COFFMAN ENGINEERS

Civic Sportsplex
Building Evaluation Report

City of Bellingham Contract # C2200039
Coffman Engineers Project # 212840

April 13, 2022

Civic Sportsplex Building Evaluation Report

PREPARED FOR:

City of Bellingham Parks & Recreation Department
210 Lottie Street
Bellingham, Washington 98225

Contract Number: # C2200039

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1 INTRODUCTION

1.1 Project Need

The existing Sportsplex Ice Arena is currently experiencing issues with the building envelope system including roof leaks and condensation on the underside of the roof that is likely due to inadequate heating and ventilation. A previous study was performed in 2016 to provide roof replacement alternatives and recommendations as well as a separate facility assessment performed in 2016 which identified opportunities to reduce energy usage costs and improve building systems.

The goal of this project is to review the information and recommendations contained in the previous reports and confirm they are the appropriate solution as well as provide recommendations for upgrading the building HVAC system to provide adequate heating and ventilation. The lighting systems will be reviewed for energy efficiency systems upgrades and fixture replacement. This report will provide recommendations for addressing the current building envelope, heating, ventilation, and electrical system issues. It will also include an updated cost estimate for design, permitting, and construction costs to complete the project.

1.2 Existing Building Description

The project site is located along Civic Field Way approximately half a mile east of Interstate-5. See Figure 1.2-1.

Figure 1.2-1: Vicinity Map

We understand that the building was constructed in two phases. The south side of the building was constructed during Phase 1 and is a pre-engineered metal building with a gross square footage of approximately 38,000 square feet. The north side of the building was constructed as Phase 2 and is a pre-engineered metal building with a gross square footage of approximately 39,100 square feet. Phase 2 was originally constructed with two ice rinks in the north side of the building, but a renovation was later completed to change these to soccer fields.

The insulation on the underside of the roof in the soccer field area (Phase 2) has significant water damage due to condensation and roof leakage as seen in Figure 1.2-2.

Figure 1.2-2: Water Damage to Insulation (Soccer Field Area)

The insulation on the underside of the roof in the ice rink area (Phase 1) has minor water damage due to condensation and roof leakage as seen in Figure 1.2-3. The mechanical heating and ventilation systems serving both the soccer field and ice rink areas are no longer operational. The mechanical and ventilation systems serving the enclosed office, retail, restroom, and dressing room spaces appear to be in working condition.

Figure 1.2-3: Water Damage to Insulation (Ice Rink Area)

1.3 Project Goals and Objectives

The goal of this project is to identify the cause of the water issue and alleviate the problem with recommendations that:

- Repair damage caused by the water damage
- Prevent future water damage from occurring
- Provide heating and ventilation systems for the currently unheated and unventilated areas that meet code and are highly energy efficient
- Provide lighting systems that will increase energy efficiency to reduce operational costs

1.4 Project Team

Coffman Engineers was selected by the City of Bellingham to perform the investigation for this project. The project design team consists of the following members:

- Coffman Engineers – Mechanical, Electrical, and Structural Engineering
- RMC Architects – Architectural Design
- Rory Woolsey, CEP – Cost Estimating

1.5 Project Approach

An in-person site visit was held with the project design team, the City of Bellingham and the Sportsplex maintenance staff on February 11, 2022. The primary objectives of this meeting were to evaluate the existing conditions of the building, investigate the condition of existing envelope, mechanical and electrical systems, and establish project goals.

Following the site investigation, Coffman Engineers and RMC Architects created schematic as-built drawings documenting the current state of the building and its envelope, mechanical and electrical systems. These drawings were used to create schematic drawings showing the recommended improvements described in this evaluation report and can be used as a starting point for future design work to be completed later.

END OF SECTION

2 DESCRIPTION OF EXISTING SYSTEMS

2.1 Existing Building Envelope Systems

Existing Roofing System

Roof Covering:	Galvanized ribbed sheet metal, Estimated Age 25 years
	SBS Modified bituminous roofing over entry canopy
Roof Flashings:	Prefinished metal
Penetrations:	Sheet metal ducts, iron and PVC piping
Roof Drainage System:	Prefinished metal gutters and downspouts, discharge to grade and lower roof surfaces

Existing Exterior Envelope System

Exterior Wall Covering:	Ribbed metal siding, split-faced CMU veneer
Exterior Doors and Frames:	Hollow metal
Storefronts:	Anodized aluminum with full glazing
Overhead Garage Doors:	Steel
Entry Walkways:	Concrete
Entry Driveways:	Asphalt and gravel
Surface Drainage:	Level grade around building perimeter

2.2 Existing Structural Systems

The existing building structural framing systems for both the Phase 1 and Phase 2 structures are pre-engineered metal buildings. There are some as-built drawings available for the building foundations and partitions but no drawings are available for the pre-engineered building structures.

2.3 Existing Mechanical Systems

The following section outlines the existing mechanical heating, ventilation, and dehumidification systems. Recommendations for existing and new mechanical systems can be found in Section 4.3.

There is a gas unit heater located on the mezzanine in the ice rink area as seen in Figure 2.3-1. This heater most likely served the entry area at one point and was relocated here after it stopped working. An additional gas unit heater is located above the ticket office in the soccer area as seen in Figure 2.3-2. This heater was abandoned in place and no longer in working condition.

The ticket and back of house office areas are served by a ducted furnace with a direct expansion (DX) cooling coil as seen in Figure 2.3-3. This unit appears to be in operational order with no issues. The skate rental area is served by a ducted fan coil as seen in Figure 2.3-4. This unit appears to be in operational order with no issues.

Figure 2.3-1: Gas Unit Heater – Ice Rink Area

Figure 2.3-2: Gas Unit Heater – Soccer Area

Figure 2.3-3: Gas Furnace w/ DX Coil – Ticket Office Area

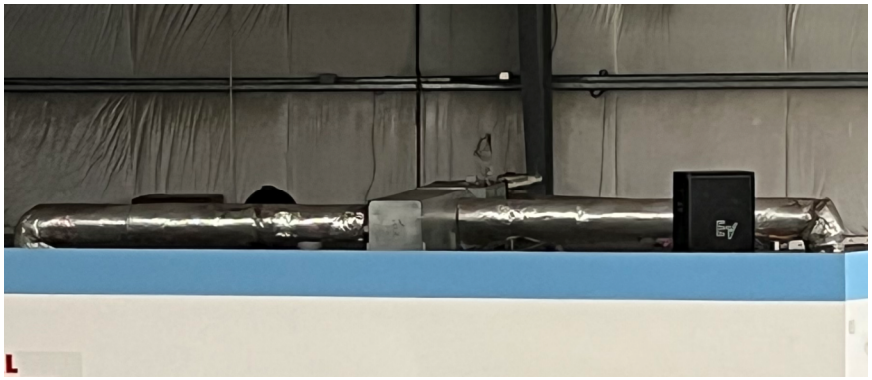


Figure 2.3-4: Ducted Fan Coil – Skate Rental Area

There are two gas ducted furnaces on the mezzanine in the ice rink area serving the dressing rooms, restrooms, and kitchen as seen Figure 2.3-5,6,7,8. These systems appear to be in operational order with no issues.

Figure 2.3-5: Ducted Furnaces – Dressing Rooms, Restrooms, Kitchen Areas

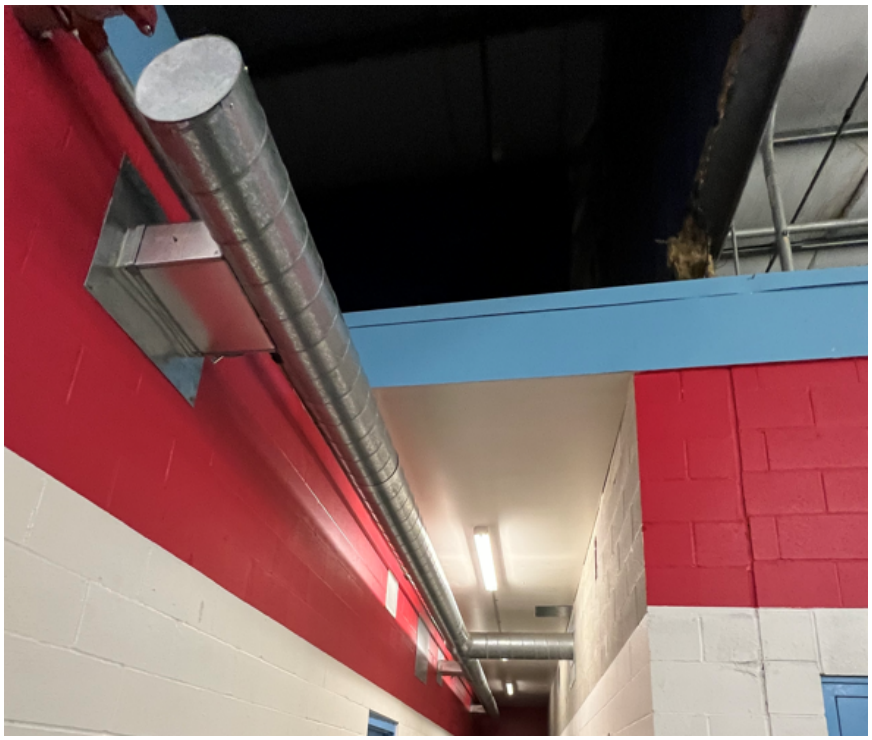


Figure 2.3-6: Furnace Ducting to Dressing Rooms

Figure 2.3-7: Furnace Ducting & Return Grille

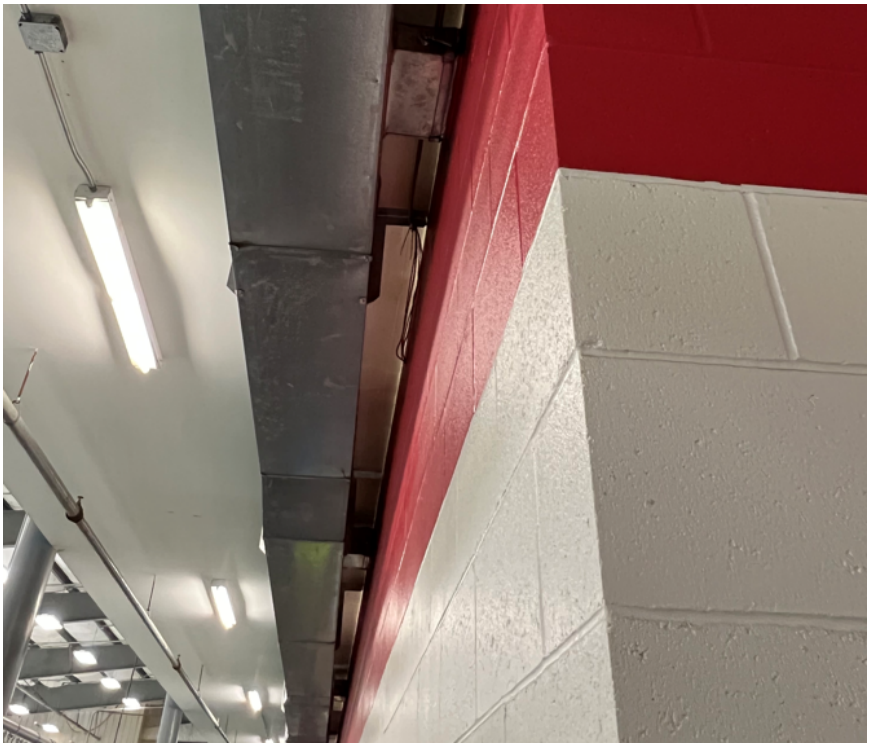


Figure 2.3-8: Furnace Ducting to Restrooms & Kitchen

There is a dehumidifier serving the Ice Rink area located outside as seen in Figure 2.3-9. The supply air is ducted two-thirds the way down the Ice Rink and the return air grille is located in the wall as seen in Figure 2.3-10. This system appears to be in working order and is necessary to keep the humidity levels within desirable levels to prevent the many issues associated with high humidity levels. For additional information, refer to the Ice Rink Mechanical Equipment section 4.3.

