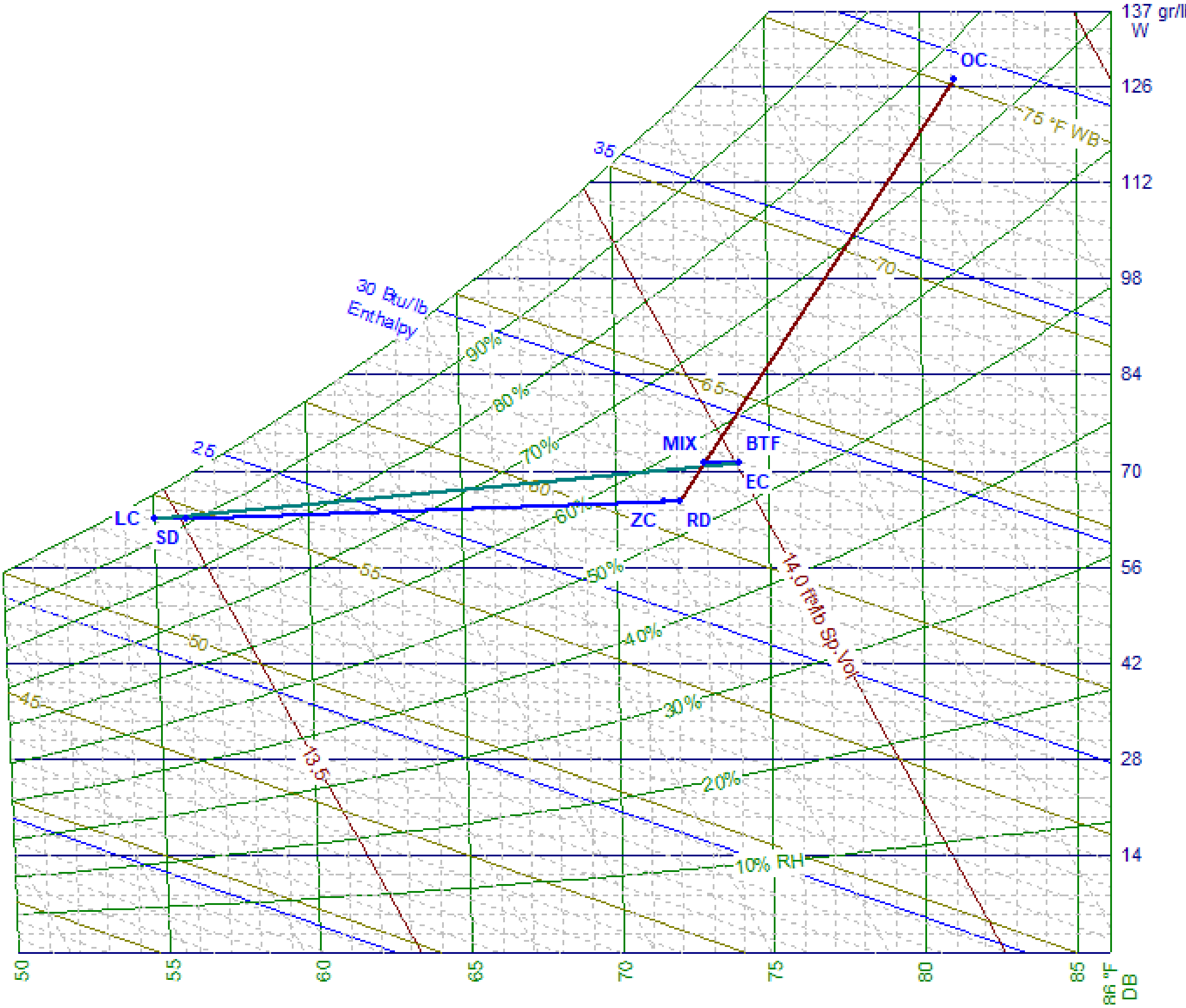
Air System #44 (Oficina 703) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



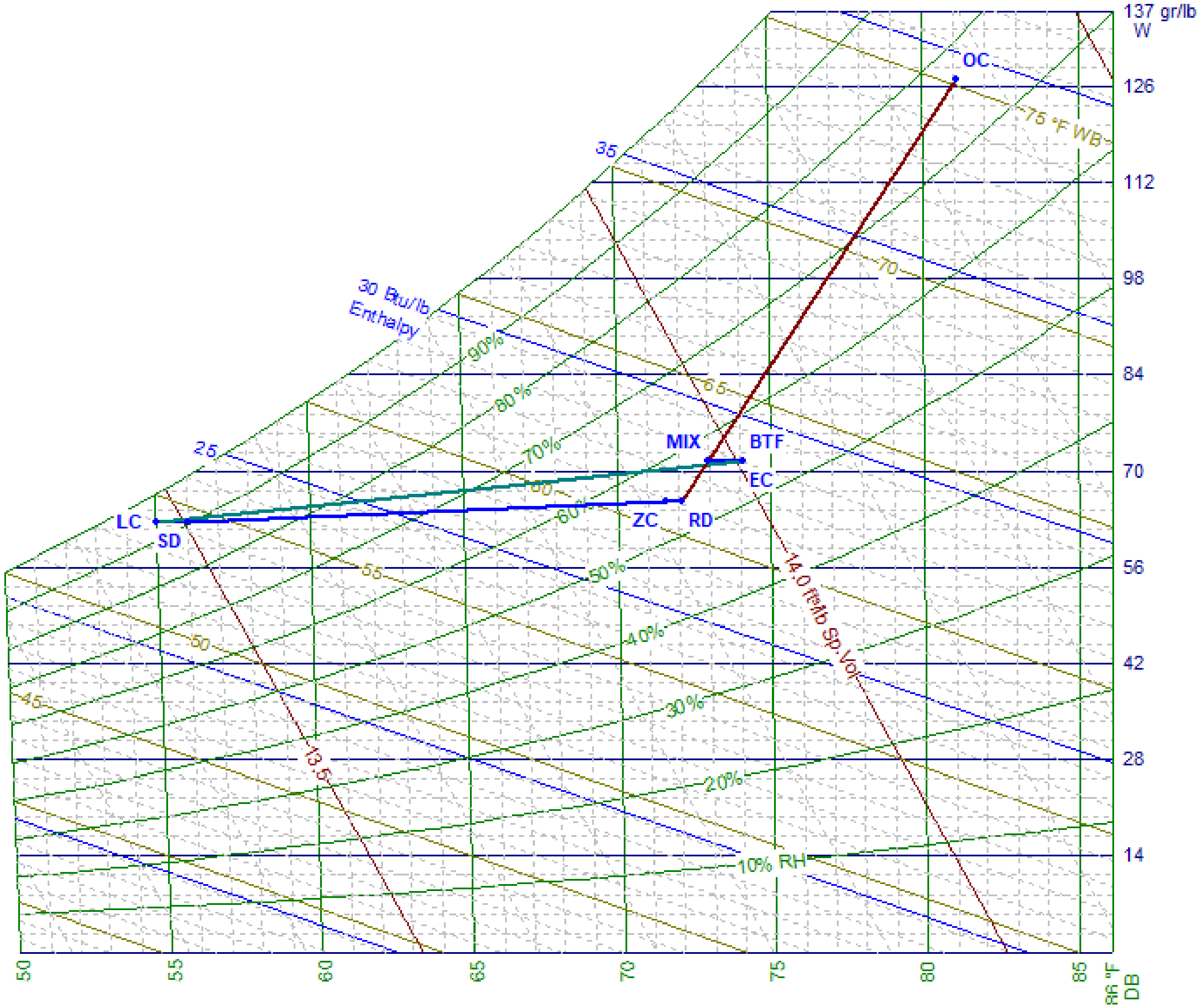
Air System #45 (Hall Ascensores 7mo Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



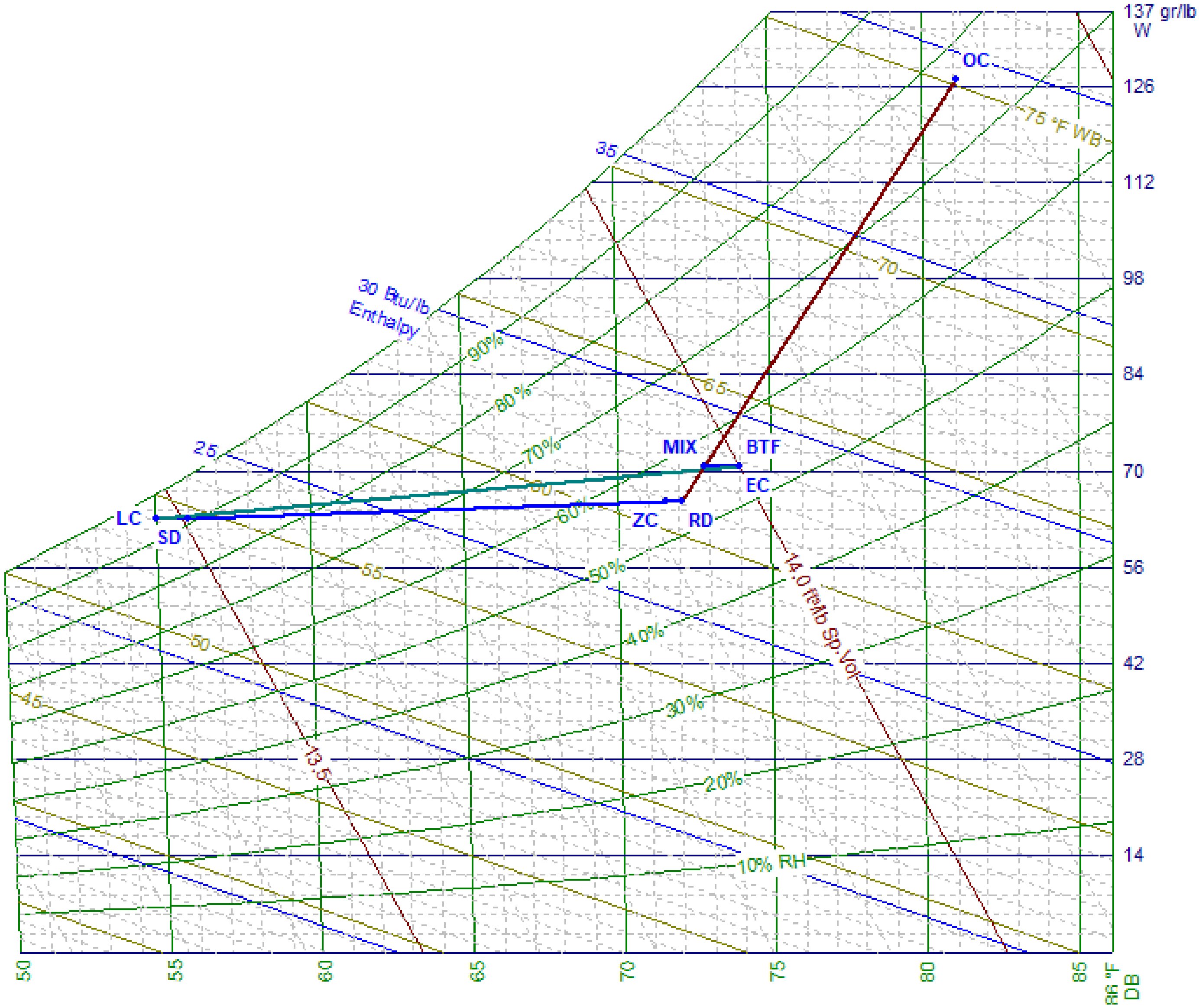
Air System #46 (Corredor 1 7mo Piso) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



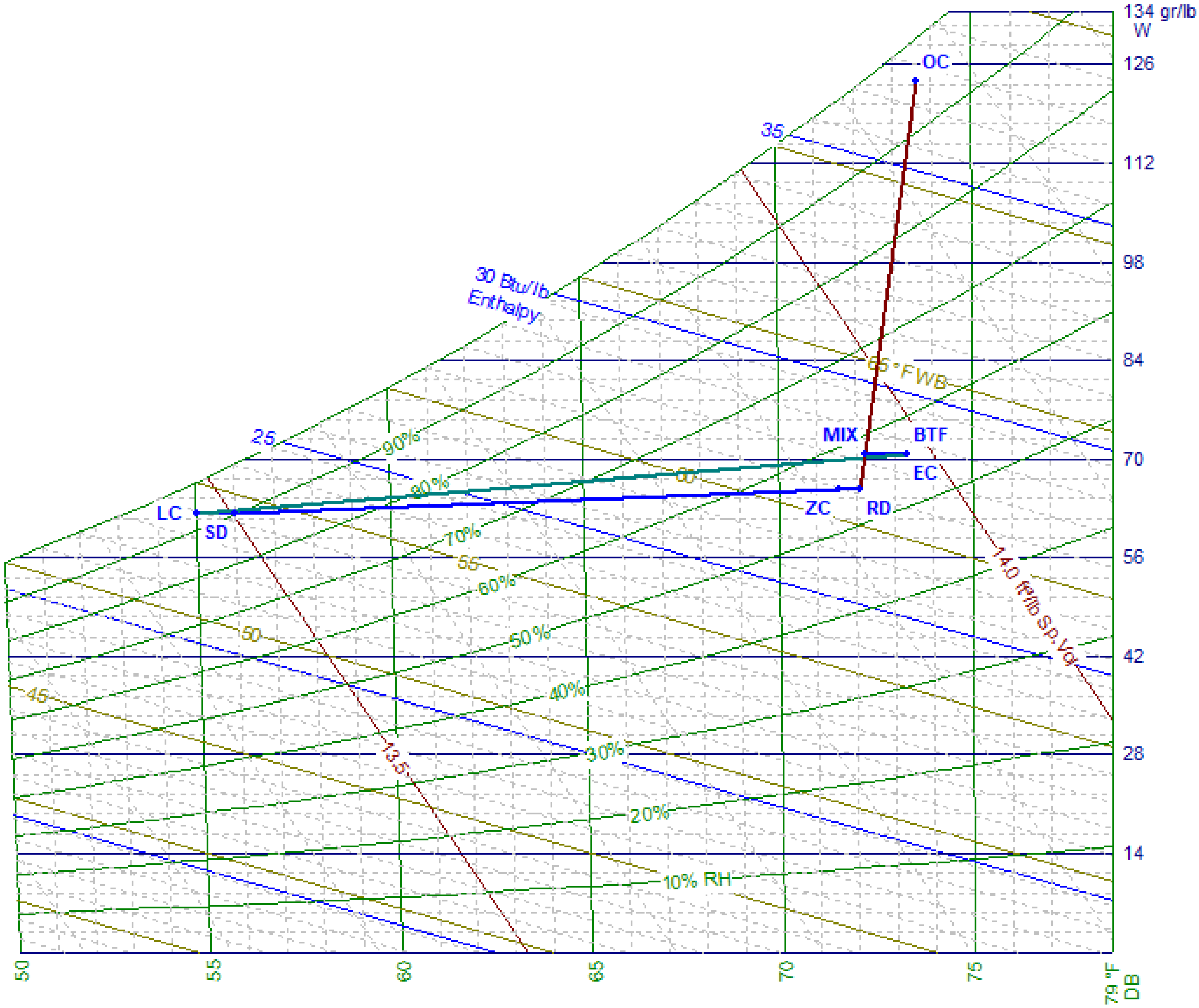
Air System #47 (Corredor 2 7mo Psio) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



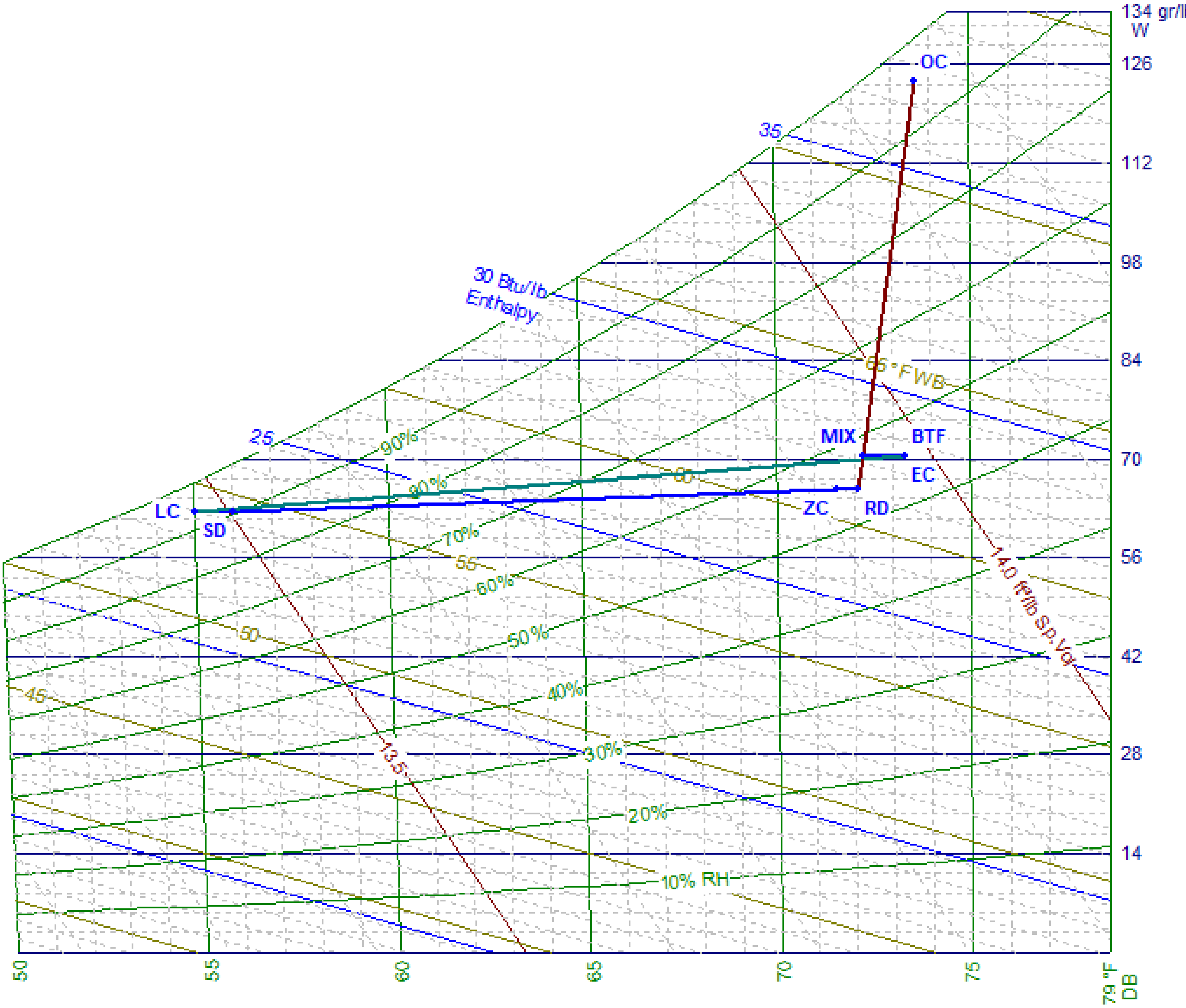
Air System #48 (Sala De Reuniones 1 Azotea) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



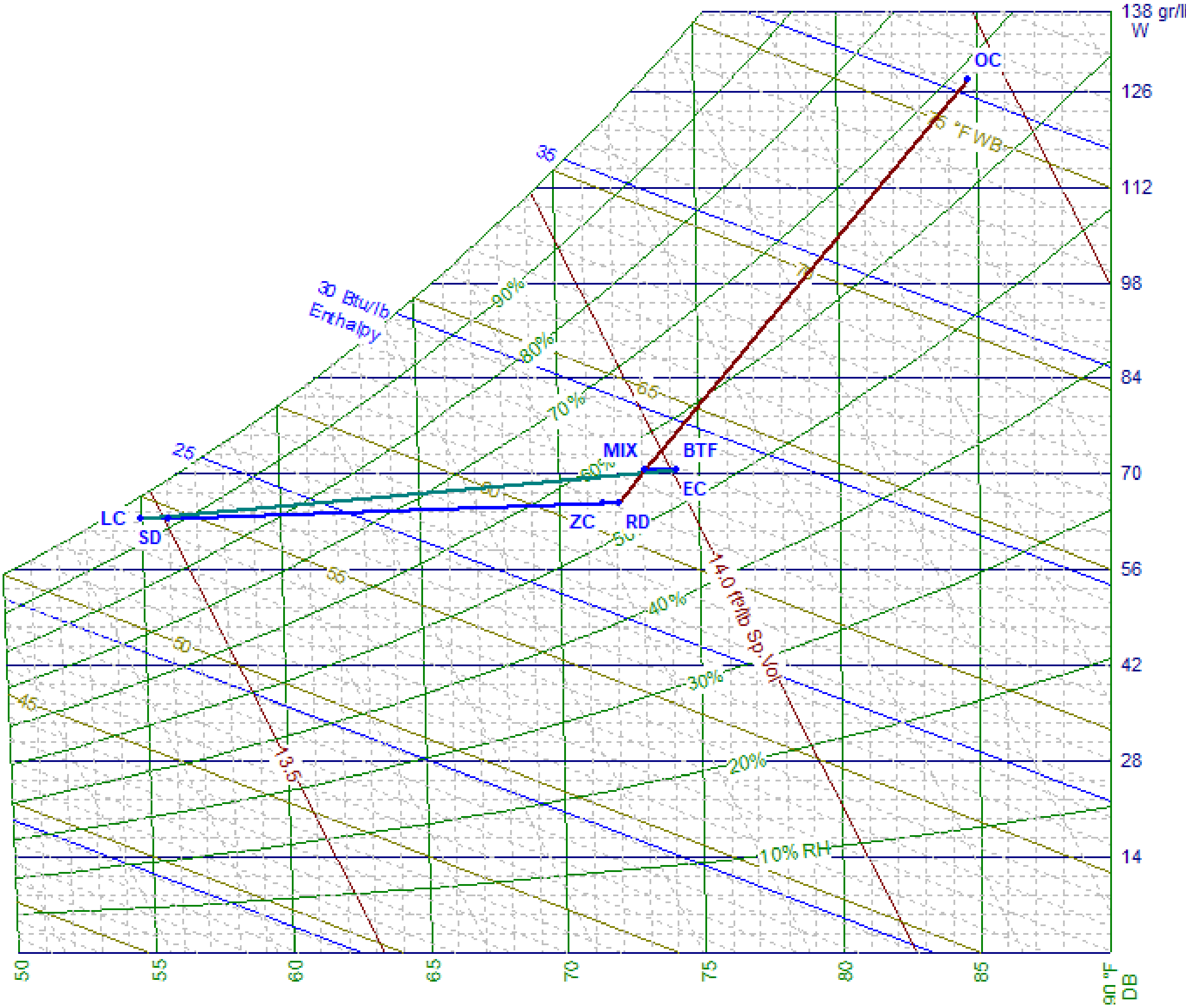
Air System #49 (Sala De Reuniones 2 Azotea) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #50 (Hall Ascensores Azotea) Psychrometric Chart

ZC	Zone Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



ANEXO 03

Johnson Controls

Design Conditions Datasheet

Unit Tag	Qty	Model No	Net Cooling Capacity (TR)	Nominal Voltage	Refrigerant Type
UNIT1	1	YVWABBBBFXJE0126SAX	126	380-3-60	R134a

PIN:								
YVWABBBBFX	JE0126SAX4	0BXXSSSXXA	LXXSXREXXX	AW175EXTSA	X44321CXX1	CGWX95260C	XXSCGWLB1S	XXX1XXXXXX
....5...10	....5...20	....5...30	....5...40	....5...50	....5...60	....5...70	....5...80	....5...90

Evaporator Data		Condenser Data		Performance Data	
EWT (°F)	54	EWT (°F)	85	Full Load Efficiency (kW/TR)	0.664
LWT (°F)	44	LWT (°F)	94.6		
Flow (USGPM)	301.6	Flow (USGPM)	378		
Pressure Drop (ft H2O)	8	Pressure Drop (ft H2O)	8.4	**Physical Data**	
Fluid	Water	Fluid	Water	Rigging Wt. (lb)	7579
FF	0.0001	FF	0.00025	Operating Wt. (lb)	8139
Water Volume (USGAL)	43	Water Volume (USGAL)	39	Refrigerant Charge (lb)	280
Min Fluid Flow Rate (USGPM)	240	Min Fluid Flow Rate (USGPM)	190		
Max Fluid Flow Rate (USGPM)	750	Max Fluid Flow Rate (USGPM)	780		

Electrical Data				
Circuit	1	2	3	4
Compressor RLA	140	0	0	0
Compressor Overload Setting	227	0	0	0

Single Point				
Min. Circuit Ampacity	172			
Min. Non-Fused Disconnect (A)	225			
Min. Fuse / CB Rating (A)	225			
Max. Fuse / CB Rating (A)	300			
Unit Short Circuit Withstand (STD)	65 [kA]			
Wire Lugs Per Phase	1			
Wire Range (Lug Size)	2/0~500 kcmil			
Starter Type	VSD		**Operating Condition Electrical Data**	
			Compressor kW	83.6
			Total kW	83.6
			Chiller FLA	145

Notes:
Sound Data in accordance with AHRI Standard 575
Nominal Current based on design conditions
Subject to change without prior notice

Design Conditions Datasheet

Certified in accordance with the AHRI Water-Cooled Water Chilling Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P). Certified units may be found in the AHRI Directory at www.ahridirectory.org Auxiliary components included in total KW - Oil heaters, Chiller controls. Auxiliary power is already included in the compressor power

AHRI CERTIFIED®
www.ahridirectory.org
Water-Cooled Chillers
AHRI Standard 550/590

Part Load Rating Data					
Load %	Capacity (TR)	COND EWT (°F)	COND LWT (°F)	Total kW	Unit Efficiency (kW/TR)
100	126	85	94.6	83.6	0.664
90	113.4	81	89.4	66.9	0.59
80	100.8	77	84.4	53.4	0.53
70	88.2	73	79.3	42.1	0.477
60	75.6	69	74.5	32.6	0.431
50	63	65	69.4	25	0.397
40	50.4	65	68.5	20.5	0.407
30	37.8	65	67.6	16.2	0.429
27	34.3	65	67.5	15.2	0.444

Sound Power Levels									
Load %	63	125	250	500	1K	2K	4K	8K	LWA
100	77	101	73	93	96	88	87	73	98
90	76	92	80	91	96	87	87	74	98
80	73	89	81	103	95	87	83	71	101
70	77	85	88	102	97	82	84	68	101
60	77	84	75	115	89	84	83	68	112
50	86	90	69	102	87	81	78	64	100
40	81	87	80	101	91	76	72	64	99
30	84	86	75	101	84	80	72	63	98
27	90	86	73	107	82	80	71	64	104

Note: Unit is equipped with Low Sound Kit (Level 1 Reduction).

THE OCTAVE AND A-WEIGHTED SOUND PRESSURE LEVELS ARE THE LEVELS EXPECTED TO BE OBTAINED IF MEASUREMENTS ARE PERFORMED IN ACCORDANCE WITH AHRI STANDARD 575-94,

METHOD OF MEASURING MACHINERY SOUND WITHIN EQUIPMENT ROOMS. SOUND PRESSURE LEVELS ARE AT 1 METER FROM THE CHILLER AND 1.5 METERS ABOVE THE FLOOR; DB IS REFERENCED TO 20 MICRO PA. THESE LEVELS ARE THE AVERAGE OF VARIOUS POSITIONS AROUND THE CHILLER.

THESE LEVELS ARE EXPECTED TO OCCUR ONLY IN AN ACOUSTIC FREE-FIELD ENVIRONMENT, SUCH AS A LARGE MACHINERY ROOM WITH ACOUSTIC ABSORPTION ON PERIMETER WALLS. PROPER ISOLATION IS REQUIRED AT THE CHILLER MOUNTING FEET, WATER PIPING AND OTHER CHILLER TO BUILDING INTERFACES.

SOUND LEVELS LISTED ARE ONLY FOR CHILLER OPERATION AT THE SCREW COMPRESSOR DESIGN VOLUME RATIO. SOUND LEVELS WILL INCREASE BASED ON CHILLER OPERATING PARAMETERS THAT CAUSE THE VOLUME RATIO TO DIFFER FROM THE DESIGN. SOUND ESTIMATES ARE BASED ON WATER TEMPERATURES OF 44 DEG F LEAVING CHILLED WATER AND 85 DEG F ENTERING CONDENSER WATER AT FULL LOAD AND WITH AHRI-550/590 CONDENSER WATER RELIEF AT PART LOADS.CONTACT MARKETING FOR

SOUND ESTIMATES AT OTHER TEMPERATURES.

TOLERANCES: THE SOUND LEVEL OF IDENTICAL UNIT SELECTIONS CAN VARY DUE TO MANUFACTURING TOLERANCE AND TEST REPEATABILITY. VARIATIONS OF +/-3 dBA ON THE A-WEIGHTED LEVELS AND +/-5 DB ON THE OCTAVE BAND LEVELS ARE POSSIBLE. SOUND LEVELS CAN BE GUARANTEED AT THE UPPER END OF THE TOLERANCE RANGE, WITNESS TESTS MUST BE CONDUCTED IN FREE-FIELD ENVIRONMENTS SUCH AS THE SOUND TEST FACILITIES AT THE GRANTLEY PLANT, YORK PA.

SOUND DATA SHOWN IS BASED ON A YVWA UNIT WITH LOW SOUND KIT (LEVEL 1 REDUCTION).

ANEXO 04

MESAN USA - 3620 NW 115th Ave., Doral, Fl 33178
Phone: 305-471-9050; Fax: 305-471-9001
sales@mesanusa.com; www.mesanusa.com

Cooling Tower Data

Series:	MXR-KM Cross Flow, L Type		
Model:	MXR-KM-A2-3	CTI Certification:	08-26-03(R4)
Cell(s) Per Set:	1	Fan Motor Pole No.:	4 p
Fan Type:	Axial	Fan Motor Power Per Cell:	5.0 hp
Fan Diameter:	63"	Fan Motor Power Total:	5.0 hp
Fans Per Cell:	1	Air Flow Per Cell:	39672 cfm
Water Pressure Drop:	16.7 ft	Air Flow Total:	39672 cfm

Performance Data

Water Flow Rate Per set :	378 gpm	Evaporation Loss:	0.927 %
Entering Water Temp.:	95°F	Drift Loss:	≤ 0.005 %
Leaving Water Temp.:	85°F	Make-up Water:	≤ 1.5 %
Ambient Wet Bulb Temp:	75°F	Heat Rejection Capacity:	1894 MBH
Range:	10°F	Capability:	102 %
Approach:	10°F	*This selection satisfies your design conditions.*	

Physical Data

	Per Set		**Total Per Set**
Length:	6'-11"	Dry Weight:	3116 lb
Width:	12'-11 1/2"	Operating Weight:	6225 lb
Height:	11'-4 1/2"		

Note: Weights and dimensions do not include options.

Notes: The tower selection & performance are based on a well-ventilated condition and single set design. For multiple-set jobs or in unfavorable conditions, please contact our engineering department for assistance with the towers layout.

ANEXO 05

MESAN USA - 3620 NW 115th Ave., Doral, Fl 33178
Phone: 305-471-9050; Fax: 305-471-9001
sales@mesanusa.com; www.mesanusa.com

Cooling Tower Data

Series:	MST-1000 Cross Flow		
Model:	MST-1030		
Cell(s) Per Set:	1	Fan Motor Pole No.:	8 p
Fan Type:	Axial	Fan Motor Power Per Cell:	2.0 hp
Fan Diameter:	47"	Fan Motor Power Total:	2.0 hp
Fans Per Cell:	1	Air Flow Per Cell:	13538 cfm
Water Pressure Drop:	10 ft	Air Flow Total:	13538 cfm

Performance Data

Water Flow Rate Per set :	120 gpm	Evaporation Loss:	0.927 %
Entering Water Temp.:	95°F	Drift Loss:	≤ 0.005 %
Leaving Water Temp.:	85°F	Make-up Water:	≤ 1.5 %
Ambient Wet Bulb Temp:	75°F	Heat Rejection Capacity:	601 MBH
Range:	10°F		
Approach:	10°F	*This selection satisfies your design conditions.*	

Physical Data

	Per Set		**Total Per Set**
Length:	5'-3 3/4"	Dry Weight:	662 lb
Width:	6'-6 3/4"	Operating Weight:	1588 lb
Height:	6'-2 1/2"		

Note: Weights and dimensions do not include options.

Notes: The tower selection & performance are based on a well-ventilated condition and single set design. For multiple-set jobs or in unfavorable conditions, please contact our engineering department for assistance with the towers layout.

ANEXO 06

MUELLER ACCU-THERM
PLATE HEAT EXCHANGER SPECIFICATION SHEET

PMC Spec. No.	182118-02.01	Sales Manager	Jorge Hernandez
Ref No.	Edificio santa cruz	Date	Monday, May 19, 2014

Design Data	Hot Side	Cold Side	
Heat Transfer Media	Water	Water	
Volume Flow Rate	120.0	120.0	GPM
Mass Flow Rate	59717.7	59779.0	LB/HR
Inlet Temperature	100.0	85.0	°F
Outlet Temperature	90.0	95.0	°F
Density	8.30	8.31	LB/GAL
Specific Heat	0.998	0.998	BTU/LB F
Viscosity	0.72	0.76	CPS
Thermal Conductivity	0.359	0.357	BTU/FT H F
Pressure Drop	5.3	5.2	PSI
Operating Pressure	50.0	50.0	PSI G
Heat Transfer Rate	595972		BTU/H
Log Mean Temperature Difference	5.0		°F
Operating U-Value	1659		BTU/FT2 H F
Heat Transfer Area (All Frames)	71.8		FT2

Mechanical Description

Frame

Type	LC-150 Carbon Steel
Design Code	ASME Section VIII, Div. 1 UM
Design Pressure	75 PSI G
Design Temp. Max/Min	150 °F / 32°F
Test Pressure	98 PSI G
Frames In Parallel/Series/Total	1/ 1/ 1
A-Dim. Min./Max.	7.37/ 7.60 Inch
Overall Length	14.25 Inch
Overall Width	11.00 Inch
Overall Height	36.00 Inch
Guide Bar Length/Capacity	13.50 Inch / 64 plates
Compression Bolt Length/Capacity	14.00 Inch / 63 plates
Weight Operating/Empty	404/ 356 LB

Plate

Type	AT10 F
Plate Material	0.50 MM 316 S/S SA-240
Plates/Frame	60
Passes-H/C	1/1
Channels-H/C	29/30
Gasket Material	NBR

Connections		Location
Hot In	2.00 Inch 316L S/S TOE	1F
Hot Out	2.00 Inch 316L S/S TOE	4F
Cold In	2.00 Inch 316L S/S TOE	3F
Cold Out	2.00 Inch 316L S/S TOE	2F

Notes: V11.10.1.0

Aluminum shroud omitted
The purchaser of the equipment bears total responsibility for suitability of use of all materials in this application.
We may have assumed some design values. If they differ from your requirements, a new design may be necessary.

ACCU-THERM FLOW DIAGRAM

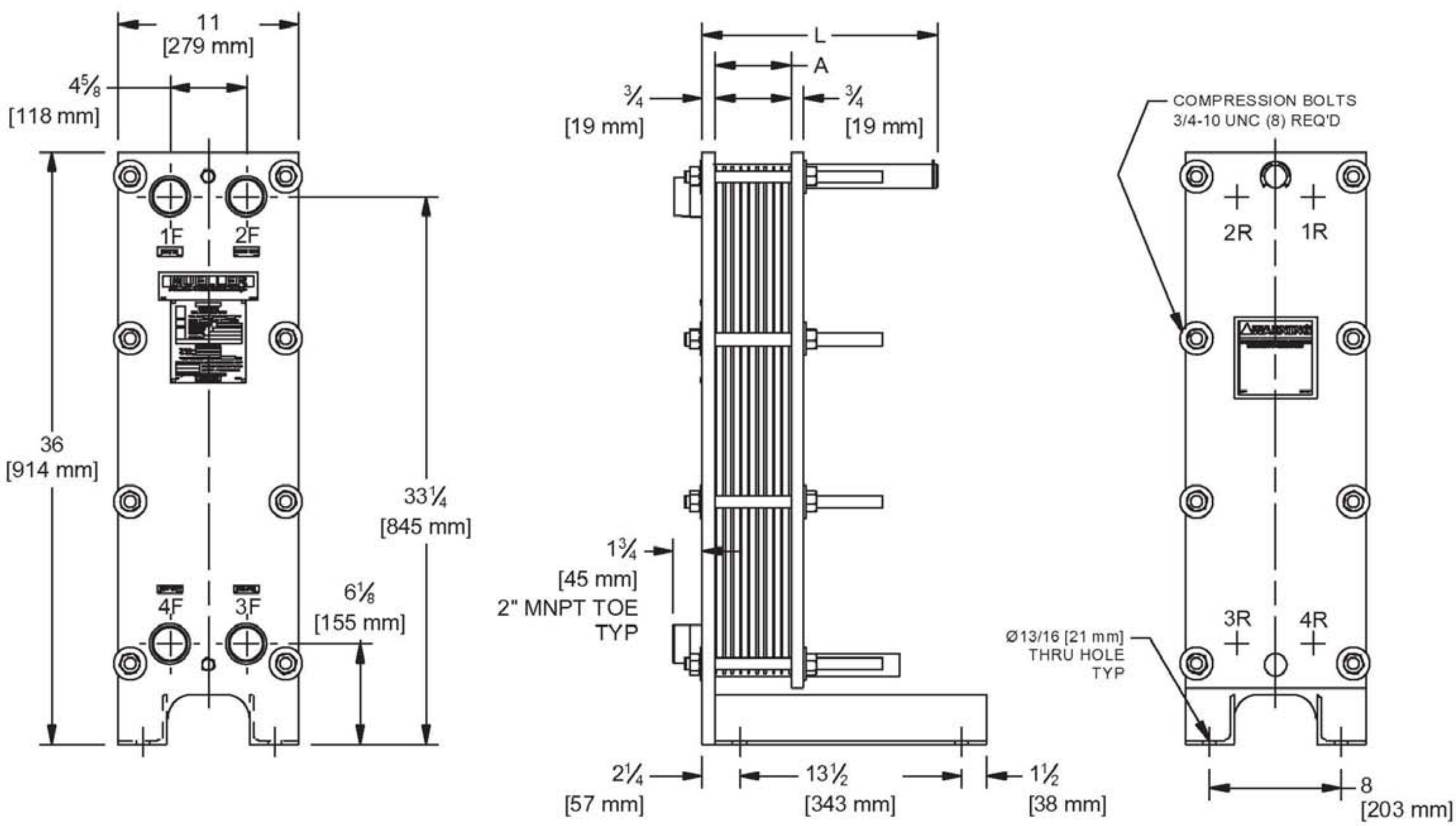
CUSTOMER:	SAEG Peru	**DATE:**	05/19/2014
LOCATION:	Lima , Peru	**INQUIRY NUMBER:**	182118-02.01
TYPE:	ACCU-THERM 10 F / LC-150	**SERIAL NO.:**	

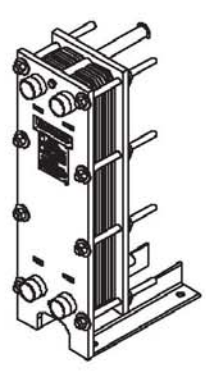
	HOT	COLD			
MEDIUM:	Water	Water		**DESIGN PRESS:**	75 PSI G
FLOW:	120.0	120.0	GPM	**TEST PRESS:**	98 PSI G
TEMPERATURE IN:	100.0	85.0	°F	**DESIGN TEMP:**	150°F
TEMPERATURE OUT:	90.0	95.0	°F	**MDMT:**	32°F
PRESSURE DROP:	5.3	5.20	PSI	**VOLUME:**	5.61 Gallons
FLOW PATH:	1 X 29	1 X 30		**PLATE MATERIAL:**	0.50 MM 316 S/S SA-240
GUIDE LENGTH / CAPACITY:	13.5 Inch / 64 plates			**GASKET MATERIAL:**	NBR
BOLT LENGTH / CAPACITY:	14.0 Inch / 63 plates				

CONNECTIONS	TYPE	MATERIAL	SIZE	POSITION
HOT IN	TOE	316L S/S	2.00	1F
HOT OUT	TOE	316L S/S	2.00	4F
COLD IN	TOE	316L S/S	2.00	3F
COLD OUT	TOE	316L S/S	2.00	2F

PACK LENGTH MAX (A):	7.60 Inch
PACK LENGTH MIN:	7.37 Inch
OVERALL LENGTH (L):	14.25 Inch
EMPTY WEIGHT:	356 LB
OPERATING WEIGHT:	404 LB
SHROUD MATERIAL:	N/A

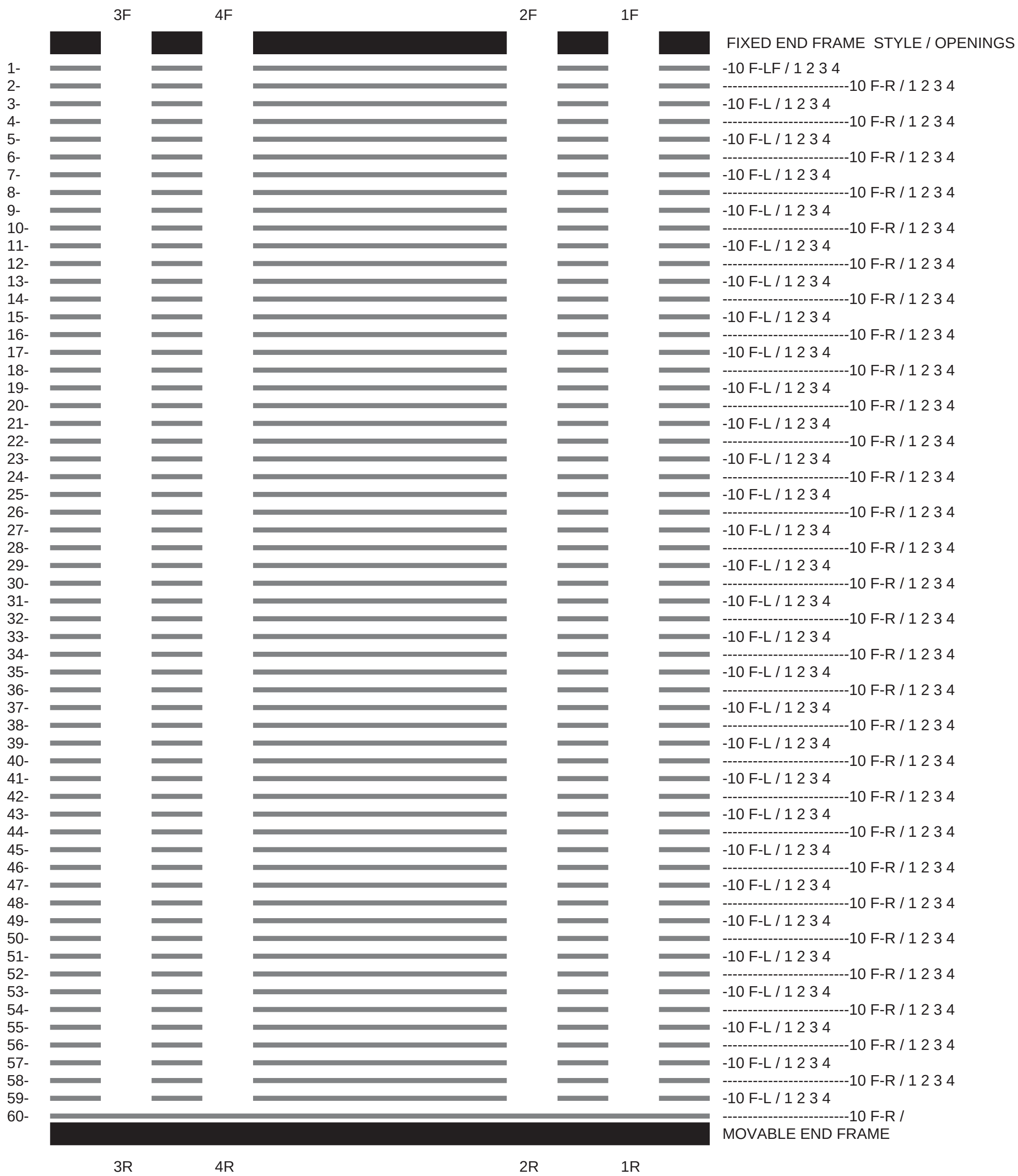
UNIT IS DESIGNED AND FABRICATED PER ASME SECTION VIII, DIV. 1 WITH UM MARKING





MATERIAL SPECIFICATIONS

END FRAMES	CS GR.70 SA-516
PLATE HANGER	304 SS
COMPRESSION BOLTS	(ZINC PLATED) SA-193-B7
COMPRESSION NUTS	(ZINC PLATED) SA-194-2H
PAINT	POLYURETHANE
MNPT TOE	2" STUB END SCH 40 316/316L SS SA-403


3F
4F
2F
1F
FIXED END FRAME STYLE / OPENINGS
1- -10 F-LF / 1 2 3 4
2- -------------------------10 F-R / 1 2 3 4
3- -10 F-L / 1 2 3 4
4- -------------------------10 F-R / 1 2 3 4
5- -10 F-L / 1 2 3 4
6- -------------------------10 F-R / 1 2 3 4
7- -10 F-L / 1 2 3 4
8- -------------------------10 F-R / 1 2 3 4
9- -10 F-L / 1 2 3 4
10- -------------------------10 F-R / 1 2 3 4
11- -10 F-L / 1 2 3 4
12- -------------------------10 F-R / 1 2 3 4
13- -10 F-L / 1 2 3 4
14- -------------------------10 F-R / 1 2 3 4
15- -10 F-L / 1 2 3 4
16- -------------------------10 F-R / 1 2 3 4
17- -10 F-L / 1 2 3 4
18- -------------------------10 F-R / 1 2 3 4
19- -10 F-L / 1 2 3 4
20- -------------------------10 F-R / 1 2 3 4
21- -10 F-L / 1 2 3 4
22- -------------------------10 F-R / 1 2 3 4
23- -10 F-L / 1 2 3 4
24- -------------------------10 F-R / 1 2 3 4
25- -10 F-L / 1 2 3 4
26- -------------------------10 F-R / 1 2 3 4
27- -10 F-L / 1 2 3 4
28- -------------------------10 F-R / 1 2 3 4
29- -10 F-L / 1 2 3 4
30- -------------------------10 F-R / 1 2 3 4
31- -10 F-L / 1 2 3 4
32- -------------------------10 F-R / 1 2 3 4
33- -10 F-L / 1 2 3 4
34- -------------------------10 F-R / 1 2 3 4
35- -10 F-L / 1 2 3 4
36- -------------------------10 F-R / 1 2 3 4
37- -10 F-L / 1 2 3 4
38- -------------------------10 F-R / 1 2 3 4
39- -10 F-L / 1 2 3 4
40- -------------------------10 F-R / 1 2 3 4
41- -10 F-L / 1 2 3 4
42- -------------------------10 F-R / 1 2 3 4
43- -10 F-L / 1 2 3 4
44- -------------------------10 F-R / 1 2 3 4
45- -10 F-L / 1 2 3 4
46- -------------------------10 F-R / 1 2 3 4
47- -10 F-L / 1 2 3 4
48- -------------------------10 F-R / 1 2 3 4
49- -10 F-L / 1 2 3 4
50- -------------------------10 F-R / 1 2 3 4
51- -10 F-L / 1 2 3 4
52- -------------------------10 F-R / 1 2 3 4
53- -10 F-L / 1 2 3 4
54- -------------------------10 F-R / 1 2 3 4
55- -10 F-L / 1 2 3 4
56- -------------------------10 F-R / 1 2 3 4
57- -10 F-L / 1 2 3 4
58- -------------------------10 F-R / 1 2 3 4
59- -10 F-L / 1 2 3 4
60- -------------------------10 F-R /
MOVABLE END FRAME
3R
4R
2R
1R

MUELLER

ACCU-THERM PLATE USAGE SUMMARY

CUSTOMER: SAEG Peru
LOCATION: Lima , Peru
TYPE: ACCU-THERM 10 F / LC-150

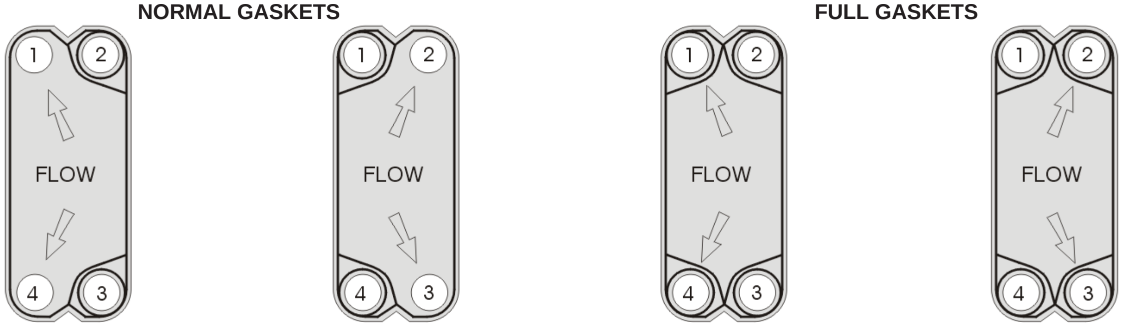
DATE: 05/19/2014
INQUIRY NUMBER: 182118-02.01
SERIAL NO.:

NUMBER HX-PLATES	PLATE MATERIAL	GASKET MATERIAL	STYLE / OPENINGS	PLATE NUMBER
1	316 S/S SA-240	FULL NBR	10 F-LF / 1 2 3 4	1
29	316 S/S SA-240	NBR	10 F-R / 1 2 3 4	
29	316 S/S SA-240	NBR	10 F-L / 1 2 3 4	
1	316 S/S SA-240	NBR	10 F-R /	60

NOTE:

PICTORIAL VIEW AND TERMINOLOGY FOR PLATES AND GASKETS

NORMAL GASKETS **FULL GASKETS**



10 F-L **10 F-R** **10 F-LF** **10 F-RF**

L = LEFT HAND R = RIGHT HAND
PLATES AS VIEWED FROM FIXED END
GASKETED SIDE OF PLATE FACES FIXED END

Paul Mueller Company
P.O. Box 828 • Springfield, Missouri 65801-0828, U.S.A.
Telephone: (417) 831-3000 • 1-800-MUELLER • Facsimile: (417) 575-9885

Additional Terms and Conditions of Sale

1. PURCHASE AND SALE. The goods shall be sold in accordance with the terms and conditions on the face hereof and the following terms and conditions, which shall constitute the entire Agreement of the parties with respect to the sale of goods.

2. ACCEPTANCE. This sale of goods is conditioned upon Purchaser's acceptance of the terms and conditions herein contained. Seller hereby expressly rejects any and all terms in any purchase order or other document of Purchaser which are in addition to, different from, or inconsistent with these terms and conditions. If this is a Quotation, it is an offer to sell, subject to final approval by Seller. The offer may be withdrawn at any time prior to receiving Purchaser's acceptance, and the offer shall expire automatically if not accepted within thirty (30) days from the date on the face hereof.

3. CREDIT APPROVAL. Payment must be made in full prior to the commencement of any product preparation or fabrication unless alternative payment arrangements are included within the Sales Order and subsequently approved by Seller's Credit Department. All alternative payment arrangements contained in any Sales Order are strictly contigent upon final approval by Seller's Credit Department. Upon Purchaser's acceptance of any Sales Order containing alternative payment terms, Seller's Credit Department shall have thirty (30) days in which to accept or reject the Sales Order in its sole discretion based on the creditworthiness of Purchaser. An evaluation of creditworthiness shall include, but not be limited to, a review of Seller's records of Purchaser's payment history. Any such Sales Order not accepted within the thirty (30) day period shall be conclusively deemed rejected. For alternative payment terms, Seller may require Purchaser to execute Seller's form of security agreement.

4. PAYMENT. Purchaser shall make payments in accordance with the payment arrangements approved by Seller's Credit Department. If Seller delays shipment as requested by Purchaser under paragraph 6 hereof, Purchaser shall pay the full purchase price (or the final installment) within thirty (30) days after the goods have been completed and, in addition, shall pay a reasonable storage charge as determined by the Seller. Any balance not paid when due shall draw interest at the rate of 1.5% per month (18% A.P.R.) on the average daily balance until paid or the highest rate allowed by applicable law, whichever is less. Notwithstanding anything to the contrary in paragraph 16 hereof, the parties agree that Seller may bring suit to collect any unpaid balance due from Purchaser (or submit such claim to arbitration in Seller's sole discretion), and Purchaser shall pay all attorney fees and court costs incurred by Seller in connection with the suit to collect such unpaid balance. The parties agree that any such suit brought by Seller shall not be stayed by virtue of any arbitration proceeding between the parties, shall proceed to judgment by the Court, and that all of Purchaser's defenses, avoidances and counterclaims (other than the defense of payment) which it might have shall be submitted to arbitration as provided in paragraph 16. All payments shall be made in currency of the United States.

5. SPECIFICATIONS. If Seller submits any drawings or other specifications to Purchaser for approval, and Purchaser does not approve or disapprove of them within the time specified by Seller, Seller shall have the right to ship the goods at a later date and charge a higher purchase price, as reasonably necessitated by Purchaser's delay.

6. SHIPMENT. So long as Purchaser is not in default, Seller shall ship the goods upon their completion, except that, subject to paragraph 4 hereof, Seller shall delay shipment as requested by Purchaser in writing. Since the goods are to be manufactured to special order, the shipment date designated on the face hereof is estimated and not guaranteed; Seller may ship the goods within a reasonable period either before or after the designated shipment date. Unless otherwise provided on the face hereof, Seller may ship the goods by any mode, and in full or partial shipments. Seller shall not be liable for any failure or delay to manufacture or ship the goods due to causes beyond its control, including without limitation, acts of God, wars, terrorism, sabotage, casualties, accidents, labor disputes or shortages, governmental laws, ordinances, rules or regulations (such as priorities, requisitions, allocations and price adjustment restrictions), or an inability to obtain material, equipment or transportation.

7. TITLE, RISK OF LOSS. Unless otherwise provided on the face hereof, the goods shall be shipped F.O.B. Seller's plant, and title to the goods and all risks of loss with respect to the goods shall transfer to the Purchaser after they have been placed in the possession of a carrier, which carrier may include Mueller Transportation, Inc. If Seller agrees to ship the goods F.O.B. destination, Purchaser shall bear all risks of loss with respect to the goods upon their tender to Purchaser at the point of destination.

8. INSPECTION. Purchaser shall inspect the goods at the time and place of delivery and Purchaser agrees that such occasion shall constitute a reasonable opportunity for its full inspection. The parties agree that Purchaser's failure to reject the goods within three (3) business days shall constitute acceptance of the goods. After Purchaser inspects and accepts the goods, Purchaser shall, except as provided in paragraph 10 hereof, be deemed to have acknowledged that the goods comply with all specifications, representations and warranties of Seller, and to have waived any claim or cause of action against Seller with respect to the goods. Purchaser is encouraged to visit Seller's plant prior to shipment to inspect and, when possible, witness testing of the goods. If return of the goods is impractical, Purchaser may be required to inspect the goods at Seller's plant prior to shipment, which shall be deemed to be a reasonable opportunity to inspect and, upon satisfactory completion, shall constitute Purchaser's acceptance of the goods.

9. TAXES AND DUTIES. In addition to the purchase price, Purchaser shall pay all sales, use and excise taxes, tariffs, duties and other charges imposed by any country, state, locality or other political subdivision in connection with the sale of the goods. For tax purposes, title to the goods shall pass from Seller to Purchaser upon being loaded for shipment, whether by common carrier, or Purchaser's own trucks, or otherwise.

10. WARRANTIES. Seller warrants to Purchaser that the goods are free of defects in material and workmanship. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED, EXCEPT THE WARRANTY OF TITLE AND AGAINST PATENT INFRINGEMENT. If the goods do not conform to this warrantywithin one (1) year from the date of original shipment (or from the earlier date of completion if Seller delays shipment as requested by Purchaser under paragraph 6 hereof), Seller, at its election and expense, shall repair or replace the goods or refund the purchase price for such goods, but only after receiving written notification of any defects and substantiation that the goods have been stored, installed, maintained and operated in accordance with Seller's recommendations and standard industry practice. Purchaser shall not return goods claimed to be defective except at the direction of the Seller. All charges for transporting such goods to Seller shall be prepaid by Purchaser, and Seller shall return such goods to Purchaser freight collect. If Seller determines that it is impractical to have the goods returned, Seller may elect (i) to repair the goods at Purchaser's facility, using independent contractors or Seller's own personnel, (ii) to pay Purchaser a reasonable allowance for repairs, but not exceeding the amount which Seller would have paid for its own employees, or (iii) to refund the purchase price for such goods. During the course of repairs, Purchaser, without charge, shall fully cooperate with, and make the goods and its facilities available to, Seller and Seller's agents and employees.

THIS WARRANTY IS EXCLUSIVE. THE SOLE AND EXCLUSIVE OBLIGATION OF SELLER SHALL BE, AT ITS ELECTION, TO REPAIR, REPLACE, OR REFUND THE PURCHASE PRICE OF DEFECTIVE GOODS IN THE MANNER AND FOR THE PERIOD PROVIDED ABOVE. SELLER SHALL NOT HAVE ANY OTHER OBLIGATION WITH RESPECT TO THE GOODS, WHETHER BASED ON CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT OR OTHERWISE. THIS WARRANTY DOES NOT EXTEND TO PRODUCTS NOT OF SELLER'S MANUFACTURE; AS TO SUCH PRODUCTS, SELLER CONVEYS TO PURCHASER THE WARRANTY, IF ANY, OF SELLER'S SUPPLIER.

ORAL STATEMENTS BY SELLER'S EMPLOYEES OR REPRESENTATIVES DO NOT CONSTITUTE WARRANTIES, shall not be relied upon by Purchaser, and are not part of the contract for sale. NO OTHER WARRANTIES are given beyond those set forth in this document.

11. LIMITATION OF LIABILITY. Purchaser's exclusive remedy for claims arising hereunder shall be for damages. Seller shall not under any circumstances be liable for special or consequential damages, such as, but not limited to, damage or loss of other property or equipment, loss of profits or revenue, costs of capital, or claims by Purchaser's customers. The remedies of the Purchaser set forth herein are exclusive, and the liability of the Seller with respect to the goods, or anything done in connection therewith, or from the manufacture, sale, delivery, resale, installation or use of any of the goods sold hereunder, whether arising out of contract, negligence, strict liability, tort, or under any warranty, or otherwise, shall not exceed the price of the goods upon which such liability is based.

SELLER SHALL NOT BE LIABLE FOR CORROSION OR SUITABILITY OF USE OF ANY MATERIAL IN ANY PARTICULAR APPLICATION, CORROSION RESISTANCE AND SUITABILITY FOR USE OF ANY MATERIAL IS DEPENDENT UPON OPERATING ENVIRONMENT AND CONDITIONS, CLEANING AGENTS AND PRACTICES, AND MANY OTHER FACTORS BEYOND THE CONTROL OF SELLER. PURCHASER BEARS ALL RESPONSIBILITY AND RISK FOR CORROSION OR SUITABILITY FOR USE OF ALL MATERIALS IN THEIR PARTICULAR APPLICATION.

12. Cleanliness. Unless otherwise provided on the face hereof, Seller's obligation is to provide completed equipment to the shipping carrier in broom-clean condition. Prior to placing the equipment into service, the equipment may require cleaning to remove road film, adhesive film from the protective sheeting, abrasives dust, or other residues resulting from the manufacturing process and shipment.

13. CANCELLATION. Purchaser shall not have any right to cancel this Agreement without Seller's prior written consent, and without paying Seller a cancellation charge equal to total selling price less the estimated direct labor and materials not expended less the salvage value of materials already purchased.

14. REMEDIES. If Purchaser fails to make required payments in a timely manner, or breaches any of the other terms or conditions hereof or any other agreement with Seller, Seller shall have the right to terminate this Agreement and withhold further shipments on this or any other order. The remedies provided herein shall be cumulative and in addition to any other remedies allowed by law or in equity. The failure of Seller to exercise any remedy shall not constitute a waiver of the right to exercise that, or any other remedy; and no waiver of any breach of any provision herein shall operate as a waiver of any other breach of the same or any other provision.

15. APPLICABLE LAW. This Agreement shall be governed by the laws of the State of Missouri, without reference to its choice of law provisions. Purchaser hereby consents to personal jurisdiction of the state and federal courts located in Springfield, Missouri, and agrees that any suit shall be brought solely in such courts. In the event of a suit between the parties, THE PARTIES EXPRESSLY WAIVE ANY RIGHT TO TRIAL BY JURY.

16. ARBITRATION. Except as provided in paragraph 4 hereof, any dispute, controversy or claim arising out of or relating to this Agreement or any purchase order issued by Purchaser and accepted by Seller hereunder (including, but not limited to, any dispute relating to the existence, interpretation, breach or termination hereof or thereof) that cannot be resolved by the parties involved, within ninety (90) days of notification by either party of the dispute, shall be resolved by binding arbitration administered by and in accordance with the Arbitration Rules of the American Arbitration Association. The award of the arbitrator(s) may be entered by any court having jurisdiction thereof. The costs of the arbitration shall be shared equally by the parties, and each party shall bear its own attorney fees and expenses. Any arbitration proceeding shall be conducted exclusively in Springfield, Missouri.

17. MISCELLANEOUS. This Agreement is intended by the parties as a complete and exclusive statement of the terms of their agreement. No course of prior dealings between the parties and no usage of trade shall be relevant to supplement or explain any term used herein, and no modification shall be binding on Seller unless made in a writing signed by Seller. No claim or right arising out of a breach of this Agreement can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by separate consideration and is in a writing signed by Seller. Purchaser shall not assign its rights or delegate its duties under this Agreement. Facsimile and E-mail signatures of the parties shall constitute original signatures for all purposes. The invalidity of any portion of this Agreement shall not affect the validity of any remaining portions thereof.

THIS AGREEMENT CONTAINS A BINDING ARBITRATION PROVISION WHICH MAY BE ENFORCED BY THE PARTIES.

(11/02) 0-136TC

WARRANTY

Mueller¨ Accu-Therm¨ Plate Heat Exchanger

General Provisions

Paul Mueller Company (*hereinafter referred to as Company*) warrants to the original purchaser/user (*hereinafter referred to as the Customer*) that all equipment or parts thereof manufactured by it will be free from defects in material and workmanship only, under normal use and service, for a period of one year from the date of original shipment.

The *Company* shall not be liable for any loss of profit, loss by reason of plant shutdown, non-operation or increased cost of operation, loss of product or materials, or other special or consequential loss or damages. This warranty will not apply to any equipment (or parts thereof) which has been subjected to accident, alteration, abuse, or misuse. Misuse may constitute but not be limited to: subjecting the heat exchanger to temperature, pressure, or vacuum beyond the design limitations; compression of the plate pack beyond the minimum dimension; or improper disassembly or assembly by the *Customer*, or uses other than those intended by the *Company*. The *Company* will warrant thermal performance of the unit in conformance with original specifications only, since process changes such as flow rates, temperatures, or media will affect thermal performance. The *Company* cannot warrant against any fouling or plugging for any design. The *Company* will aid in the selection of gasket, plate, and adhesive material but will assume no liability for material compatibility with *Customer's* products or media. The *Company* is not responsible for corrosion or suitability for use of any material in any particular application. The corrosion resistance and suitability for use of a material is dependent on operating environment, and conditions, cleaning, practices, and many other factors beyond the control of the *Company*. The user of this equipment bears total responsibility for corrosion or suitability for use of all materials in their particular application. This warranty is in lieu of all other warranties, expressed or implied, (including the implied warranty of merchantability and fitness) and of all other obligations or liabilities on the part of the *Company*, and the *Company* will neither assume nor authorize any other person to assume for it any other obligation or liability in connection with this equipment.

Components Not Manufactured By the Company

Components not manufactured by the *Company*, but furnished as part of its equipment (for example: motors, starters, thermometers, controls, etc.), will be warranted by the *Company* only to the extent of the component manufacturer's warranty.

Return of Parts or Equipment to Company Plant

Permission to return any parts or equipment must be obtained, in writing, and must be returned with transportation costs prepaid. Any used heat-exchanger, plate, or gasket that is being returned must be accompanied by a "Certificate of Use and Cleanliness" (available upon request) and a Manufacturer's Safety Data Sheet similar to OSHA Form 20. In the event that equipment (or parts thereof) manufactured by the *Company* is returned to the *Company* plant, the *Company* obligation will be limited to repairing or replacing parts which, upon examination, are found (to the satisfaction of the *Company*) to be defective in either material or workmanship. No transportation charges will be paid by the *Company* unless written approval for transportation charges is given by the *Company*.

Visit to Company Plant Before Shipment

When the *Customer* plans to install *Mueller* equipment in a manner (or at such distance from the *Company* plant) that will make it impractical to return it for in-warranty repairs, the *Customer* is encouraged to visit the *Company* plant before shipment to inspect and, when possible, witness testing of the equipment.

Repair of Equipment Installed in the Continental United States

Should an in-warranty failure occur, and it is, in the judgement of the *Company*, impractical to return the equipment for repairs, the *Company* will arrange for the repairs to be made by its personnel or, at its option, sublet to a qualified company. The *Customer* will be expected to cooperate by making the equipment available and accessible when the work is scheduled and is expected to provide the necessary utilities.

If local labor conditions prohibit such work being done by *Company* personnel under the conditions and at the rates payable by its contracts with its employees, the *Company* obligation shall be limited to supervision of the work, replacement of defective parts, and labor costs in an amount equal to the amount which would be payable for a reasonable number of hours required to make the repairs at the rates payable under the terms of *Company* contracts with its employees. In such an event, all labor costs shall be paid by the *Customer* and the *Company* will reimburse the *Customer* to the extent set forth above.

Repair of Equipment Installed Outside the Continental United States

Should an in-warranty failure occur, and it is, in the judgement of the *Company*, impractical to return the equipment for repairs, the *Company* obligation shall be limited, and the *Company* shall have the options of either sending a service representative to repair (or supervise the repairs) or granting a reasonable allowance for having the repairs made locally.

MUELLER®

Paul Mueller Company

P.O. Box 828 • Springfield, Missouri 65801-0828, U.S.A.

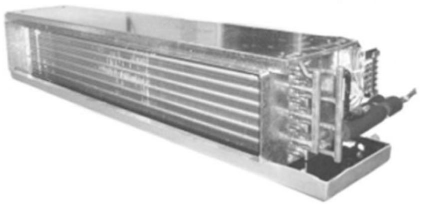
Telephone: (417) 831-3000 • 1-800-MUELLER • Facsimile: (417) 831-6642

ANEXO 07

Classic
AIR CONDITIONERS

Chilled Water Ceiling Concealed Fan Coil / FanCoil para uso con Agua Helada

400 – 2000 CFM
Model/Modelo: EHW



Specifications:

Casing – The casing shall be constructed of galvanized steel. Interior panels of the coil section shall be lined with low density closed cell polyethylene foam for thermal and acoustical insulation.

Coil – The cooling coil shall be fabricated of 3/8" diameter copper tubing mechanically bonded to the aluminum fins. Coils shall be factory leak tested to 450 psig and suitable for working pressure to 350 psig. Coil shall be provided with manual air vent and sweat fittings for water connections.

Motors – Motor shall be 3 speed PSC type. Motor bearings shall be of the sleeve type, permanently lubricated. Motors shall have inherent protection with automatic reset thermal overload embedded in the winding.

Fans – Fans shall be centrifugal, forward curved type. Fan wheels shall be fabricated of fiber reinforced plastic, housings shall be plastic with smooth airflow surfaces

Drain Pan – Drain pan shall be fabricated of galvanized steel, with bitumen/rubber anti-rust coating on interior surfaces and fully insulated exterior. The unit shall have a 3/4" drain connection for condensate removal.

Especificaciones:

Gabinete – Construido de acero galvanizado. Los paneles interiores están acabados con aislamiento de polietileno de baja densidad para proveer aislamiento térmico y acústico.

Serpentín – Construido de tubería internamente estriada de 3/8 pulgada diámetro que está adherida mecánicamente a las aletas de aluminio. El serpentín está probado por fugas en la fábrica a 450 psig y está diseñado para trabajo nominal a 350 psig. Viene con un escape manual de aire y conexiones que se soldarán.

Motores – El motor tiene tres velocidades y es tipo PSC. Los cojinetes del motor son tipo casquillo y están permanentemente lubricados. Los motores están protegidos contra sobrecalentamiento con un protector de sobrecarga ubicado dentro del bobinado del motor. El protector de sobrecarga se reajusta automáticamente.

Turbinas – Son tipo centrífugo, con curva hacia adelante. Son hechas de plástico reforzado con fibra de vidrio para ser más robustas y silenciosas. Los caracoles de las turbinas son de plástico acústico.

Bandeja de Drenaje – Está hecho de acero galvanizado con acabado en el interior de betumen/goma anti-corrosión. El exterior de la bandeja también tiene acabado de aislamiento. Viene con conexión de 3/4 pulgada para drenar el condensado.

EMC D DEMKO D CE ISO 9002

CLASSIC® Air Conditioners are quality certified in an idependent laboratory in accordance with International Standard (IEC) & European Standard (EN)

La calidad de los equipos CLASSIC® está certificada en un laboratorio independiente de acuerdo al Standard Internacional (IEC) y Standard Europeo (EN)

76 db / 65 wb

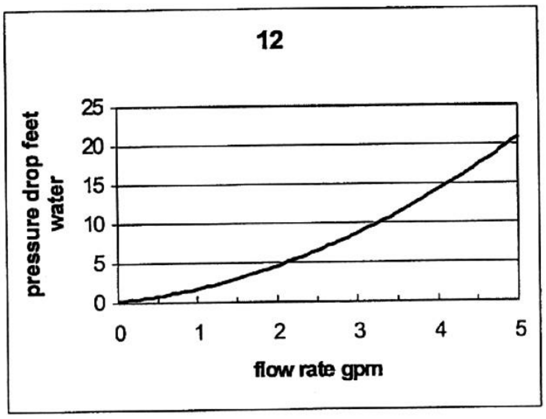
WTR deg F	Model EHW	40 deg F ewt				45 deg F ewt				50 deg F ewt			
		TH MBH	SH MBH	GPM	PD	TH MBH	SH MBH	GPM	PD	TH MBH	SH MBH	GPM	PD
8	**12**	14.8	9.5	3.7	12.4	11.7	7.2	2.9	8.3	8.4	6.0	2.1	4.9
	18	21.7	13.6	5.4	22.8	17.1	10.5	4.3	15.1	12.3	8.7	3.1	8.7
	25	30.6	18.5	7.6	48.0	24.1	14.7	6.0	30.0	17.4	12.4	4.3	15.7
	30	35.6	21.7	8.9	64.7	28.1	17.7	7.0	40.4	20.2	14.8	5.0	21.1
	36	42.7	26.5	10.7	79.5	33.7	20.8	8.4	49.8	24.2	17.0	6.0	25.7
	48	52.6	31.9	13.1	48.1	41.4	24.9	10.3	29.2	29.8	20.8	7.4	14.7
	60	66.7	40.4	16.7	66.0	52.5	31.9	13.1	40.3	37.8	26.9	9.4	20.3
10	**12**	13.5	8.4	2.7	7.3	10.6	6.9	2.1	5.0	7.2	5.3	1.4	2.8
	18	19.8	12.0	3.9	13.2	15.6	9.9	3.1	8.9	10.6	7.6	2.1	4.9
	25	27.9	17.2	5.6	25.6	21.9	14.0	4.4	16.0	14.9	11.0	3.0	7.4
	30	32.4	19.9	6.5	34.5	25.5	16.5	5.1	21.5	17.3	12.7	3.5	10.0
	36	38.9	23.5	7.8	42.6	30.6	19.3	6.1	26.2	20.8	15.2	4.2	11.2
	48	47.8	28.9	9.6	24.8	37.7	22.9	7.5	15.0	25.6	19.0	5.1	6.7
	60	60.7	37.4	12.1	34.1	47.8	29.4	9.5	20.7	32.5	24.2	6.5	9.2
12	**12**	12.4	7.5	2.1	4.8	9.6	10.0	1.6	3.3	6.3	5.0	1.1	1.9
	18	18.2	10.8	3.0	8.5	14.0	8.6	2.3	5.6	9.2	7.2	1.5	3.1
	25	25.7	15.9	4.3	15.2	19.7	13.0	3.3	9.0	13.0	10.2	2.2	3.9
	30	29.8	18.1	5.0	20.5	23.0	14.8	3.8	12.2	15.1	11.4	2.5	5.3
	36	35.8	21.2	6.0	24.9	27.5	16.5	4.6	14.1	18.2	14.3	3.0	4.6
	48	44.1	26.3	7.3	14.2	33.9	21.3	5.6	8.2	22.4	17.0	3.7	3.4
	60	55.9	33.4	9.3	19.7	43.0	27.2	7.2	11.4	28.4	21.6	4.7	4.8

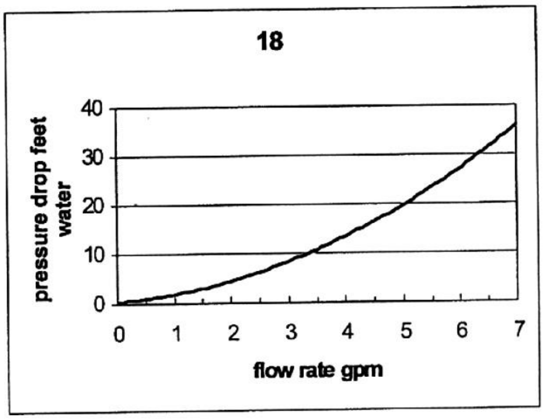
80 db / 67 wb

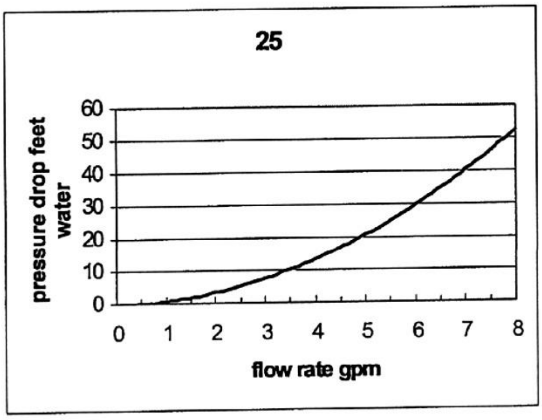
WTR deg F	Model EHW	40 deg F ewt				45 deg F ewt				50 deg F ewt			
		TH MBH	SH MBH	GPM	PD	TH MBH	SH MBH	GPM	PD	TH MBH	SH MBH	GPM	PD
8	12	16.5	10.1	4.1	14.8	13.5	8.7	3.4	10.6	10.1	7.4	2.5	6.6
	18	24.1	14.8	6.0	27.4	19.8	12.7	4.9	19.3	14.8	10.9	3.7	11.8
	25	34.0	21.2	8.5	59.0	27.9	17.9	7.0	39.8	20.9	16.0	5.2	22.6
	30	39.5	24.2	9.9	79.4	32.4	21.4	8.1	53.6	24.3	17.6	6.1	30.4
	36	47.4	29.1	11.8	97.2	38.9	24.8	9.7	66.1	29.2	21.3	7.3	37.5
	48	58.4	36.0	14.6	59.7	47.8	31.2	11.9	39.5	35.9	26.6	9.0	21.6
	60	74.0	45.7	18.5	81.8	60.7	40.2	15.2	54.3	45.5	34.0	11.4	29.9
10	12	15.5	9.5	3.1	9.2	12.5	8.2	2.5	6.5	9.1	6.9	1.8	4.0
	18	22.7	14.0	4.5	16.7	18.3	11.7	3.7	11.6	13.4	9.9	2.7	7.0
	25	32.0	19.5	6.4	33.7	25.8	17.2	5.2	22.0	18.8	14.8	3.8	11.8
	30	37.2	23.0	7.4	45.4	30.0	19.4	6.0	29.7	21.9	16.4	4.4	15.9
	36	44.6	27.2	8.9	56.0	36.0	22.6	7.2	36.5	26.3	19.4	5.2	19.0
	48	54.9	34.4	11.0	33.1	44.3	28.8	8.8	21.1	32.3	24.6	6.5	10.9
	60	69.7	44.7	13.9	45.5	56.2	36.8	11.2	29.1	41.0	31.3	8.2	15.1
12	12	14.6	9.1	2.4	6.2	11.5	7.8	1.9	4.3	8.1	6.2	1.3	2.6
	18	21.4	13.3	3.6	11.1	16.8	11.4	2.8	7.5	11.8	9.1	2.0	4.4
	25	30.1	19.0	5.0	20.9	23.7	16.4	4.0	13.0	16.6	12.7	2.8	6.4
	30	35.1	21.8	5.8	28.2	27.6	18.7	4.6	17.6	19.3	14.8	3.2	8.6
	36	42.1	26.0	7.0	34.6	33.1	22.4	5.5	21.1	23.2	17.6	3.9	9.3
	48	51.8	32.1	8.6	19.9	40.8	27.6	6.8	12.1	28.5	22.3	4.7	5.7
	60	65.7	41.1	10.9	27.5	51.7	35.3	8.6	16.7	36.2	28.4	6.0	7.9

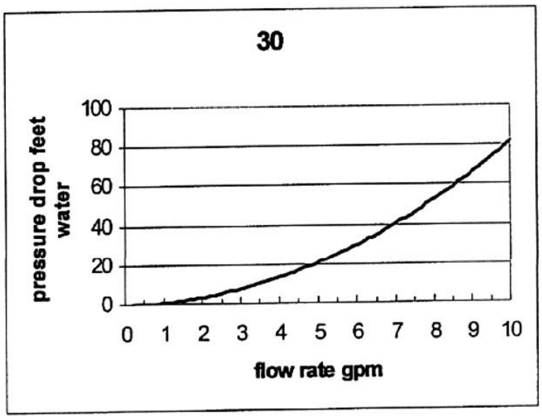
Notes:
1. TH – Total Heat, SH – Sensible Heat
2. WTR - Water Temperature Rise
3. EWT – Entering Water temperature
4. PD – Pressure Drop, expressed in feet of water
5. GPM – water flow rate, usgpm
6. db – Dry Bulb / wb – Wet Bulb
7. WTR – Water
8. deg – Degrees
9. MBH – Btu/hour (000)

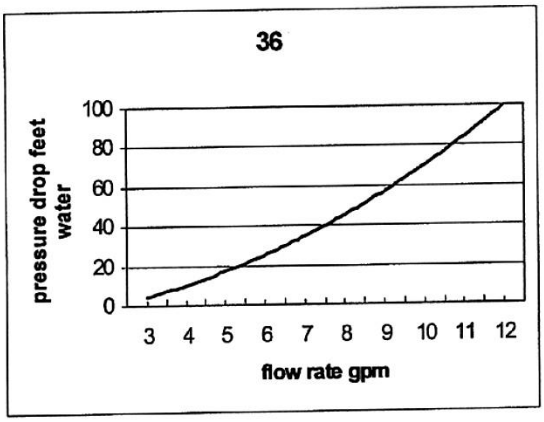
Notas:
1. TH – Calor Total, SH – Calor Sensible
2. WTR – Aumento en temperatura del agua
3. EWT – Temperatura del agua en la entrada
4. PD – Caida de Presión (pies de agua)
5. GPM – Caudal del Agua en galones por minuto
6. db – Bulbo Seco / wb – Bulbo Humedo
7. WTR – Agua
8. deg – Grados F
9. MBH – Mil Btu/hora

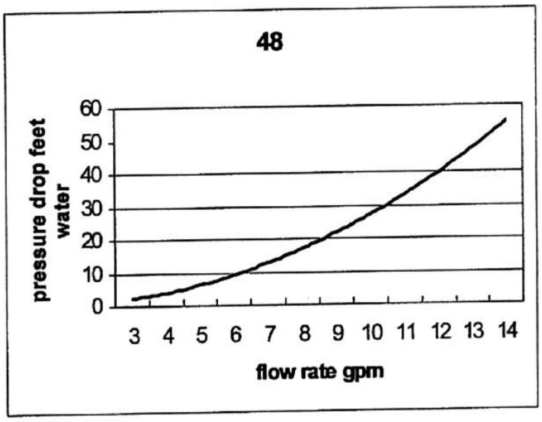

12
pressure drop feet water
flow rate gpm

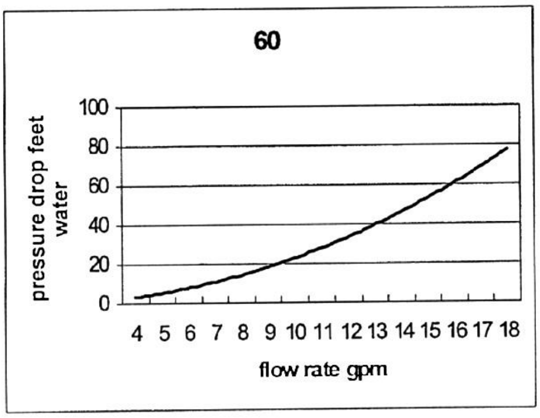

18
pressure drop feet water
flow rate gpm


25
pressure drop feet water
flow rate gpm


30
pressure drop feet water
flow rate gpm

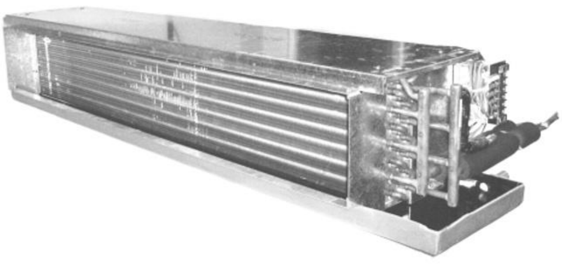

36
pressure drop feet water
flow rate gpm


48
pressure drop feet water
flow rate gpm



Technical Data:

EHW		12	18	25	30	36	48	60
Nominal air flow	cfm (max)	400	600	800	1000	1200	1600	2000
Power supply	v/ph/Hz	220-240 / 1 / 50-60						
noise level	dbA	45	48	51	52	60	62	63
Motor	no	1	1	1	1	2	2	2
	Amps	0.60	0.60	0.70	0.80	1.20	1.40	1.60
	watts	33	33	54	60	66	108	120
Fan	type	double inlet centrifugal fan						
	no.	2	2	2	2	4	4	4
Size	inch	6 x 6	6 x 8	6 x 9	6 x 9	6 x 8	6 x 9	6 x 9
Evaporator	type	copper tube dia 3/8" – aluminum fin						
face area	sq. ft.	1.20	1.70	2.45	2.45	3.20	3.20	4.00
Rows	no.	3	3	3	3	3	4	4
fins per inch	fpi	12	12	12	12	12	12	12
Water connections	inch	5/8	5/8	5/8	5/8	3/4	3/4	7/8
Drain	inch	3/4	3/4	3/4	3/4	3/4	3/4	¾
unit dimensions	width	29	38	51.2	51.2	65	65	65
(inch)	depth	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	height	9	9	9	9	9	9	11
net weight	Lbs.	55	77	88	88	100	110	122