Figure 2.3-9: Dehumidifier Serving Ice Rink Area

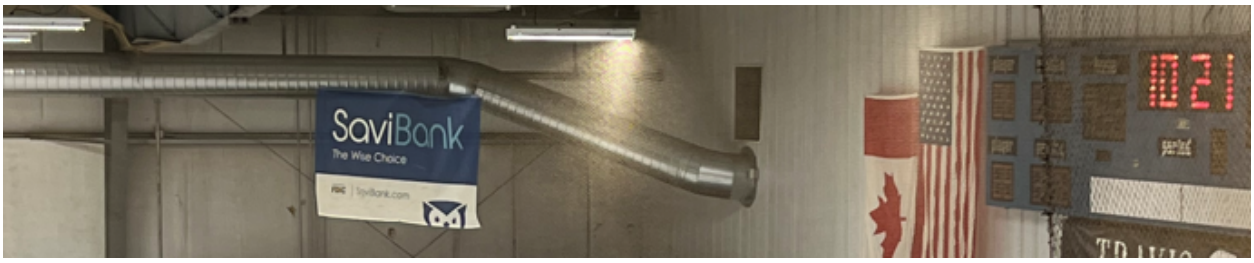


Figure 2.3-10: Dehumidifier Supply Ducting & Return Grille

2.4 Existing Electrical Systems

The following section outlines the existing electrical systems. Recommendations for existing and new electrical systems can be found in Section 4.4.

There are two main electrical rooms in the facility, both adjacent to the ice rink. The first is a 480volt, Electrical Room as shown in Figure 2.4-1 which is located in the southwest corner of the ice rink. The second is a 208volt, Electrical Room as shown in Figure 2.4-2 which is located in the northwest corner of the building.

Figure 2.4-1: 480V Electrical Service Entrance Distribution Board

Figure 2.4-2: 208V Electrical Distribution Equipment

Generator Set

A 30kW 208volt, 3phase, 4wire diesel-fired generator set is installed in the 'Zamboni Storage' area as shown in Figure 2.4-3. The generator set is connected thru an automatic transfer switch located in the 208volt electrical room feeding panelboard LC1. LC2 is sub-fed from LC1. Loads connected to the generator include corridor lighting, locker room lighting, fire alarm control panel, telephone equipment, kitchen lighting, coffee maker, and concession stand.

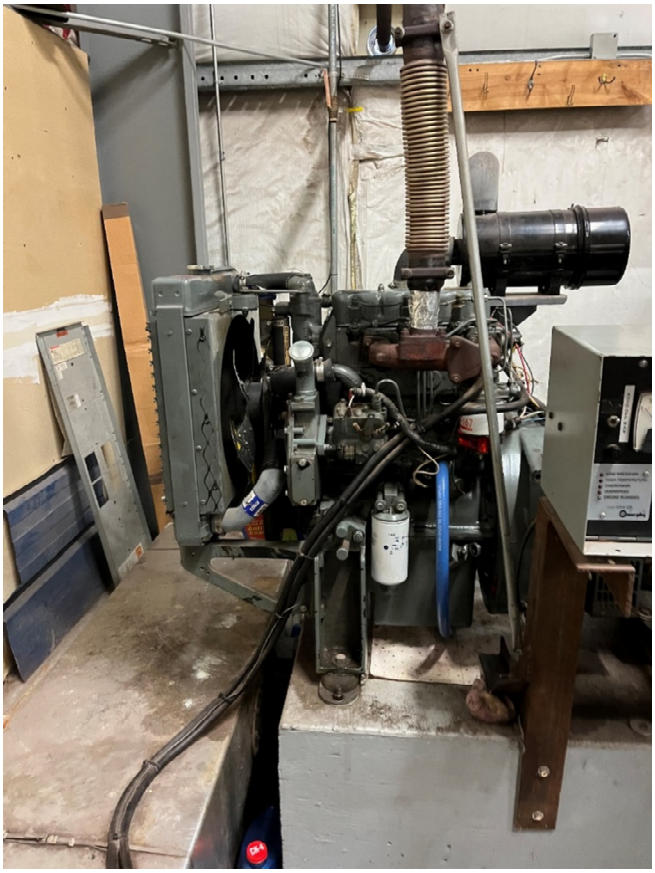


Figure 2.4-3: Generator Set

Existing Utility Service

The existing electrical service is delivered underground from a pad mount transformer at the southwest exterior of the building. The electrical service is connected to an 800amp, 480/277volt, 3 phase, main service distribution switchboard located in the main electrical room in the southwest corner of the ice rink, see Figure 2.4-1.

Power System

The main service switchboard is feeding three 480volt panels and one 208volt panel thru a 112.5kVA transformer located in the 208volt electrical room. The 480volt distribution equipment feed lighting systems at 277volts, motor loads, and a refrigeration skid. The 400amp, 208volt distribution panel is feeding four 208volt panelboards.

The 400A, 208volt distribution panel 'DR' feeds lighting, receptacles, equipment, and branch circuit panelboards; LC1, Shop Panel, SE Corner Panel and Kitchen Panel. Panel DR feeds LC1 thru an automatic transfer switch connected to a 30kW diesel fired generator set, Figure 2.4-3. Panel LC1 is sub-feeding Panel LC2.

Lighting Systems

The existing lighting system consists of fluorescent and high-intensity discharge (HID) lighting fixtures as shown in Figure 2.4-4. LED type lamps are found to be in use as replacement fluorescent lamps in strip lights throughout the facility. HID fixtures are in use at the exterior building perimeter. Four-foot fluorescent surface mount, wrap-around fixtures are in use at the concession room and offices. The rink and field lighting fixtures are open lensed suspended 6-lamp fluorescent fixtures.

Lighting systems are controlled by single pole toggle switches and circuit breakers.

Figure 2.4-4: Lighting Systems

Fire Alarm System

The existing fire alarm system is a Silent Knight Model 5207 system manufactured by Honeywell as shown in Figure 2.4-5. The Model 5207 is an 8-zone fire alarm control panel expandable to up to 16-zones for smoke detection, annunciation, and fire sprinkler supervision, for use with Class A and B circuits. This system connects to two separate telephone lines to report data to the central station. The system is designed to switch phone lines and attempt to use the second line should the first line fail to report. If the phone voltage drops below 3vdc and is not corrected within 40sec an audible trouble signal will sound at the panel and the panel will report a line fault.

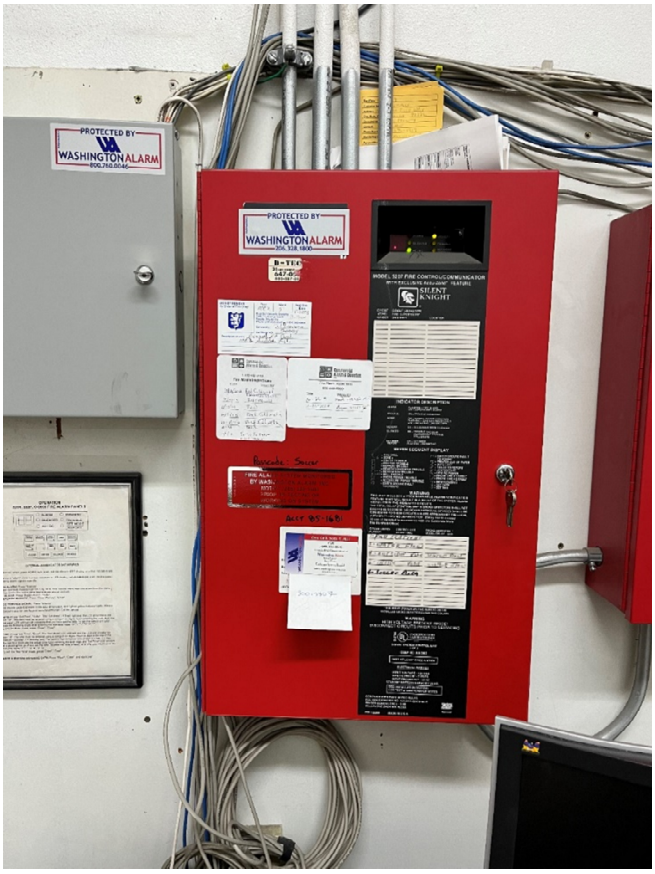


Figure 2.4-5: Fire Alarm System

Circuit Breakers

Breakers were observed to be tapped in the on-and-off positions and it appears that they receive frequent manual use as shown in Figure 2.4-6 and Figure 2.4-7.

Figure 2.4-6: Circuit Breakers

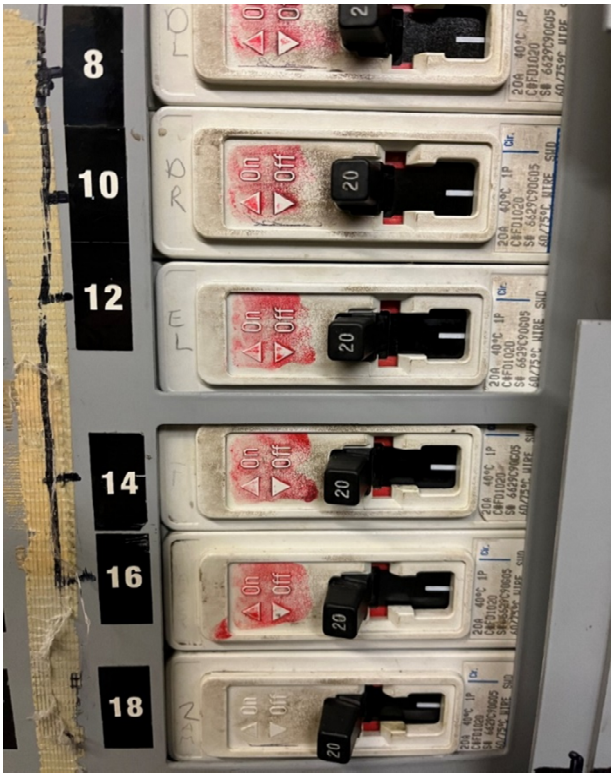


Figure 2.4-7: Circuit Breakers

END OF SECTION

3 OBSERVATIONS

3.1 Building Envelope

Roofing System

Method of Inspection: Visual inspection on January 11, 2022. Photos of the building envelope systems are included in Appendix A.