Datos Técnicos:

EHW		12	18	25	30	36	48	60
Flujo Nominal de Aire	cfm (max)	400	600	800	1000	1200	1600	2000
Suministro	v/ph/Hz	220-240 / 1 / 50-60						
Nivel de Sonido	dB(A)	45	48	51	52	60	62	63
Motor	no	1	1	1	1	2	2	2
	Amps	0.60	0.60	0.70	0.80	1.20	1.40	1.60
	watts	33	33	54	60	66	108	120
Turbina	Tipo	Turbina de doble entrada						
	no.	2	2	2	2	4	4	4
Tamaño	Pulgadas	6 x 6	6 x 8	6 x 9	6 x 9	6 x 8	6 x 9	6 x 9
Serpentín	tipo	Tubería de cobre internamente estriada / 3/8 pulgada diámetro / Aletas de Aluminio						
Área de Superficie	Pies^2	1.20	1.70	2.45	2.45	3.20	3.20	4.00
No. de Filas	no.	3	3	3	3	3	4	4
Aletas por pulgada	APP	12	12	12	12	12	12	12
Conexiones de Agua	Pulgada	5/8	5/8	5/8	5/8	3/4	3/4	7/8
Drenaje	inch	¾	¾	3/4	3/4	3/4	3/4	3/4
Dimensiones	Ancho	29	38	51.2	51.2	65	65	65
(pulgadas)	Profundidad	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	Altura	9	9	9	9	9	9	11
Peso Neto	kilos	25	35	40	40	45.4	50	55.3

Comuniquese con su distribuidor:

ANEXO 08

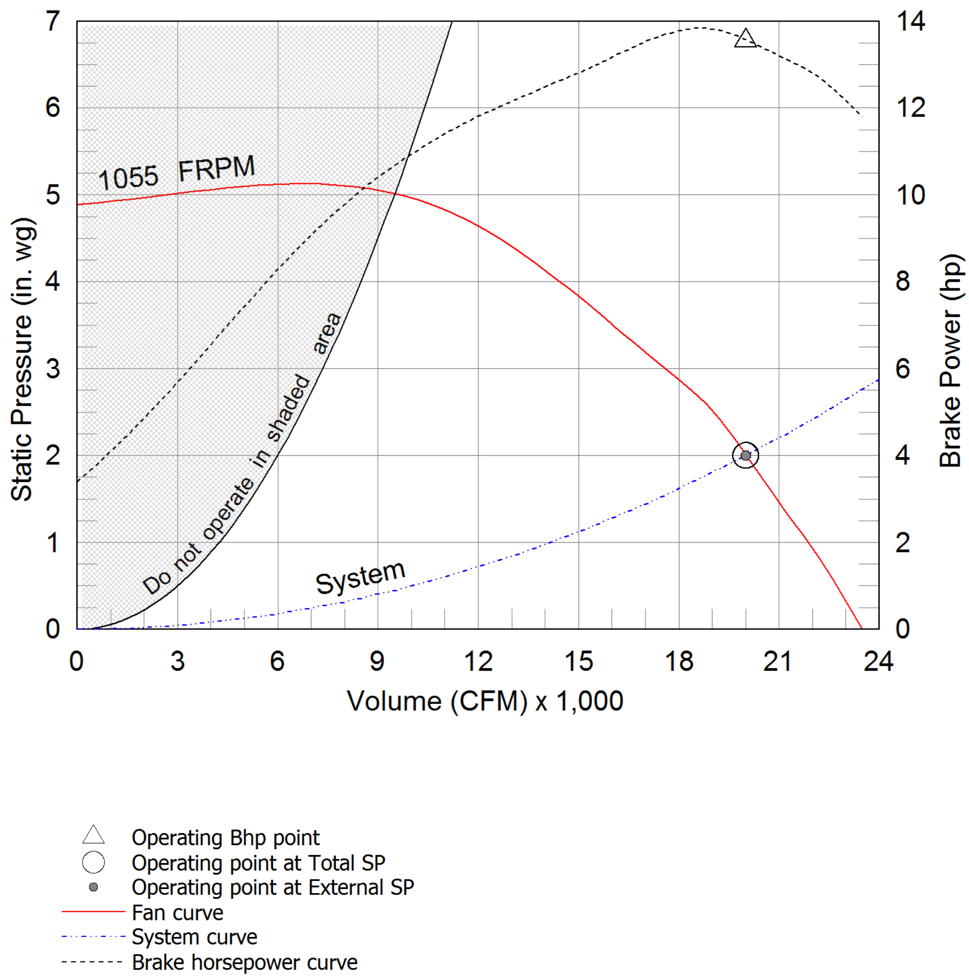
Model: SWB-333-150

Backward Inclined Centrifugal Utility Fan

Performance Corrections	
Elevation (ft)	43
Airstream Temp.(F)	70
Air Density (ft3)	0.075
Drive Loss (%)	3.4
Inlet Conditions	Standard
Outlet Conditions	Standard

Actual Performance	
Requested Volume (CFM)	20,000
Actual Volume (CFM)	20,000
External SP (in. wg)	2
Total SP (in. wg)	2
OV (ft/min)	3,195
Fan RPM	1055
Operating Power (hp)	13.54
Tip Speed (ft/min)	9,113
Static Eff. (%)	48
FEG	85

Fan Configuration	
Quantity	2
Arrangement	10
Rotation	CW
Discharge Position	TH
Drive Type	Belt



Dimensional	
Weight w/o Acc's (lb)	1,059
Weight w/ Acc's (lb)	1,226
Max T Motor Frame Size	256

Motor	
Motor Mounted	Yes
Size (hp)	15
V/C/P	380/60/3
Enclosure	TEFC
Motor RPM	1725
Windings	1
NEC FLA* (Amps)	NA
Motor Pulley Type	Constant

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	93	98	94	88	88	85	80	73	93	82	37

Notes:

All dimensions shown are in units of in..
*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: SWB-333-150

Backward Inclined Centrifugal Utility Fan

Standard Construction Features:

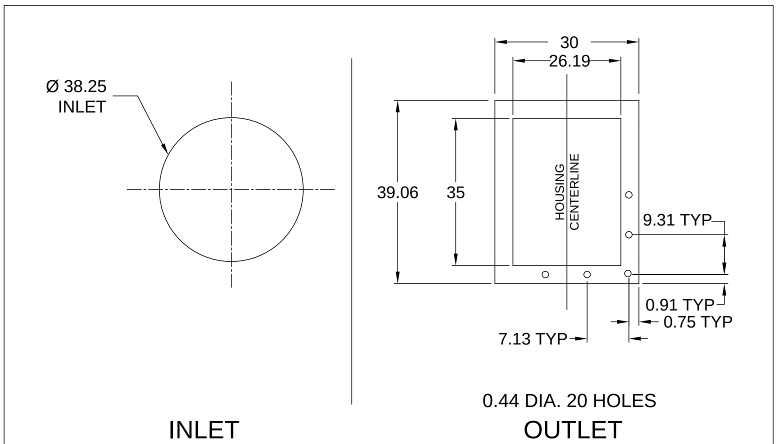
HOUSING: Steel housing with Lock-seam construction - Unit support angles with prepunched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Steel components are phosphatized and coated, Galvanized construction remains uncoated

Options & Accessories:

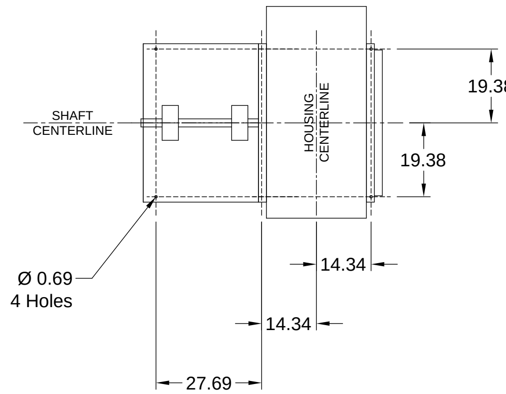
Motor VFD Rated without Shaft Grounding Protection
Motor with CSA Approval
Motor with Class B Insulation
Steel Scroll Housing
Steel Wheel Construction
Steel Inlet Cone
UL/cUL 705 Listed - "Power Ventilators"
Weatherhood
Coated with Permatector, Concrete Gray-RAL 7023, Standard Coating on Entire Fan
Outlet Flange - Punched
Steel Shaft

SWB-333-150

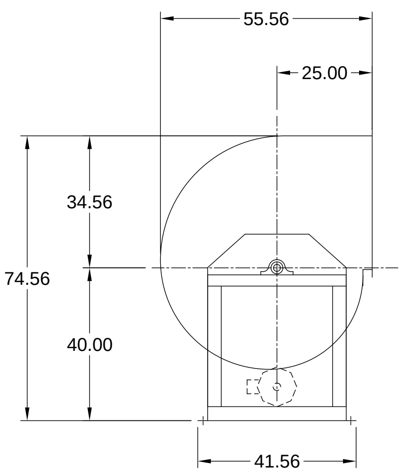
Backward Inclined Centrifugal Utility Fan



CONNECTIONS
NOT DRAWN TO SCALE

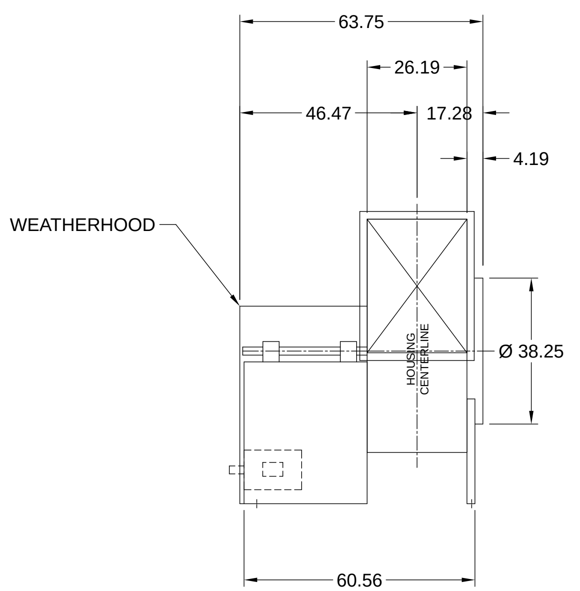


FAN FOOTPRINT



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE



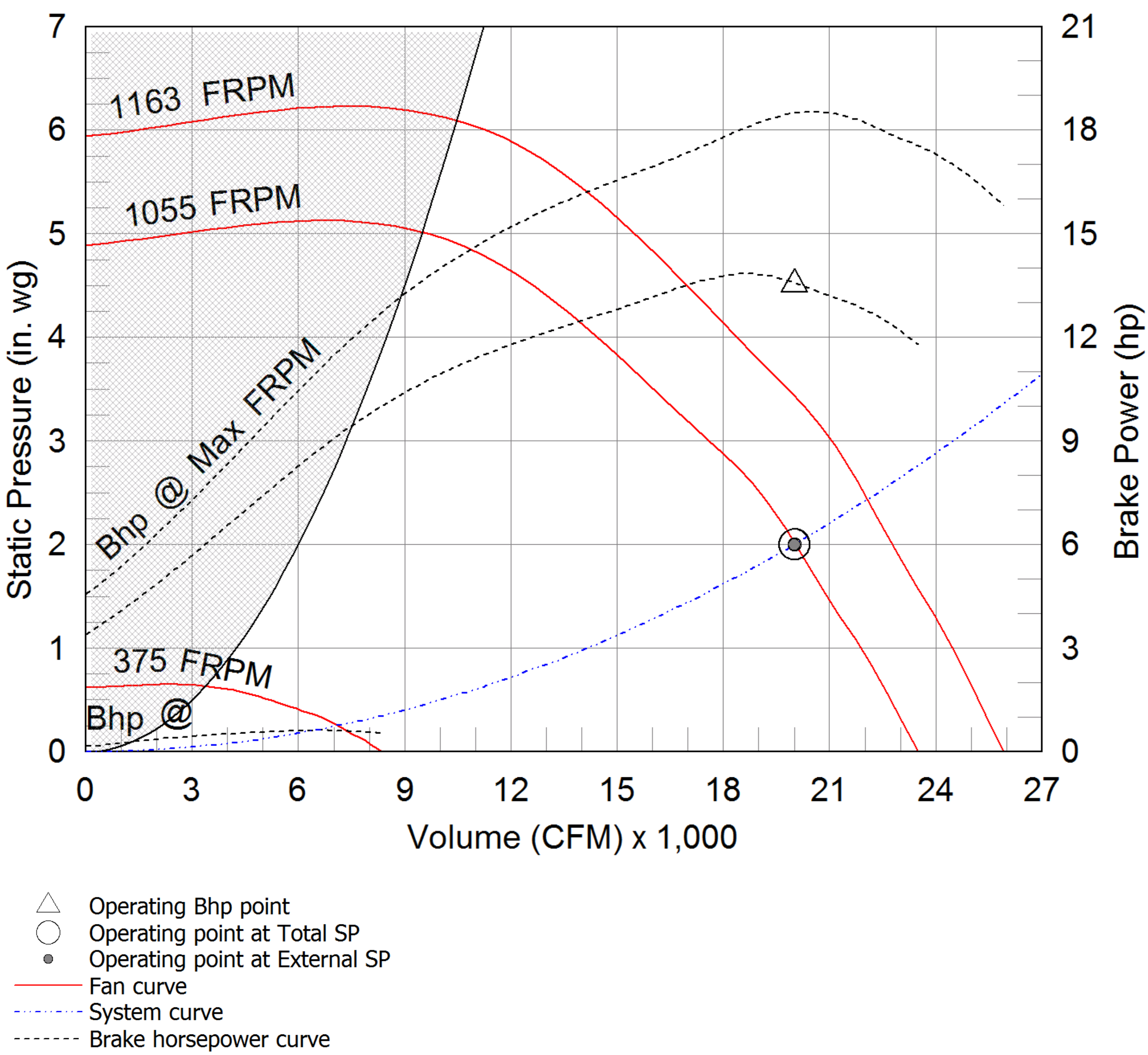
END VIEW

Notes: All dimensions shown are in units of in.

SWB-333-150 Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	Fan RPM	Operating Power (hp)
20,000	20,000	2	2	1055	13.54



AMCA

AMCA Licensed for Air Performance. Power rating (BHP/kW) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings only. Performance certified is for installation type B: Free inlet, Ducted outlet. Power rating (BHP/kW) includes transmission losses. Performance ratings do not include the effects of appurtenances (accessories).

GREENHECK
Building Value in Air.

BIDW Series 21 Backward Inclined Double Width

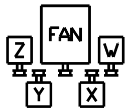
Tag EC-S-T-01

ENGINEERING DATA

Approx. Fan Weight (lb)	Class	Max. T Motor Frame Size	WR2 (lb-ft2)
188	I	215	5

**Weight does NOT include motor, drives, or accessories.

Motor Location
X



Drive Type
Constant

CONFIGURATION

Arrangement	Rotation	Discharge Position	Material Type
3	CW	TH	Steel

INSTALLATION

Inlet Conditions	Outlet Conditions
Standard	Standard

STANDARD CONSTRUCTION FEATURES

HOUSING: Series 21 class I and II fans feature Perma-Lock construction on sizes 12-49 and continuously welded steel housing on sizes 54-73 and all class III fans • Punched outlet flange standard (except for downblast - DB) on class I and II sizes 33-73, and all class III fans • All structural parts phosphatized and coated with Permatector
BEARINGS, SHAFT, AND WHEEL: Heavy duty, self-aligning ball or roller pillow block bearings • Polished, solid steel shafts • Welded centrifugal wheel

Structural or Inertia Base, required for this arrangement.

SELECTED OPTIONS & ACCESSORIES

Permatector Coating on Steel Components
Housing is not sealed for outdoor use
Class B Motor Insulation or Greater
Drive Service Factor of 1.5 - Standard
VFD Rated Motor, Meets NEMA MG-1 Standard, S.F. is 1.0
Motor Slide Base

MOTOR SPECS

Size (hp)	RPM	V/C/P	Enclosure	Frame Size
7 1/2	1725	380/60/3	ODP	213

PERFORMANCE

(Elevation ft = 43, Airstream Temperature F = 70, Start Up Temperature F = 70) Drive Loss (%) 3

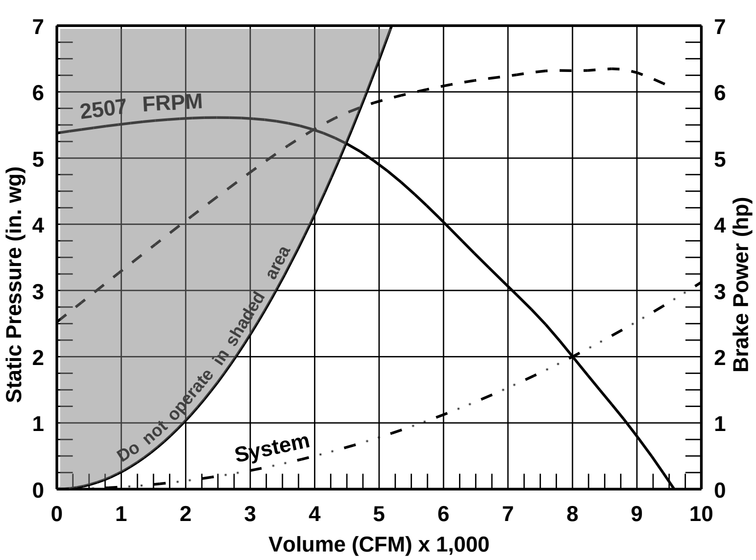
Qty	Model	Volume (CFM)	Total SP (in. wg)	TS (ft/min)	OV (ft/min)	FRPM (RPM)	Max Class FRPM	Operating Power (hp)	SE%	FEG
1	15-BIDW-21	8,000	2	9,845	3,433	2507	2,617	6.32	41	80

SOUND

Inlet / Outlet Sound Power by Octave Band								LwA	dBA
63	125	250	500	1000	2000	4000	8000		
96 / 106	97 / 97	95 / 96	100 / 97	94 / 91	90 / 89	89 / 85	85 / 79	100 / 97	89 / 86

LwA - A weighted sound power level, based on ANSI S1.4.
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft.

dBA levels are not licensed by AMCA International.

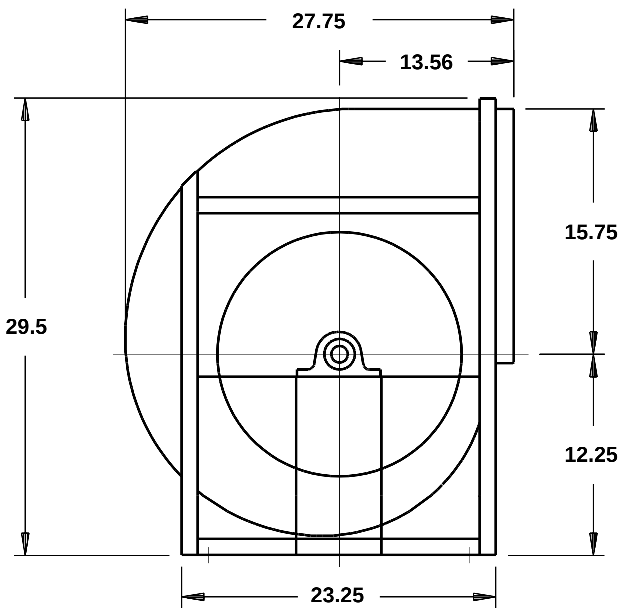


—— Fan curve
– · · – System curve
– – – Brake horsepower curve

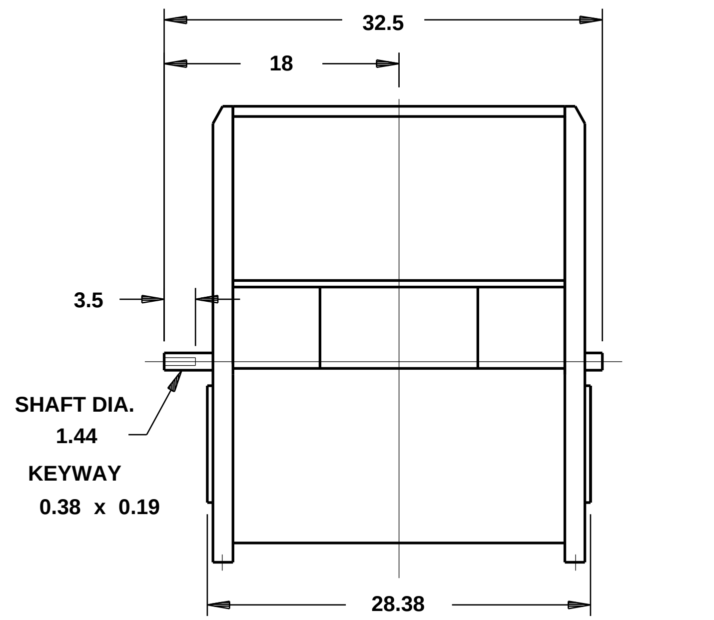
Size: 15
Arrangement: 3
Class: I

BIDW Series 21 Backward Inclined Double Width

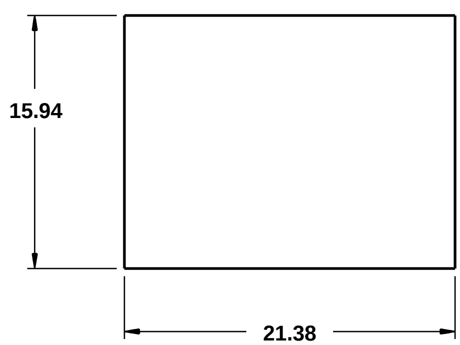
NOTES: All dimensions shown are in units of inches.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.



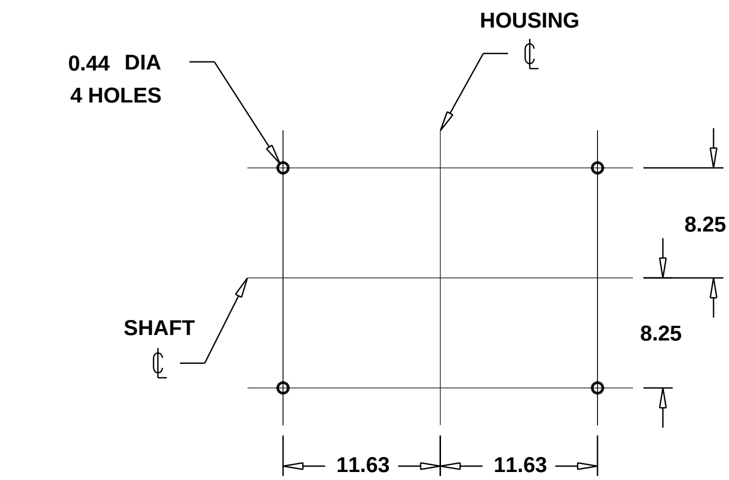
SIDE VIEW



END VIEW



OUTLET



ATTENTION:
Accessories such as bases, isolators, motors, drives, and belt guards may ship unmounted and require field installation.

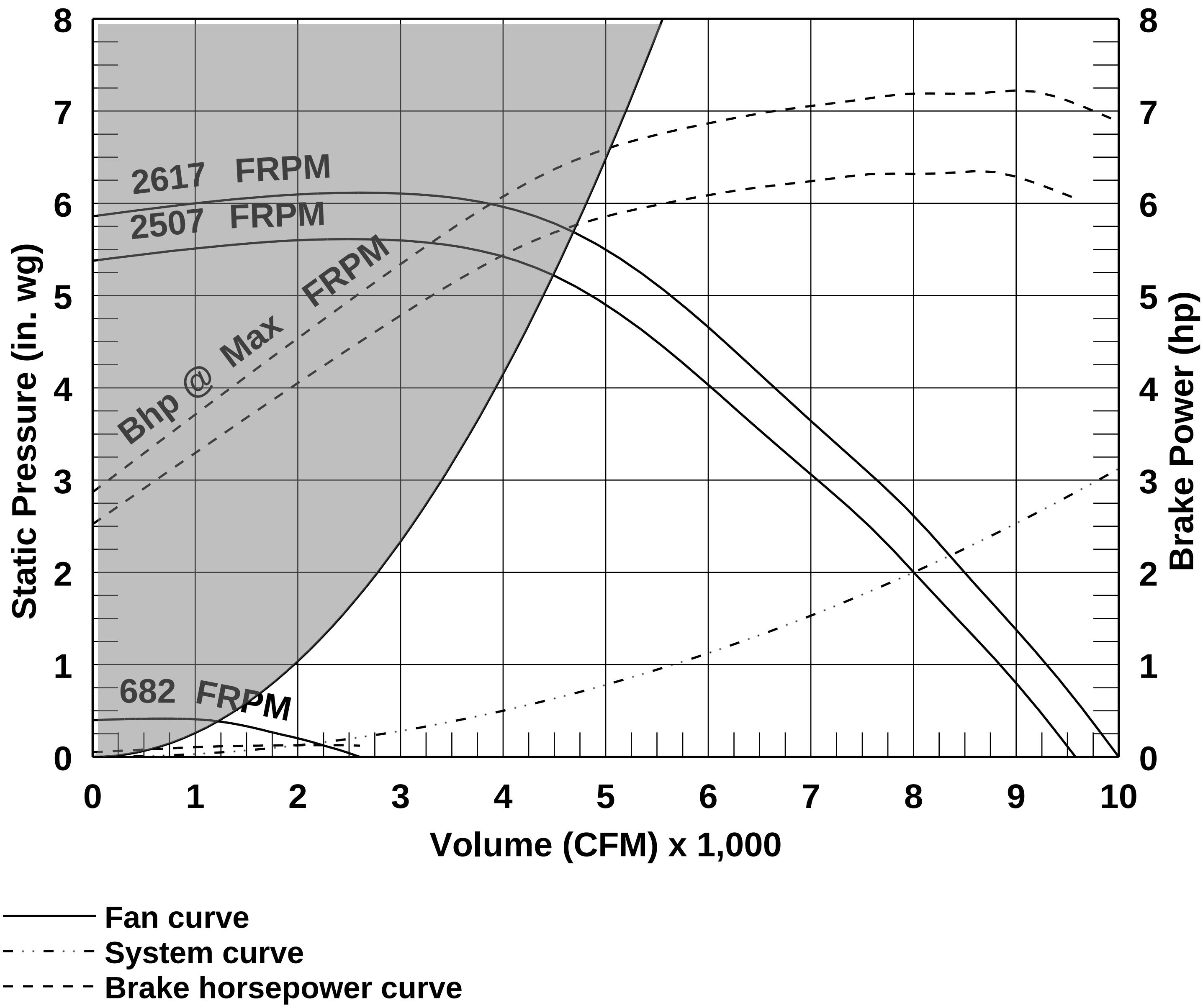
FOOTPRINT

15-BIDW-21

Min. / Max Fan Curve

PERFORMANCE (Elevation ft = 43, Airstream Temperature F = 70)

Actual Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM (RPM)	Operating Power (hp)
8,000	2	2	2507	6.32



AMCA

AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B - free inlet, ducted outlet. Performance ratings do not include the effects of appurtenances (accessories). Power ratings (BHP/kW) include transmission losses. The sound power level ratings shown are in decibels, referred to 10-12 watts calculated per AMCA Standard 301. The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lwi, LwiA, and outlet Lwo, LwoA sound power levels for installation type B: free inlet, ducted outlet. Outlet ratings include the effects of duct end correction.

BIDW Series 21 Backward Inclined Double Width

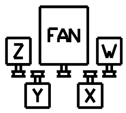
Tag EC-S6-01

ENGINEERING DATA

Approx. Fan Weight (lb)	Class	Max. T Motor Frame Size	WR2 (lb-ft2)
502	I	284	44

**Weight does NOT include motor, drives, or accessories.

Motor Location
X



Drive Type
Constant

CONFIGURATION

Arrangement	Rotation	Discharge Position	Material Type
3	CW	TH	Steel

INSTALLATION

Inlet Conditions	Outlet Conditions
Standard	Standard

MOTOR SPECS

Size (hp)	RPM	V/C/P	Enclosure	Frame Size
10	1725	380/60/3	ODP	215

STANDARD CONSTRUCTION FEATURES

HOUSING: Series 21 class I and II fans feature Perma-Lock construction on sizes 12-49 and continuously welded steel housing on sizes 54-73 and all class III fans • Punched outlet flange standard (except for downblast - DB) on class I and II sizes 33-73, and all class III fans • All structural parts phosphatized and coated with Permatector
BEARINGS, SHAFT, AND WHEEL: Heavy duty, self-aligning ball or roller pillow block bearings • Polished, solid steel shafts • Welded centrifugal wheel

Structural or Inertia Base, required for this arrangement.

SELECTED OPTIONS & ACCESSORIES

Permatector Coating on Steel Components
Housing is not sealed for outdoor use
Class B Motor Insulation or Greater
Drive Service Factor of 1.5 - Standard
VFD Rated Motor, Meets NEMA MG-1 Standard, S.F. is 1.0
Motor Slide Base

PERFORMANCE

(Elevation ft = 43, Airstream Temperature F = 70, Start Up Temperature F = 70) Drive Loss (%) 3

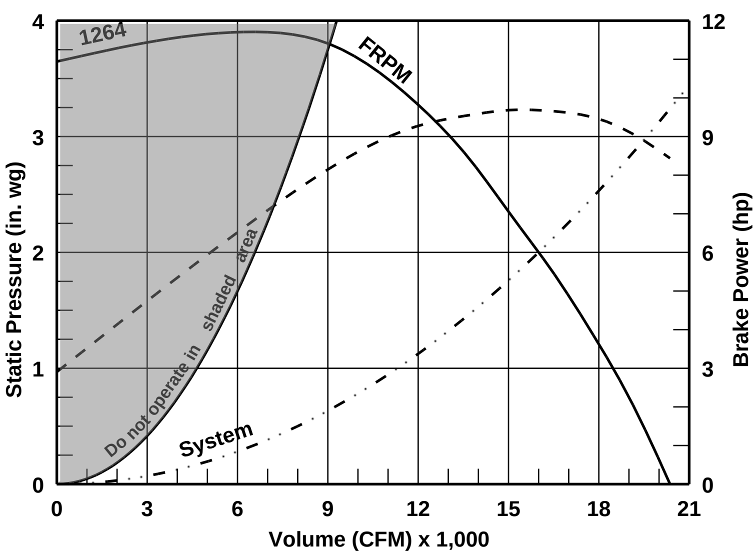
Qty	Model	Volume (CFM)	Total SP (in. wg)	TS (ft/min)	OV (ft/min)	FRPM (RPM)	Max Class FRPM	Operating Power (hp)	SE%	FEG
1	24-BIDW-21	16,000	2	8,107	2,576	1264	1,568	9.67	54	75

SOUND

Inlet / Outlet Sound Power by Octave Band								LwA	dBA
63	125	250	500	1000	2000	4000	8000		
91 / 95	91 / 96	97 / 96	89 / 90	86 / 87	82 / 82	79 / 77	77 / 70	92 / 92	81 / 81

LwA - A weighted sound power level, based on ANSI S1.4.
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft.

dBA levels are not licensed by AMCA International.



Fan curve
System curve
Brake horsepower curve

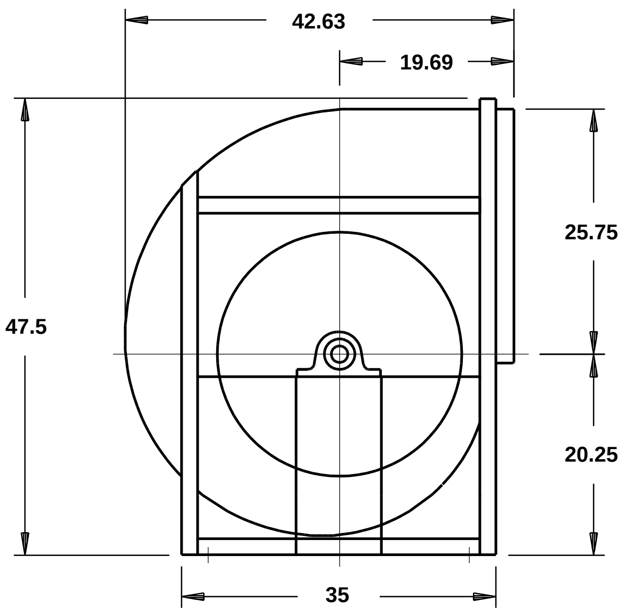
GREENHECK
Building Value in Air.

Printed Date: 12/05/2014
Job: Edificio Santa Cruz
Mark: EC-S6-01

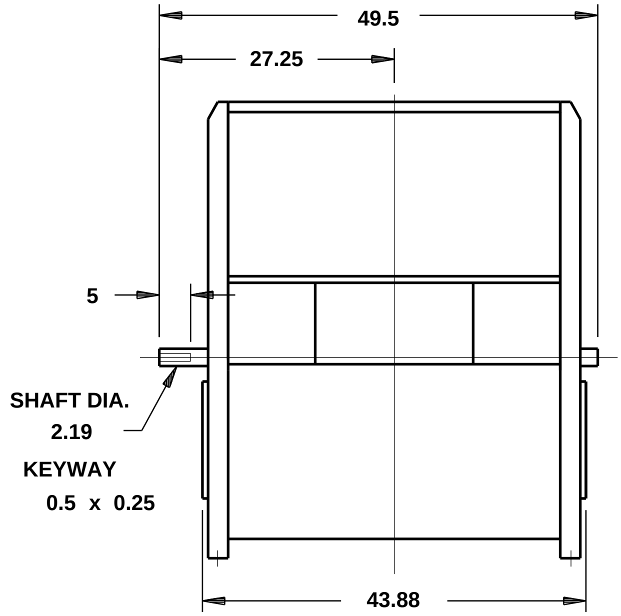
Size: 24
Arrangement: 3
Class: I

BIDW Series 21 Backward Inclined Double Width

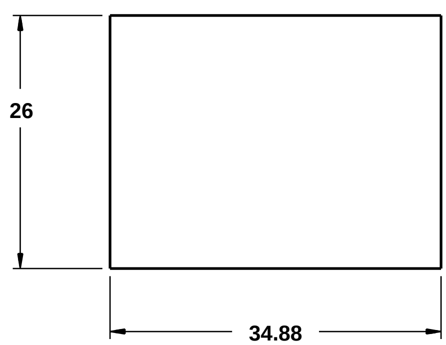
NOTES: All dimensions shown are in units of inches.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.



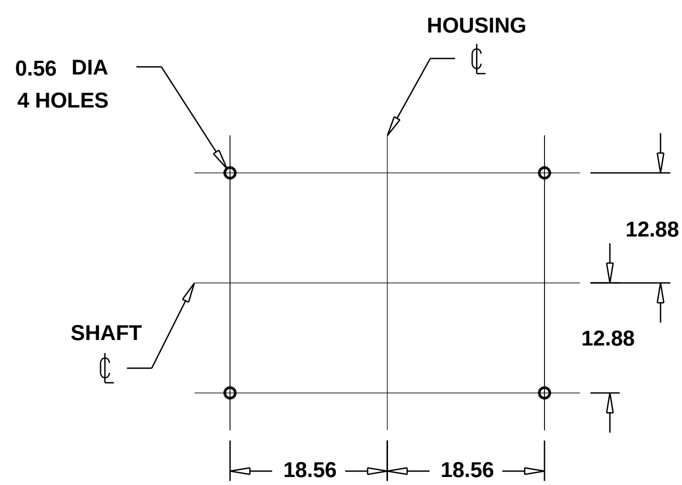
SIDE VIEW



END VIEW



OUTLET



ATTENTION:
Accessories such as bases, isolators, motors, drives, and belt guards may ship unmounted and require field installation.

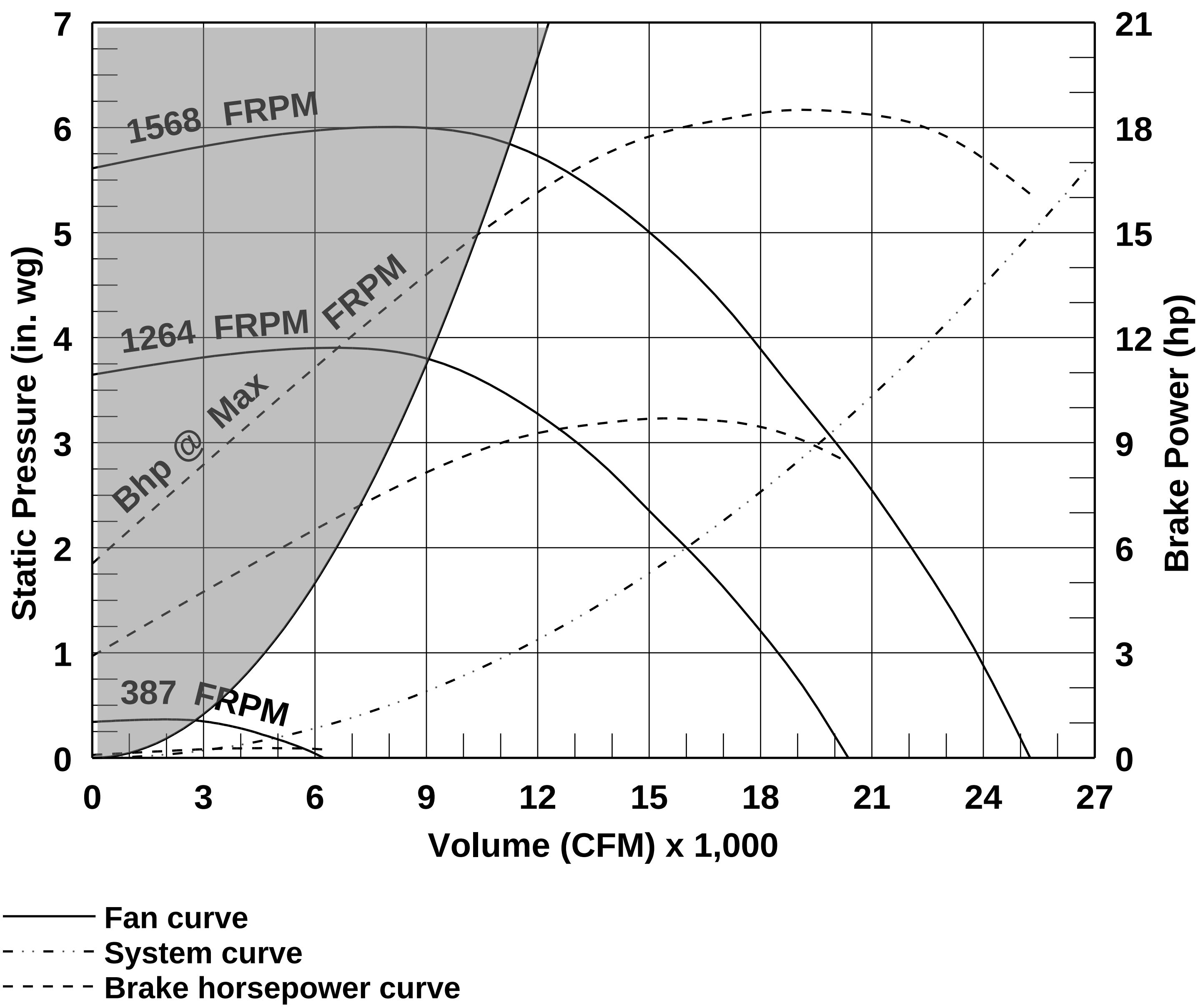
FOOTPRINT

24-BIDW-21

Min. / Max Fan Curve

PERFORMANCE (Elevation ft = 43, Airstream Temperature F = 70)

Actual Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM (RPM)	Operating Power (hp)
16,000	2	2	1264	9.67



AMCA

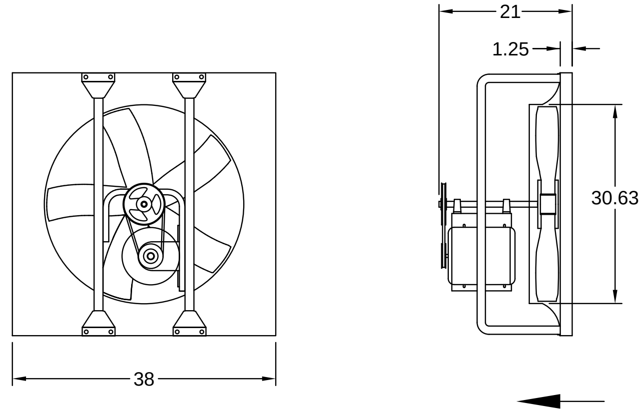
AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B - free inlet, ducted outlet. Performance ratings do not include the effects of appurtenances (accessories). Power ratings (BHP/kW) include transmission losses. The sound power level ratings shown are in decibels, referred to 10-12 watts calculated per AMCA Standard 301. The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lwi, LwiA, and outlet Lwo, LwoA sound power levels for installation type B: free inlet, ducted outlet. Outlet ratings include the effects of duct end correction.