The existing sheet metal roofing is in poor condition with active leaks. Pipe penetration boots and more than 25% of the sheet metal fasteners have failed. Lapping of ribbed sheet metal roofing is not staggered and gaps are visible at laps in some places, permitting water intrusion. To addressing leaking, caulking has been applied to failed fastener holes, sheet metal laps, and gaps at perimeter flashing. Gutters have been installed without proper lapping at ties. Many downspouts are bent and deformed and one along the south elevation has failed from corrosion. Some downspouts on the north elevation are poorly located, draining directly onto lower rooftops. Exterior water intrusion and condensation have saturated the interior fiberglass roof insulation on both the north and south sides of the building and is no longer performing its intended purpose. Deterioration of the roof insulation system is worse at the north end of the building. Higher levels of humidity and inadequate ventilation is likely the cause of increased moisture build-up between the fiberglass insulation and metal roofing. Above the ice rink, the facing of the vapor barrier has numerous small holes reportedly due to hockey puck penetrations.

Problems due to wet insulation:

- Loss of insulation R-value
- Loss of protection from radiant heat transfer
- Likely mold and mildew in insulation
- Likely rust/oxidation on underside of sheet metal roofing
- Saturated and sagging insulation blanket
- Interior roof and wall air barrier is compromised in multiple locations

Exterior Envelope Systems

The exterior walls of the building are generally in fair condition. Metal siding shows some signs of aging and soiling, with a few scratches and dents. Less than 10% of observable fasteners are rusted, but appear otherwise sound. Concrete and CMU foundation walls are, for the most part, in fair condition, but require cleaning and maintenance. There are several areas along the north and northeast elevations where water and organic staining indicates possible water intrusion. The transition from the metal siding to the CMU foundation is different from the south and southeast walls and does not allow for positive drainage. Mortar appears to be compromised in areas where staining is visible. There are no visible cracks, spauling, or pop-outs in the CMU walls. Paint has been applied in patches to a few areas on the south and west CMU walls presumably for protection or to hide graffiti.

Interior finish surfaces range from metal paneling, CMU, coverboard, and exposed vapor barrier. In areas where the vapor barrier is exposed along the bottom 2 feet of wall, it is compromised and damaged. Holes and torn seams are also present on the center dividing wall above the locker rooms, as well as the back-of-house spaces and at the west end of the hockey arena. Pipe penetrations on the SW exterior façade are not properly sealed.

Automatic doors at the East main entry and all personnel/exit doors are functioning well. Some personnel and overhead doors have bent/dented metal trim and flashing at the exterior siding. The bottom of the exterior overhead door on the west end of the ice arena is heavily dented.

3.2 Structural Systems

The existing structural systems appear to be in good condition. No corrosion or deterioration was observed in the existing structural framing systems.

3.3 Mechanical Systems - Heating and Ventilation

It appears that the existing mechanical systems are not adequate to provide proper ventilation to the building which is leading to condensation on the interior side of the building envelope systems.

Condensation occurs when a surface is at the dew point temperature of the air that it comes into contact with. The dew point of air varies depending on the dry bulb temperature and the relative humidity of the air. For instance air at a dry bulb temperature of 60°F and a relative humidity of 60% has a dry bulb temperature of 50°. This can be determined by using a psychrometric chart as seen in Figure 3.3-1.

When the ice rinks in the north end of the building were modified to soccer fields, the mechanical systems were left as-is and ultimately were abandoned. Without a heated and ventilated spaces, the temperature of the steel beams supporting the roof is not regulated and will drop below the dew point temperature of the air in the space on a regular basis. This led to the water damage issues currently seen in the space.

The south area where the ice rink currently is located has minor water damage, mostly near the adjacent soccer area. There are two main reasons for this, the first is that the space is served by a dehumidifier with ducting along the wall furthest from the soccer area. This keeps the relative humidity on this side of the space relatively low which in turn lowers the dew point of the air reducing the chance of condensation occurring.

The second is that the air in the space is kept relatively cool by the ice rink which means the dew point is also lower and it is therefore less likely the temperature of the steel beams will drop below the dew point temperature of the air. Moving closer to the soccer area, the temperature gradient rises along with the dew point temperature, meaning condensation is more likely to occur.

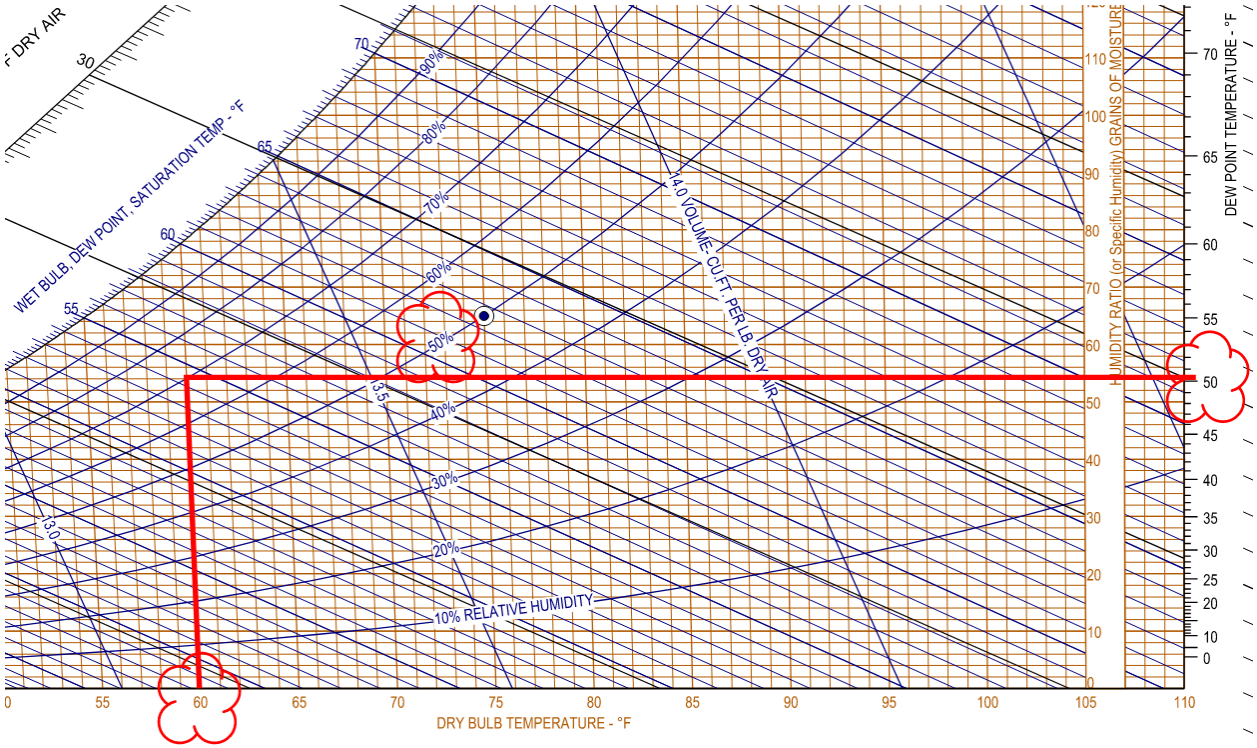


Figure 3.3-1: Psychrometric Chart – Dew Point

In order to prevent the steel beams from dropping below the dew point of the air in the space, both the soccer and ice rink areas need to be properly heated and ventilated. In addition to alleviating the condensation issue, providing heating and ventilation will also reduce the chance of mold growth in the space by reducing the relative humidity and keeping moisture from accumulating on stagnant surfaces. Thermal comfort and air quality will also be improved for the betterment of the health of the building occupants.

3.4 Electrical Systems

The electrical equipment was installed in 1997 and is now 25 years old. Electrical distribution system equipment has a typical life expectancy of 30-35 years.

The main service switchboard and panelboards appear to be in good condition. The over-current protective devices (circuit-breakers) have significant manual use.

Tape is being used to fix the breaker handle position in the ‘off’ and ‘on’ positions. Although tape is typically used to temporarily place the circuit in the off position for maintenance and used as a notice to others that the circuit is under a “work condition” it appears the use is more of a permanent condition as shown in Figure 2.4-6.

It appears that the circuit breakers receive heavy use of manually switching loads on and off, as shown in Figure 2.4-7.

The lighting systems in use are fluorescent surface and suspended fixtures for use with T8 lamps. Exterior lighting systems are building mounted high-intensity-discharge, metal halide.

There is a significant build-up of ice near the entrance to the main electrical room preventing the door from shutting correctly.

END OF SECTION

4 BUILDING IMPROVEMENT RECOMMENDATIONS

4.1 Building Envelope

Metal Roofing over Ice and Soccer Arenas:

- **Recommended Demolition:** Remove existing metal roofing and insulation assembly. Existing steel purlins and framing to remain.

- **Recommended Base Bid:** Replace with new prefinished 20 ga. standing seam metal roofing at 1:12 slope. Provide minimum R-3.5 thermal blocks (1/2" thick min.) between existing steel purlins and roofing panels. Above the purlins, provide 3.5 – 4" compressed, unfaced metal building insulation. Within purlin bays, install uncompressed, unfaced metal building insulation to achieve a minimum total U-factor of 0.031 (or R-25 + R11 Liner System). Provide a continuous "Simple Saver" vapor barrier below purlins and galvanized steel banding. An optional 20 ga. wire mesh scrim may be installed above ice area for additional impact protection if existing structure can support.

- **Two alternate options are recommended:**
    - **Alternate No. 1:** Install new 60-mil. TPO roofing, ½" coverboard and R-38 average rigid insulation over new 20 ga. sheet metal roofing. Existing steel structure to remain.
    - **Alternate No. 2:** Install new 60-mil. TPO assembly described above over the existing metal roofing. Remove existing interior insulation and vapor barrier. Clean any visible rust and abate any discovered mold at the underside of existing metal roofing. Prepare for new painting.

- **Flashings:** Install new prefinished metal flashings. Integrate to match roof panels with either new metal roofing or TPO roofing.

- **Gutters and Downspouts:** Install new properly flashed prefinished metal gutters and new downspouts connected to existing civil/stormwater connection points. Properly lap new roofing over gutter tie-ins and relocate downspouts away from lower roofs to ensure stormwater is dispersed away from the exterior of the building.

SBS Modified Bituminous Roofing (BUR) and Metal Pan Soffit at Entry Canopy

- **Recommended Replacement:** Existing BUR is 25 years old and is nearing its life expectancy (30 years). Replacement in kind is recommended.

- **Repair:** Replace missing plexiglass panel at perimeter guardrail to match existing.

- **Repair:** Refasten/repair metal paneling along perimeter of entry canopy soffit.

Exterior Envelope Systems

Interior Wall Repair: Replace damaged sections of exposed insulation and vapor barrier. Install metal siding or finish covered board at lower wall areas to match existing or to 10 feet in height.

Exterior Wall Repair: Provide full-coverage prefinished metal flashing with drip where metal siding transitions to CMU. Lap flashing under metal siding (6" min.). At exterior metal siding and flashing, remove all loose dirt and debris by air compressor blast cleaning. Remove moderate atmospheric and organic soiling with low-pressure washing and rinsing with either clean water or mild non-acidic detergent. Start at 100 PSI and do not exceed 400 PSI. Apply commercial clean and etch solution (MPI #25). Follow manufacturer recommendations for application and rinsing and safety protections.