Printed Date: 12/05/2014
Job: Edificio Santa Cruz
Mark: IA

Model: SBS-2H30-15

Sidewall Belt Drive Supply Fan



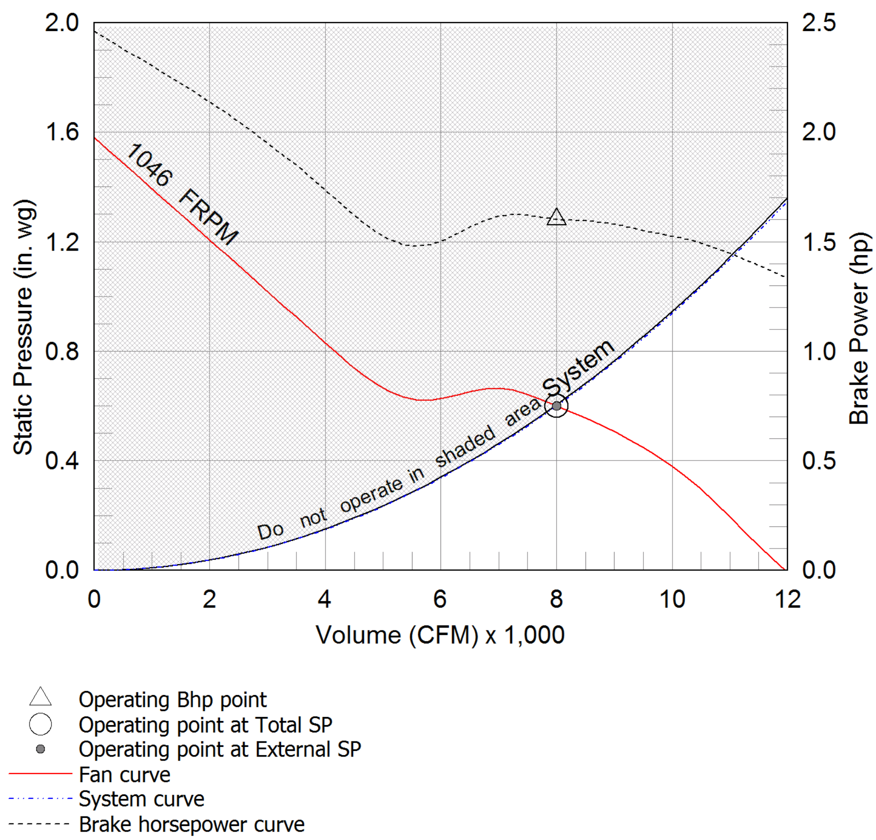
SUPPLY FANS CAN CARRY RAIN
OR SNOW INTO THE BUILDING

AIR FLOW

See the Assembly Drawing For
Selected Accessories

Dimensional	
Quantity	7
Weight w/o Acc's (lb)	105
Weight w/ Acc's (lb)	105
Max T Motor Frame Size	184
Wall Opening (in.)	32.5 x 32.5

Performance	
Requested Volume (CFM)	8,000
Actual Volume (CFM)	8,000
External SP (in. wg)	0.6
Total SP (in. wg)	0.6
Fan RPM	1046
Operating Power (hp)	1.6
Elevation (ft)	43
Airstream Temp.(F)	70
Air Density (ft3)	0.075
Drive Loss (%)	5.2
Tip Speed (ft/min)	8,219
Static Eff. (%)	50



Motor	
Motor Mounted	Yes
Size (hp)	1 1/2
V/C/P	380/60/3
Enclosure	ODP
Motor RPM	1725
Windings	1
NEC FLA* (Amps)	NA

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	85	91	88	88	86	83	78	74	91	80	31

Notes:
All dimensions shown are in units of in..
*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: SBS-2H30-15

Sidewall Belt Drive Supply Fan

Standard Construction Features:

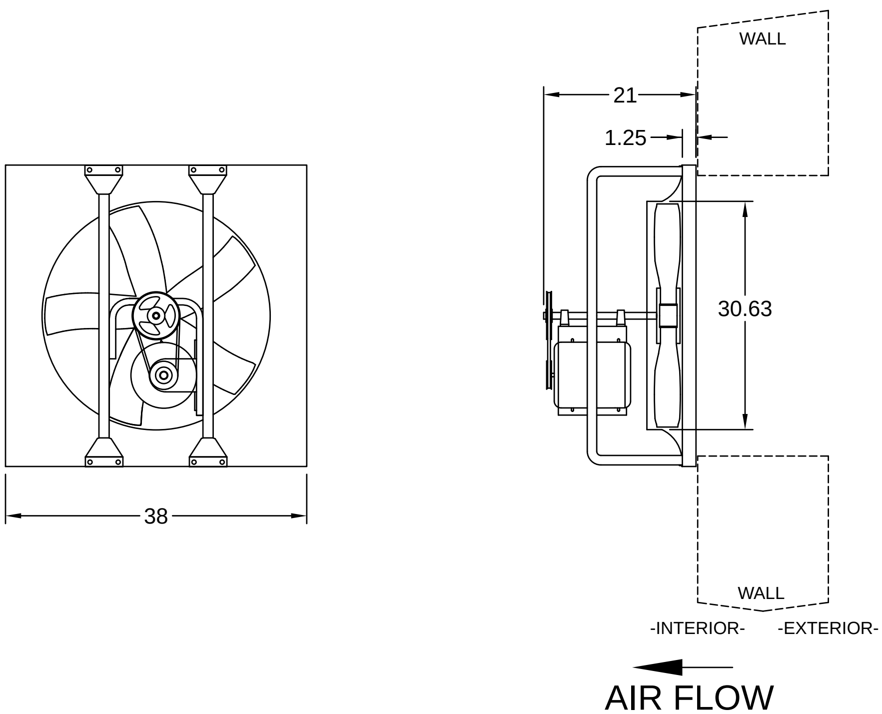
- Galvanized steel fan panel - Die formed, galvanized steel drive frame assembly - Fabricated steel propeller for Levels 1 and 2, welded and painted steel for Level 3 - Adjustable motor pulley - Ball bearing motors - Fan shaft mounted in ball bearing pillow blocks - Static resistant belts - Corrosion resistant fasteners

Options & Accessories:

Energy Efficient Motor - meets NEMA Table 12-11
Motor with 1.15 or Greater Motor Service Factor
Motor with Class B Insulation
Bearings with Grease Fittings
Unit Warranty: 1 Yr (Standard)

Assembly Drawing

Type: Sidewall Belt Drive Supply Fan



supply fans can carry rain or snow into the building

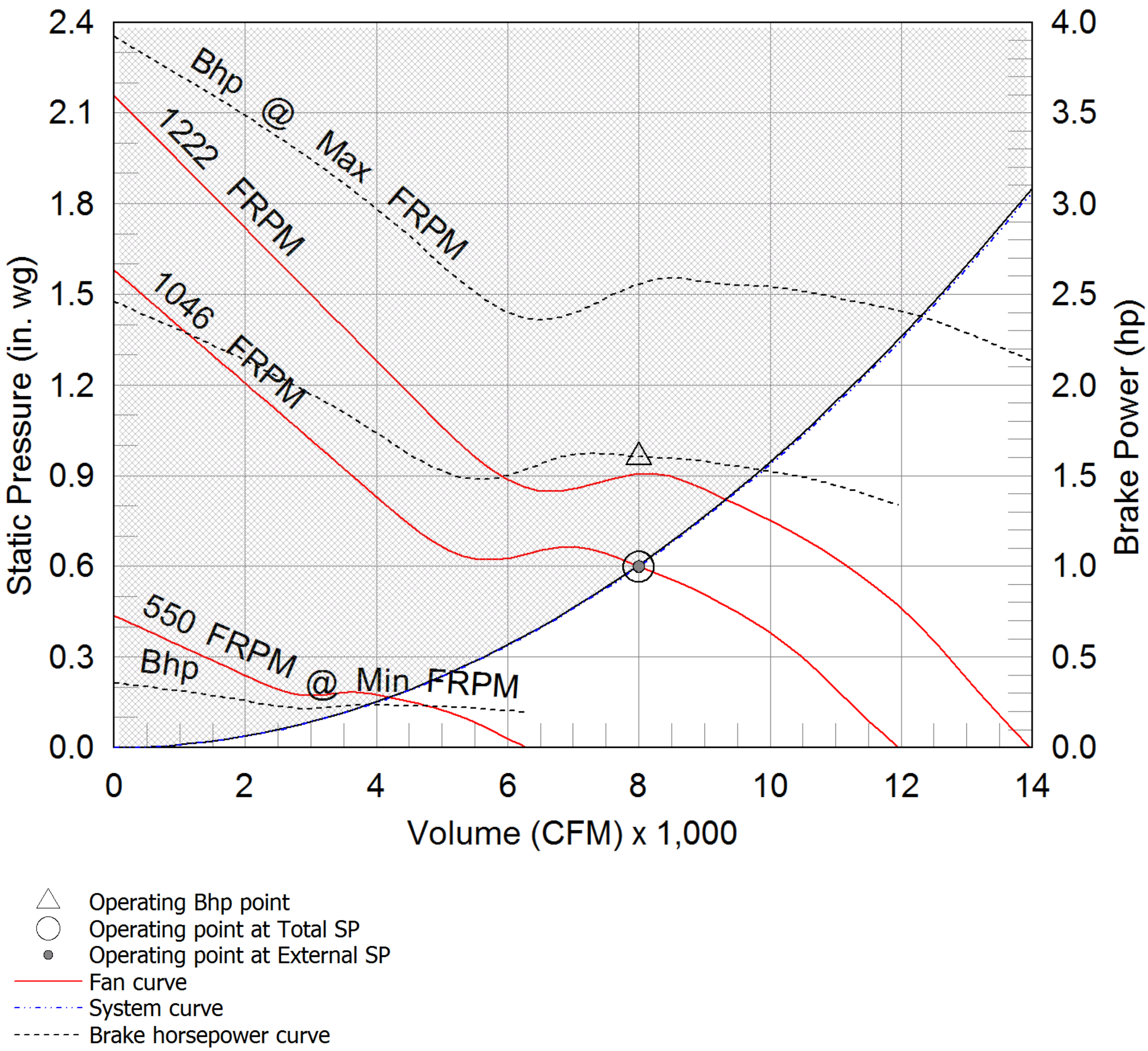
WALL OPENING 32.5 SQ.

Notes: All dimensions shown are in units of in..

SBS-2H30-15 Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	Fan RPM	Operating Power (hp)
8,000	8,000	0.6	0.6	1046	1.6



AMCA

AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP/kW) includes transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: free inlet hemispherical sone levels. dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal applies to sone ratings only.

ANEXO 09

Submittal Data Information
FI Series Pumps

301-1428T

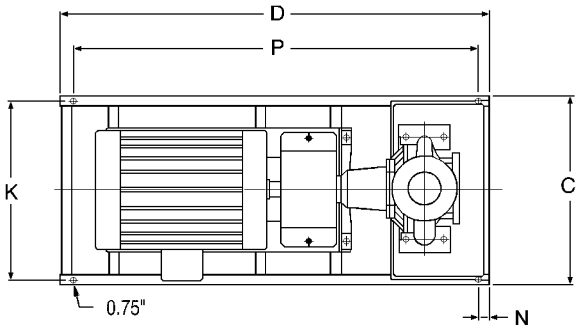
MODEL 3009C **1760 RPM**

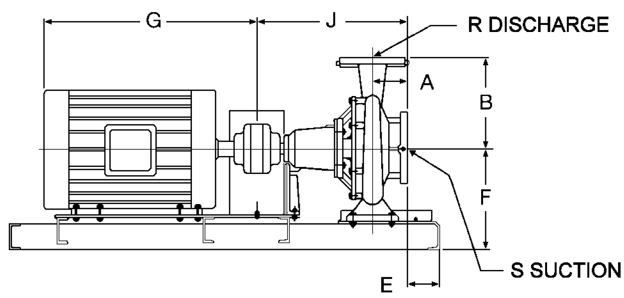
JOB: PROYECTO 01 CONTRACTOR:

ENGINEER: REP:

COMMENTS: MOTOR TEFC NEMA Super E Efficiency/ Eficiencia Mecanica 77%/ NPSH: 4Ft/ Potencia Calculada:5.96 HP

ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
	FI3009C	8.4	302	60	7.5	380VAC/3F/60Hz

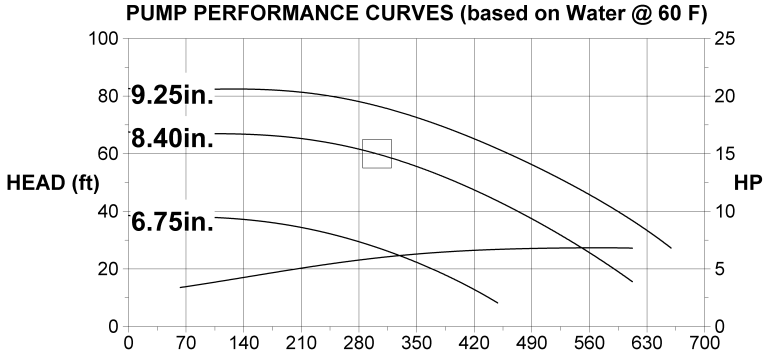




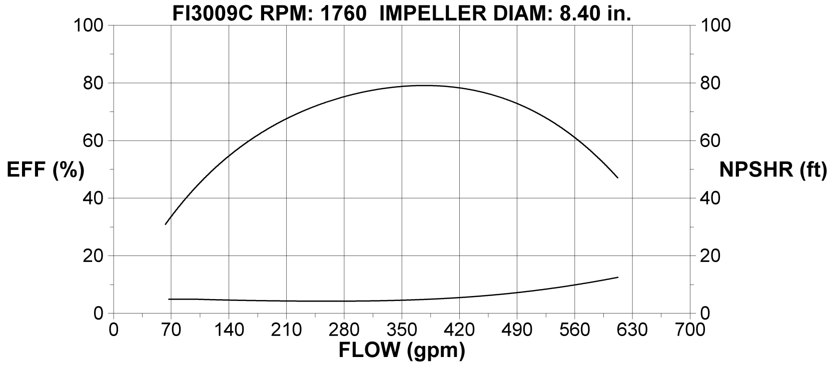
* Dimensions in inches. Do not use for construction purposes unless certified.

HP	FRAME	A	B	C	D	E	F	G	J	K	N	P	R	S
7.5	213T	4.73	10	16.17	41.5	1.04	11.4	17.94	23.24	14.67	2	37.5	3	4

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



FI3009C RPM: 1760 IMPELLER DIAM: 8.40 in.



Item	BRONZE FITTED			
	Std. Pump Constr.	Optional		
Casing	Cast Iron ASTM A48 Cl.30A			
Impeller	Bronze ASTM B584-836			
Wear Ring				
Shaft	Carbon Steel AISI 1045			
Shaft Sleeve	Bronze SAE 660			
Mech. Seal	Ceramic			
Seal Flush Line	Copper			

OPERATING SPECIFICATIONS		
	Standard	Optional
Flange	125#	
Pressure	175 PSIG*	
Temperature	250 F	

Motors: All NEMA Standard (T Frame)
* In Accordance with ANSI Standard B16.1 Class 125
** In Accordance with ANSI Standard B16.1 Class 250 Dim.

Do it once. Do it right.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401)942-8000 FAX: (401)942-2360.
TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone:905/564-9422. FAX: 905/564-9436

ANEXO 10

Submittal Data Information
FI Series Pumps

301-2126T

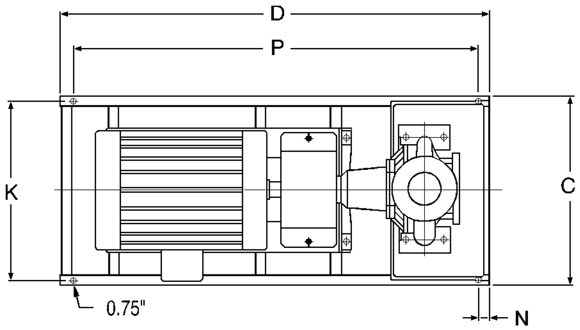
MODEL 4011C **1760 RPM**

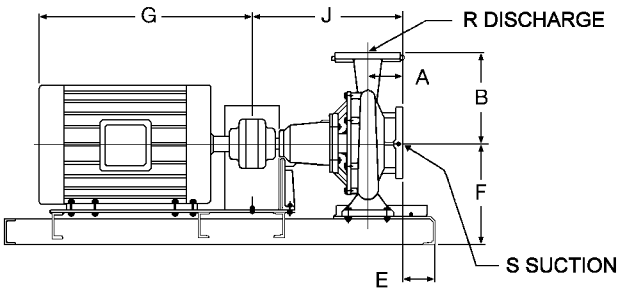
JOB: PROYECTO 01 CONTRACTOR:

ENGINEER: REP:

COMMENTS: MOTOR TEFC NEMA Super E Efficiency/ Eficiencia Mecanica 80%/ NPSH: 15Ft/ Potencia Calculada:18.07 HP

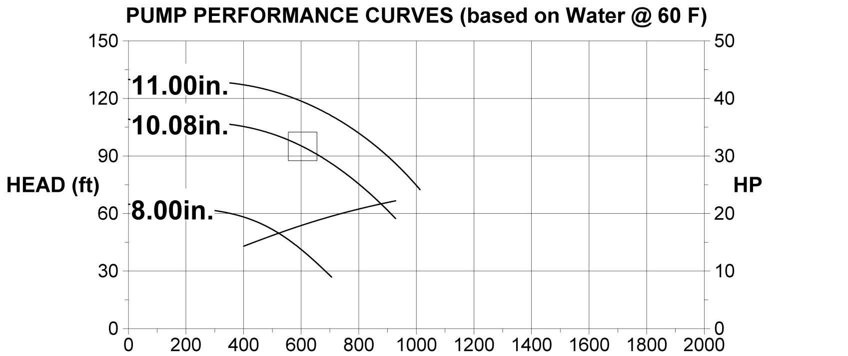
ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
	FI4011C	10.1	605	95	20	380VAC/3F/60Hz

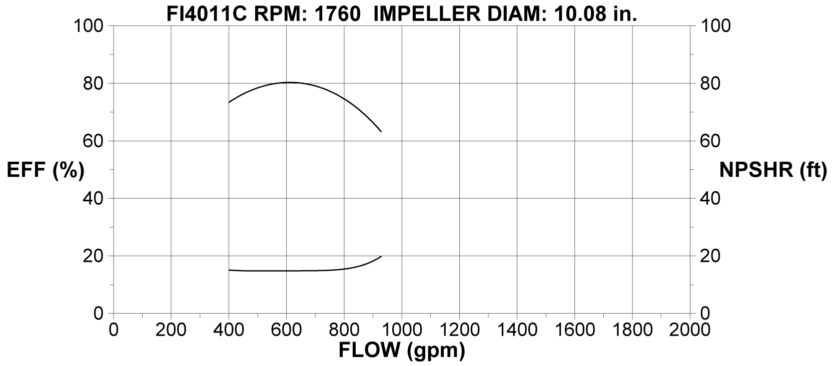




* Dimensions in inches. Do not use for construction purposes unless certified.

HP	FRAME	A	B	C	D	E	F	G	J	K	N	P	R	S
20	256T	5.31	14	19.17	52	1.46	14.03	23.19	24.24	17.67	2	48	4	5





Item	BRONZE FITTED			
	Std. Pump Constr.	Optional		
Casing	Cast Iron ASTM A48 Cl.30A			
Impeller	Bronze ASTM B584-836			
Wear Ring				
Shaft	Carbon Steel AISI 1045			
Shaft Sleeve	Bronze SAE 660			
Mech. Seal	Ceramic			
Seal Flush Line	Copper			

OPERATING SPECIFICATIONS		
	Standard	Optional
Flange	125#	
Pressure	175 PSIG*	
Temperature	250 F	

Motors: All NEMA Standard (T Frame)
* In Accordance with ANSI Standard B16.1 Class 125
** In Accordance with ANSI Standard B16.1 Class 250 Dim.

Do it once. Do it right.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401)942-8000 FAX: (401)942-2360.
TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone:905/564-9422. FAX: 905/564-9436

ANEXO 11

Submittal Data Information
FI Series Pumps

301-1428T

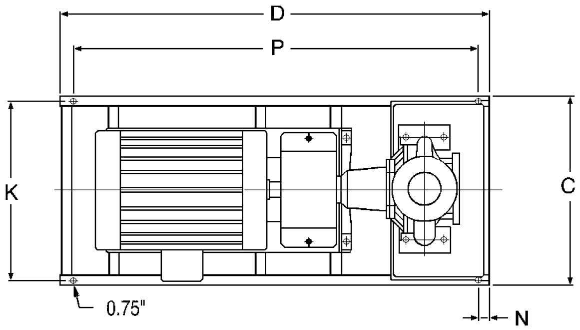
MODEL 3009C **1760 RPM**

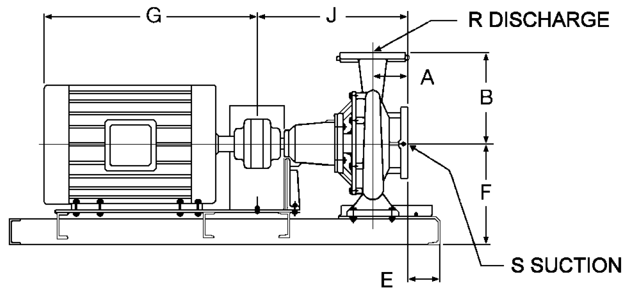
JOB: PROYECTO 01 CONTRACTOR:

ENGINEER: REP:

COMMENTS: MOTOR TEFC NEMA Super E Efficiency/ Eficiencia Mecanica 79%/ NPSH: 5Ft/ Potencia Calculada:7.25 HP

ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
	FI3009C	8.7	378	60	7.5	380VAC/3F/60Hz

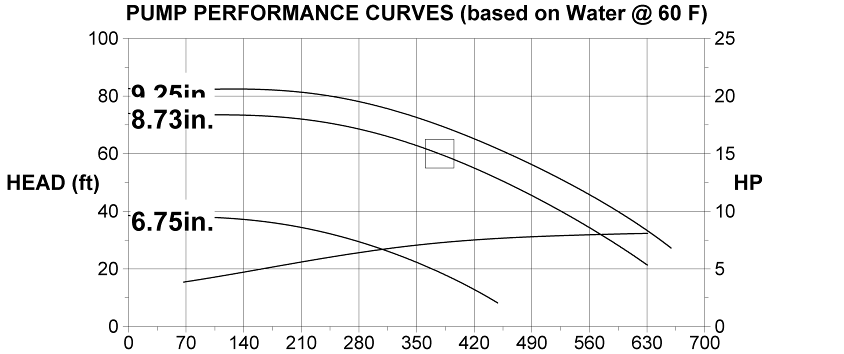




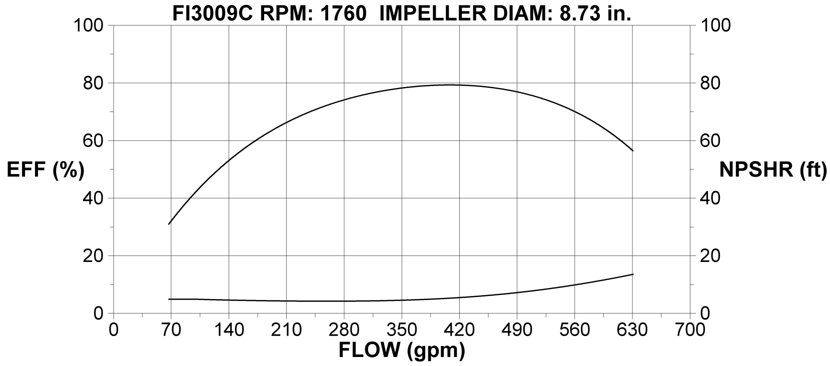
* Dimensions in inches. Do not use for construction purposes unless certified.

HP	FRAME	A	B	C	D	E	F	G	J	K	N	P	R	S
7.5	213T	4.73	10	16.17	41.5	1.04	11.4	17.94	23.24	14.67	2	37.5	3	4

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



FI3009C RPM: 1760 IMPELLER DIAM: 8.73 in.



Item	BRONZE FITTED			
	Std. Pump Constr.	Optional		
Casing	Cast Iron ASTM A48 Cl.30A			
Impeller	Bronze ASTM B584-836			
Wear Ring				
Shaft	Carbon Steel AISI 1045			
Shaft Sleeve	Bronze SAE 660			
Mech. Seal	Ceramic			
Seal Flush Line	Copper			

OPERATING SPECIFICATIONS		
	Standard	Optional
Flange	125#	
Pressure	175 PSIG*	
Temperature	250 F	

Motors: All NEMA Standard (T Frame)
* In Accordance with ANSI Standard B16.1 Class 125
** In Accordance with ANSI Standard B16.1 Class 250 Dim.

Do it once. Do it right.

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TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone:905/564-9422. FAX: 905/564-9436

ANEXO 12

Proyecto **EDIFICIO SANTA CRUZ**
Fecha 22/08/2014
Referencia **AIRE ACONDICIONADO - SUMINISTRO DE EQUIPOS**

Item	Cantidad	Descripción	US$ P.unit.	US$ P.total
1.-		**EQUIPOS**		
	2 u	**CHILLER CONDENSADOR ENFRIADO POR AGUA**	84,563.00	169,126.00
		Marca YORK Capacidad 126 TR Refrigerante R-410A Tipo de compresor **TORNILLO** Numero de Compresores: 01 Compresor por chiller. Modelo YVWABBBBFXJE0126SAX **ARI 550/590** Electricidad **380V/3F/60Hz**		
	3 u	**BOMBAS PRIMARIAS**	2,518.00	7,554.00
		Marca TACO (USA) Caudal 302 GPM@ 60 pies c.a. Tipo Horizontal Clase 125 Electricidad 7.5 HP,380V-3F-60Hz TEFC		
	1 gbl	**ACCESORIOS DE BOMBAS PRIMARIAS**	3,500.00	3,500.00
	3 u	Valvula multipropósito marca TACO (USA) modelo MPV030-4, 3", roscado NPT		
	3 u	Difusor de succión marca TACO (USA) modelo SD040030-5; 4"x3", bridada		
	3 u	Union flexible de 4"Ø marca Wheatley modelo SSP0400		
	3 u	Union flexible de 3"Ø marca Wheatley modelo SSP0250		
	3 u	Válvula mariposa de 4"Ø marca Wheatley modelo BVF040L		
	3 u	Manómetro marca Winters, 6" largo, termopozo 1/2"NPT,rango -40/100F modelo T130AG6		
	2 u	**BOMBAS SECUNDARIAS**	4,025.00	8,050.00
		Marca TACO (USA) Caudal 605 GPM @95pies c.a. Tipo Horizontal Clase 125 Electricidad 20 HP, 380V-3F-60Hz TEFC		
	1 gbl	**ACCESORIOS DE BOMBAS SECUNDARIAS**	7,492.00	7,492.00
	2 u	Valvula multipropósito marca TACO (USA) modelo MPV040-4, 4", bridado		
	2 u	Difusor de succión marca TACO (USA) modelo SD060050-5; 6"x5", bridada		
	2 u	Union flexible de 6"Ø marca Wheatley modelo SSP0600		
	2 u	Union flexible de 4"Ø marca Wheatley modelo SSP0400		
	2 u	Válvula mariposa de 4"Ø marca Wheatley modelo BVF040L		
	2 u	Manómetro marca Winters, 6" largo, termopozo 1/2"NPT,rango -40/100F modelo T130AG6		
	2 u	Variador de frecuencia de 20 HP marca Danfoss		
	2 u	Transmisor de presión diferencial para agua marca DWYER, 4-20mA, 0-150 psi		

	3 u	**BOMBAS DE CONDENSACION**	2,601.00	7,803.00
		Marca TACO (USA) Caudal 378 GPM @ 60 pies c.a. Tipo Horizontal Clase 125 Electricidad 7.5 HP, 380V-3F-60Hz TEFC		
	1 gbl	**ACCESORIOS DE BOMBAS DE CONDENSACION**	3,637.00	3,637.00
	3 u	Valvula multipropósito marca TACO (USA) modelo MPV030-4, 3", roscado NPT		
	3 u	Difusor de succión marca TACO (USA) modelo SD050040-5; 5"x4", bridada		
	4 u	Union flexible de 4"Ø marca Wheatley modelo SSP0400		
	4 u	Union flexible de 2.5"Ø marca Wheatley modelo SSP0250		
	3 u	Válvula mariposa de 5"Ø marca Wheatley modelo BVF050L		
	3 u	Manómetro marca Winters, 6" largo, termopozo 1/2"NPT,rango -40/100F modelo T130AG6		
		TORRES DE ENFRIAMIENTO		
	2 u	TORRE DE ENFRIAMIENTO TIRO INDUCIDO, VENTILADOR AXIAL, CERTIF CTI Marca Mesan Cooling Tower Caudal 378 GPM Electricidad 4 HP, 380V/3F/60Hz, TEAO	16,319.00	32,638.00
	2 u	Variador de frecuencia marca Danfoss (USA) de 4HP 380V-3F-60Hz modelo FC-101P3**T4 NEMA1 con display alfanumérico y kit de montaje	620.00	1,240.00
	2 u	Transmisor de temperatura marca Johnson Controls modelo A350PS-1C salida 0-20mA rango de sensado de -30 a 130ºF 24VAC	217.00	434.00
	2 u	Sensor with high temperature silicon cable; cable length 9-3/4 in(0.25m) range -40 to 248ºF	42.00	84.00
	2 u	Módulo adicional de poder modelo Y350R para alimentación 220VAC	67.00	134.00
	1 gbl	**ACCESORIOS PARA CHILLER y TORRE DE ENFRIAMIENTO**	14,671.00	14,671.00
	1 u	Tanque separador de aire tangencial marca TACO modelo ACT06-125 de 6" con filtro, ASME, 125PSI, caudal máximo 900 GPM		
	1 u	Tanque de expansión cerrado marca TACO modelo CA215-125 capacidad 57 galones ASME, 125 PSI		
	1 u	Válvula dual para reposición de agua marca TACO		
	8 u	Purgadores de aire, conexión de 1/2"x3/4", marca TACO		
	12 u	Válvula mariposa de 4"Ø marca Wheatley modelo BVF040L		
	12 u	Union flexible de neoprene de 4"Ø, con brida, marca Wheatley modelo SSP0400		
	12 u	Union rigida tipo vitaulic de 4"Ø		
	12 u	Manometro - rango 0-100PSI		
	12 u	Termometro de columna con termopozo, rango 40 a 100°F		
	2 u	Válvula mariposa de 5"Ø marca Wheatley modelo BVF050L		
	2 u	Union flexible de neoprene de 5"Ø, con brida, marca Wheatley modelo SSP0500		
	1 u	Ablandador de agua		
		CUARTO DE SERVIDORES		
	2 u	**BOMBAS PRIMARIAS DE CONDENSADO**	2,179.00	4,358.00
		Marca TACO (USA) Caudal 120 GPM @ 60 pies c.a. Tipo Horizontal Clase 125 Electricidad 5 HP, 380V-3F-60Hz		
	1 gbl	**ACCESORIOS DE BOMBAS PRIMARIAS**	1,796.00	1,796.00
	2 u	Valvula multipropósito marca TACO (USA) modelo MPV025-4, 2-1/2" roscado		
	2 u	Difusor de succión marca TACO (USA) modelo SD030025-5; 3"x2", bridada		
	2 u	Union flexible de 3"Ø marca Wheatley modelo SSP0300		
	2 u	Union flexible de 2.5"Ø marca Wheatley modelo SSP0250		
	2 u	Válvula mariposa de 3"Ø marca Wheatley modelo BVF030L		
	2 u	Manómetro marca Winters, 6" largo, termopozo 1/2"NPT,rango -40/100F modelo T130AG6		
	2 u	**BOMBAS SECUNDARIAS**	3,750.00	7,500.00
		Marca TACO (USA) Caudal 120 GPM @ 110 pies c.a. Tipo Horizontal Clase 125 Electricidad 7.5 HP, 380V-3F-60Hz		
	1 gbl	**ACCESORIOS DE BOMBAS SECUNDARIAS**	4,380.00	4,380.00
	2 u	Valvula multipropósito marca TACO (USA) modelo MPV025-4, 2-1/2" roscado		
	2 u	Difusor de succión marca TACO (USA) modelo SD030025-5; 3"x2", bridada		

	2 u	Union flexible de 3"Ø marca Wheatley modelo SSP0300		
	2 u	Union flexible de 2.5"Ø marca Wheatley modelo SSP0250		
	2 u	Válvula mariposa de 3"Ø marca Wheatley modelo BVF030L		
	2 u	Manómetro marca Winters, 6" largo, termopozo 1/2"NPT,rango -40/100F modelo T130AG6		
	2 u	Variador de frecuencia de 7.5 HP marca Danfoss		
	2 u	Transmisor de presión diferencial para agua marca DWYER, 4-20mA, 0-150 psi		

		TORRE DE ENFRIAMIENTO		
	1 u	TORRE DE ENFRIAMIENTO TIRO INDUCIDO, VENTILADOR AXIAL, CERTIF CTI Marca Mesan Cooling Tower Caudal 120 GPM Electricidad 2 HP, 380V/3F/60Hz, TEAO	5,709.00	5,709.00
	1 u	Variador de frecuencia marca Danfoss (USA) de 2HP 380V-3F-60Hz modelo FC-01P*K5T4 NEMA1 con display alfanumérico y kit de montaje	706.00	706.00
	1 u	Transmisor de temperatura marca Johnson Controls modelo A350PS-1C salida 0-20mA rango de sensado de -30 a 130ºF 24VAC	230.00	230.00
	1 u	Sensor with high temperature silicon cable; cable length 9-3/4 in(0.25m) range -40 to 248ºF	45.00	45.00
	1 u	Módulo adicional de poder modelo Y350R para alimentación 220VAC	71.00	71.00
		INTERCAMBIADOR DE CALOR		
	1 u	Intercambiador de calor de placas marca Muller 120 GPM modelo AT40MHV, placas de 0.5mm de acero inoxidable, conexiones de ingreso y salida de 4"	8,334.00	8,334.00
	1 gbl	**ACCESORIOS PARA TORRE DE ENFRIAMIENTO**	3,288.00	3,288.00
	1 u	Tanque separador de aire tangencial marca TACO modelo ACT05-125 de 2-1/2" con filtro, ASME, 125PSI, caudal máximo 130 GPM		
	1 u	Tanque de expansión cerrado marca TACO modelo CA90-125 capacidad 24 galones ASME, 125 PSI		
	1 u	Válvula dual para reposición de agua marca TACO		
	8 u	Purgadores de aire, conexión de 1/2"x3/4", marca TACO		
	4 u	Válvula mariposa de 3"Ø marca Wheatley modelo BVF030L		
	4 u	Union flexible de neoprene de 3"Ø, con brida, marca Wheatley modelo SSP0300		
	4 u	Union rigida tipo vitaulic de 3"Ø		
	4 u	Manometro - rango 0-100PSI		
	4 u	Termometro de columna con termopozo, rango 40 a 100°F		
		AMORTIGUADORES DE VIBRACION		
	45 u	Amortiguadores marca MASON type FSN-4 size 2500	134.00	6,030.00
	60 u	Amortiguadores marca MASON type FSN-6 size 500	134.00	8,040.00
	12 u	Amortiguadores marca MASON type FSN-6 size 700	145.00	1,740.00
	18 u	Amortiguadores marca MASON type FSN-6 size 1300	156.00	2,808.00
	16 u	Amortiguadores marca MASON modelo SRLS0EBP-C2-880	889.00	14,224.00
	4 u	Amortiguadores marca MASON modelo SRLS0EBP-B2-450	800.00	3,200.00
		CIRCUIT SETTER		
	9 u	Circuit setter de 1-1/4"Ø	94.00	846.00
	6 u	Circuit setter de 3/4"Ø	58.00	348.00
	4 u	Circuit setter de 1"Ø	67.00	268.00
	1 u	Circuit setter de 1-1/2"Ø	125.00	125.00
2.-		**FAN COIL DE AGUA HELADA**		
	1 u	Fan coil de agua helada Marca: TGM o similar Capacidad: 12 000 BTU/h Electricidad: 220V-1F-60Hz	250.00	250.00
	6 u	Fan coil de agua helada Marca: TGM o similar Capacidad: 18 000 BTU/h Electricidad: 220V-1F-60Hz	300.00	1,800.00
	3 u	Fan coil de agua helada Marca: TGM o similar Capacidad: 24 000 BTU/h Electricidad: 220V-1F-60Hz	350.00	1,050.00
	2 u	Fan coil de agua helada Marca: TGM o similar Capacidad: 36 000 BTU/h Electricidad: 220V-1F-60Hz	450.00	900.00
	9 u	Fan coil de agua helada Marca: TGM o similar Capacidad: 48 000 BTU/h Electricidad: 220V-1F-60Hz	600.00	5,400.00
	21 u	Termostato digital	66.00	1,386.00
	21 u	Válvula motorizada ON-OFF	94.00	1,974.00
	21 u	Circuit setter	65.00	1,365.00
3.-		**EQUIPO SPLIT**		

	1 u	SPLIT DUCTO CON FAN COIL (SOLO FRIO) Marca: YORK/ MIDEA Capacidad: 24 000 BTU/h Electricidad: 220V-1F-60Hz	1,375.00	1,375.00
			Sub total US$	**345,909.00**
			IGV (18%) US$	62,263.62
			Total US$	**408,172.62**

MALCOLM FORD D.
DIRECTOR GERENTE

Proyecto EDIFICIO SANTA CRUZ
Fecha 22/08/2014
Referencia VENTILACION MECANICA - SUMINISTRO DE EQUIPOS

Item	Cantidad	Descripción	US$ P.unit.	US$ P.total
1.-		PRESURIZACION DE ESCALERAS		
	1 u	IC-AZ-01 VENTILADOR CENTRIFUGO DE SIMPLE ENTRADA Marca: Greenheck Caudal: 20000 CFM@2"c.a. Electricidad: 15 HP, 380V-3F-60Hz	6,586.00	6,586.00
	1 u	IC-AZ-02 VENTILADOR CENTRIFUGO DE SIMPLE ENTRADA Marca: Greenheck Caudal: 25000 CFM@2"c.a. Electricidad: 20 HP, 380V-3F-60Hz	8,946.00	8,946.00
	1 u	Variador de frecuencia de 15 HP	1,066.00	1,066.00
	1 u	Variador de frecuencia de 20 HP	1,364.00	1,364.00
	3 u	Transmisor de presión diferencial	154.00	462.00
	4 u	Damper barométrico marca Greenheck	273.00	1,092.00
2.-		EXTRACCION DE MONOXIDO DE CARBONO		
	1 u	EC-S2-01 EXTRACTOR DE DOBLE ENTRADA/FLUJO MIXTO o EN LINEA Marca: Greenheck Caudal: 8000 CFM@2"c.a. Electricidad: 5 HP, 380V-3F-60Hz	6,393.00	6,393.00
	3 u	EC-T1-01 EXTRACTOR DE DOBLE ENTRADA/FLUJO MIXTO o EN LINEA Marca: Greenheck Caudal: 8000 CFM@2"c.a. Electricidad: 5 HP, 380V-3F-60Hz	6,393.00	19,179.00
	1 u	EC-S6-01 EXTRACTOR CENTRIFUGO DE DOBLE ENTRADA Marca: System Air/ Greenheck Caudal: 16000 CFM@2"c.a. Electricidad: 10 HP, 380V-3F-60Hz	6,819.00	6,819.00
	1 u	EC-S6-02 EXTRACTOR DE DOBLE ENTRADA/ FLUJO MIXTO o EN LINEA Marca: Greenheck Caudal: 8000 CFM@2"c.a. Electricidad: 5 HP, 380V-3F-60Hz	6,393.00	6,393.00
	1 u	IA-S1-01 INYECTOR AXIAL Marca: Greenheck Caudal: 8000 CFM@0.6"c.a. Electricidad: 1.5 HP, 380V-3F-60Hz	2,037.00	2,037.00
	1 u	IA-S2-01 INYECTOR AXIAL Marca: Greenheck Caudal: 8000 CFM@0.6"c.a. Electricidad: 1.5 HP, 380V-3F-60Hz	2,037.00	2,037.00
	3 u	IA-T1-01 INYECTOR AXIAL Marca: Greenheck Caudal: 8000 CFM@0.6"c.a. Electricidad: 1.5 HP, 380V-3F-60Hz	2,037.00	6,111.00
	1 u	IA-S6-01 INYECTOR AXIAL Marca: Greenheck Caudal: 8000 CFM@0.6"c.a. Electricidad: 1.5 HP, 380V-3F-60Hz	2,037.00	2,037.00
	1 u	IA-S6-02 INYECTOR AXIAL Marca: Greenheck Caudal: 8000 CFM@0.6"c.a. Electricidad: 1.5 HP, 380V-3F-60Hz	2,037.00	2,037.00
	5 u	Variador de frecuencia de 5 HP	810.00	4,050.00
	1 u	Variador de frecuencia de 10 HP	1,023.00	1,023.00

	13 u	Detector de monóxido de carbono	353.00	4,589.00
	4 u	Damper de gravedad de 28"x28"	330.00	1,320.00
3.-		**VENTILACION FORZADA**		
	1 u	EC-S5-01 EXTRACTOR CENTRIFUGO EN LINEA Marca: System Air / Soler&Palau o similar Caudal: 6000 CFM@0.50"c.a. Electricidad: 380V-3F-60Hz	1,530.00	1,530.00
	1 u	EC-S1-01 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 1340 CFM@0.40"c.a. Electricidad: 220V-1F-60Hz	562.00	562.00
	1 u	EC-S1-02 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 510 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
	1 u	EC-S1-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 310 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	234.00	234.00
	1 u	EC-1-01 EXTRACTOR CENTRIFUGO CON REJILLA INCORPORADA Marca: System Air / Soler&Palau o similar Caudal: 80 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
	1 u	EC-1-02 EXTRACTOR CENTRIFUGO CON REJILLA INCORPORADA Marca: System Air / Soler&Palau o similar Caudal: 80 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
	1 u	EC-1-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 140 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	133.00	133.00
	1 u	EC-1-04 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 240 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	223.00
	1 u	EC-1-05 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 170 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	146.00	146.00
	1 u	EC-1-06 EXTRACTOR CENTRIFUGO CON REJILLA INCORPORADA/HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 100 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
	1 u	EC-1-07 EXTRACTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 210 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	223.00
	1 u	EC-2-01 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 370 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	234.00	234.00
	1 u	EC-2-02 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 160 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	146.00	146.00