At exterior split-faced CMU and concrete foundation walls, remove all dirt, loose mortar, biological growth, scale, powder, mortar spatters, oil and grease, paint, and any other foreign matter. Any rust stains must be removed by abrasion or by chemical cleaning. Stains that have penetrated the surface should be removed with chemical cleaning or power wire wheel grinding. Oil and grease should be removed by a TSP wash (50 grams per liter or ½ lb. per gallon, plus or minus, depending upon requirements). Follow by a thorough rinsing with clean water. Allow surface to dry out completely (moisture content in, and on the substrate shall not exceed 12%). Use specific paint/graffiti removers. Cleaners containing acid, hydrochloric (HCL), Hydrofluoric, muriatic acid or ammonium bifluoride are not acceptable. Cracks, holes, broken off corners, joints, and other surface imperfections must be repaired and filled with an appropriate concrete-based material. All patches are to be made flush with adjacent/adjoining surfaces and blend with texture and appearance to the greatest extent possible. Such patches must be dry and fully cured before application of any finish coatings. Reseal concrete and CMU walls with water repellent and anti-graffiti sealers.

Penetration Sealing: At open pipe penetrations, remove existing exterior siding. Provide insulation around piping and install galvanized or prefinished sheet metal "quick flashing" at exterior side of pipe penetration. Provide continuous sealant around pipe opening. Reinstall existing metal siding over flashing.

4.2 Structural Systems

The existing structural systems appear to be in good condition and no improvements or repairs to existing structural systems are recommended at this time. Structural strengthening of the mezzanine level floor joists may be needed in the future to support new mechanical equipment depending on the preferred mechanical equipment weights and locations selected as part of the final design. Further investigation may be needed to determine structural strengthening needs.

All of the proposed roof replacement assemblies do not increase the roof dead load by more than 3 pounds per square foot so it is assumed that no structural evaluation or modifications to the existing building structure will be required per the 2018 International Existing Building Code (IEBC) Section 706.2, Exception 2.

4.3 Mechanical Systems - Heating and Ventilation

The existing mechanical heating and ventilation systems serving both the ice rink and soccer areas should be removed or abandoned in place and new code compliant heating and ventilation system should be installed. The existing heating and ventilation systems serving the enclosed back-of-house spaces are assumed to be working adequately and not contributing to the water condensation issue and are therefore excluded for the purposes of this study.

To size the new mechanical equipment, heating load and ventilation calculations have been performed and can be found in Appendix G. The heating load and ventilation calculations were performed with the following assumptions:

- Minimum ventilation rates required per 2018 Washington State Mechanical Code, refer to Appendix G for ventilation calculations
- Ventilation air to be tempered by heat recovery and duct heaters
- Soccer fields indoor design temperature of 72°F
- Ice rink indoor design temperature of 55°F and 60% RH

The existing heating systems serving the ice rink and soccer areas are natural gas unit heaters. Due to the carbon footprint, the City of Bellingham is phasing out the use of natural gas heating systems in addition to resistance heating as the main source of heating. The recommended heating system type is therefore heat pumps. The downside of heat pumps in cold climates is that they need to utilize a defrost cycle during regular intervals to prevent the exterior condensing unit coils from freezing. During this time, the heat pump typically will be unable to provide heat to the space. Electric resistance heat is provided as a backup heat source to function during these defrost cycles. Refer to Appendix E for preliminary cut sheets of recommended heating equipment.

For ventilation, a dedicated outdoor air system (DOAS) with energy recovery is required per the 2018 Washington State Energy Code. Providing a separate heating and ventilation system will allow the ventilation system to be sized only as required to provide adequate fresh air and the heating system to cycle on and off to meet thermal load requirements in the space allowing a net gain in energy savings. In addition, the DOAS system will recover heat to bring up the incoming outdoor air temperature prior to tempering the air as it enters the building.

The combination of these systems balances upfront cost and energy efficiency to reduce cost of operation to provide the most cost-effective solution that meets the new energy code requirements.

Ice Rink Mechanical Equipment

There are many issues associated with the control of the air conditions in ice rink spaces. These issues are primarily associated with humidity in the air which can cause fog, condensation, drips,

mildew stains, peeling paint, rust, and poor ice quality. It is recommended that a desiccant dehumidifier be utilized to efficiently regulate humidity conditions so that the issues associated with poor air conditions in ice rinks can be eliminated.

Indoor design conditions play a big role in the sizing of ice rink dehumidification systems. The recommended design temperature of the space is from 55°F-60°F and the recommended relative humidity of the space is from 40%-70%. For the purposes of this investigation, a design temperature of 60°F and a relative humidity of 70% have been assumed.

The ice sheet provides the entire cooling requirement so the mechanical systems primary function in an ice rink is to dehumidify. The outside air is the largest dehumidification load for the rink. By incorporating carbon monoxide and carbon dioxide sensors or occupied/unoccupied mode time clock will allow a reduction in the amount of outside air being delivered to the space.

Dehumidification systems that treat outdoor air prior to entering the space are costly; therefore, a recirculation system integral to the Air Handling Unit that provides heating for the space used in tandem with the ventilation system is recommended. Refer to Appendix E for preliminary cut sheets of the dehumidification system.

2018 Washington State Energy Code Section C406 Requirements

The substantial building improvements outlined in this report may trigger the building to be brought up to full code compliance. The 2018 Washington State Energy Code section C406 outlines additional energy efficiency options that would be required due to the change in space conditioning associated with the addition of cooling to the space.

The project would need to achieve a minimum of eight credits outlined in table C406.1. Possible options for meeting this requirement include the following:

- Option 1 (3 points): More efficient HVAC performance by providing space conditioning systems that are 15% or higher than the minimum code requirement
- Option 6 (4 points): Dedicated outdoor air system with energy recovery meeting the requirements of section C406.6
- Option 2 (2 points): Reduced lighting power option 1 in accordance with section C406.3.1
- Option 4 (1 point): Enhanced lighting controls in accordance with section C406.4

To achieve the eight credits, it is recommended that either of the two combinations be used:

- Combination 1 (Option 1, Option 6 and Option 4): The HVAC credits are relatively easy to achieve since the heating and ventilation systems are separate. This combination utilizes enhanced lighting controls in lieu of reduced lighting power and is recommended if reducing the lighting power is not possible or not cost effective.

- Combination 2 (Option 1, Option 6, & Option 2): The HVAC credits are relatively easy to achieve since the heating and ventilation systems are separate. This combination utilizes reduced lighting power in lieu of enhanced lighting controls and is recommended if enhanced lighting controls is not possible or not cost effective.

Recommended Mechanical Equipment List

Recommended Base Bid: Provide the following equipment:

- Air Handling Unit including heat pump, backup electric resistance heat, and desiccant dehumidification for Ice Rink, remove the existing dehumidification unit.
- Air Handling Unit including heat pump, backup electric resistance heat for Ice Rink Deck.
- Air Handling Unit including heat pump, backup electric resistance heat for Northeast Soccer Field.
- Air Handling Unit including heat pump, backup electric resistance heat for Northwest Soccer Field.
- Air Handling Unit including heat pump, backup electric resistance heat for Soccer Deck.
- Two Energy Recovery Ventilation units with duct heaters for the Ice Rink Area.
- Two Energy Recovery Ventilation units with duct heaters for the Soccer Area.

Value Engineering Alternate: Provide the following equipment:

- Air Handling Unit including heat pump with backup electric resistance heat for Ice Rink and Ice Rink Deck, existing dehumidification unit to remain.
- Air Handling Unit including heat pump with backup electric resistance heat for Soccer Fields & Soccer Deck.
- Two Energy Recovery Ventilation units with duct heaters for the Ice Rink Area.
- Two Energy Recovery Ventilation units with duct heaters for the Soccer Area.

The base bid includes additional air handling units that allows for better zoning based on exterior exposures. This will allow for better thermal comfort by providing individual thermostat control for each of the additional zones. The base bid system would also utilize less energy than the VE alternate since it will be controlling to smaller zones. In addition, the ice rink dehumidification system would be replaced with a desiccant dehumidification system that utilizes a heat pump in lieu of natural gas.

Refer to Appendix E for preliminary cut sheets of recommended heating equipment.

Refer to Appendix C for schematic mechanical drawings showing preliminary equipment locations and airflow distribution to provide heating and ventilation.

4.4 Electrical Systems

An electrical service upgrade is recommended due to the added mechanical equipment loads, overcurrent protection, and feeder connection capacity. Refer to Appendix H for electrical load calculations. Refer to Appendix I for new mechanical equipment schedule and associated electrical connections.

A new 480-volt, 1600-amp, 3-phase, 4-wire, service distribution switchboard is recommended to replace the existing 800amp switchboard. New and existing panelboards are to be fed from the new switchboard. Two new 400-amp, 480-volt, 3-phase, 4-wire panelboards are required to feed new mechanical loads. The existing panelboards appear to be in good condition and are not in need of upgrade or replacement. The existing over-current protective devices (circuit-breakers) have significant wear. It is recommended that circuit breakers be tested and replaced as required.

Tape is being used to fix the breaker handle position in the ‘off’ and ‘on’ positions. Although tape is typically used to temporarily place the circuit in the off position for maintenance and used as a notice to others that the circuit is under a “work condition” it appears the use is more of a permanent condition. Tape on the breaker handle may impede the operation of the over-current protection device and it is recommended that it be removed. See Figure 2.4-6.

It appears that the circuit breakers receive heavy use of manually switching loads on and off, Figure 2.4-7. A new lighting control system may reduce the need to switch loads off and on from the panelboards. If the desire is to frequently switch the breakers, they should be replaced with SWD rated units. Circuit breakers have a life expectancy of 35 years under normal use. Approximately 42, 20-amp, 1-pole, breakers are recommended for replacement.

It is recommended that the entire facility receive lighting upgrades to high performance, energy efficient, LED lighting fixtures throughout designed to perform in accordance with the Illuminating Engineering Society recommendations. A new LED system will reduce energy consumption and increase system longevity. Exit signs should be replaced with new LED type signs. There are approximately 180, 6-lamp fluorescent T8, suspended luminaires providing rink and field illumination producing over 16k lumens each recommended for replacement. A one-to-one lighting fixture replacement would minimize the cost of circuiting adjustments. New lighting control cabinets can be installed adjacent to the existing branch circuit panelboards to provide facility wide lighting control system upgrades.

Although there are some wall box occupancy sensors in use; it is recommended that an improved energy saving lighting control system, for use with occupancy sensors, should be employed in all offices, restrooms, locker rooms, storage rooms, etc. reduce energy consumption.

An automated lighting control system with manual override capabilities is recommended at the ice-rink and field to better control lighting systems and eliminate circuit breaker switching.

There is a significant build-up of ice near the entrance to the main electrical room preventing the door from shutting correctly. This door should be secured.

The existing fire alarm system should be replaced with a new addressable system updated with current technologies for annunciation and communications upgrades.

Although the generator set appears to receive the appropriate maintenance and testing, it is recommended that this system be replaced as it has met its useful life expectancy. An exterior mounted 100kW diesel fired generator set, in a self-contained, sound attenuated, weather-proof enclosure is recommended. A new 480volt, 4pole, 150amp automatic transfer switch and 480volt, 200amp, 3phase panelboard is recommended to feed new egress lighting systems and existing 208volt equipment currently feeding genset loads.