1 u	EC-2-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
1 u	EC-2-04 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-2-05 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-2-06 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 260 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	223.00
1 u	EC-2-07 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
3 u	EC-T2-01 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 370 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	233.00	699.00
3 u	EC-T2-02 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 160 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	146.00	438.00
3 u	EC-T2-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	741.00
3 u	EC-T2-04 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	1,077.00
3 u	EC-T2-05 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	1,077.00
3 u	EC-T2-06 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 260 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	669.00
3 u	EC-T2-07 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	741.00
1 u	EC-6-01 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 370 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	234.00	234.00
1 u	EC-6-02 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 160 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	146.00	146.00

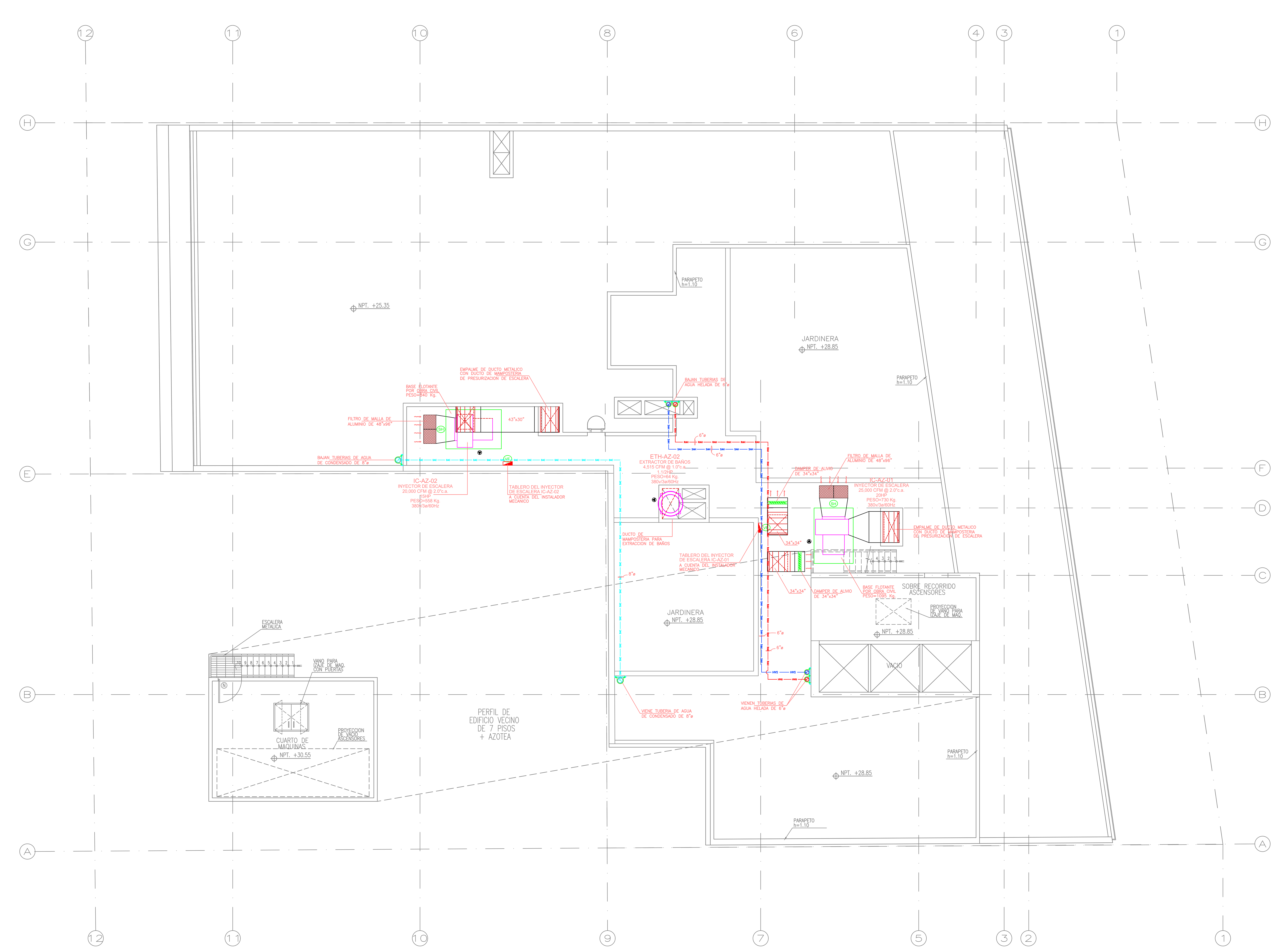
1 u	EC-6-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
1 u	EC-6-04 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-6-05 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-6-06 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 260 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	223.00
1 u	EC-6-07 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
1 u	EC-7-01 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 370 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	234.00	234.00
1 u	EC-7-02 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 160 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	146.00	146.00
1 u	EC-7-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
1 u	EC-7-04 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-7-05 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 600 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-7-06 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 260 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	223.00
1 u	EC-7-07 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 420 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
1 u	EC-AZ-01 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 370 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	234.00	234.00
1 u	EC-AZ-02 EXTRACTOR CENTRIFUGO EN LINEA Marca: System Air / Soler&Palau o similar Caudal: 2200 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	146.00	146.00

1 u	EC-AZ-03 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 460 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	247.00	247.00
1 u	EC-AZ-04 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 530 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	359.00	359.00
1 u	EC-AZ-05 EXTRACTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 260 CFM@0.30"c.a. Electricidad: 220V-1F-60Hz	223.00	223.00
1 u	ETH-AZ-01 EXTRACTOR CENTRIFUGO HONGO Marca: System Air / Soler&Palau o similar Caudal: 7300 CFM@1"c.a. Electricidad: 380V-3F-60Hz	1,863.00	1,863.00
1 u	ETH-AZ-02 EXTRACTOR CENTRIFUGO HONGO Marca: System Air / Soler&Palau o similar Caudal: 4515 CFM@1"c.a. Electricidad: 380V-3F-60Hz	1,260.00	1,260.00
1 u	IC-S6-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 55 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
3 u	IC-T1-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 55 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	384.00
1 u	IC-S2-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 55 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
1 u	IC-S1-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 55 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
1 u	IC-1-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 315 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	256.00	256.00
1 u	IC-2-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 135 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	171.00	171.00
3 u	IC-T2-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 135 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	171.00	513.00
1 u	IC-6-01 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 135 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	171.00	171.00
1 u	IC-7-01 INYECTOR CENTRIFUGO EN GABINETE Marca: System Air / Soler&Palau o similar Caudal: 135 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	171.00	171.00

	1 u	IC-AZ-01 INYECTOR CENTRIFUGO EN LINEA Marca: System Air / Soler&Palau o similar Caudal: 2200 CFM@0.60"c.a. Electricidad: 380V-3F-60Hz	803.00	803.00
	1 u	IC-AZ-02 INYECTOR CENTRIFUGO EN GABINETE/HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 170 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	214.00	214.00
	1 u	IC-AZ-03 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 75 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
	1 u	IC-AZ-04 INYECTOR CENTRIFUGO EN GABINETE/ HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 65 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
	1 u	IC-AZ-05 INYECTOR CENTRIFUGO EN GABINETE/HELICOCENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 120 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	171.00	171.00
	1 u	IC-AZ-06 INYECTOR CENTRIFUGO EN GABINETE/HELICENTRIFUGO Marca: System Air / Soler&Palau o similar Caudal: 40 CFM@0.35"c.a. Electricidad: 220V-1F-60Hz	128.00	128.00
	10 u	Damper cortafuego cortahumo motorizado ON-OFF de 14"x6"	209.00	2,090.00
	5 u	Damper cortafuego cortahumo motorizado ON-OFF de 12"x9"	250.00	1,250.00
	1 u	Damper cortafuego cortahumo motorizado ON-OFF de 12"x8"	209.00	209.00
	11 u	Damper cortafuego cortahumo motorizado ON-OFF de 12"x6"	209.00	2,299.00
	8 u	Damper cortafuego cortahumo motorizado ON-OFF de 12"x5"	209.00	1,672.00
	6 u	Damper cortafuego cortahumo motorizado ON-OFF de 10"x8"	209.00	1,254.00
	6 u	Damper cortafuego cortahumo motorizado ON-OFF de 10"x4"	184.00	1,104.00
	3 u	Damper cortafuego cortahumo motorizado ON-OFF de 8"x5"	184.00	552.00
	2 u	Damper cortafuego cortahumo motorizado ON-OFF de 8"x4"	184.00	368.00
	5 u	Damper cortafuego cortahumo motorizado ON-OFF de 8"x6"	184.00	920.00
	1 u	Damper cortafuego cortahumo motorizado ON-OFF de 18"x16"	250.00	250.00
			Sub total US$	**118,144.00**
			IGV (18%) US$	21,265.92
			Total US$	**139,409.92**

MALCOLM FORD D.
DIRECTOR GERENTE

8.2. Planos



CUARTO DE MAQUINAS

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

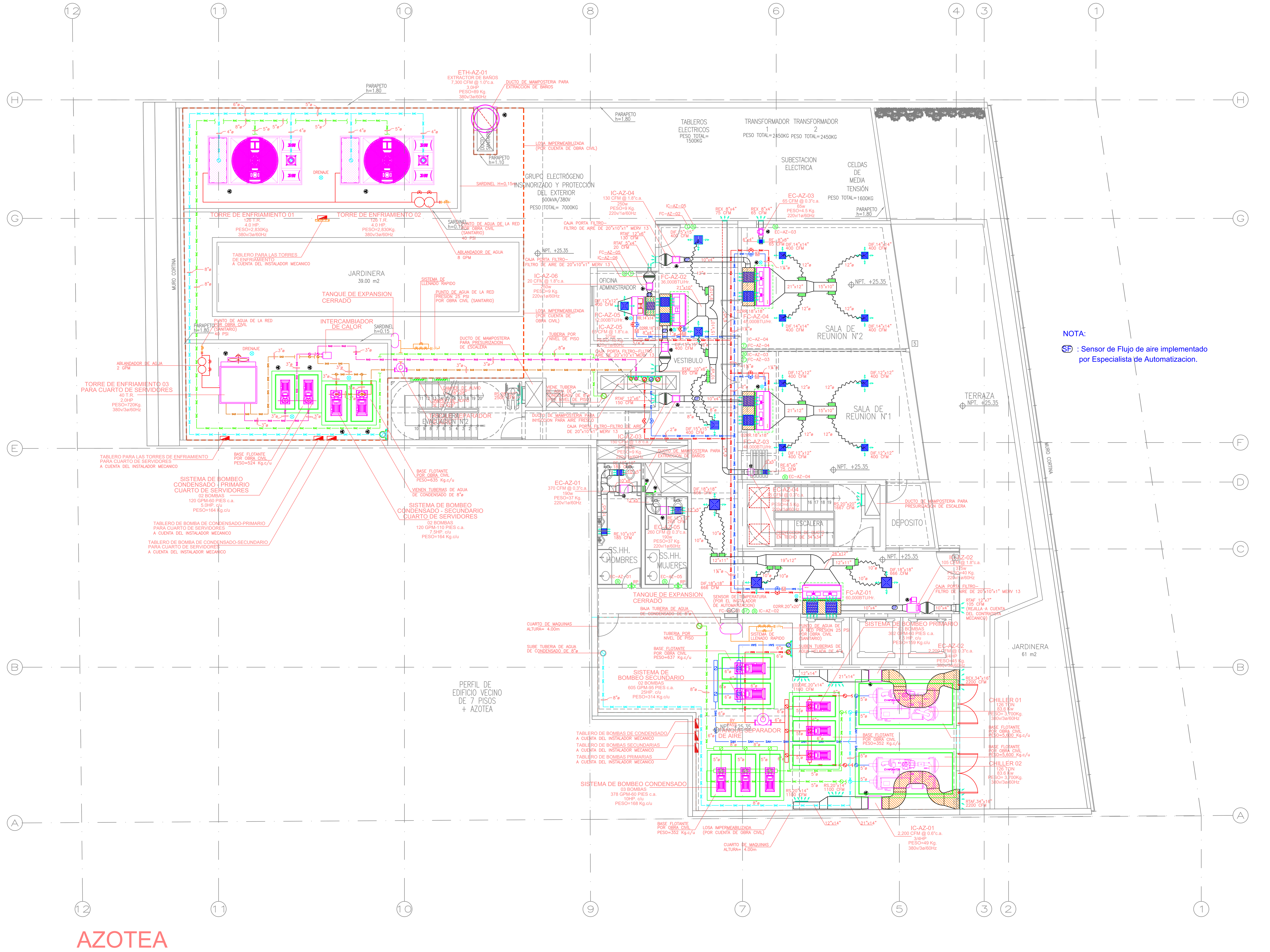
PLANO:

CUARTO DE MAQUINAS

INGENIERO RESPONSABLE:

MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:	LÁMINA:
05 AGOSTO 2014	IM-01
ESCALA: 1:75	01 DE 23



REFRICORP

Av. Piura 868 - Miraflores - Telf. 241-0833 241-0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

AZOTEA

INGENIERO RESPONSABLE:

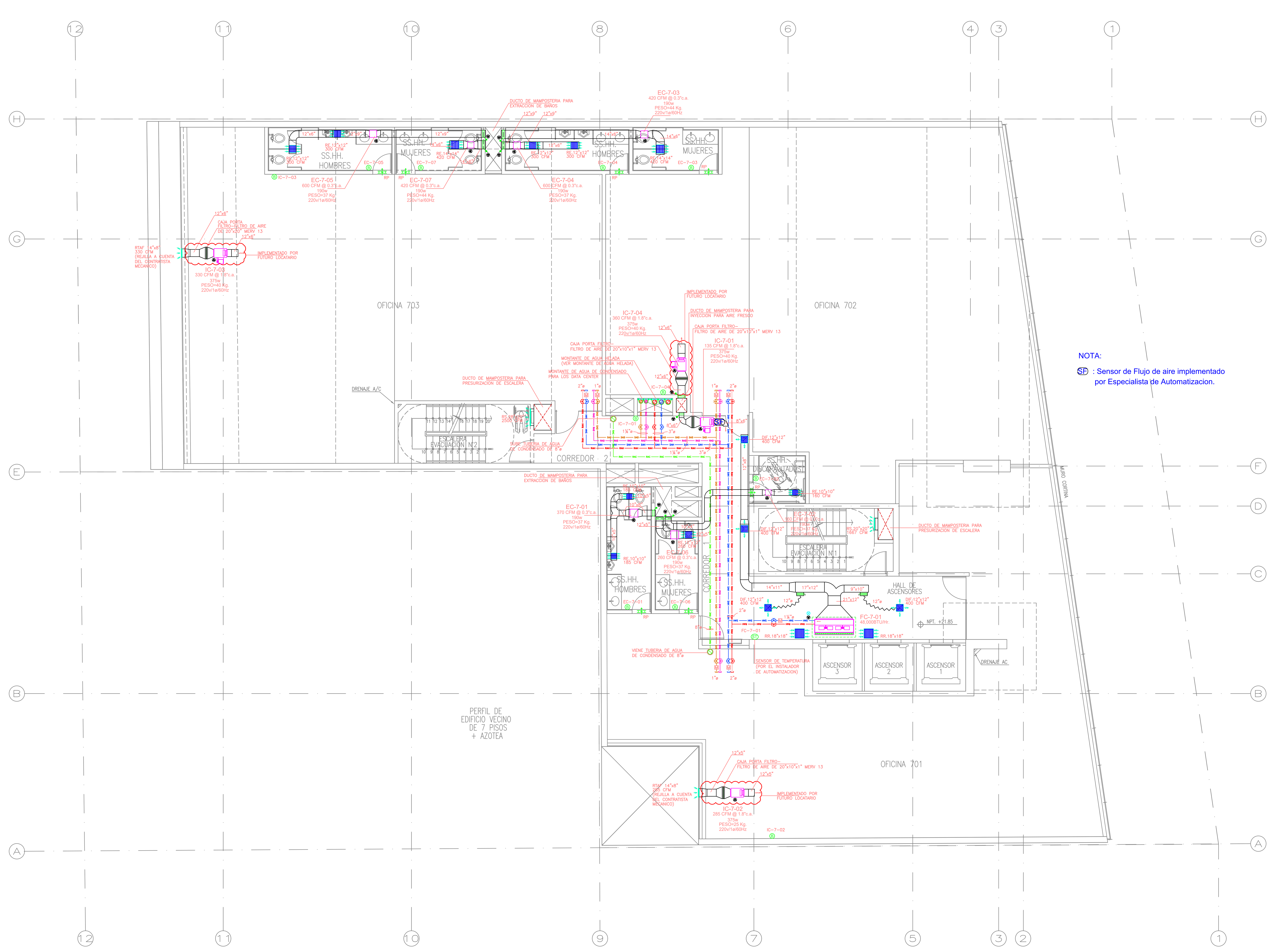
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

LAMINA: IM-02

ESCALA: 1:75

02 DE 23



PLANTA 7º PISO

REFRICORP

Av. Piura 868 – Miraflores – Telf. 241-0833 241-0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
PLANTA 7º PISO

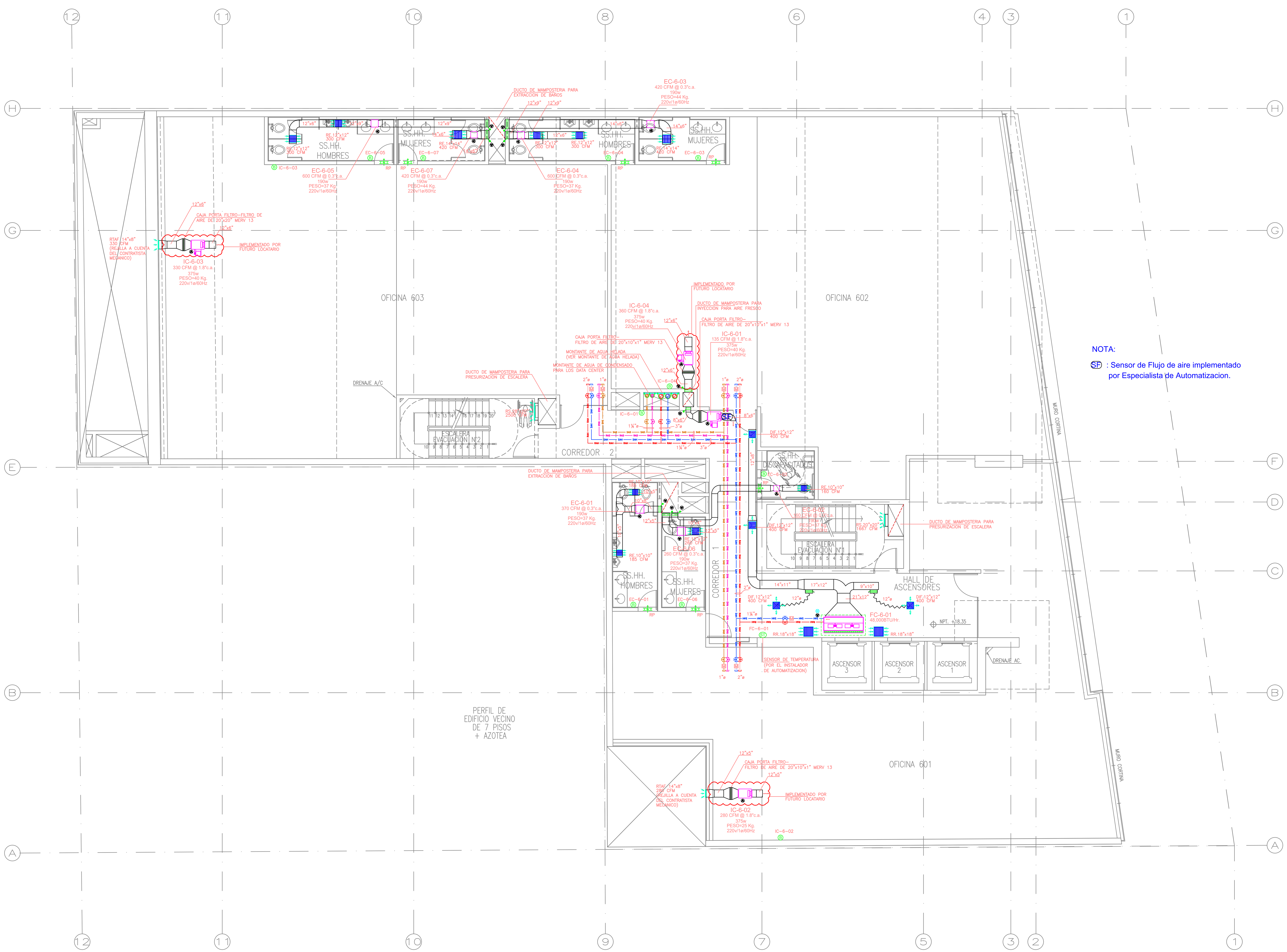
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LÁMINA: IM-03

03 DE 23



NOTA:

SF : Sensor de Flujo de aire implementado por Especialista de Automatizacion.

PLANTA 6º PISO

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241-0833 241-0259

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

PLANTA 6º PISO

INGENIERO RESPONSABLE:

MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:

05 AGOSTO 2014

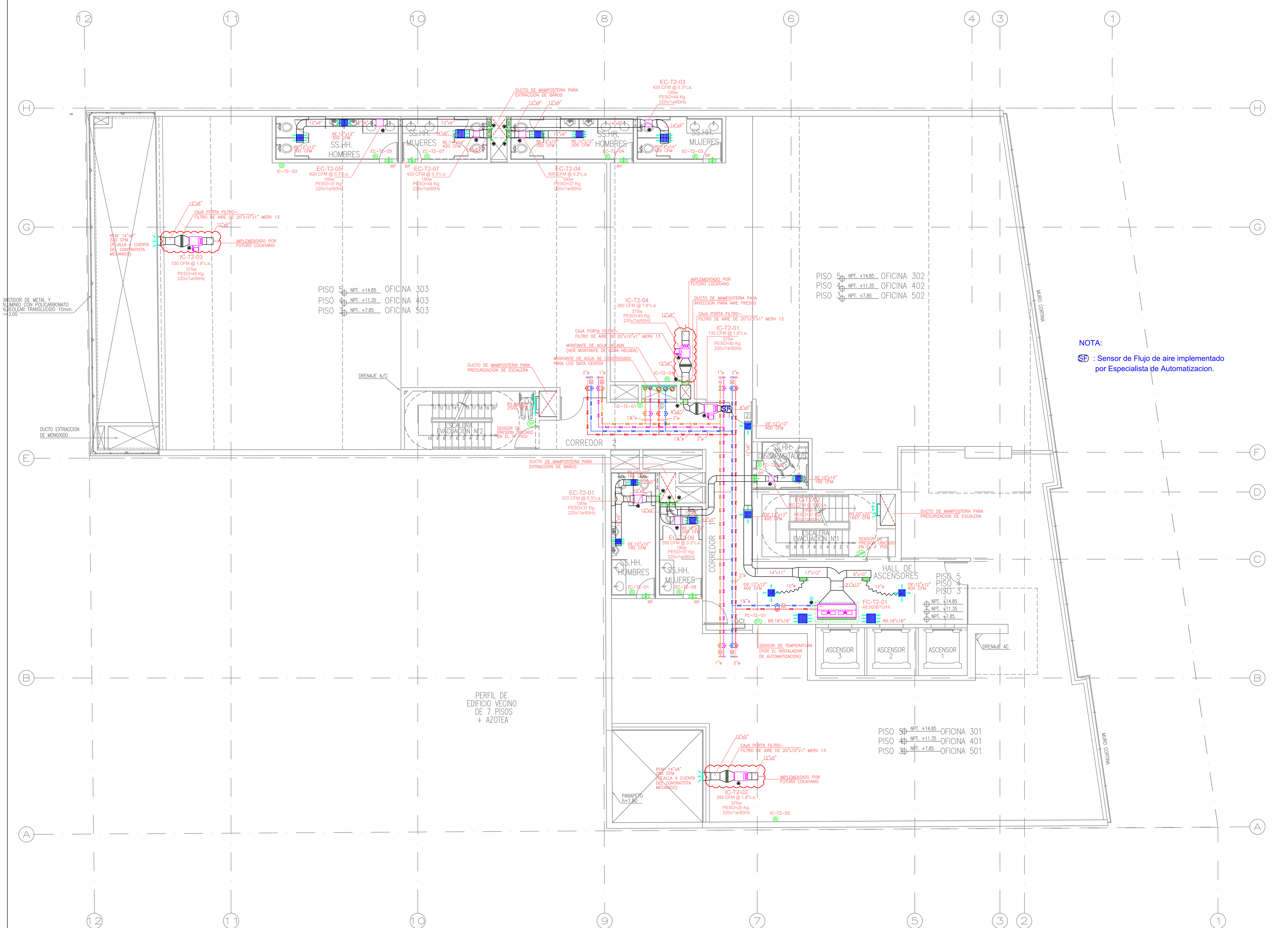
ESCALA:

1:75

LAMINA:

IM-04

04 DE 23



PLANTA TIPICA 3º AL 5º PISO

REFRICORP

PROYECTO: SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO: EDIFICIO EMPRESARIAL SANTA CRUZ

PROPIETARIO: SAN MIGUEL INMOBILIARIA S.A.C.

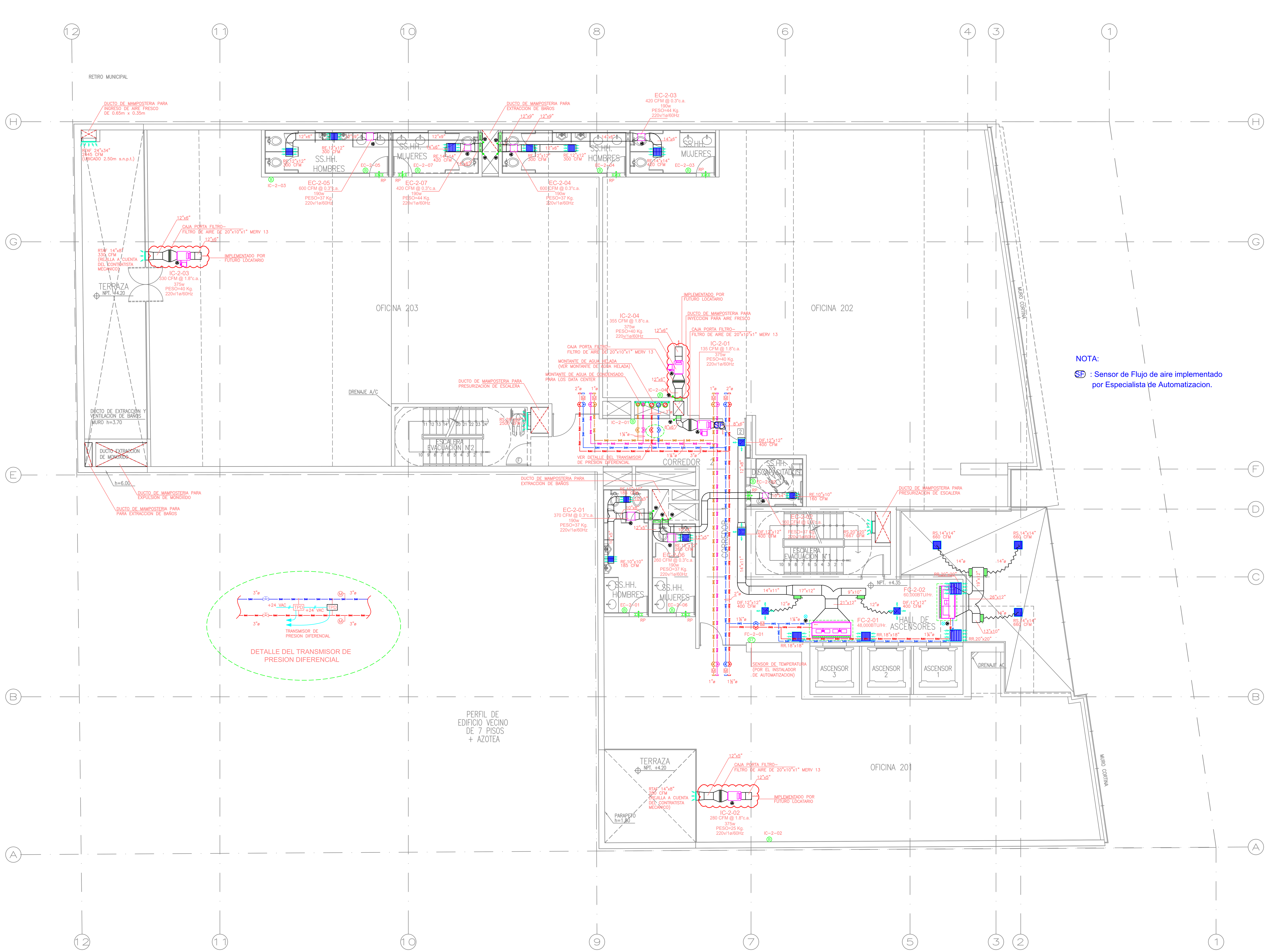
PLANO: PLANTA TIPICA 3º AL 5º PISO

INGENIERO RESPONSABLE: MANUEL AZAHUANCHE ASMAT C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LAMINA: IM-05



PLANTA 2º PISO

REFRICORP

Av. Flora 868 – Miraflores – Telf: 241-0833 241-0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
PLANTA 2º PISO

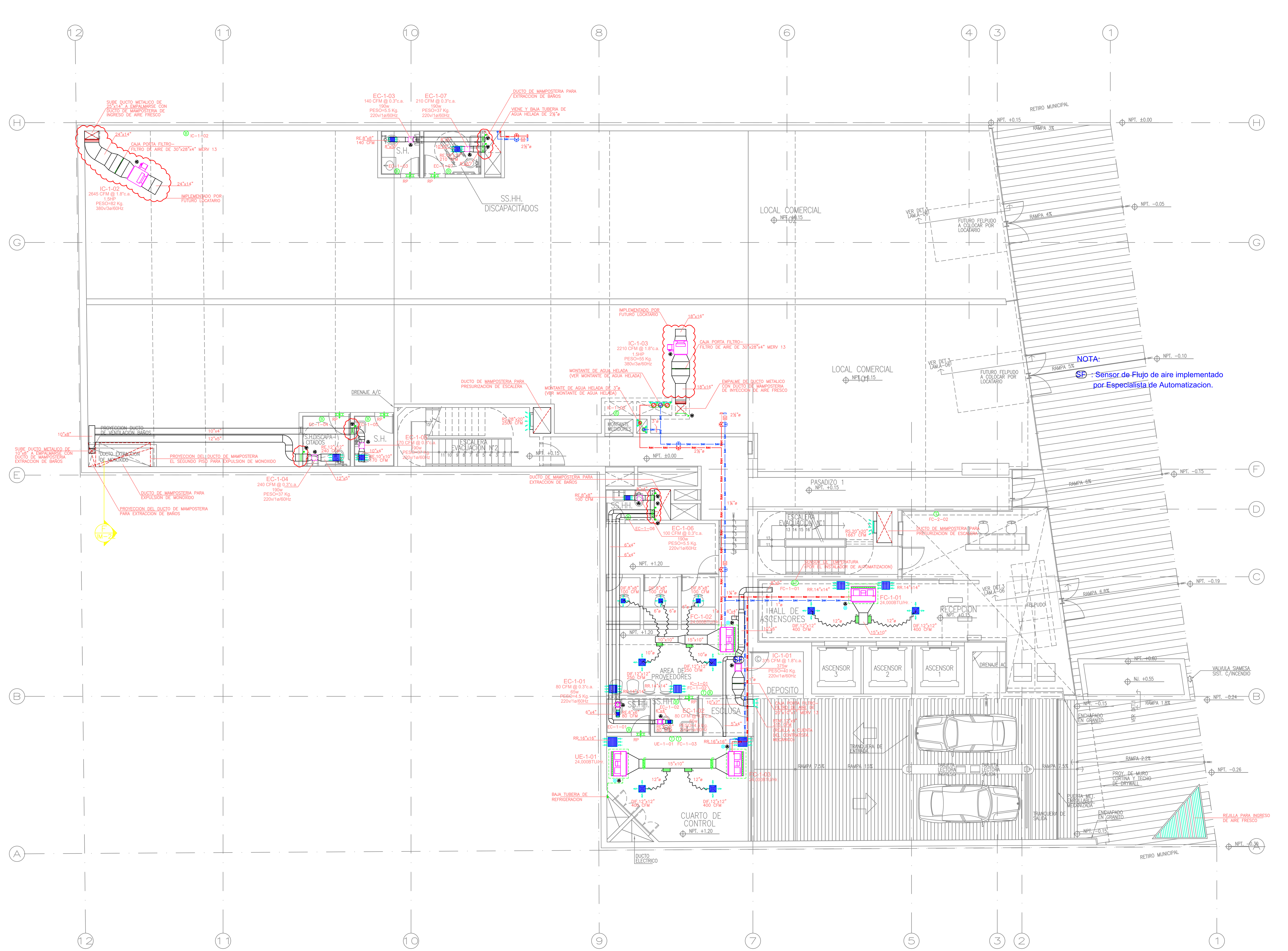
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

LAMINA: IM-06

ESCALA: 1:75

06 DE 23



PLANTA 1º PISO

REFRICORP

Av. Pardo 868 – Miraflores – Telf: 241-0833 241-0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
PLANTA 1º PISO

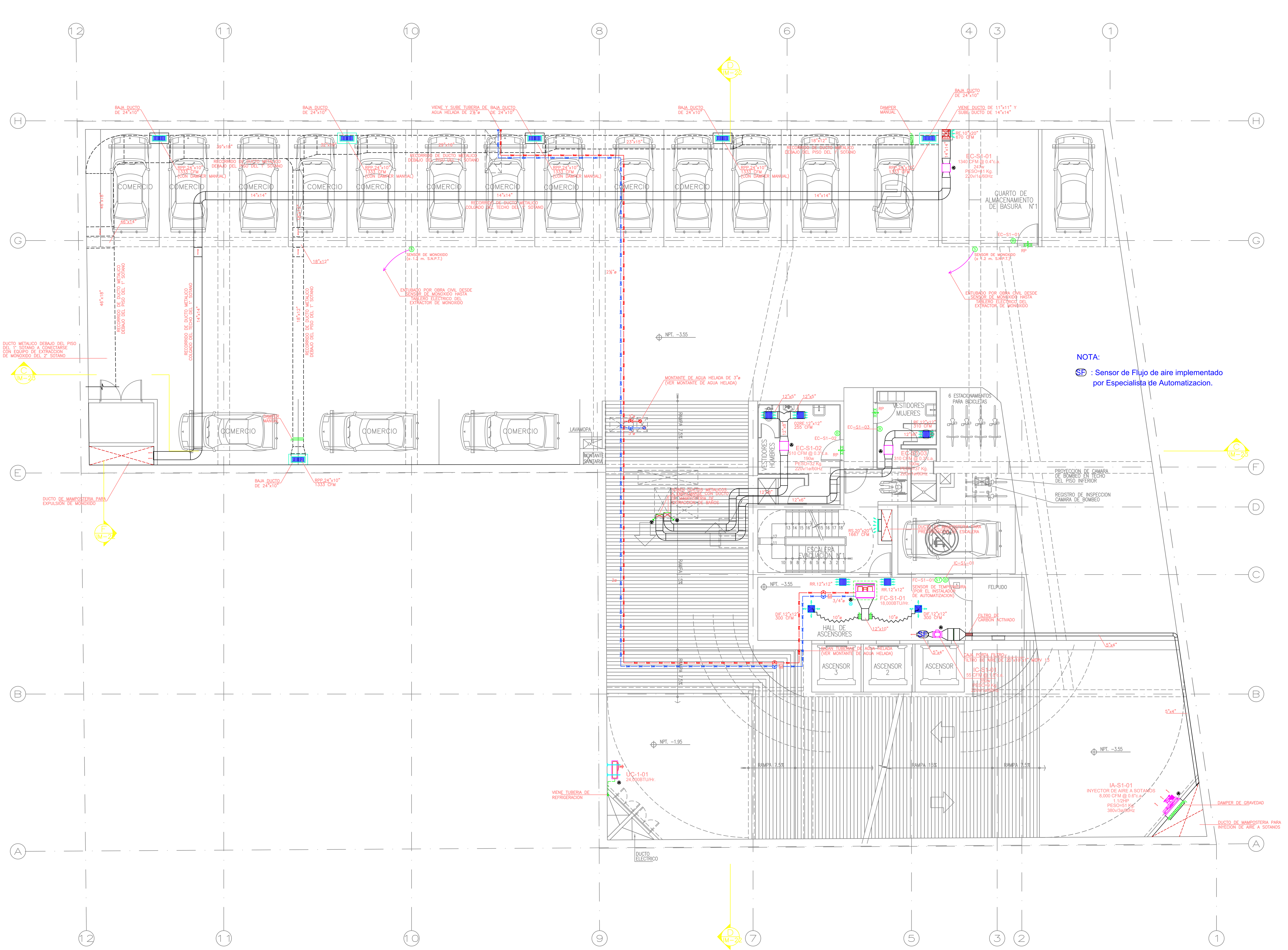
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LAMINA: IM-07

07 DE 23



PLANTA SOTANO 1º

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

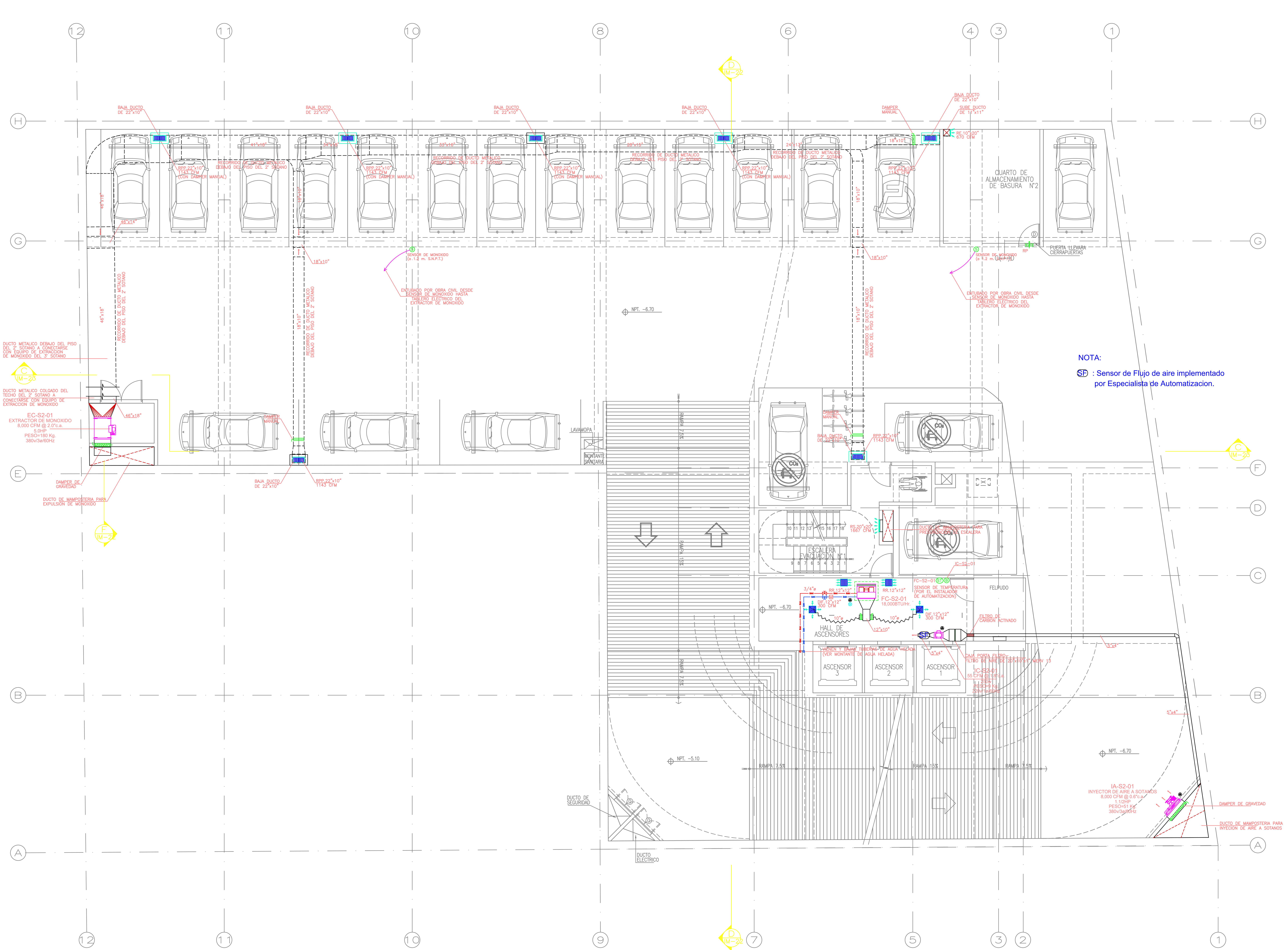
PLANO:

PLANTA SOTANO 1º

INGENIERO RESPONSABLE:

MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:	LÁMINA:
05 AGOSTO 2014	IM-08
ESCALA: 1:75	08 DE 23



PLANTA SOTANO 2º

REFRICORP

Av. Piura 888 - Miraflores - Telf: 241-0833 241-0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

PLANTA SOTANO 2º

INGENIERO RESPONSABLE:

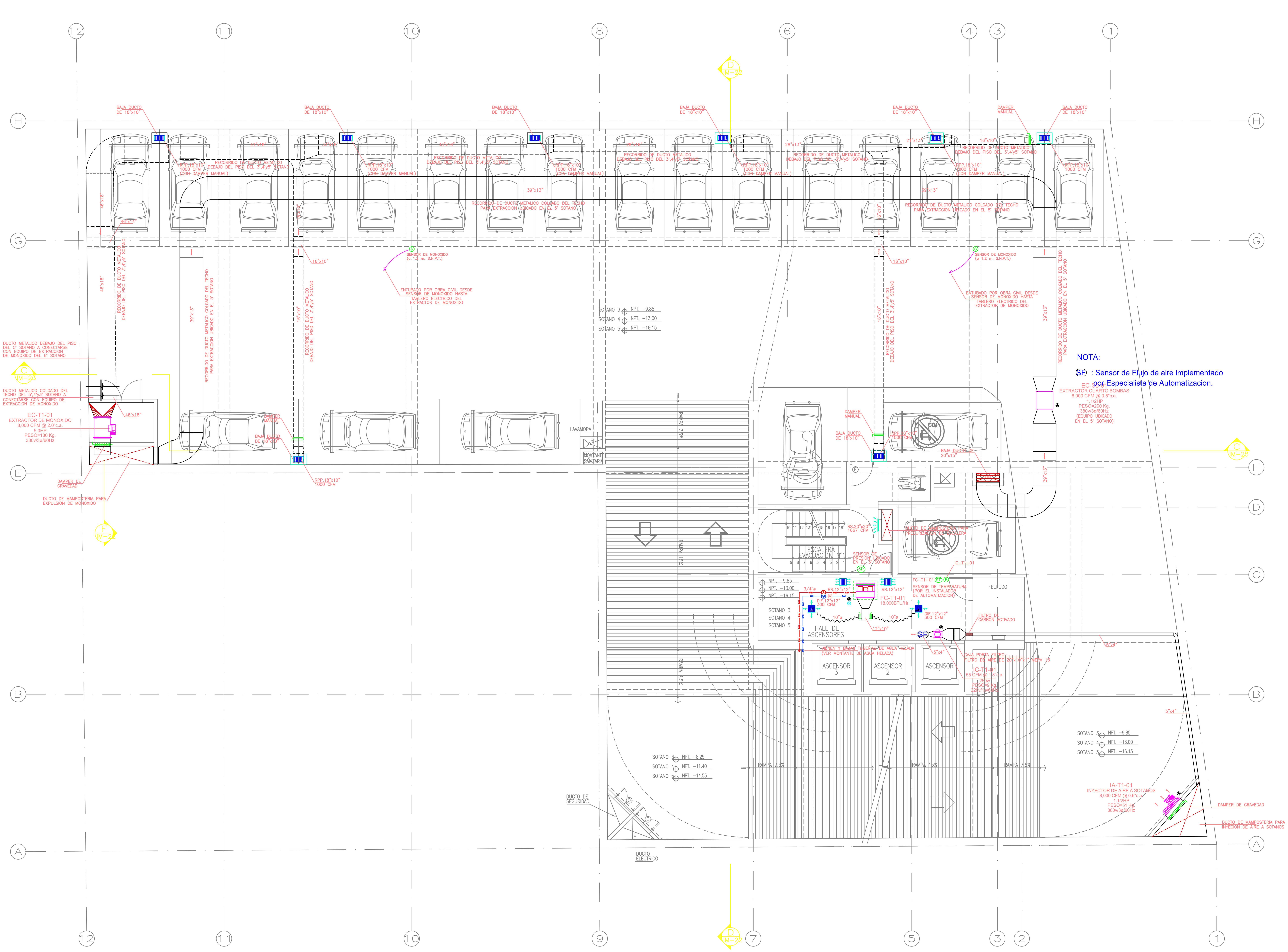
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

LAMINA: IM-09

ESCALA: 1:75

09 DE 23



PLANTA TIPICA SOTANOS 3º AL 5º

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
PLANTA TIPICA SOTANOS 3º AL 5º

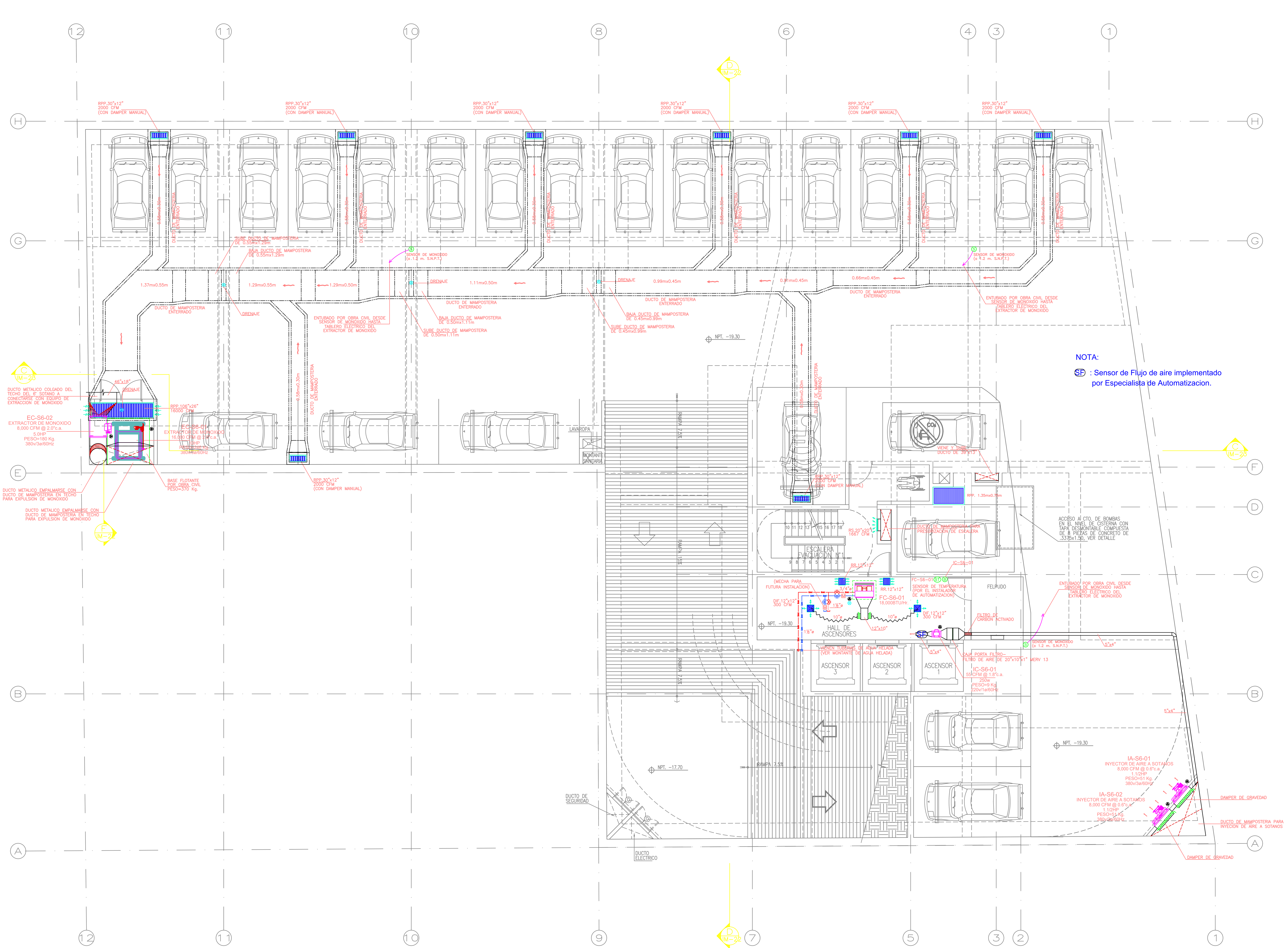
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LÁMINA: IM-10

10 DE 23



PLANTA SOTANO 6º

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

PLANTA SOTANO 6º

INGENIERO RESPONSABLE:

MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:

05 AGOSTO 2014

ESCALA:

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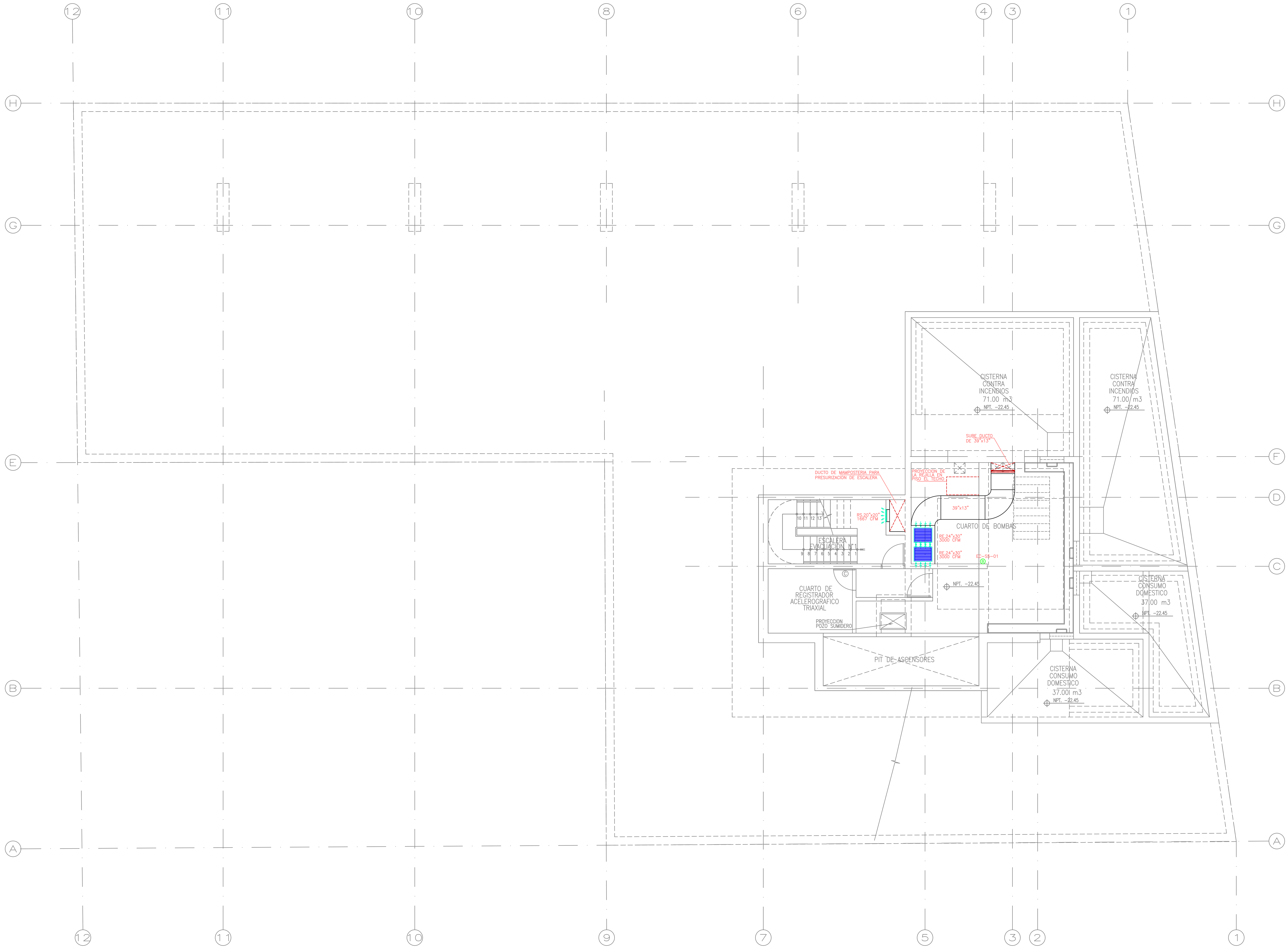
LÁMINA:

IM-11

11 DE 23



NIVEL CISTERNA

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

NIVEL CISTERNA

INGENIERO RESPONSABLE:

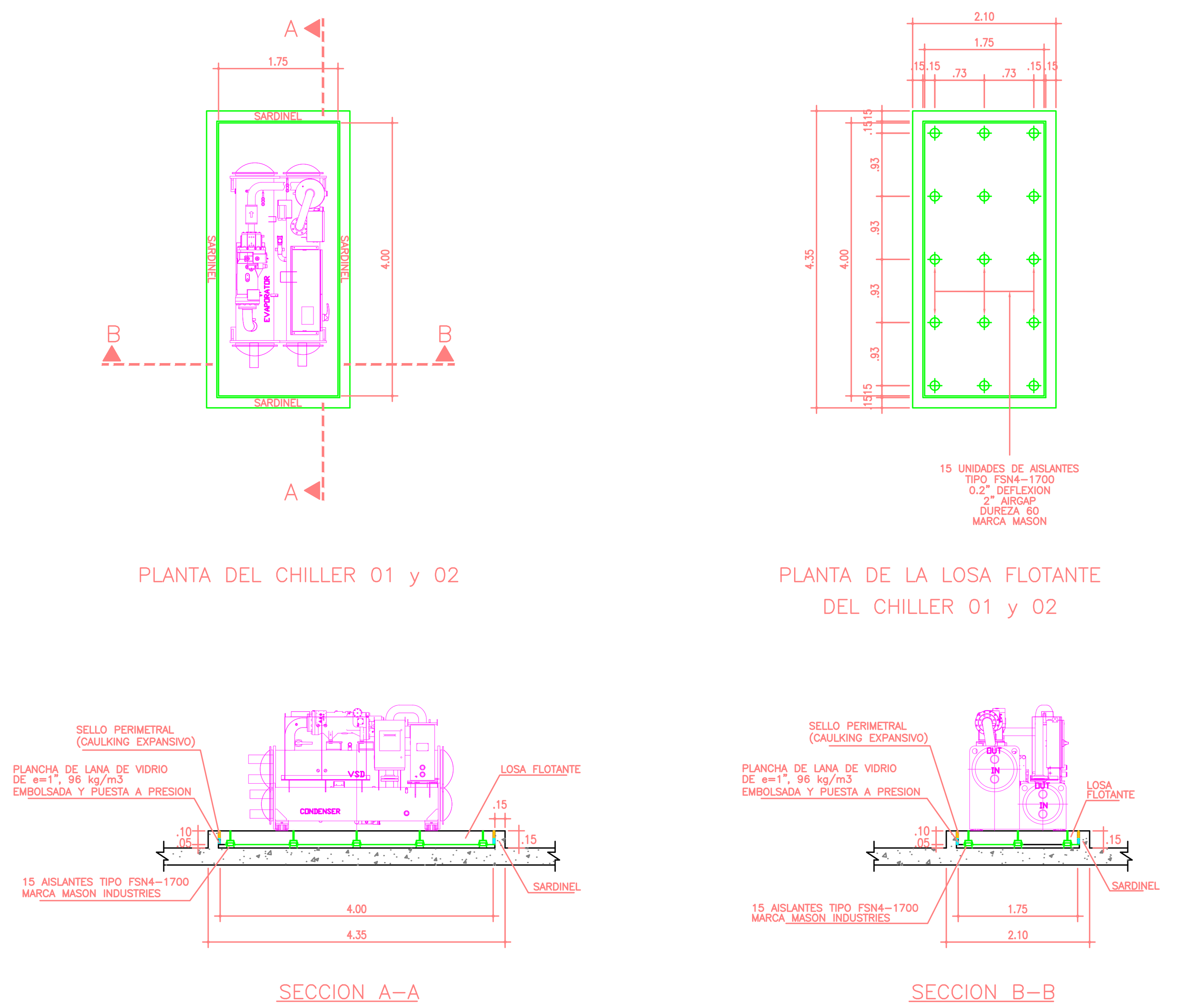
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

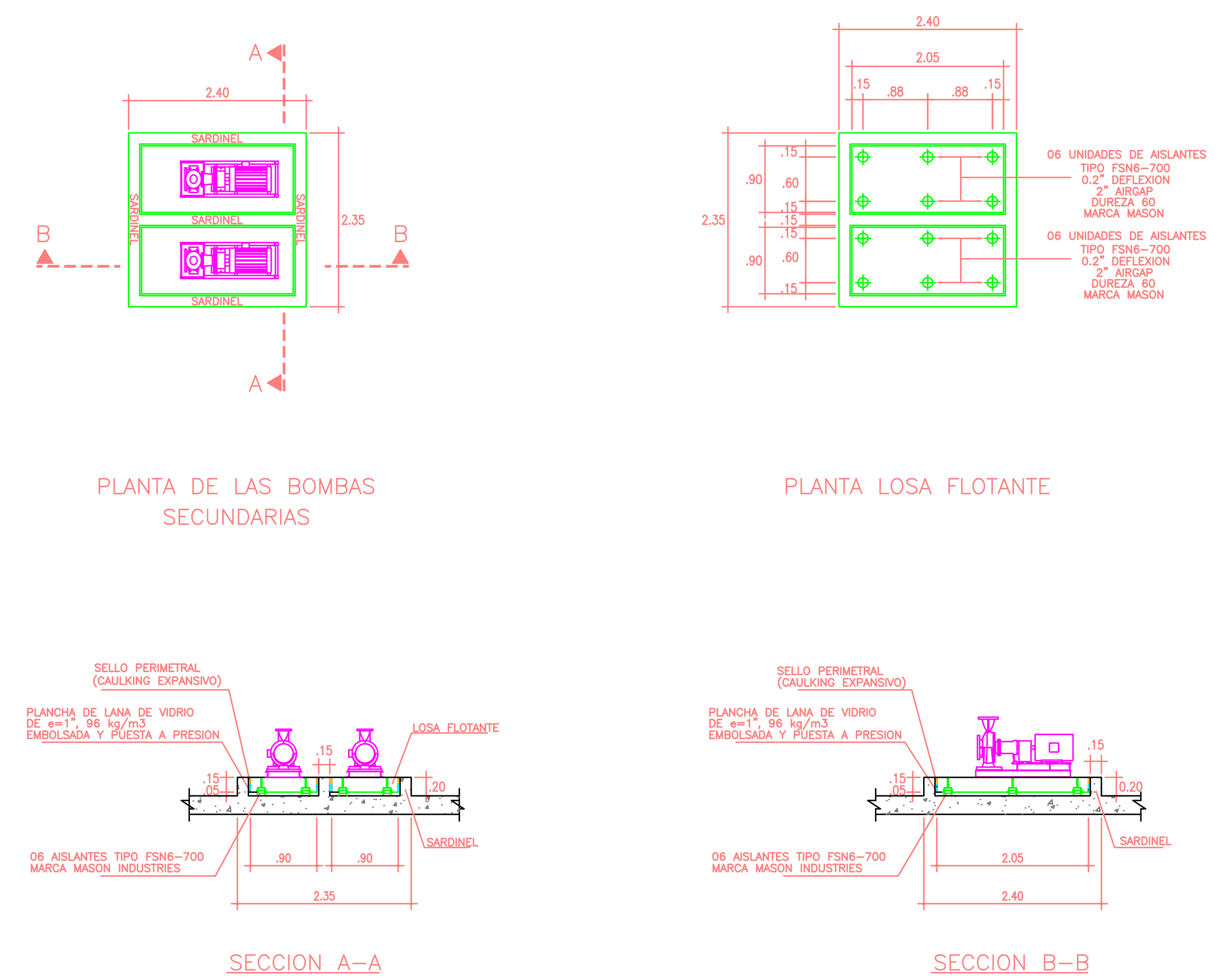
LÁMINA: IM-12

12 DE 23



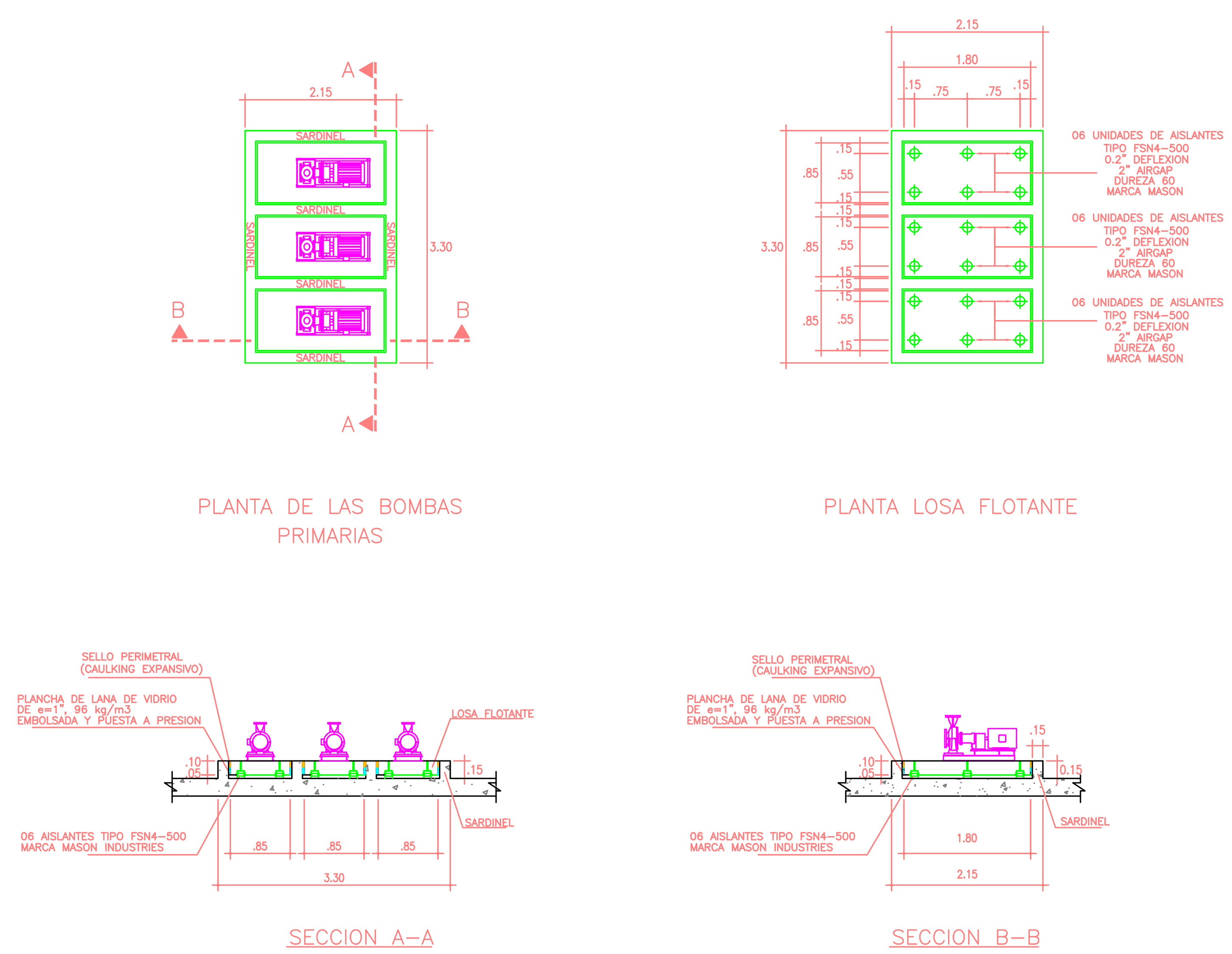
NOTA:
– LAS DIMENSIONES EXPRESADAS EN METROS.

DETALLE DE LOSA FLOTANTE PARA EL CHILLER 01 y 02
SUMINISTRADA POR OBRA CIVIL O PROPIETARIO



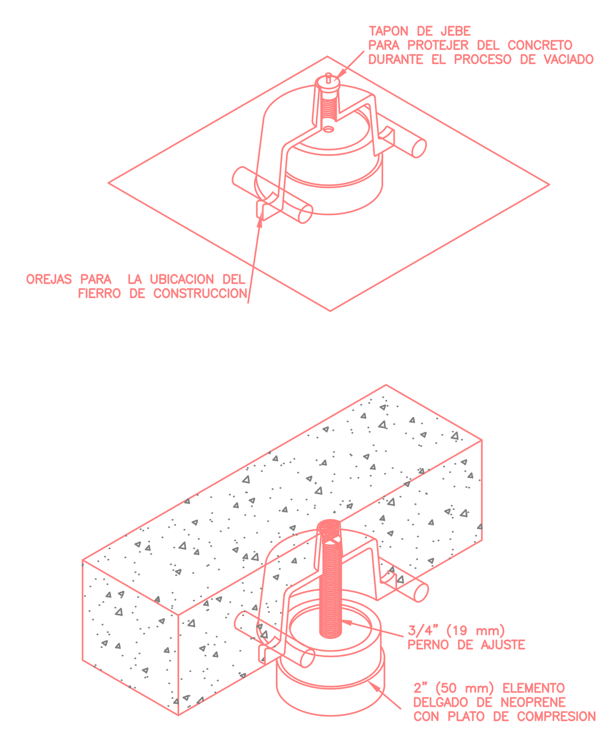
NOTA:
– LAS DIMENSIONES EXPRESADAS EN METROS.

DETALLE DE LOSA FLOTANTE DE LAS BOMBAS SECUNDARIAS
SUMINISTRADA POR OBRA CIVIL O PROPIETARIO



NOTA:
– LAS DIMENSIONES EXPRESADAS EN METROS.

DETALLE DE LOSA FLOTANTE DE LAS BOMBAS PRIMARIAS
SUMINISTRADA POR OBRA CIVIL O PROPIETARIO



FSN
MONTAJE DEL ELEMENTO MASON
S/E

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
BASES FLOTANTES CHILLERS Y BOMBAS

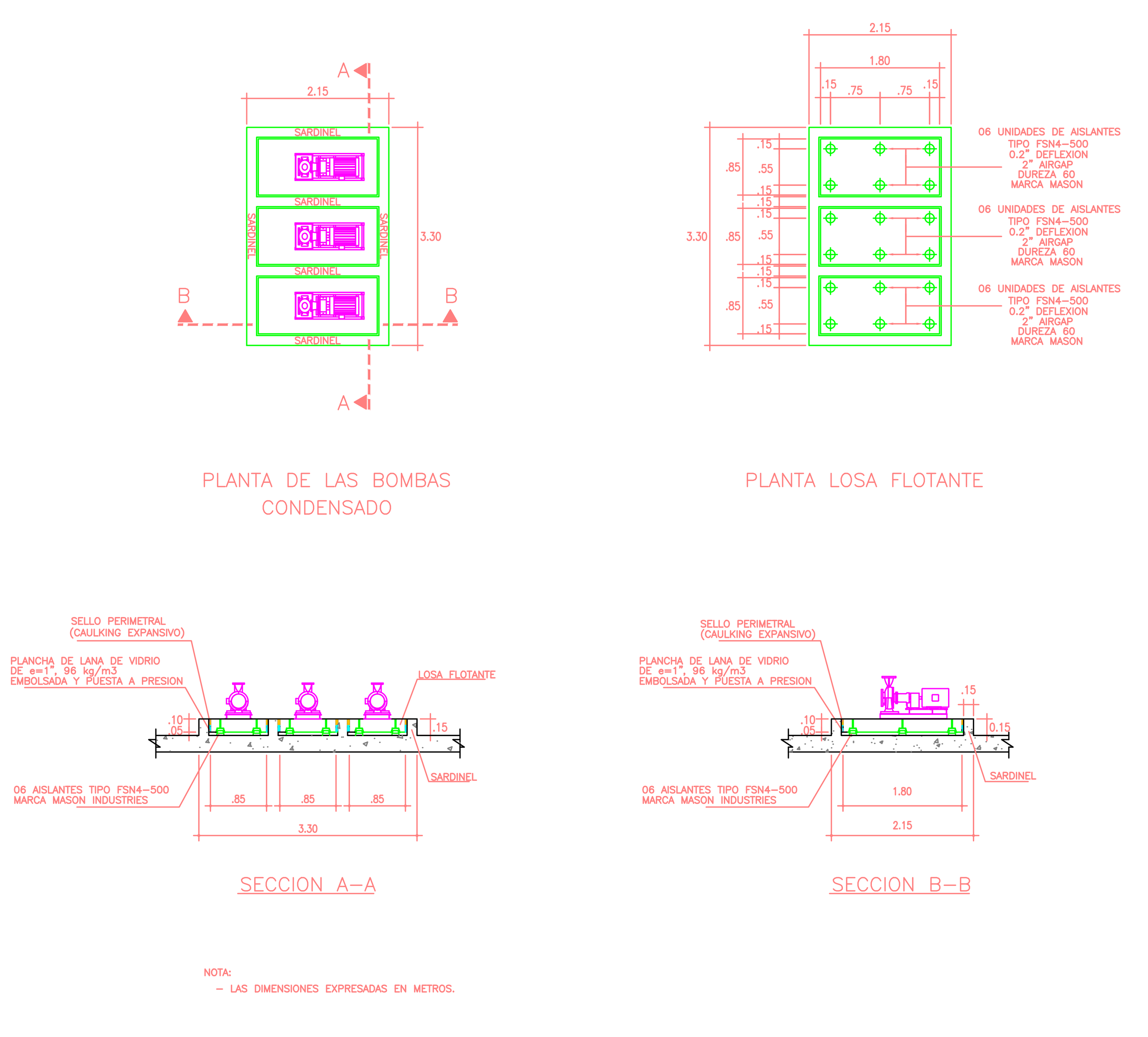
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

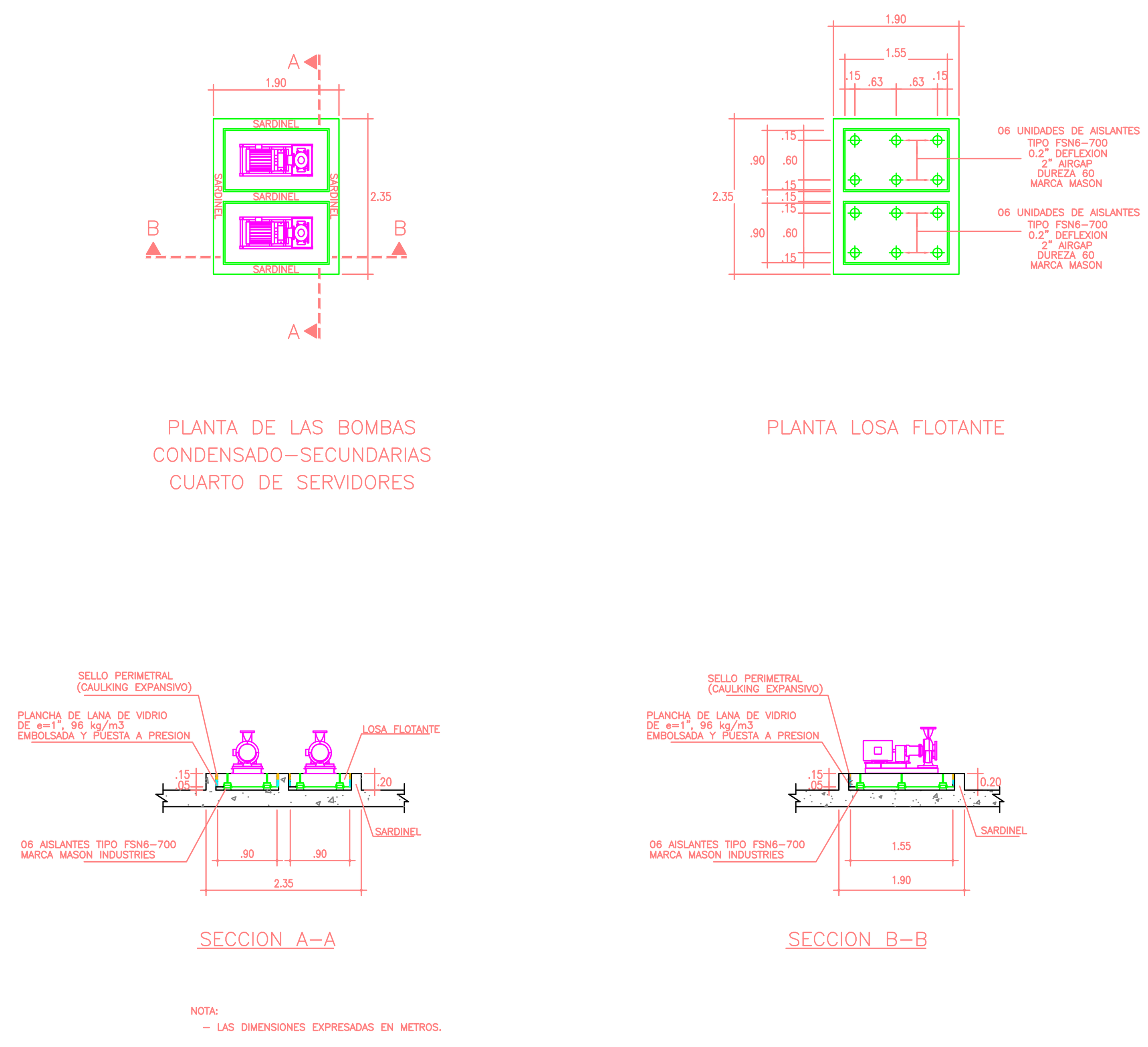
LÁMINA: IM-13

13 DE 23



DETALLE DE LOSA FLOTANTE DE LAS BOMBAS CONDENSADO

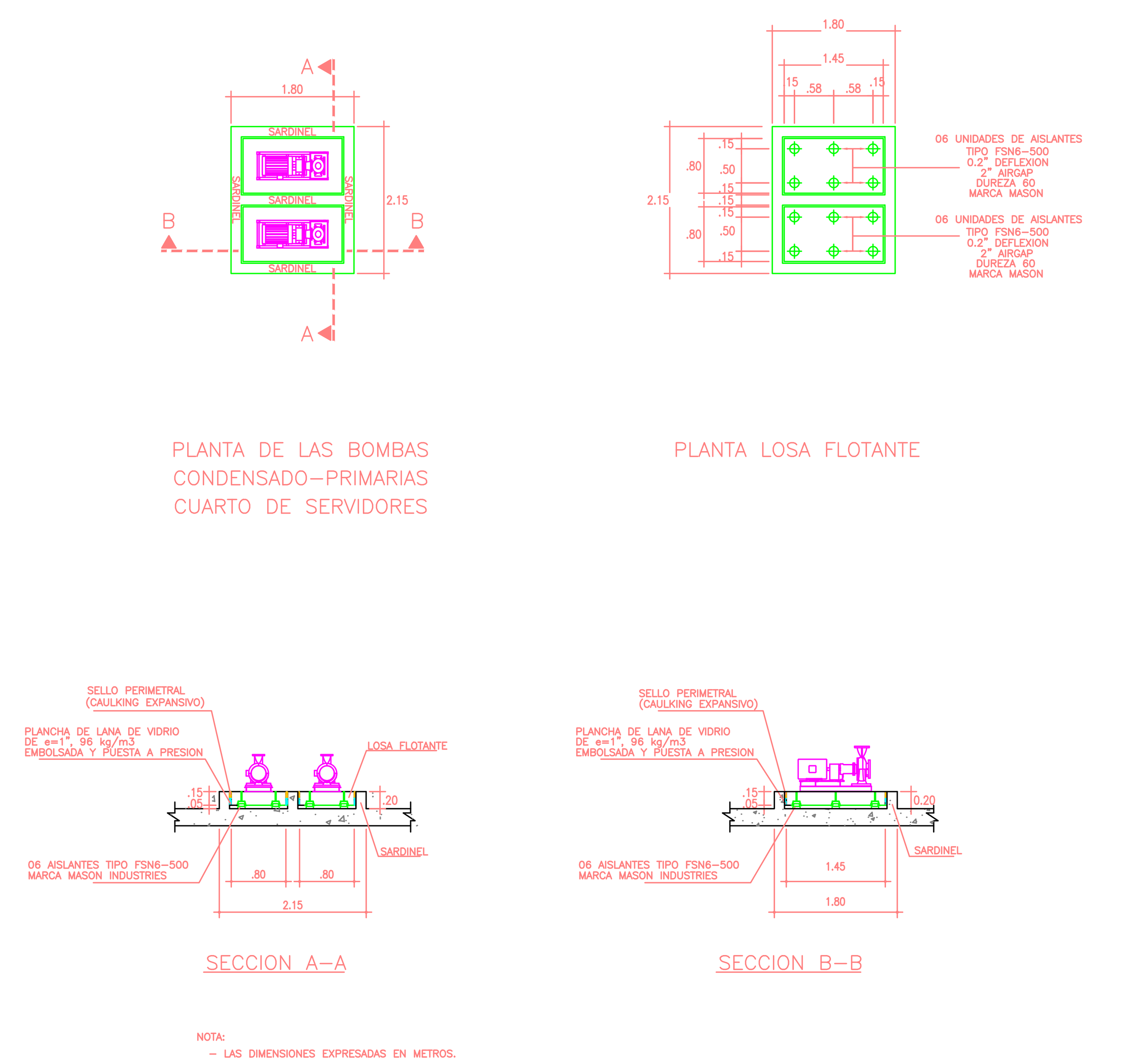
SUMINISTRADA POR OBRA CIVIL O PROPIETARIO



DETALLE DE LOSA FLOTANTE DE LAS BOMBAS CONDENSADO

SECUNDARIAS-CUARTO DE SERVIDORES

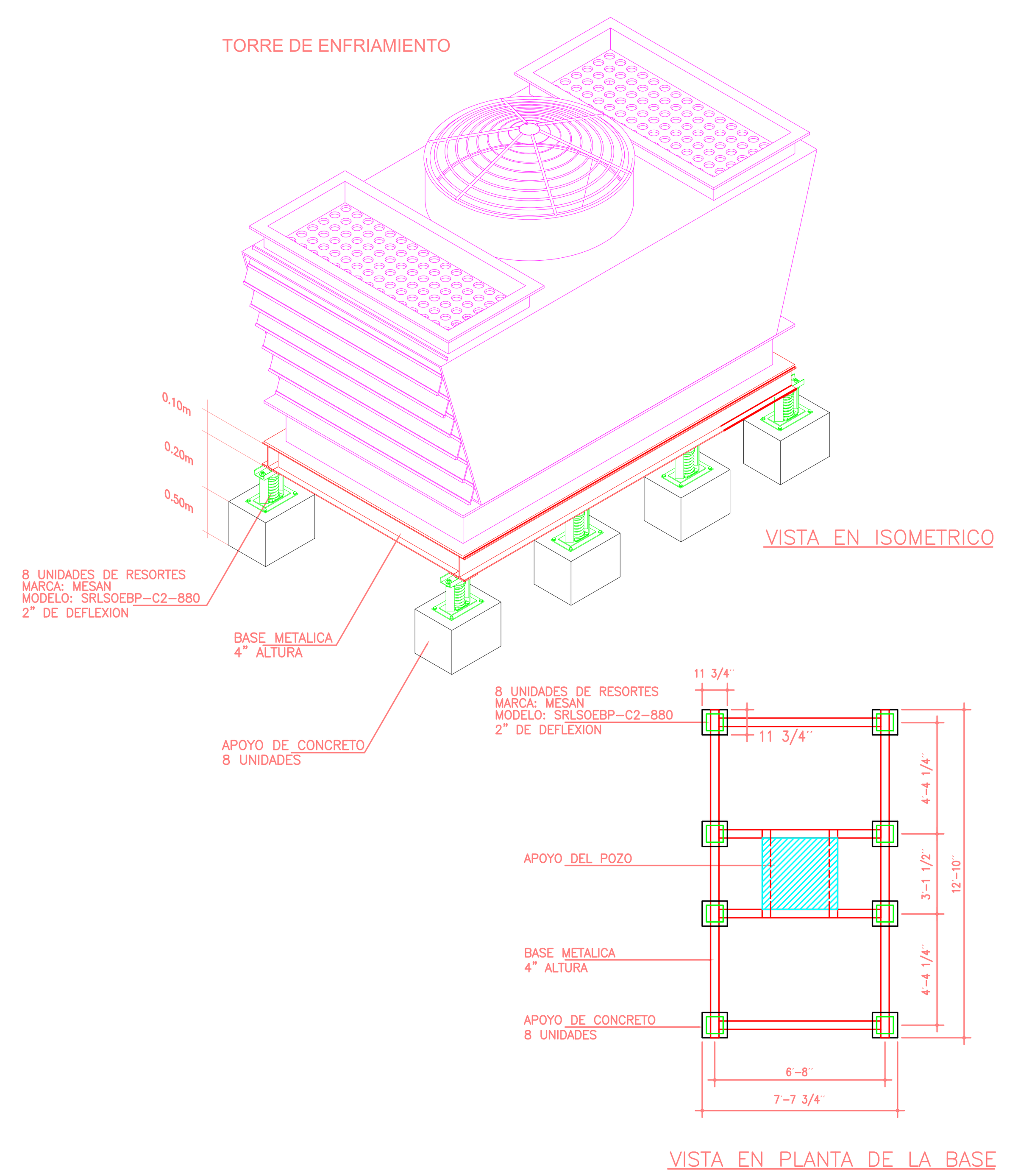
SUMINISTRADA POR OBRA CIVIL O PROPIETARIO