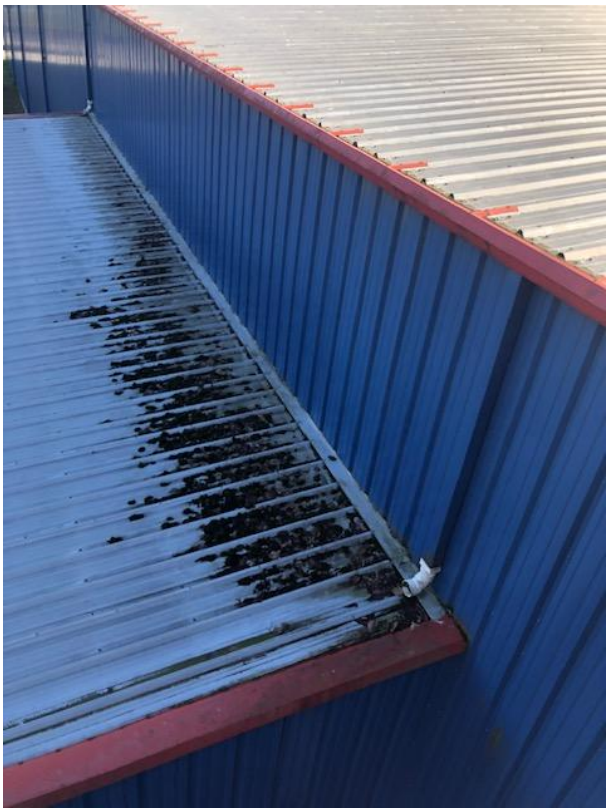
Refer to Appendix D for schematic electrical drawings showing the recommended improvements to power new mechanical equipment.

END OF SECTION

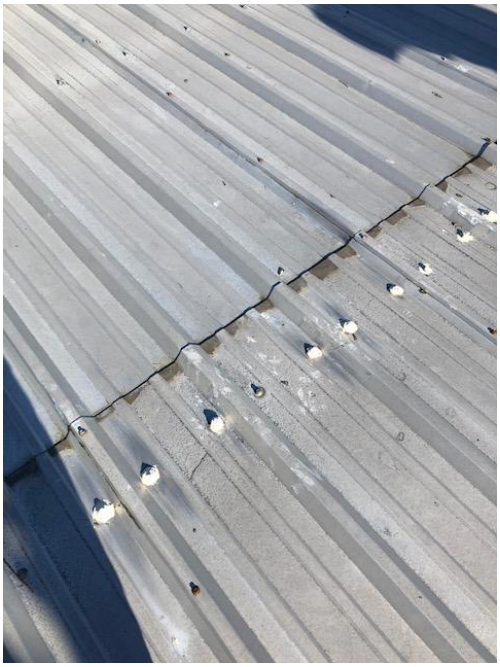
Appendix A – Existing Envelope Condition Photos

Existing Envelope Conditions

February 11, 2022



Existing downspouts on north end drain on to lower roofs. For better stormwater dispersion, relocate downspouts to drain directly away from the building.



Lapping of metal roofing panels is not staggered and there are many gaps at lap locations allowing for water intrusion.

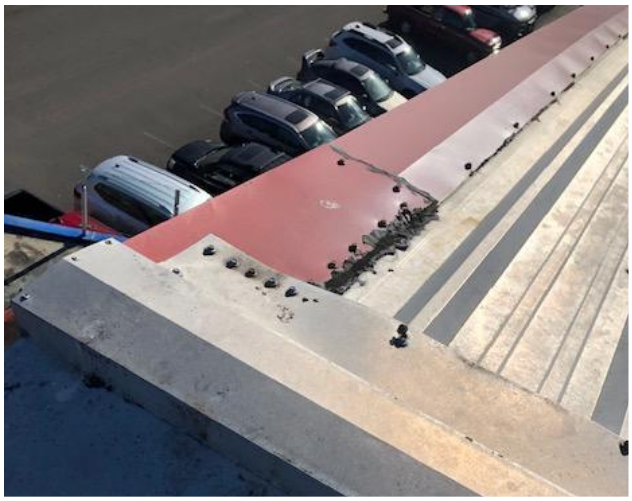
Existing downspouts bent, dented or corroded through. Damaged gutters to be replaced and connected to existing stormwater drainage system.

Existing gutter standoffs are improperly installed over top the metal roofing. New gutters to be installed with roofing lapped over the ties.

Over 25% fasteners have failed from corrosion. Caulking has been applied to fasteners in many locations.

Debris build-up at ridge flashing retains moisture. This condition can lead to water intrusion.

Pipe penetration boots and seals have failed. Replacement required.



Many flashings are loose or bent and do not provide a weather tight seal. Temporary caulking has been applied in many locations.

At east entry canopy guardrail, replace missing plexi-glass panel.

Repair loose metal panel at north end of entry canopy soffit.

Failed sag-N-bag insulation below existing roof. Water damage and deterioration is significantly worse of the north end of the building (soccer arena) where the level of indoor humidity is higher. This condition suggests inadequate ventilation. Insulation to the replaced with new roofing assembly meeting current Washington State Energy Code. Improvements to building ventilation system recommended.

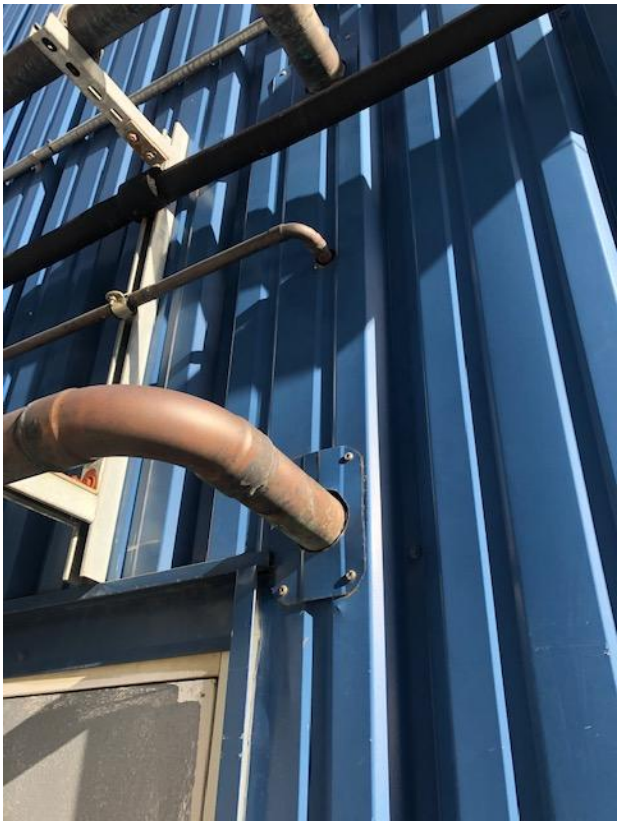
Exposed vapor barrier is damaged in numerous ceiling and wall locations from hockey pucks on south end of building (ice arena). Replacement recommended with wire mesh protection.

Insulation and vapor barrier damage at emergency exit on the west end of the ice arena.

Insulation and vapor barrier damage on south wall of ice arena.

Failed seams in vapor barrier above locker rooms.

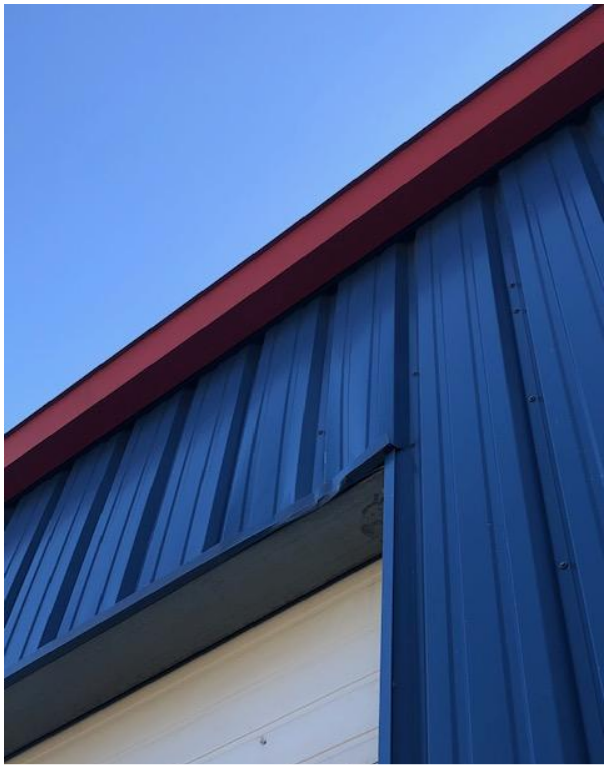
Water intrusion and interior insulation and vapor barrier damage is found in many locations on the south side of the building.



Proper flashing and weathersealing is needed at southwest exterior wall penetrations.

Repair damaged metal siding and flashing at Southeast corner of building. Gently clean and remove paint from CMU and reseal with anti-graffiti and weather protective coating.

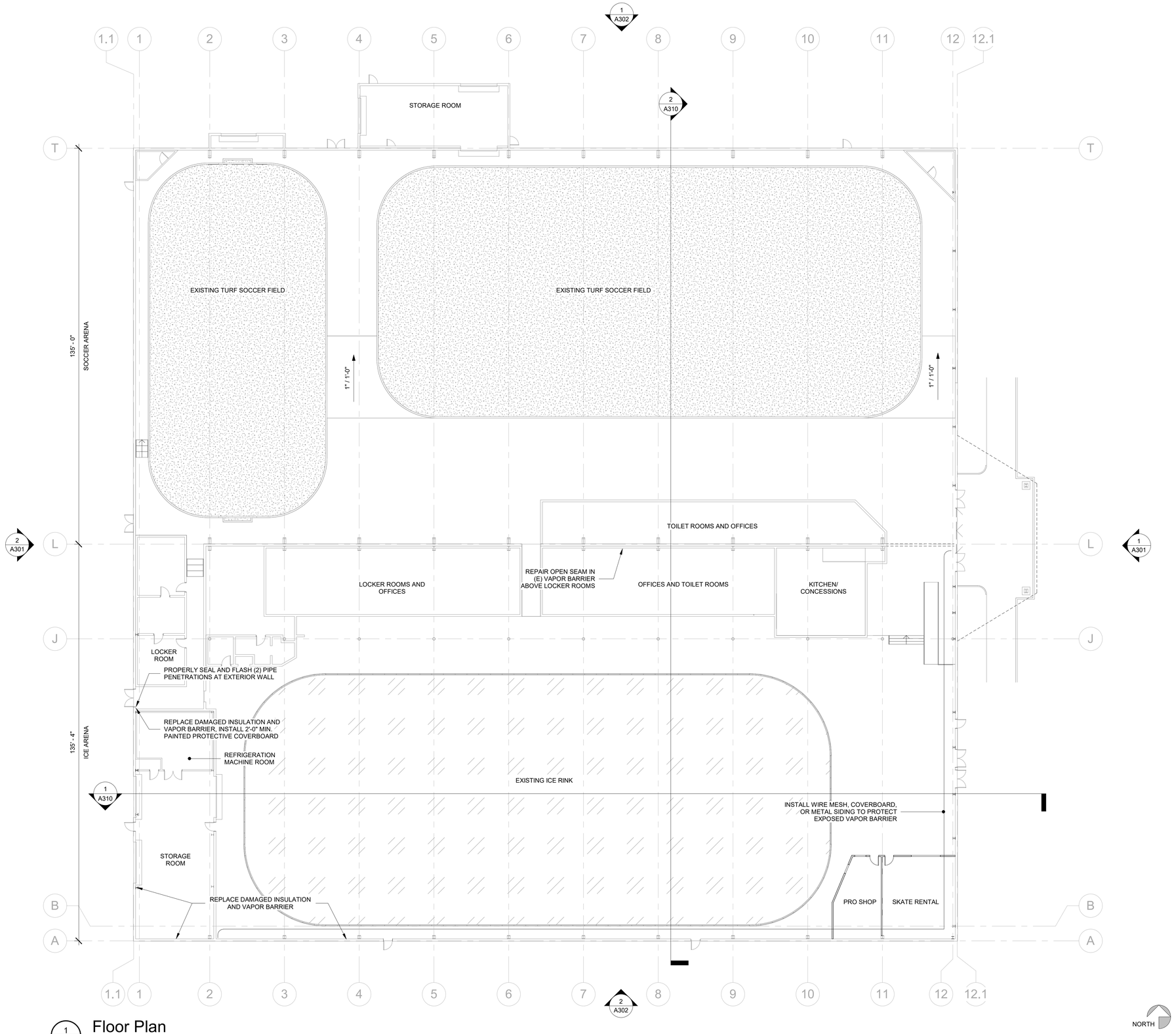
Likely water intrusion at concrete and CMU foundation walls where there is improper flashing at transition from metal siding. Providing flashing with positive drainage is recommended. Gently clean exterior walls and remove organic staining. Repair damaged mortar joints.



Damaged and improperly lapped metal trim at exterior doors can lead to water intrusion and build-up of organic growth. Properly lapped header flashing is recommended.

Heavy denting at west overhead door inhibits a weather-tight seal. Repair or replacement recommended.

Appendix B – Schematic Architectural Drawings



1 A201 **Floor Plan**

1/16" = 1'-0"

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City of Bellingham

Sportsplex Envelope Repairs

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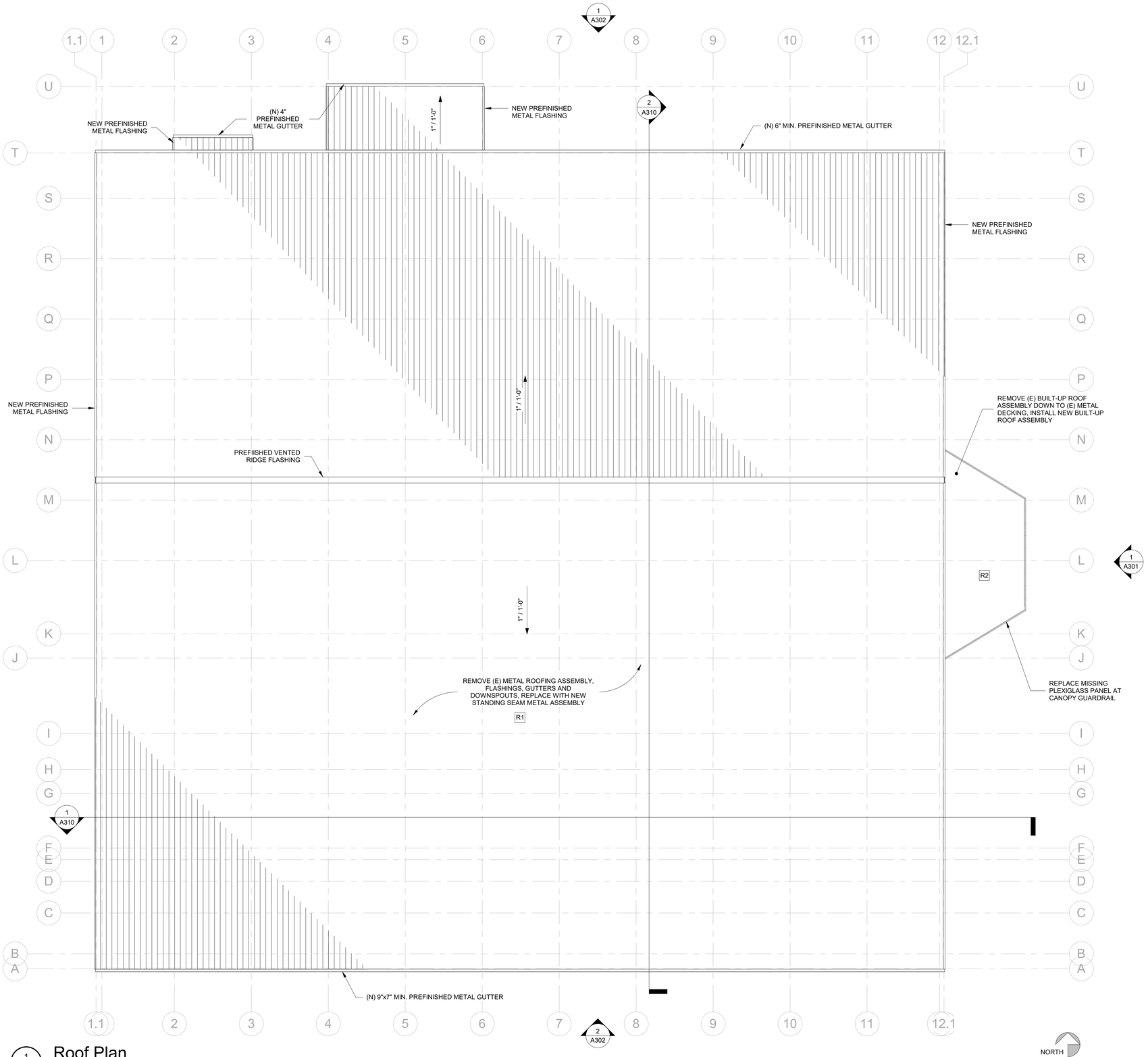
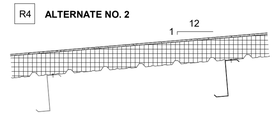
FLOOR PLAN

A201



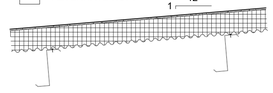
1 A202 **Roof Plan**
1/16" = 1'-0"

R4 **ALTERNATE NO. 2**



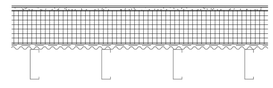
NON-RATED TPO MEMBRANE AND EXISTING METAL ROOFING ASSEMBLY
- NEW 60 MIL. TPO ROOFING MEMBRANE
- 1/2" MIN. COVERBOARD
- R-38 (AVERAGE) RIGID INSULATION
- NEW 20 GA. SHEET METAL DECKING
- EXISTING STEEL STRUCTURE

R3 **ALTERNATE NO. 1**



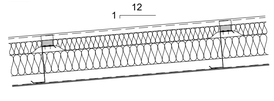
NON-RATED TPO MEMBRANE AND NEW METAL DECKING ASSEMBLY
- NEW 60 MIL. TPO ROOFING MEMBRANE
- 1/2" MIN. COVERBOARD
- R-38 (AVERAGE) RIGID INSULATION
- NEW 20 GA. SHEET METAL DECKING
- EXISTING STEEL STRUCTURE

R2 **BASE BID - ENTRY CANOPY ROOF**



NON-RATED MODIFIED BITUMINOUS ROOFING ASSEMBLY
- TORCH APPLIED MODIFIED BITUMINOUS BASE, MID AND CAPSHEET WITH TWO PLY FLASHINGS
- 1/4" GLASS FIBERINFOCED GYPSUM COVERBOARD, ADHERED
- R-38 (AVERAGE) POLYISO INSULATION, MECHANICAL FASTENED, TAPERED TO DRAIN
- VAPOR RETARDER / TEMPORARY ROOF MEMBRANE
- EXISTING SHEET METAL DECKING
- EXISTING STEEL STRUCTURE
- EXISTING METAL PAN SOFFIT FINISH

R1 **BASE BID - MAIN BUILDING ROOF**



NON-RATED STANDING SEAM METAL ROOFING ASSEMBLY
- NEW PREFINISHED STANDING SEAM METAL ROOFING ON R-3.5 MIN.THERMAL SPACER BLOCK
- NEW R-25 METAL BUILDING INSULATION, COMPRESSED, UNFACED
- EXISTING METAL PURLINS ON MAIN-FRAME RAFTER
- NEW R-11 METAL BUILDING INSULATION, UNCOMPRESSED, UNFACED BETWEEN PURLINS
- NEW CONTINUOUS POLYETHYLENE VAPOR BARRIER (WHITE) LINER SYSTEM
- GLAVANIZED STEEL BANDING

2 A202 **Proposed Re-roof Assemblies**
1/2" = 1'-0"

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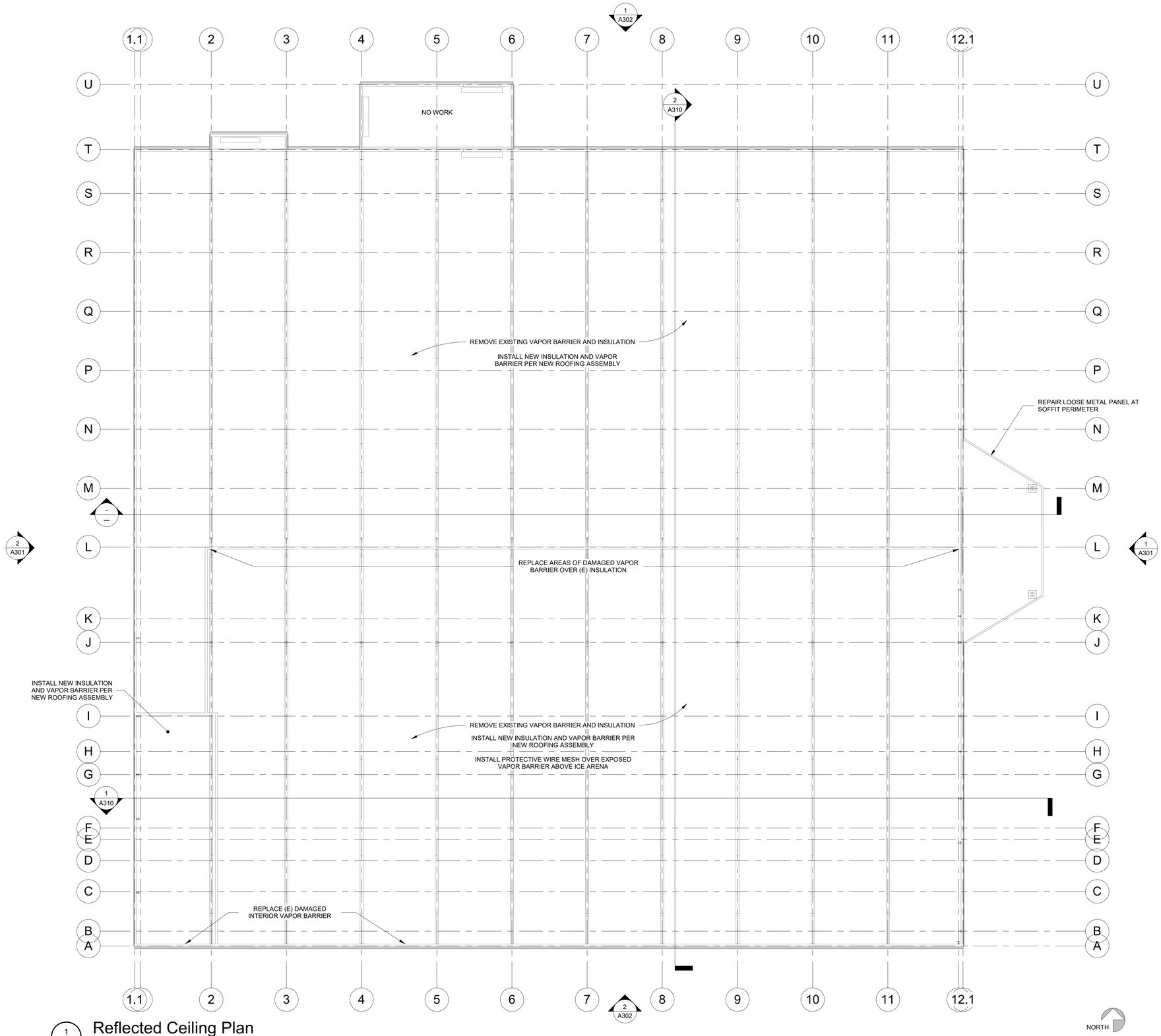
ROOF PLAN