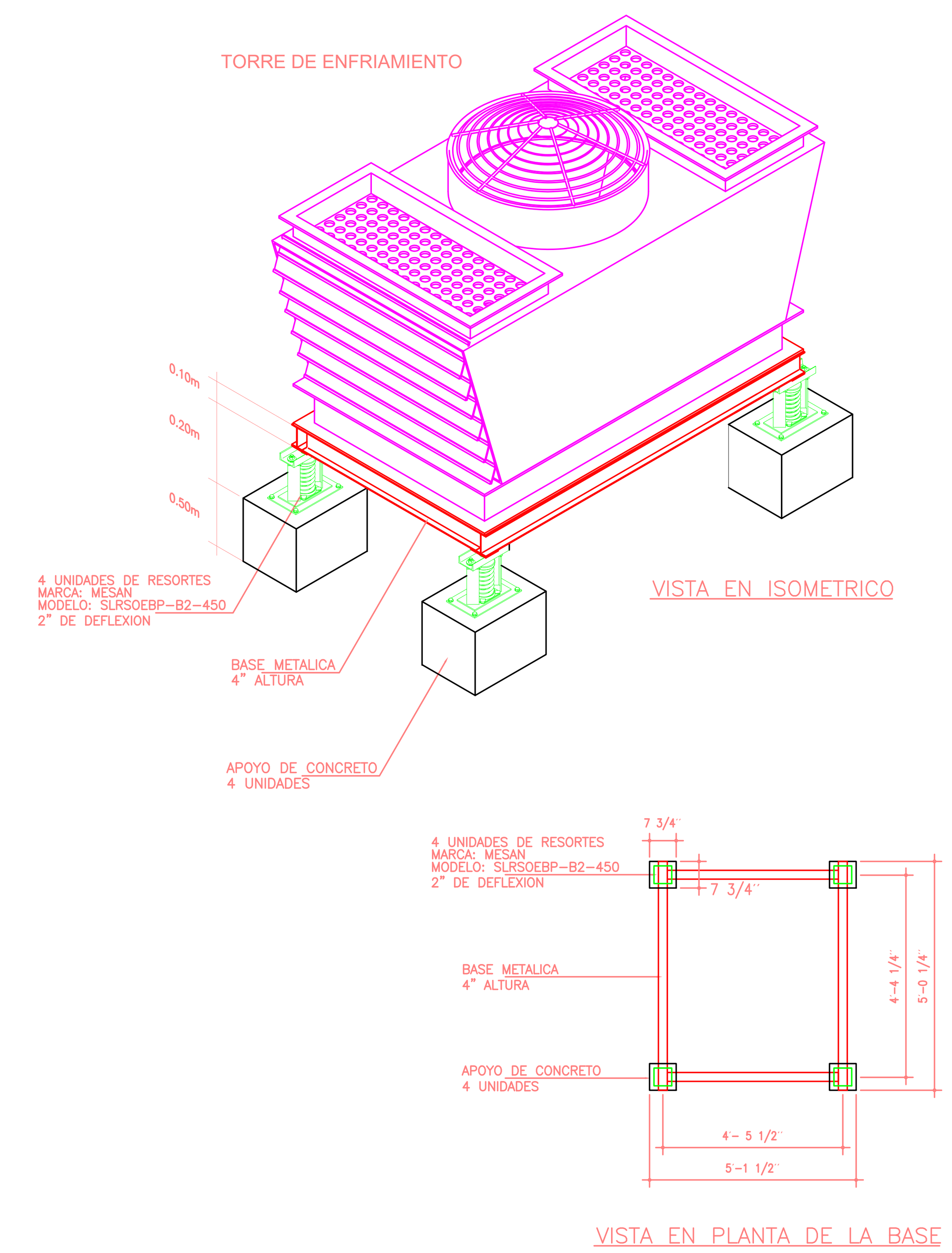
DETALLE DE LOSA FLOTANTE DE LAS BOMBAS CONDENSADO

PRIMARIAS-CUARTO DE SERVIDORES

SUMINISTRADA POR OBRA CIVIL O PROPIETARIO



BASE PARA LA TORRES DE ENFRIAMIENTO DE 126 TON



BASE PARA LA TORRES DE ENFRIAMIENTO DE 40 TON

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
BASES FLOTANTES BOMBAS

INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

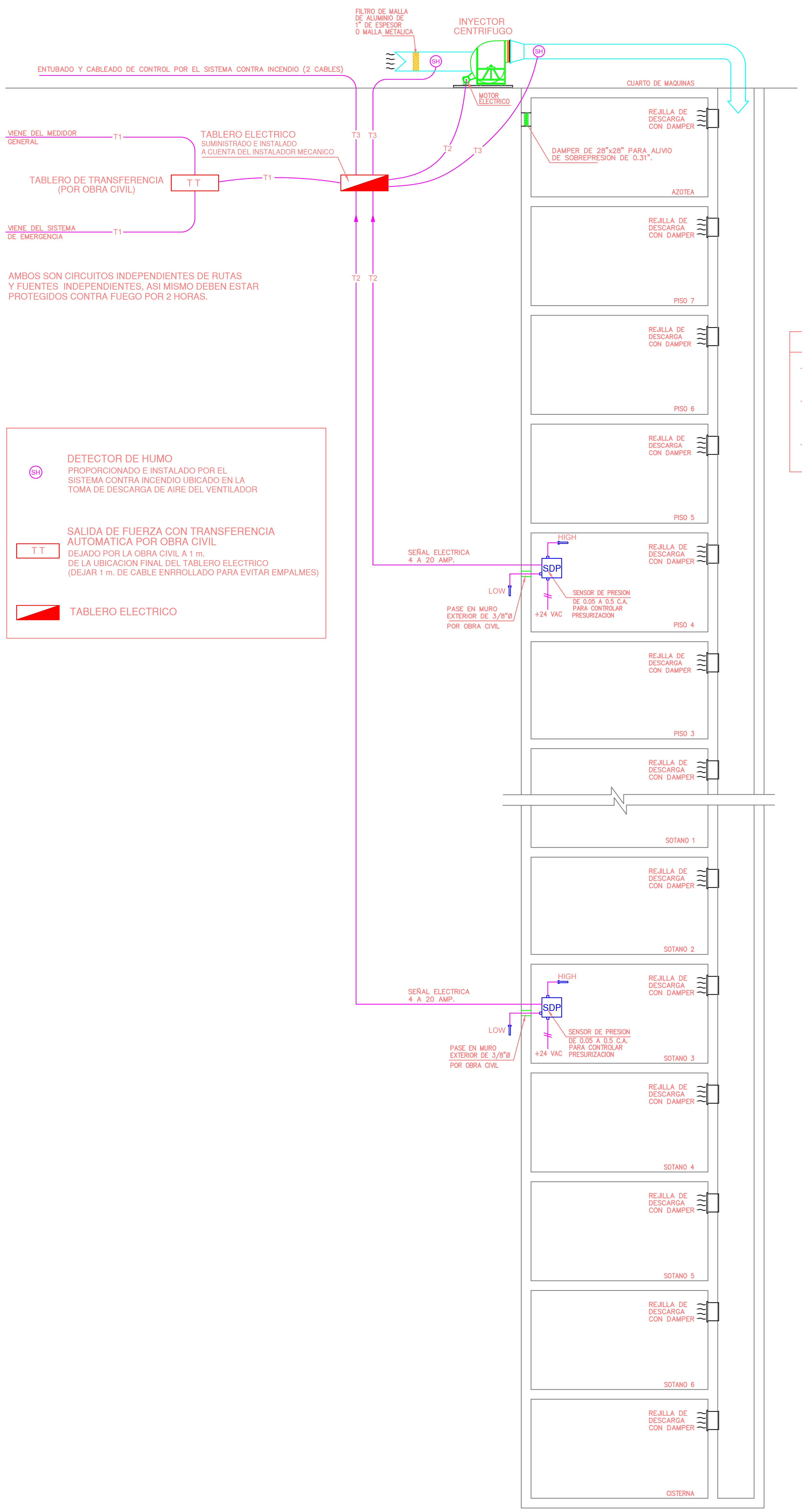
ESCALA: 1:75

LÁMINA: IM-14

14 DE 23

PRESURIZACION DE ESCALERAS N°1 - IC-AZ-01
ESQUEMA DE PRINCIPIO

BASADO EN LA NORMA A.130 DEL RNE
SUBCAPITULO IV



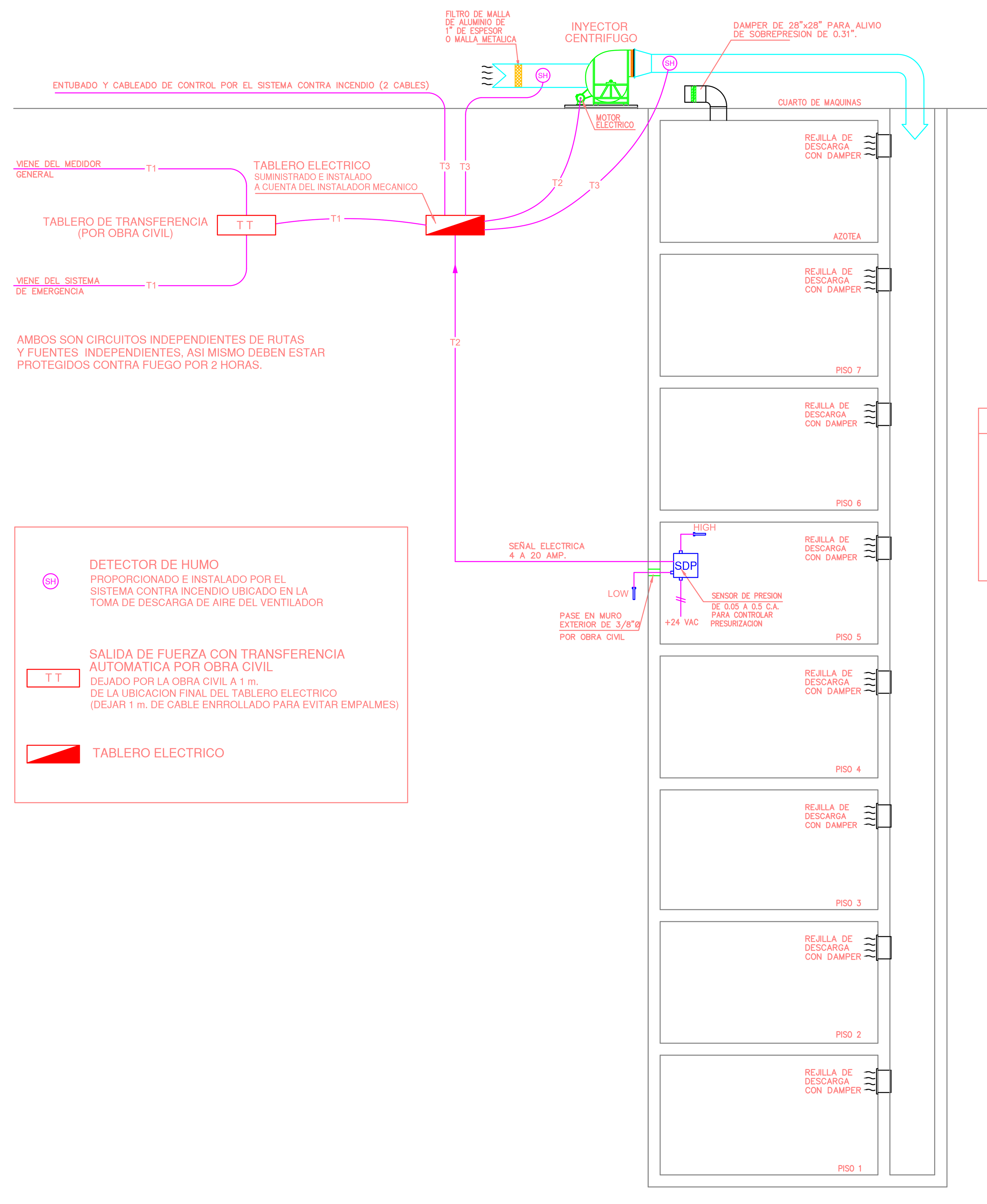
LEYENDA

T1: TIPO 1	- CABLEADO Y ENTUBADO POR OBRA CIVIL
T2: TIPO 2	- CABLEADO POR CUENTA DEL INSTALADOR MECANICO - ENTUBADO POR OBRA CIVIL
T3: TIPO 3	- CABLEADO Y ENTUBADO POR SISTEMA CONTRA INCENDIO

ESCALERA N°1

PRESURIZACION DE ESCALERAS N°2 - IC-AZ-02
ESQUEMA DE PRINCIPIO

BASADO EN LA NORMA A.130 DEL RNE
SUBCAPITULO IV



LEYENDA

T1: TIPO 1	- CABLEADO Y ENTUBADO POR OBRA CIVIL
T2: TIPO 2	- CABLEADO POR CUENTA DEL INSTALADOR MECANICO - ENTUBADO POR OBRA CIVIL
T3: TIPO 3	- CABLEADO Y ENTUBADO POR SISTEMA CONTRA INCENDIO

ESCALERA N°2

REFRICORP

Av. Piura 868 - Miraflores - Telf: 241-0833 241-0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
ESQUEMAS DE PRINCIPIO DE PRESURIZACION DE ESCALERAS

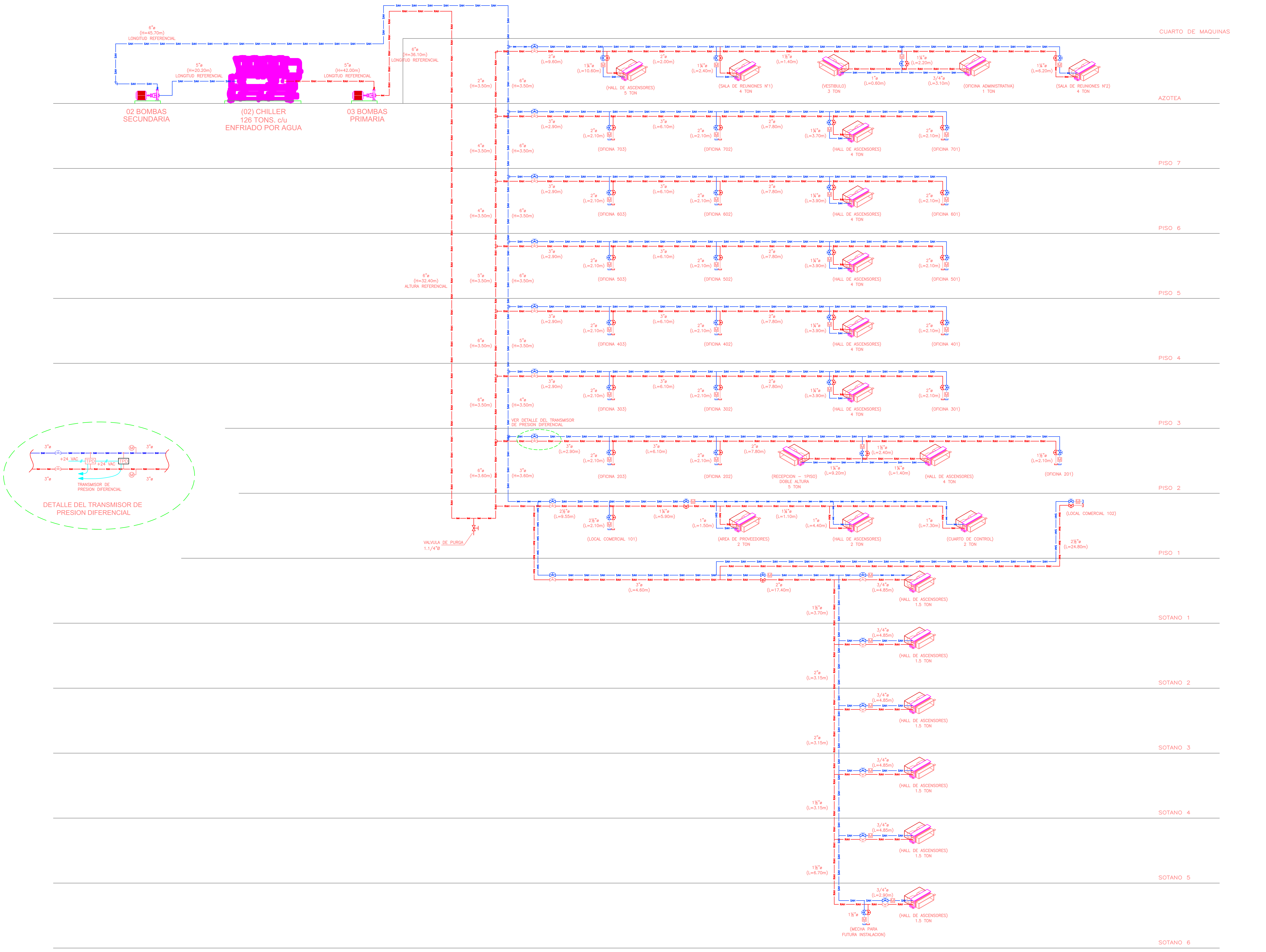
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LAMINA: IM-15

15 DE 23



MONTANTE DE AGUA HELADA - CHILLER

REFRICORP

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
MONTANTE DE AGUA HELADA

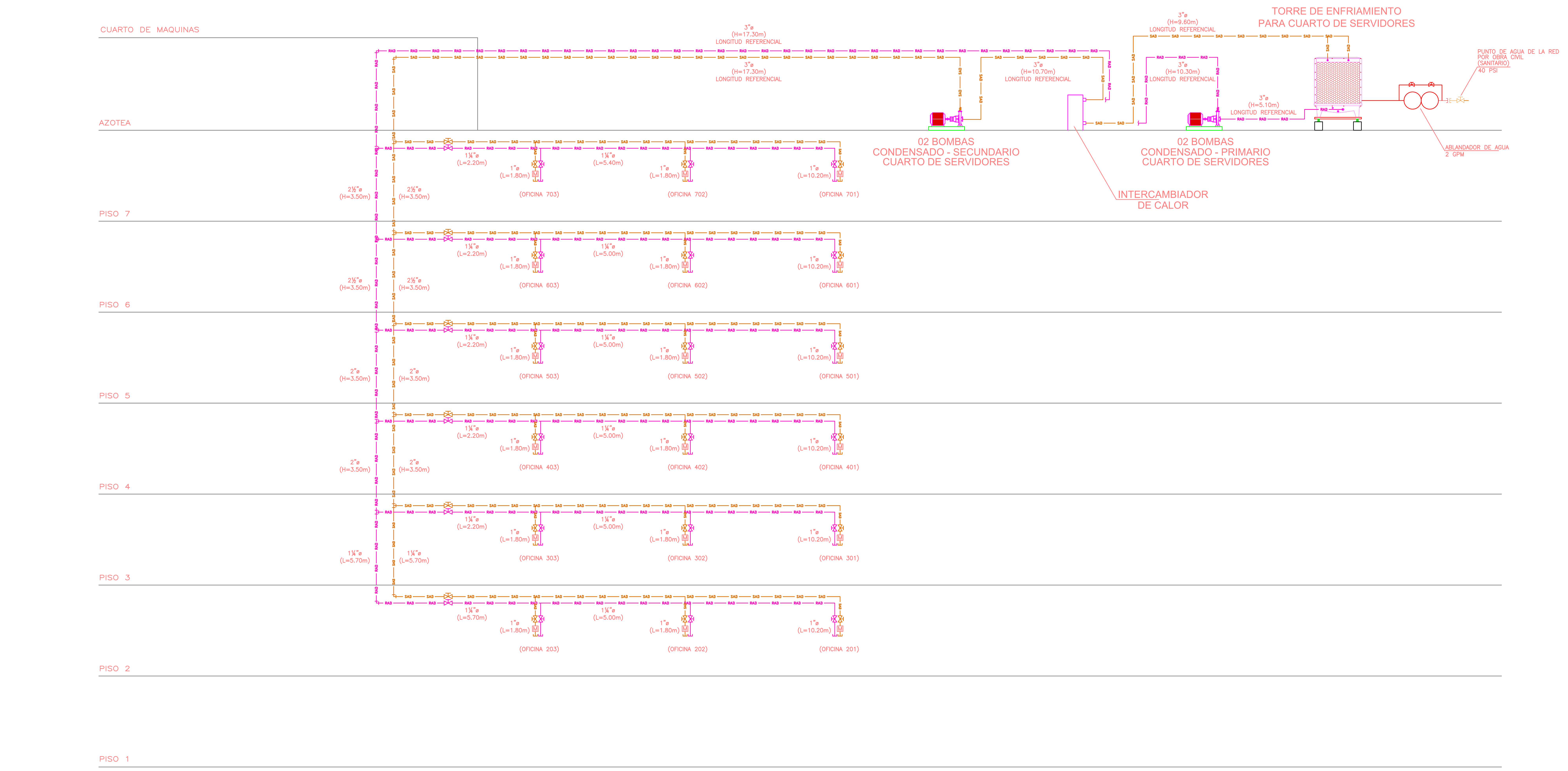
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:
05 AGOSTO 2014

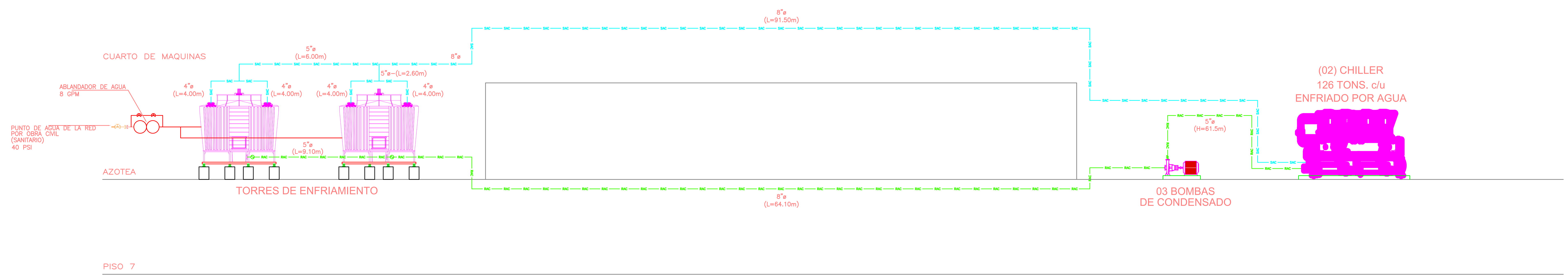
ESCALA:
1:75

LAMINA:
IM-16

16 DE 23



MONTANTES DE AGUA DE CONDENSADO PARA LOS CUARTOS DE SERVIDORES



MONTANTE DE AGUA DE CONDENSADO PARA LAS TORRES DE ENFRIAMIENTO

REFRICORP

Av. Pardo 866 - Miraflores - Telf: 241-0833 241-0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

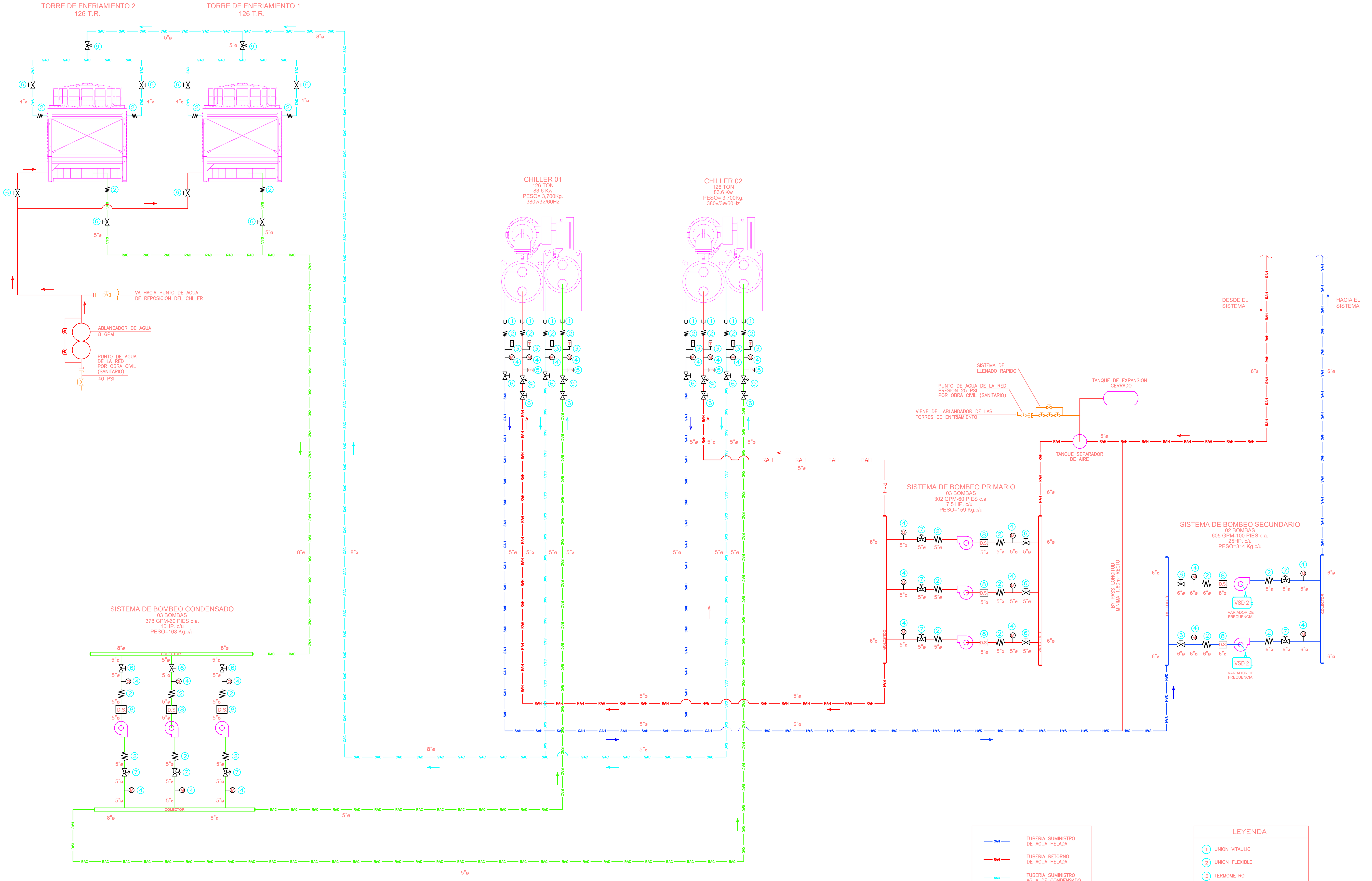
PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
MONTANTE DE AGUA CONDENSADO DE LOS CUARTOS DE SERVIDORES

INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014
ESCALA: 1:75
LAMINA: IM-17
17 DE 23



SAH	TUBERIA SUMINISTRO DE AGUA HELADA
RAH	TUBERIA RETORNO DE AGUA HELADA
SAC	TUBERIA SUMINISTRO AGUA DE CONDENSADO
RAC	TUBERIA RETORNO AGUA DE CONDENSADO

LEYENDA	
1	UNION VITAULIC
2	UNION FLEXIBLE
3	TERMOMETRO
4	MANOMETRO
5	FLOW SWITCH
6	VALVULA MARIPOSA
7	VALVULA MULTIPROPOSITO
8	DIFUSOR DE SUCCION
9	VALVULA MOTORIZADA

ESQUEMA DE PRINCIPIO - SISTEMA DE AGUA HELADA
SALA DE MAQUINAS

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
ESQUEMAS DE PRINCIPIO DE SISTEMA DE AGUA HELADA

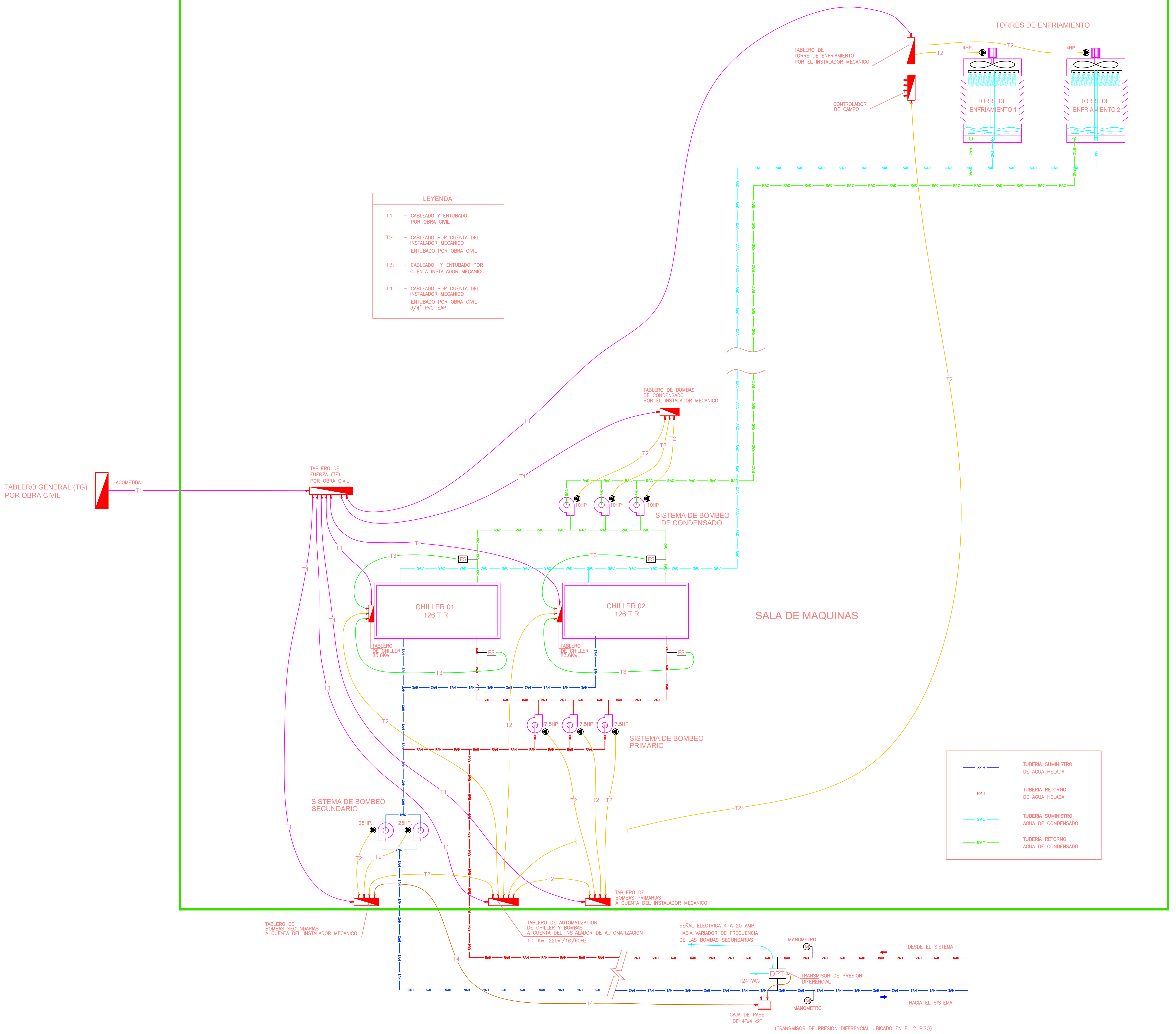
INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LÁMINA: IM-18

18 DE 23



ESQUEMA DE PRINCIPIO ELECTRICO FUERZA Y CONTROL
SISTEMA CHILLER - SALA DE MAQUINAS

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
ESQUEMAS DE PRINCIPIO ELECTRICO-SISTEMA CHILLER

INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:	LÁMINA:
05 AGOSTO 2014	IM-19
ESCALA: 1:75	19 DE 23

LEYENDA

	(RPP.) REJILLA PARA PISO
	(RS.) REJILLA DE SUMINISTRO
	(REX.) REJILLA DE EXPULSION
	(RTAF.) REJILLA DE TOMA DE AIRE FRESCO
	(RE.) REJILLA DE EXTRACCION DE MONOXIDO A 0.3m. S.N.P.T.
	SALIDA DE FUERZA
	PUNTO DE DRENAJE
B	BOTONERA
T	TERMOSTATO
S	SENSOR DE MONOXIDO (a 1.2 m. S.N.P.T.)
ST	SENSOR DE TEMPERATURA
SP	SENSOR DIFERENCIAL DE PRESION
SH	SENSOR DE HUMO
VF	VARIADOR DE FRECUENCIA
FC	FANCOIL
EC	EXTRACTOR CENTRIFUGO
EA	EXTRACTOR AXIAL
ETH	EXTRACTOR TIPO HONGO
VC	VENTILADOR CENTRIFUGO
CH	CHILLER
TE	TORRE DE ENFRIAMIENTO
BS	BOMBA SECUNDARIA
BP	BOMBA PRIMARIA
BC	BOMBA CONDENSADO
M	MEDIDOR DE CAUDAL (LECTORA LOCAL/REMOTA) POR ESPECIALISTA EN AUTOMATIZACION
SAH	TUBERIA SUMINISTRO DE AGUA HELADA
RAH	TUBERIA RETORNO DE AGUA HELADA
SAC	TUBERIA SUMINISTRO AGUA DE CONDENSADO
RAC	TUBERIA RETORNO AGUA DE CONDENSADO
SAD	TUBERIA SUMINISTRO AGUA DE CONDENSADO PARA CUARTO DE SERVIDORES
RAD	TUBERIA RETORNO AGUA DE CONDENSADO PARA CUARTO DE SERVIDORES
	VALVULA DE COMPUERTA
	DUCTO METALICO
	DUCTO DE MAMPOSTERIA ENTERRADO
	DUCTO METALICO CON DUCT LINER
	DUCTO FLEXIBLE
	(RS) REJILLA DE SUMINISTRO
	(RR) REJILLA DE RETORNO (RE) REJILLA DE EXTRACCION
	(DIF) DIFUSOR DE TRES VIAS
	(DIF) DIFUSOR DE CUATRO VIAS
	(RP) REJILLA EN PUERTA
	DAMPER CORTA FUEGO Y CORTA HUMO (VERTICAL)
	DAMPER CORTA FUEGO Y CORTA HUMO (HORIZONTAL)
	DAMPER DE GRAVEDAD
	DAMPER DE ALIVIO
	DAMPER MANUAL
	EQUIPO FANCOIL DE AGUA HELADA CON TAPA DESMONTABLE PARA MANTENIMIENTO (por cuenta de obra civil)
	TABLERO DE BOMBAS SECUNDARIAS A CUENTA DEL INSTALADOR MECANICO
	TABLERO DE BOMBAS PRIMARIAS A CUENTA DEL INSTALADOR MECANICO
	TABLERO DE BOMBAS DE CONDENSADO A CUENTA DEL INSTALADOR MECANICO
	TABLERO PARA LAS TORRES DE ENFRIAMIENTO A CUENTA DEL INSTALADOR MECANICO

NOTAS:

01.– CORRERA POR CUENTA DE LA OBRA CIVIL LO SGTE:

- BASES FLOTANTES PARA CHILLERS, BOMBAS Y VENTILADORES.
- PUNTO DE ALIMENTACION ELECTRICA CERCANO A CADA EQUIPO (MAX. A 0.5m. DE DISTANCIA).
- PUNTO DE DRENAJE CERCANO A CADA EQUIPO INDICADO (MAX. A 0.5m. DE DISTANCIA).
- EJECUCION DE PASES Y RESANES DONDE SEA NECESARIO PARA LA CORRECTA INSTALACION DEL SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN.
- REJILLAS EN PUERTAS PARA BAÑOS
- REJILLAS Y PASES PARA LAS TOMAS DE AIRE FRESCO DONDE SE REQUIERA SEGUN LOS PLANOS.
- ACCESOS PARA MANTENIMIENTO DE LOS EQUIPOS FANCOILS, VENTILADORES, VALVULAS, ETC. EN MONTANTES CERRADAS Y TECHOS DE DRYWALL.

02.– TODOS LOS PUNTOS DE DRENAJE DEBERAN SER COORDINADOS Y DEFINIDOS POR EL ESPECIALISTA SANITARIO.

03.– LAS APERTURAS EN LAS PAREDES Y EN LOZAS SERAN COORDINADAS ANTES DE LA CONSTRUCCION CON EL ESPECIALISTA EN ESTRUCTURAS.

04.– SERA POR PARTE DE LA OBRA CIVIL, REFORZAR LA ESTRUCTURA DEL EDIFICIO PARA EL MONTAJE DE LAS UNIDADES DE AIRE ACONDICIONADO Y VENTILACIÓN.

05.– EL SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN SE COORDINARA CON LOS OTROS SISTEMAS EN TODO EL RECORRIDO DE SU INSTALACION.

06.– LA UBICACION FINAL DE LOS TERMOSTATOS Y BOTONERAS SE COORDINARA CON EL PROPIETARIO Y EL ARQUITECTO (SERAN INSTALADOS A 1.5m DEL NIVEL DEL PISO TERMINADO).

07.– LOS DUCTOS LLEVARAN INTERIORMENTE DAMPERS MANUALES PARA BALANCEAR EL SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN.

08.– LOS DUCTOS QUE VAN DENTRO DE FALSO TECHO IRAN AISLADOS CON LANA DE VIDRIO DE 1½" DE ESPESOR Y FOIL DE ALUMINIO, CUYA CONDUCTIVIDAD TERMICA SEA MENOR O IGUAL A 0,27 BTU x Pulg./h x pie2 x °F, DENSIDAD 1lb/pie3.

09.– TODO LOS TAMAÑOS DE LOS DUCTOS MOSTRADOS EN LOS PLANOS INDICAN DIMENSIONES INTERIORES DE LOS DUCTOS.

10.– LA UNION FLEXIBLE PARA DUCTOS SERAN DE LONA DE VINYL PESADO Y NEOPRENE DE 10" DE ANCHO, SIMILAR O IGUAL AL TIPO DFN–10 NEOPRENE DE LA MARCA DURO DYNE.

11.– LAS CAJAS PLENUM DE RETORNO SE AISLARAN INTERIORMENTE CON DUCT LINER DE 1" DE ESPESOR Y DENSIDAD DE 3 lb/pie3.

12.– EL SENSOR DIFERENCIAL DE PRESION SE UBICARA EN LA ALTURA MEDIA DE LA ESCALERA.

13.– LA IMPLEMENTACION DE LA INYECCION DE AIRE FRESCO DE LAS OFICINAS, EL CUAL COMPRENDE DUCTOS E INYECTORES SERAN POR CUENTA DEL FUTURO LOCATARIO.

CUADRO DE EQUIPOS DE AIRE ACONDICIONADO – FANCOIL – AGUA HELADA

CLAVE	CANTIDAD	CAP. NOMINAL COMERCIAL (BTU/HR)	TIPO	CAUDAL NOMINAL COMERCIAL (CFM)	ELECTRICIDAD	AMBIENTE QUE ACONDICIONAN	PISO
FC–S6–01	01	18,000	FAN COIL	600	120W., 220V/1ø/60Hz.	HALL DE ASCENSORES	6° SOTANO
FC–T1–01	03	18,000	FAN COIL	600	120W., 220V/1ø/60Hz.	HALL DE ASCENSORES	3° AL 5° SOTANO
FC–S2–01	01	18,000	FAN COIL	600	120W., 220V/1ø/60Hz.	HALL DE ASCENSORES	2° SOTANO
FC–S1–01	01	18,000	FAN COIL	600	120W., 220V/1ø/60Hz.	HALL DE ASCENSORES	1° SOTANO
FC–1–01	01	24,000	FAN COIL	800	200W., 220V/1ø/60Hz.	HALL DE ASCENSORES	1° PISO
FC–1–02	01	24,000	FAN COIL	800	200W., 220V/1ø/60Hz.	AREA DE PROVEEDORES	1° PISO
FC–1–03	01	24,000	FAN COIL	800	200W., 220V/1ø/60Hz.	CUARTO DE CONTROL	1° PISO
FC–2–01	01	48,000	FAN COIL	1600	300W., 220V/1ø/60Hz.	HALL DE ASCENSORES	2° PISO
FC–2–02	01	60,000	FAN COIL	2000	400W., 220V/1ø/60Hz.	RECEPCION	1° PISO
FC–T2–01	03	48,000	FAN COIL	1600	300W., 220V/1ø/60Hz.	HALL DE ASCENSORES	3° AL 5° PISO
FC–6–01	01	48,000	FAN COIL	1600	300W., 220V/1ø/60Hz.	HALL DE ASCENSORES	6° PISO
FC–7–01	01	48,000	FAN COIL	1600	300W., 220V/1ø/60Hz.	HALL DE ASCENSORES	7° PISO
FC–AZ–01	01	60,000	FAN COIL	2000	400W., 220V/1ø/60Hz.	HALL DE ASCENSORES	AZOTEA
FC–AZ–02	01	36,000	FAN COIL	1200	300W., 220V/1ø/60Hz.	PASADIZO	AZOTEA
FC–AZ–03	01	48,000	FAN COIL	1600	300W., 220V/1ø/60Hz.	SALA DE REUNION N°1	AZOTEA
FC–AZ–04	01	48,000	FAN COIL	1600	300W., 220V/1ø/60Hz.	SALA DE REUNION N°2	AZOTEA
FC–AZ–05	01	12,000	FAN COIL	400	100W., 220V/1ø/60Hz.	OFICINA ADMINISTRADOR	AZOTEA

CUADRO DE CARACTERISTICAS DE CHILLER 01

CARACTERISTICAS	
CANT.	01
TIPO	ENFRIADO POR AGUA
CAP.NOMINAL (T.R.)	126
CARGA ELECTRICA	83.6 Kw.
CARACTERISTICAS ELECTRICAS	380v/3ø/60Hz.
TIPO DE COMPRESOR	TORNILLO
GAS REFRIGERANTE	R134A
PESO MAXIMO (Kg.)	3,700

CUADRO DE CARACTERISTICAS DE CHILLER 02

CARACTERISTICAS	
CANT.	01
TIPO	ENFRIADO POR AGUA
CAP.NOMINAL (T.R.)	126
CARGA ELECTRICA	83.6 Kw.
CARACTERISTICAS ELECTRICAS	380v/3ø/60Hz.
TIPO DE COMPRESOR	TORNILLO
GAS REFRIGERANTE	R134A
PESO MAXIMO (Kg.)	3,700

CUADRO DE CARACTERISTICAS TORRE DE ENFRIAMIENTO 01

CARACTERISTICAS	
CANTIDAD	01
CAPACIDAD	126 TONS.
TEMPERATURA BULBO HUMEDO	75.0 °F
RANGO	10°F (85°F/95°F)
CARACTERISTICAS ELECTRICAS	4.0 HP/380v/3ø/60Hz.
PESO	2,830 Kg.

CUADRO DE CARACTERISTICAS TORRE DE ENFRIAMIENTO 02

CARACTERISTICAS	
CANTIDAD	01
CAPACIDAD	126 TONS.
TEMPERATURA BULBO HUMEDO	75.0 °F
RANGO	10°F (85°F/95°F)
CARACTERISTICAS ELECTRICAS	4.0 HP/380v/3ø/60Hz.
PESO	2,830 Kg.

CUADRO DE CARACTERISTICAS TORRE DE ENFRIAMIENTO 03–CUARTO DE SERVIDORES

CARACTERISTICAS	
CANTIDAD	01
CAPACIDAD	40 TONS.
TEMPERATURA BULBO HUMEDO	75.0 °F
RANGO	10°F (85°F/95°F)
CARACTERISTICAS ELECTRICAS	2.0 HP/380v/3ø/60Hz.
PESO	720 Kg.

ELECTROBOMBA DE AGUA HELADA SISTEMA SECUNDARIO

CARACTERISTICAS	
CANTIDAD	02
CAUDAL	605 GPM
PRESION ESTATICA	95 PIES
POTENCIA APROX.	25 HP / TEFC
CARACTERISTICAS ELECTRICAS	1,760 RPM/380v/3ø/60Hz.
PESO	314 Kg.
CLASE	125

ELECTROBOMBA DE AGUA HELADA SISTEMA PRIMARIO

CARACTERISTICAS	
CANTIDAD	03
CAUDAL	302 GPM
PRESION ESTATICA	60 PIES
POTENCIA APROX.	7.5 HP / TEFC
CARACTERISTICAS ELECTRICAS	1,760 RPM/380v/3ø/60Hz.
PESO	159 Kg. c/u
CLASE	125

ELECTROBOMBA DE AGUA HELADA SISTEMA DE CONDENSADO

CARACTERISTICAS	
CANTIDAD	03
CAUDAL	378 GPM
PRESION ESTATICA	60 PIES
POTENCIA APROX.	10 HP / TEFC
CARACTERISTICAS ELECTRICAS	1,760 RPM/380v/3ø/60Hz.
PESO	168 Kg. c/u
CLASE	125

ELECTROBOMBA DE SISTEMA DE CONDENSADO SECUNDARIO PARA CUARTO DE SERVIDORES

CARACTERISTICAS	
CANTIDAD	02
CAUDAL	120 GPM
PRESION ESTATICA	110 PIES
POTENCIA APROX.	7.5 HP / TEFC
CARACTERISTICAS ELECTRICAS	1,760 RPM/380v/3ø/60Hz.
PESO	164 Kg. c/u
CLASE	125

ELECTROBOMBA DE SISTEMA DE CONDENSADO PRIMARIO PARA CUARTO DE SERVIDORES

CARACTERISTICAS	
CANTIDAD	02
CAUDAL	120 GPM
PRESION ESTATICA	60 PIES
POTENCIA APROX.	5.0 HP / TEFC
CARACTERISTICAS ELECTRICAS	1,760 RPM/380v/3ø/60Hz.
PESO	164 Kg. c/u
CLASE	125

CUADRO DE EQUIPOS DE EXTRACCION DE MONOXIDO

CLAVE	CANTIDAD	CAUDAL (CFM)	TIPO	CAIDA DE PRESION (Pulg. c.a.)	ELECTRICIDAD	PISO	PESO (Kg)
EC–S2–01	01	8,000	FLUJO MIXTO	2.0	5.0HP/380v/3ø/60Hz.	2° SOTANO	180
EC–T1–01	03	8,000	FLUJO MIXTO	2.0	5.0HP/380v/3ø/60Hz.	3° AL 5° SOTANO	180
EC–S6–01	01	16,000	CENTRIFUGO DOBLE ENTRADA	2.0	10HP/380v/3ø/60Hz.	6° SOTANO	246
EC–S6–02	01	8,000	FLUJO MIXTO	2.0	5.0HP/380v/3ø/60Hz.	6° SOTANO	180

CUADRO DE EQUIPOS DE INYECCION DE SOTANOS

CLAVE	CANTIDAD	CAUDAL (CFM)	TIPO	CAIDA DE PRESION (Pulg. c.a.)	ELECTRICIDAD	PISO	PESO (Kg)
IA–S1–01	01	8.000	INYECTOR AXIAL	0.6	1.1/2/380v/3ø/60Hz.	1° SOTANO	51
IA–S2–01	01	8.000	INYECTOR AXIAL	0.6	1.1/2/380v/3ø/60Hz.	2° SOTANO	51
IA–T1–01	03	8.000	INYECTOR AXIAL	0.6	1.1/2/380v/3ø/60Hz.	3° AL 5° SOTANO	51
IA–S6–01	01	8.000	INYECTOR AXIAL	0.6	1.1/2/380v/3ø/60Hz.	6° SOTANO	51
IA–S6–02	01	8.000	INYECTOR AXIAL	0.6	1.1/2/380v/3ø/60Hz.	6° SOTANO	51

CUADRO DE EQUIPOS DE EXTRACCION Y INYECCION

CLAVE	CANTIDAD	CAUDAL (CFM)	TIPO	CAIDA DE PRESION (Pulg. c.a.)	ELECTRICIDAD	PISO	PESO (Kg)
EC–S5–01	01	6,000	CENTRIFUGO EN LINEA	0.5	1.1/2HP/380v/3ø/60Hz.	5° SOTANO	200
EC–S1–01	01	1340	CENTRIFUGO EN LINEA	0.4	247w/220v/1ø/60Hz.	1° SOTANO	41
EC–S1–02	01	510	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° SOTANO	32
EC–S1–03	01	310	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° SOTANO	37
EC–1–01	01	80	CENTRIFUGO EN GABINETE	0.3	65w/220v/1ø/60Hz.	1° PISO	4.5
EC–1–02	01	80	CENTRIFUGO EN GABINETE	0.3	65w/220v/1ø/60Hz.	1° PISO	4.5
EC–1–03	01	140	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° PISO	5.5
EC–1–04	01	240	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° PISO	37
EC–1–05	01	170	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° PISO	37
EC–1–06	01	100	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° PISO	5.5
EC–1–07	01	210	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	1° PISO	37
EC–2–01	01	370	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	37
EC–2–02	01	160	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	37
EC–2–03	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	44
EC–2–04	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	37
EC–2–05	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	37
EC–2–06	01	260	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	37
EC–2–07	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	2° PISO	44
EC–T2–01	01	370	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	37
EC–T2–02	01	160	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	37
EC–T2–03	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	44
EC–T2–04	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	37
EC–T2–05	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	37
EC–T2–06	01	260	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	37
EC–T2–07	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	3° AL 5° PISO	44
EC–6–01	01	370	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	37
EC–6–02	01	160	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	37
EC–6–03	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	44
EC–6–04	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	37
EC–6–05	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	37
EC–6–06	01	260	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	37
EC–6–07	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	6° PISO	44
EC–7–01	01	370	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	37
EC–7–02	01	160	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	37
EC–7–03	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	44
EC–7–04	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	37
EC–7–05	01	600	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	37
EC–7–06	01	260	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	37
EC–7–07	01	420	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	7° PISO	44
EC–AZ–01	01	370	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	AZOTEA	37
EC–AZ–02	01	2,200	CENTRIFUGO EN LINEA	0.3	3/4HP/380v/3ø/60Hz.	AZOTEA	45
EC–AZ–03	01	65	CENTRIFUGO EN GABINETE	0.3	65w/220v/1ø/60Hz.	AZOTEA	4.5
EC–AZ–04	01	75	CENTRIFUGO EN GABINETE	0.3	65w/220v/1ø/60Hz.	AZOTEA	4.5
EC–AZ–05	01	260	CENTRIFUGO EN GABINETE	0.3	190w/220v/1ø/60Hz.	AZOTEA	37
ETH–AZ–01	01	7,300	EXTRACTOR TIPO HONGO	1.0	3HP/380v/3ø/60Hz.	AZOTEA	89
ETH–AZ–02	01	4,515	EXTRACTOR TIPO HONGO	1.0	1.1/2HP/380v/3ø/60Hz.	AZOTEA	64
IC–S6–01	01	55	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	6° SOTANO	9
IC–T1–01	01	55	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	3° AL 5° SOTANO	9
IC–S2–01	01	55	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	2° SOTANO	9
IC–S1–01	01	55	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	1° SOTANO	9
IC–1–01	01	315	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	1° PISO	40
IC–2–01	01	135	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	1° PISO	40
IC–T2–01	01	135	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	3° AL 5° PISO	40
IC–6–01	01	135	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	6° PISO	40
IC–7–01	01	135	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	7° PISO	40
IC–AZ–01	01	2,200	CENTRIFUGO EN LINEA	0.6	3/4HP/380v/3ø/60Hz.	AZOTEA	49
IC–AZ–02	01	105	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	AZOTEA	40
IC–AZ–03	01	150	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	AZOTEA	9
IC–AZ–04	01	130	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	AZOTEA	9
IC–AZ–05	01	65	CENTRIFUGO EN GABINETE	1.8	375w/220v/1ø/60Hz.	AZOTEA	40
IC–AZ–06	01	20	CENTRIFUGO EN GABINETE	1.8	250w/220v/1ø/60Hz.	AZOTEA	9

CUADRO DE EQUIPOS DE AIRE ACONDICIONADO – FANCOIL – EXPANSION DIRECTA

CLAVE	CANTIDAD	CAP. NOMINAL (BTU/HR)	TIPO	CAUDAL NOMINAL (CFM)	ELECTRICIDAD	AMBIENTE QUE ACONDICIONAN	PISO
UE–1–01/UC–1–01	01	24,000	FAN COIL	800	2.5Kw., 220V/1ø/60Hz.	CUARTO DE CONTROL	1° PISO

CUADRO DE EQUIPOS DE INYECCION – PRESURIZACION DE ESCALERA

CLAVE	CANTIDAD	CAUDAL (CFM)	TIPO	CAIDA DE PRESION (Pulg. c.a.)	ELECTRICIDAD	PISO	PESO (Kg)
IC–AZ–01	01	20,000	CENTRIFUGO SIMPLE ENTRADA	2.0	15HP/380v/3ø/60Hz.	TECHO	558
IC–AZ–02	01	25,000	CENTRIFUGO SIMPLE ENTRADA	2.0	20HP/380v/3ø/60Hz.	TECHO	730

REFRICORP

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:
TABLAS, NOTAS Y LEYENDA

INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA: 05 AGOSTO 2014

ESCALA: 1:75

LÁMINA: IM-20

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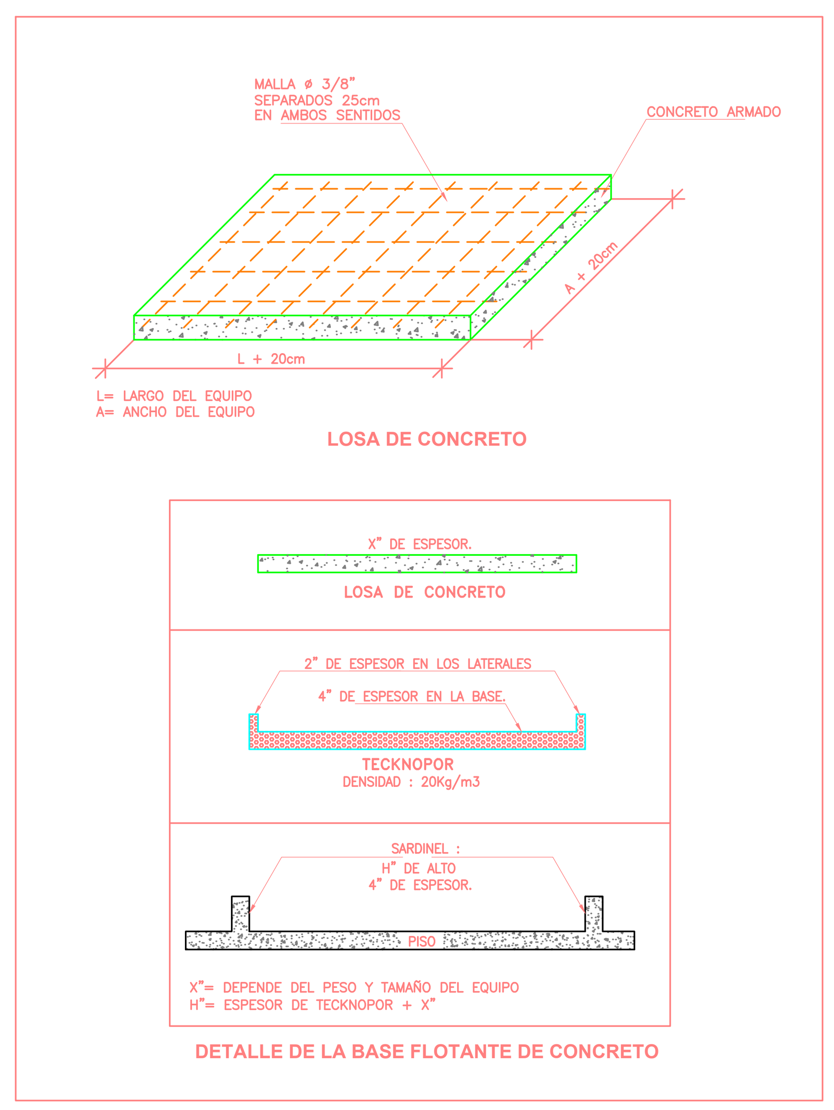
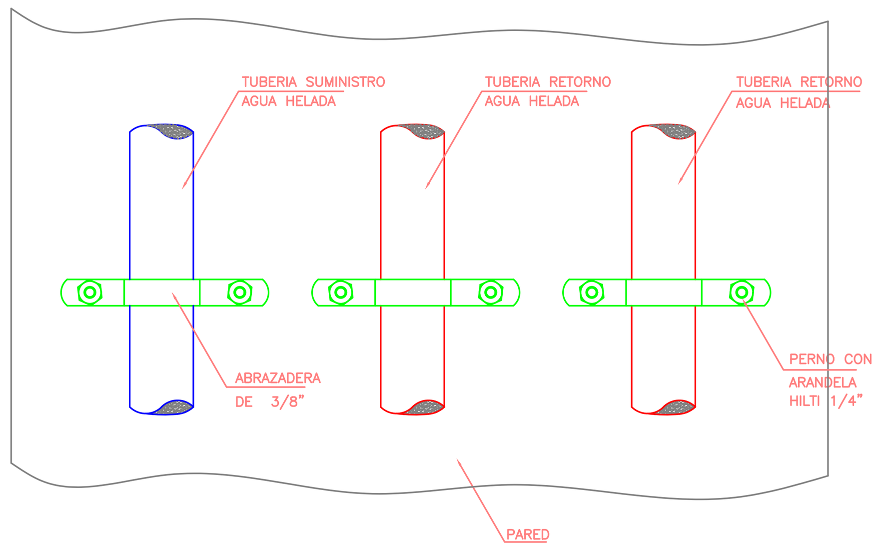
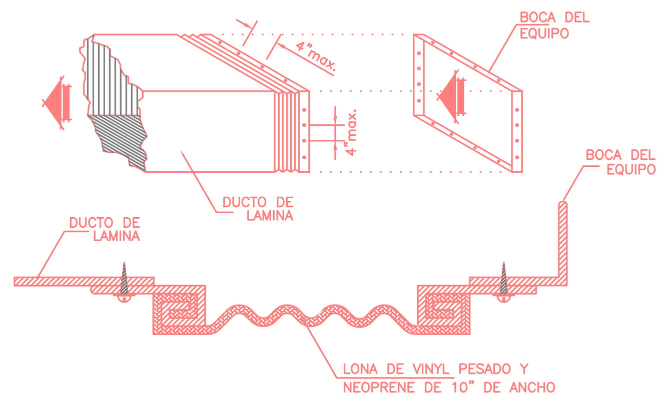


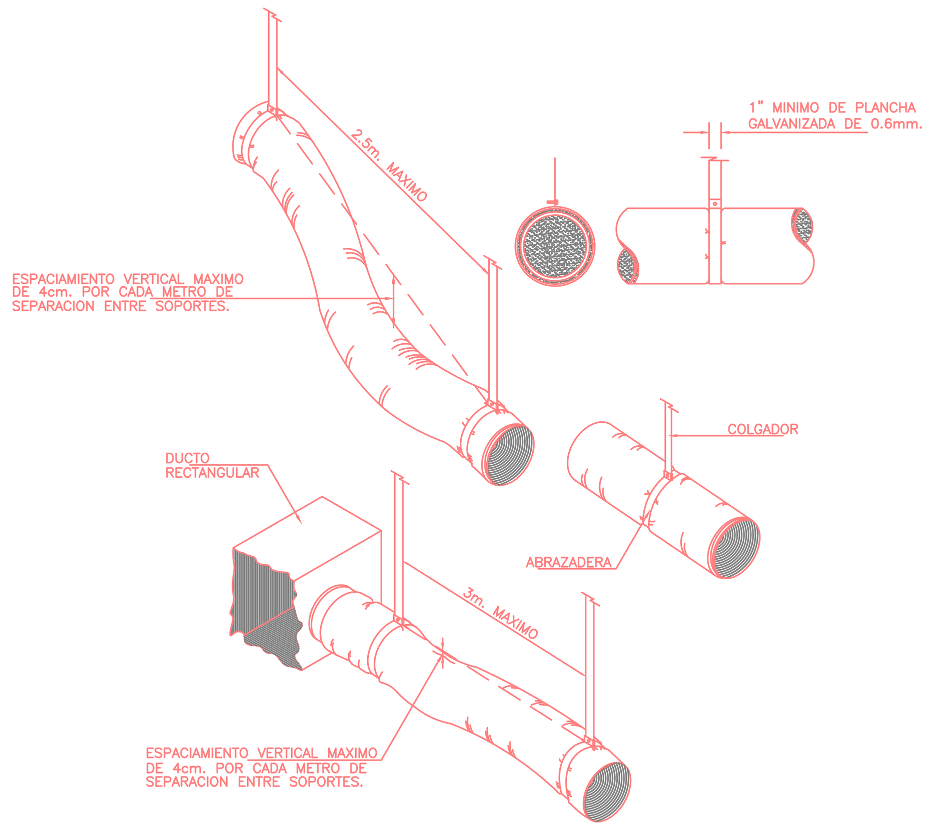
DETALLE DE INSTALACION DE BASE FLOTANTE PARA EQUIPOS
DE EXTRACCION DE MONOXIDO Y PRESURIZACION DE ESCALERA
SIN ESCALA



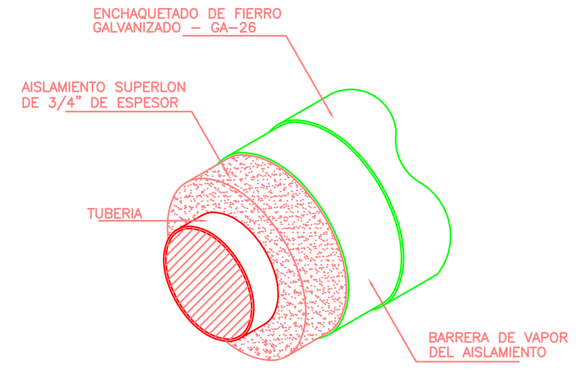
DETALLE DEL COLGADOR TIPICO DE TUBERIAS
DE AGUA HELADA VERTICAL
SIN ESCALA



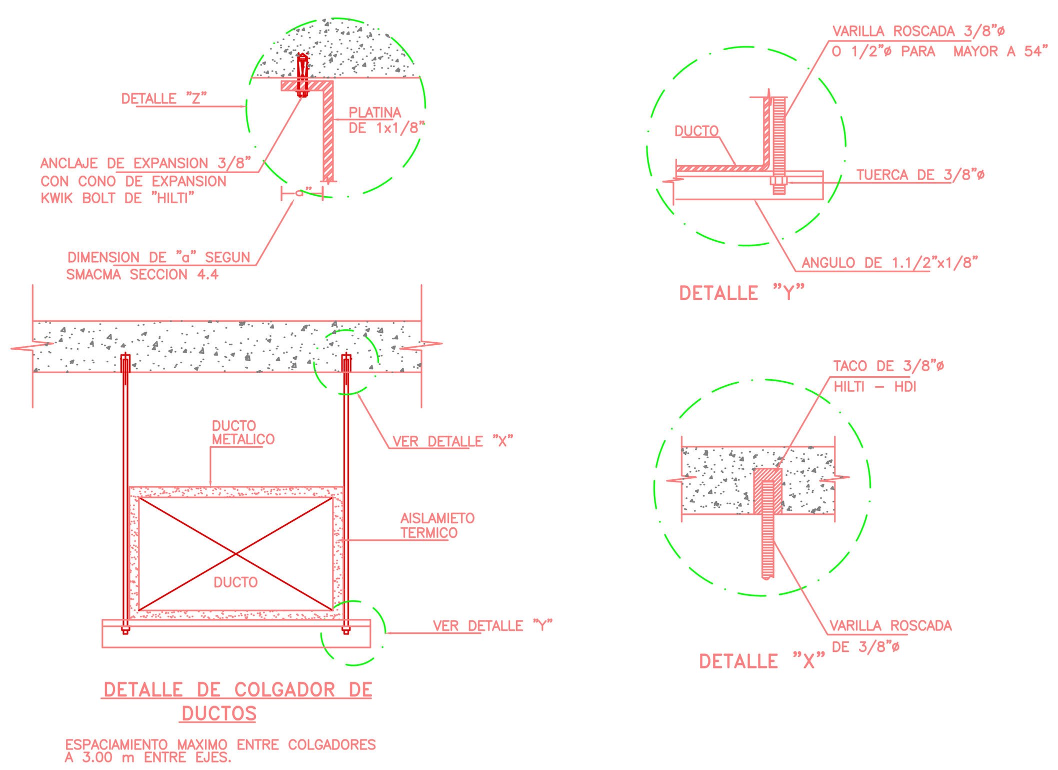
DETALLE TIPO PARA CONEXION FLEXIBLE DE LONA AHULADA
SIN ESCALA



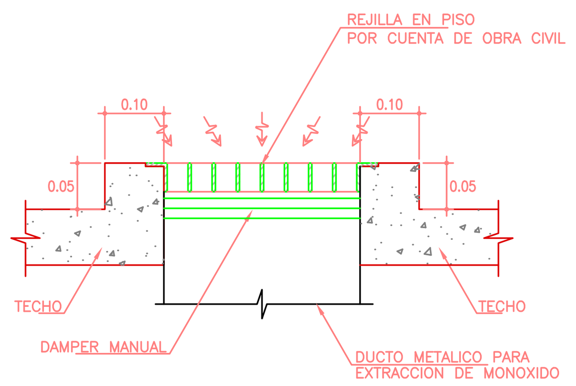
DETALLE DE SOPORTES PARA DUCTOS FLEXIBLES
SIN ESCALA



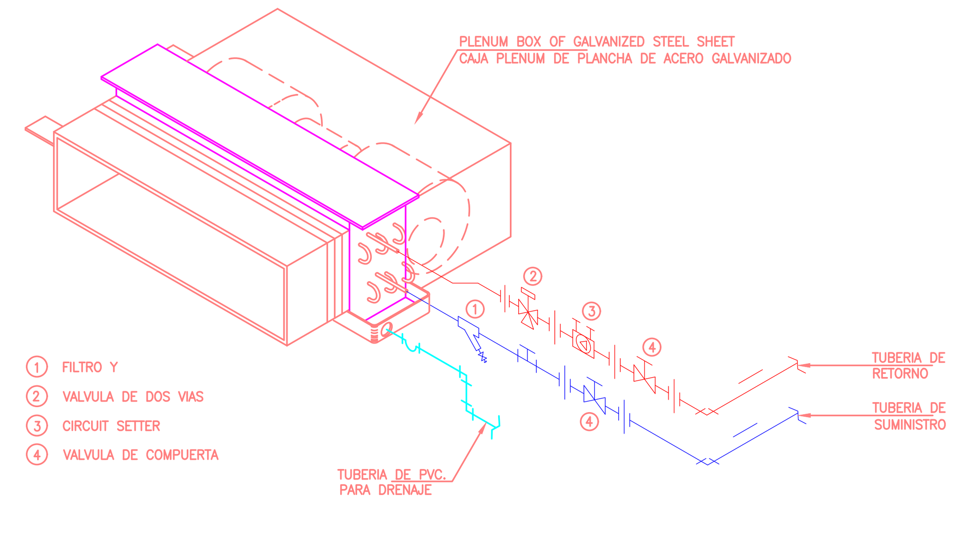
DETALLE DE AISLAMIENTO
DE TUBERIAS DE AGUA HELADA
PARA EXTERIORES



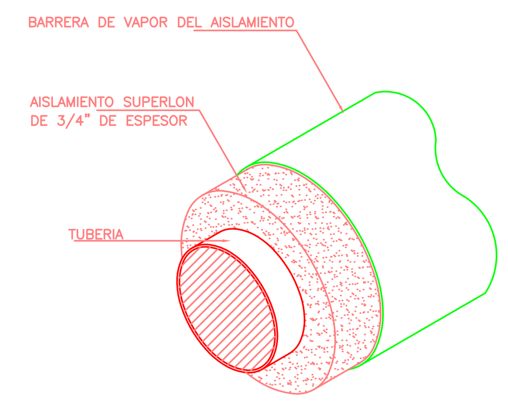
DETALLES DE ANCLAJE PARA COLGADOR DE DUCTO
S/E



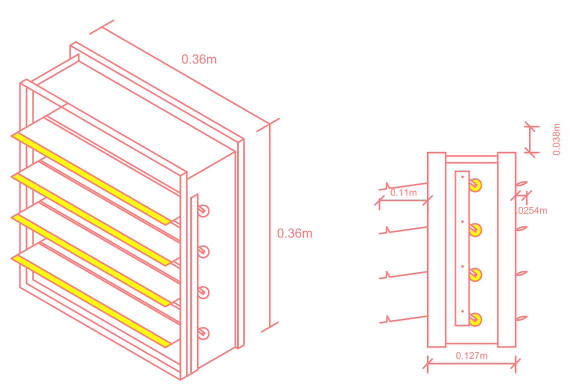
DETALLE DEL SARDINEL PARA LAS REJILLAS
EN PISO DE EXTRACCION DE MONOXIDO
S/E



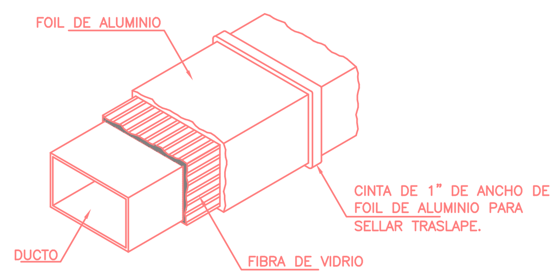
DETALLE DE INSTALACION DE UNIDADES TIPO FANCOIL
SIN ESCALA



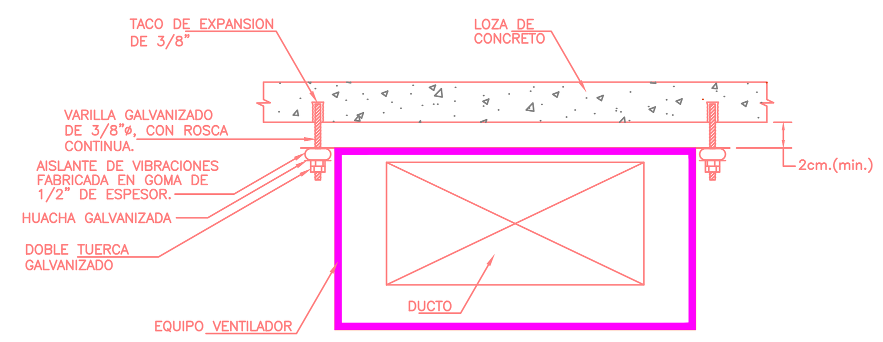
DETALLE DE AISLAMIENTO
DE TUBERIAS DE AGUA HELADA
PARA INTERIORES
S/E



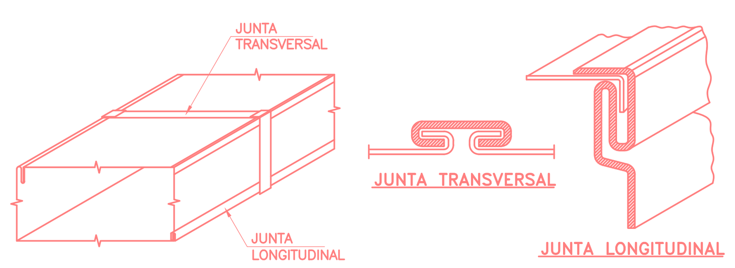
DETALLE DE DAMPER DE ALIVIO
S/E



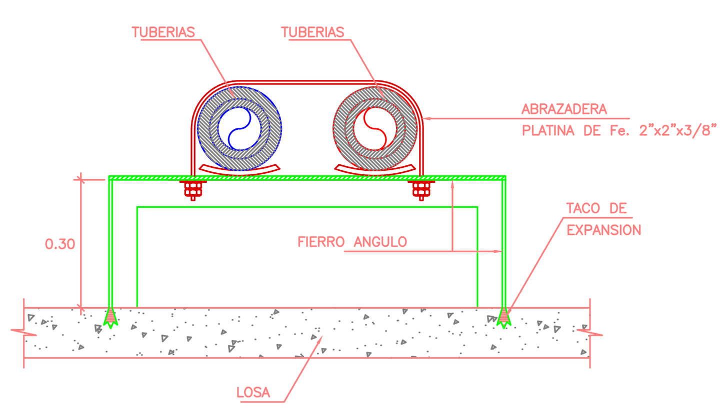
DETALLE TIPICO DE AISLAMIENTO DE DUCTO
SIN ESCALA



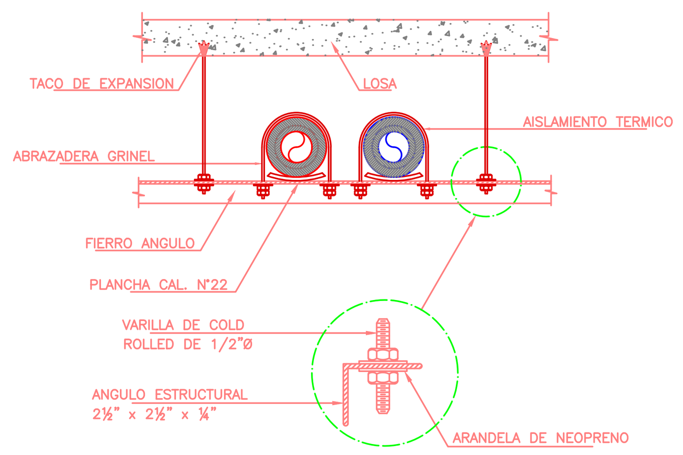
DETALLE DE INSTALACION DE
VENTILADOR CENTRIFUGO EN GABINETE
SIN ESCALA



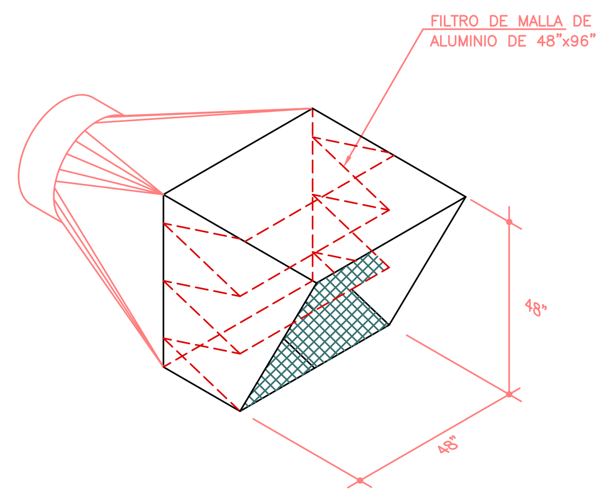
DETALLE DE DOBLEZ Y EMPALME DE DUCTOS
SIN ESCALA



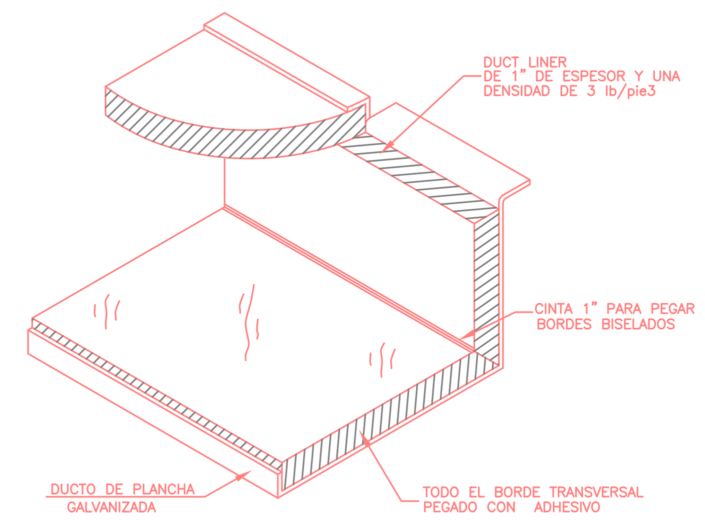
DETALLE DE SUJECION DE TUBERIAS
EN AZOTEA
SIN ESCALA



DETALLE TIPO DE SOPORTERIA PARA TUBERIAS
HORIZONTALES
SINE ESCALA



DETALLE TOMA DE AIRE PRESURIZACION
DE ESCALERAS
S/E



DETALLE DE AISLAMIENTO ACUSTICO INTERIOR
CAJA DE MEZCLA DE FAN COIL
S/E

REFRICORP

PROYECTO:
SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:
EDIFICIO EMPRESARIAL SANTA CRUZ
Av. SANTA CRUZ N° 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:
SAN MIGUEL INMOBILIARIA S.A.C.

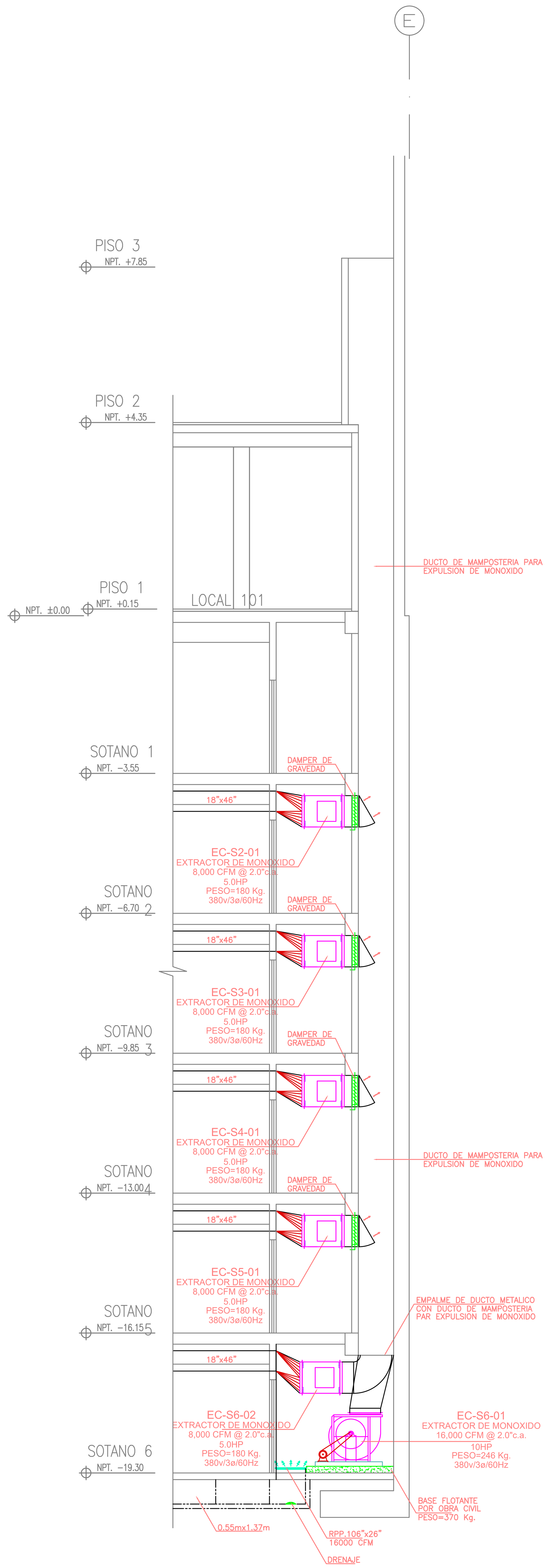
PLANO:
DETALLES

INGENIERO RESPONSABLE:
MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

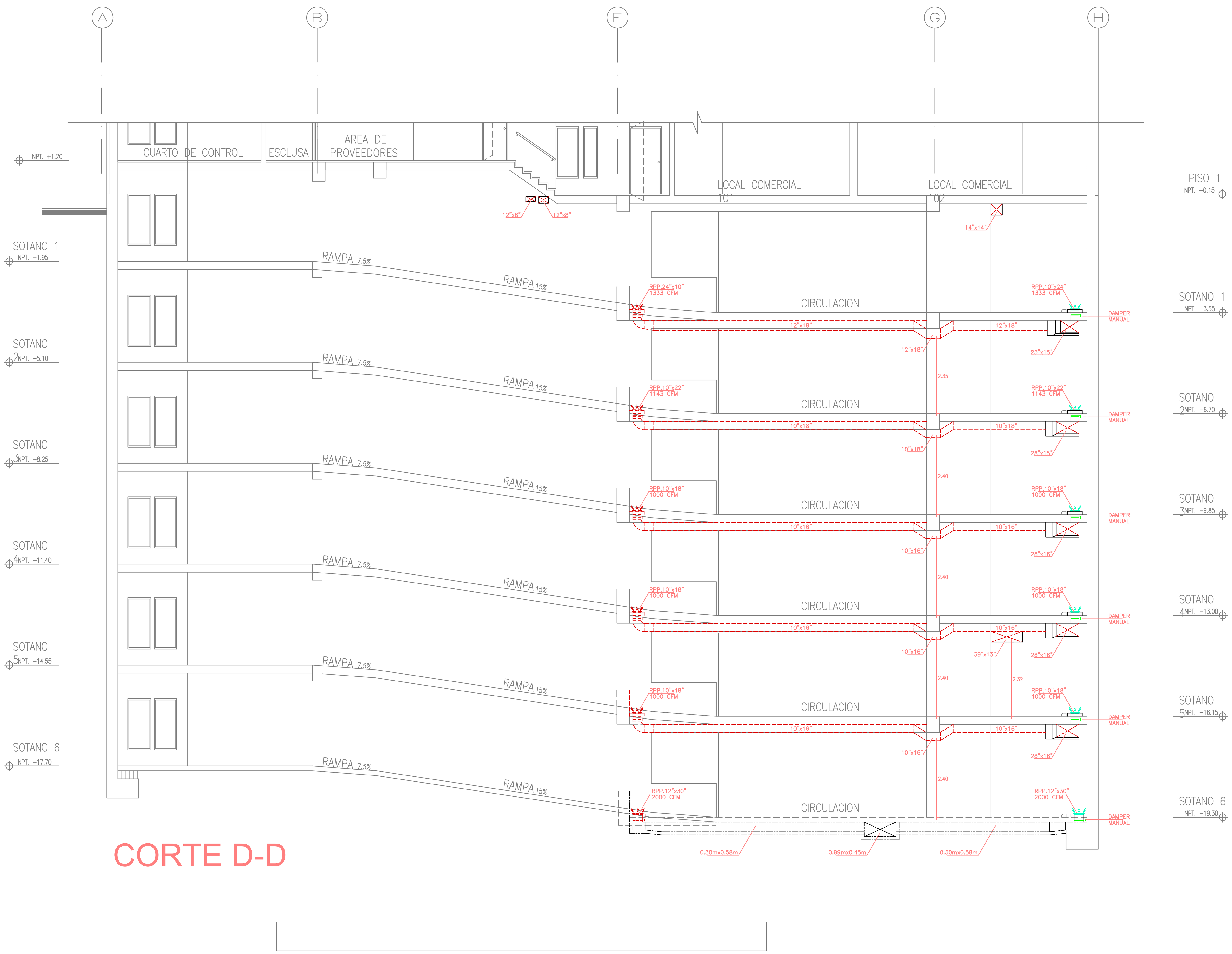
FECHA:
05 AGOSTO 2014

ESCALA:
1:75

LÁMINA:
IM-21
21 DE 23



CORTE F-F



CORTE D-D

REFRICORP

Av. Piura 868 - Miraflores - Telf: 241-0833 241-0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

CORTE D-D y 1-1

INGENIERO RESPONSABLE:

MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:

05 AGOSTO 2014

ESCALA:

1:75

LAMINA:

IM-22

22 DE 23

CORTE C-C

REFRICORP

Av. Piura 868 – Miraflores – Telf: 241–0833 241–0255

PROYECTO:

SISTEMA DE VENTILACION Y AIRE ACONDICIONADO

PROYECTO:

EDIFICIO EMPRESARIAL SANTA CRUZ

Av. SANTA CRUZ Nº 884, 886, 888 y 890 - MIRAFLORES

PROPIETARIO:

SAN MIGUEL INMOBILIARIA S.A.C.

PLANO:

CORTE C-C

INGENIERO RESPONSABLE:

MANUEL AZAHUANCHE ASMAT
C.I.P. 96351

FECHA:

05 AGOSTO 2014

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