A202



1 / A210 Reflected Ceiling Plan

1/16" = 1'-0"

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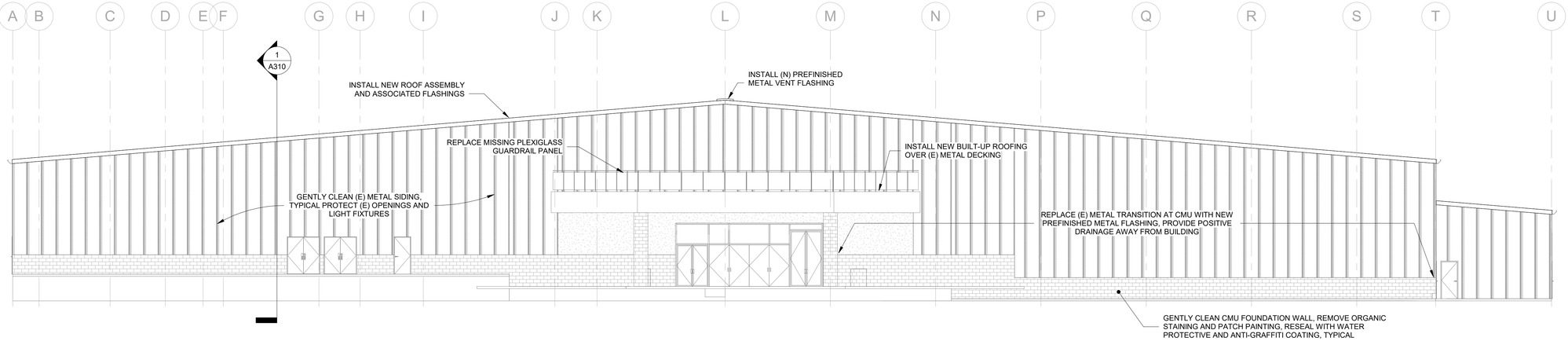
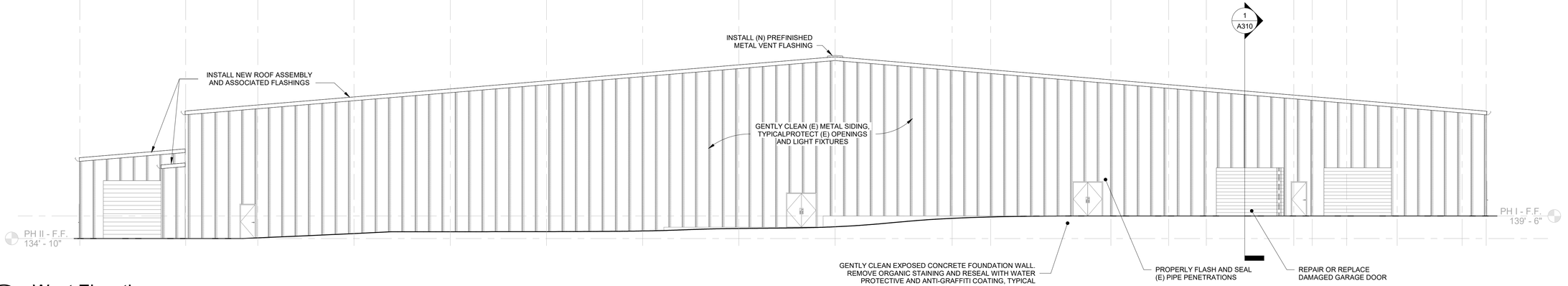
REFLECTED CEILING PLAN

A210



1 / A301 East Elevation

3/32" = 1'-0"



2 / A301 West Elevation

3/32" = 1'-0"

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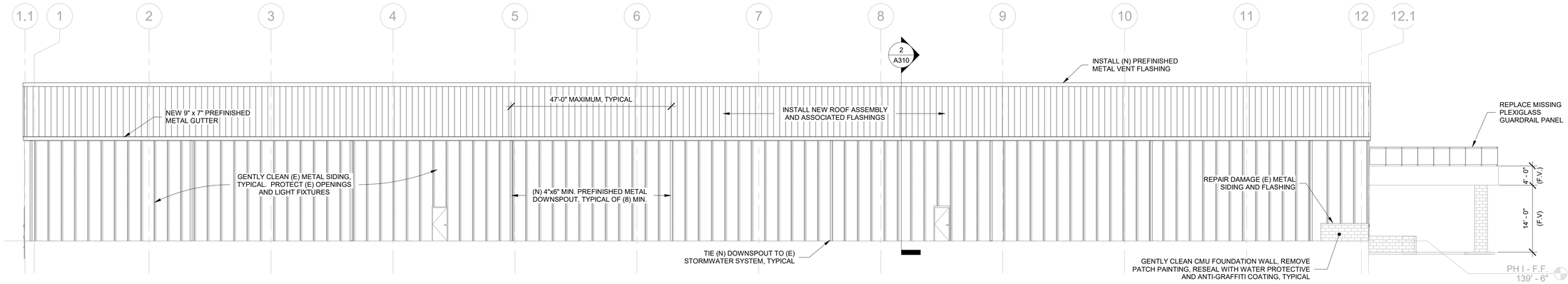
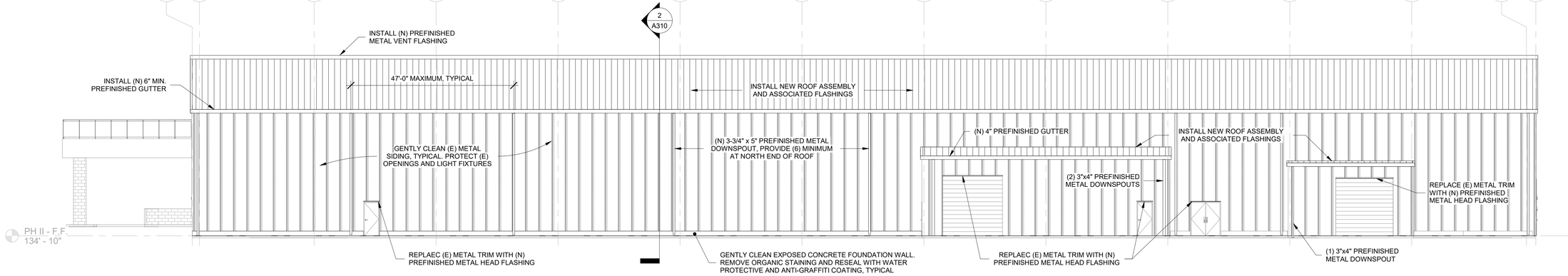
EXTERIOR ELEVATIONS

A301



2 / A302 **South Elevation**

3/32" = 1'-0"



1 / A302 **North Elevation**

3/32" = 1'-0"

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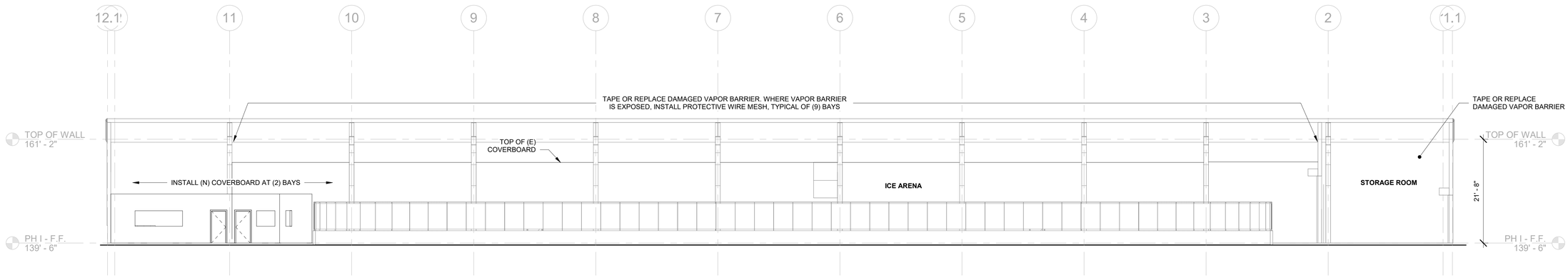
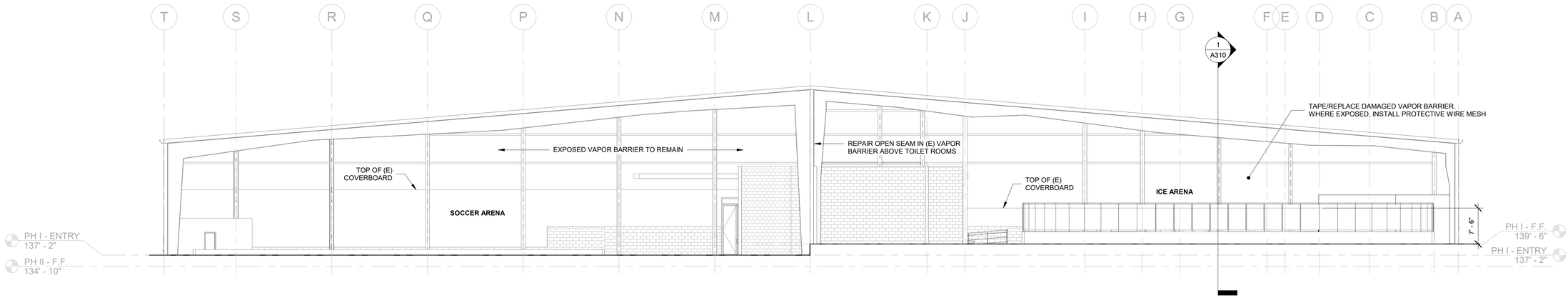
EXTERIOR
ELEVATIONS

A302



1 / A310 E/W Section at Ice Arena

3/32" = 1'-0"



2 / A310 N/S Building Section

3/32" = 1'-0"

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BUILDING SECTIONS

A310

Appendix C – Schematic Mechanical Drawings

AIR HANDLING UNIT SCHEDULE

TAG	LOCATION	AREA SERVED	MAKE & MODEL	OUTDOOR UNIT	SUPPLY FAN SECTION										ELEC. HEAT					HEATING COIL		FILTERS	EQUIPMENT				DISCH. AIR DUCT SIZE	REMARKS
					TYPE	TOTAL CFM	TSP (IN. WG)	ESP (IN. WG)	MOTOR QTY	MOTOR HP	MOTOR VOLTS	MOTOR PH	MCA	MOP	VOLTS	PH	EDB ° F	LDB ° F	KW	AMBIENT DB/WB ° F	TOTAL MBH		WEIGHT LBS	L IN.	W IN.	H IN.		
AHU-1	MEZZANINE	ICE RINK	BASX DESICCANT	CU-1	ARRAY	4,000	3.0	1.5	1	3.8	460	3	18.5	25	460	3	68	88	50.6	24/23	624.0	MERV-8	3,900	192	54	66	50x24	1,2,3,4
AHU-2	MEZZANINE	ICE RINK DECK	DAIKIN CAH010GDQM	CU-2	ARRAY	4,000	3.0	1.5	2	3.7	460	3	18.5	25	460	3	68	88	50.6	24/23	191.9	MERV-8	2,600	182	42	54	38x16	1,2,3,4
AHU-3	MEZZANINE	NE SOCCER FIELD	DAIKIN CAH017GDQM	CU-3	ARRAY	4,000	3.0	1.5	1	3	460	3	10.3	15	460	3	68	88	21.5	24/23	527.8	MERV-8	3,800	192	54	66	50x24	1,2,3,4
AHU-4	MEZZANINE	NW SOCCER FIELD	DAIKIN CAH0096GDQM	CU-4	ARRAY	3,400	3.0	1.5	1	3	460	3	10.3	15	460	3	68	88	25.3	24/23	257.7	MERV-8	2,600	180	54	60	38x14	1,2,3,4
AHU-5	MEZZANINE	SOCCER DECK	DAIKIN CAH010GDQM	CU-5	ARRAY	4,000	3.0	1.5	1	3.8	460	3	10.3	15	460	3	68	88	25.3	24/23	181.4	MERV-8	2,600	182	54	60	38x16	1,2,3,4

NOTES:
1. PROVIDE 100kAIC FUSED DISCONNECT
2. PROVIDE NEMA 1 ENCLOSURE FOR CONTROLS AND DISCONNECT
3. PROVIDE CONDENSATE DRAIN PIPING TO INDIRECT DRAIN RECEPTOR
4. PROVIDE SEPARATE POWER CONNECTION FOR ELECTRIC HEATER

CONDENSING UNIT SCHEDULE

UNIT	BASIS OF DESIGN (DAIKIN)	NOMINAL TONNAGE	COOLING CAPACITY MBH	COOLING CAPACITY AMBIENT DESIGN (°F DB)	HEATING CAPACITY MBH	HEATING CAPACITY AMBIENT DESIGN (°F DB)	ELECTRICAL VOLTAGE – PHASE	ELECTRICAL MIN CIRCUIT AMPS	ELECTRICAL MAX OVERCURRENT PROTECTION		REMARKS
CU-1A	RXYQ384XAYDA	32	383.8	84.2	312.0	24	460 / 3	25.9 / 20.6 / 20.6	35 / 25 / 25	709.9 / 555.6 / 553.4	1-5
CU-1B	RXYQ384XAYDA	32	383.8	84.2	312.0	24	460 / 3	25.9 / 20.6 / 20.6	35 / 25 / 25	709.9 / 555.6 / 553.4	1-5
CU-2	RXYQ192XAYDA	16	191.9	84.2	172.1	24	460 / 3	20.6 / 12.3	25 / 20	555.6 / 451.9	1-5
CU-3A	RXYQ336XAYDA	28	335.8	84.2	257.7	24	460 / 3	25.9 / 25.9	35 / 35	709.9 / 709.9	1-5
CU-3B	RXYQ408XAYDA	34	407.7	84.2	324.7	24	460 / 3	25.9 / 25.9 / 20.6	35 / 35 / 25	709.9 / 709.9 / 553.4	1-5
CU-4	RXYQ336XAYDA	28	335.8	84.2	257.7	24	460 / 3	25.9 / 25.9	35 / 35	709.9 / 709.9	1-5
CU-5A	RXYQ264XAYDA	22	263.9	84.2	218.6	24	460 / 3	25.9 / 20.6	35 / 25	709.9 / 555.6	1-5
CU-5B	RXYQ264XAYDA	22	263.9	84.2	218.6	24	460 / 3	25.9 / 20.6	35 / 25	709.9 / 555.6	1-5

NOTES:
1. PROVIDE REQUIRED FACTORY AND FIELD REFRIGERANT CHARGE BASED ON MECHANICAL DRAWINGS AND AS-BUILT CONDITIONS.
2. SYSTEM RATING DATA BASED ON DESIGN AMBIENT CONDITIONS FOR COOLING AND FOR HEATING.
3. MANUFACTURERS SUBMITTAL MUST INCLUDE REFRIGERANT PIPING DIAGRAM WITH PIPE DIAMETERS, LENGTHS, AND REFRIGERANT VOLUME.
4. CONTRACTOR TO VERIFY PIPING DIMENSIONS.
5. CONTRACTOR TO FURNISH AND INSTALL INSULATION ON REFRIGERANT PIPING.

ENERGY RECOVERY VENTILATOR SCHEDULE

TAG	LOCATION	SERVES	MAKE & MODEL	SUPPLY FAN CFM	SUPPLY FAN ESP	EXHAUST FAN CFM	EXHAUST FAN ESP	WINTER SUPPLY DB	ELECTRICAL VOLTS	PH	HZ	MCA	FLA	MOP	SENSIBLE EFFECTIVNESS WINTER	SENSIBLE EFFECTIVNESS SUMMER	OA FILTER	RA FILTER	OPER WT. (LBS.)	DIMENSIONS (LxWxH IN.)	REMARKS
ERV-1	MEZZANINE	SOCCER AREA	OXYGEN8 C70IN-BP	7150	1	7150	1.0	47	460	3	60	39.3	34.9	50	60	60	MERV-13	MERV-8	2000	85.7x91x65.7	1-3
ERV-2	MEZZANINE	SOCCER AREA	OXYGEN8 C70IN-BP	7150	1	7150	1.0	47	460	3	60	39.3	34.9	50	60	60	MERV-13	MERV-8	2000	85.7x85x65.7	1-3
ERV-3	MEZZANINE	ICE RINK AREA	OXYGEN8 C48IN-BP	5000	1	5000	1.0	47	460	3	60	26.3	23.4	35	60	60	MERV-13	MERV-8	1500	85.7x69.5x61.7	1-3
ERV-4	MEZZANINE	ICE RINK AREA	OXYGEN8 C48IN-BP	5000	1	5000	1.0	47	460	3	60	26.3	23.4	35	60	60	MERV-13	MERV-8	1500	85.7x69.5x61.7	1-3

NOTES:
1. PROVIDE MINIMUM ENERGY RECOVERY AND FAN EFFICIENCY PER 2018 WSEC
2. UNIT SHALL BE ON 24/7, UNLESS INDICATED OTHERWISE BY OWNER. PROVIDE STAND-ALONE FACTORY CONTROLS.
3. PROVIDE CONDENSATE DRAIN PIPING FROM UNIT TO NEAREST SINK TAIL PIECE.

ELECTRIC DUCT HEATER SCHEDULE

TAG	LOCATION	SYSTEM SERVED	CFM	EAT F	LAT F	HEATER kW	VOLTS/ PHASE	FLA	MCA	MOPD	DIM WxH	CONTROL	STAGES	BASIS OF DESIGN	OPER WT. (LBS.)	REMARKS
DH-1	MEZZANINE	ERV-1	7,150	47	65	38	460/3	47.9	60	60	28x28	DUCT T-STAT	SCR	THERMOLEC	300	1,2,3,4
DH-2	MEZZANINE	ERV-2	7,150	47	65	38	460/3	47.9	60	60	28x28	DUCT T-STAT	SCR	THERMOLEC	300	1,2,3,4
DH-3	MEZZANINE	ERV-3	5,000	47	65	26	460/3	32.8	41	50	26x26	DUCT T-STAT	SCR	THERMOLEC	300	1,2,3,4
DH-4	MEZZANINE	ERV-4	5,000	47	65	26	460/3	32.8	41	50	26x26	DUCT T-STAT	SCR	THERMOLEC	300	1,2,3,4

NOTES:
1. OPEN COIL STANDARD, SLIP-IN WITH SCR CONTROLLER.
2. CONTACTOR-MAGNETIC DISCONNECT, TERMINAL BOX OVERHANG.
3. MANUAL THERMAL CUTOUT, DISCONNECT SWITCH-POWER.
4. AIRFLOW SWITCH AND CONTROL CIRCUIT TRANSFORMER.

ROOF HOOD SCHEDULE

MARK	SERVICE	LOCATION	HOOD TYPE	INSTALLATION TYPE	THROAT SIZE	HOOD SIZE	CFM	MAX P.D. (IN WC)	BASIS OF DESIGN MAKE	BASIS OF DESIGN MODEL	BASIS OF DESIGN WEIGHT LBS	REMARKS
IH-1	ERV-1 INTAKE	ROOF	INTAKE	ROOF CURB	40"x40"	67"x72"	7,500	0.10	GREENHECK	FGI	200	1-2
RH-1	ERV-1 EXHAUST	ROOF	EXHAUST	ROOF CURB	40"x40"	67"x72"	7,500	0.10	GREENHECK	FGR	200	1-2
IH-2	ERV-2 INTAKE	ROOF	INTAKE	ROOF CURB	40"x40"	67"x72"	7,500	0.10	GREENHECK	FGI	200	1-2
RH-2	ERV-2 EXHAUST	ROOF	EXHAUST	ROOF CURB	40"x40"	67"x72"	7,500	0.10	GREENHECK	FGR	200	1-2
IH-3	ERV-3 INTAKE	ROOF	EXHAUST	ROOF CURB	34"x34"	58"x60"	5,000	0.10	GREENHECK	FGI	150	1-2
RH-3	ERV-3 EXHAUST	ROOF	EXHAUST	ROOF CURB	34"x34"	58"x60"	5,000	0.10	GREENHECK	FGR	150	1-2
IH-4	ERV-4 INTAKE	ROOF	EXHAUST	ROOF CURB	34"x34"	58"x60"	5,000	0.10	GREENHECK	FGI	150	1-2
RH-4	ERV-4 EXHAUST	ROOF	EXHAUST	ROOF CURB	34"x34"	58"x60"	5,000	0.10	GREENHECK	FGR	150	1-2

NOTES:
1. 18" HIGH ALUMINUM ROOF CURB.
2. GALVANIZED STEEL BIRD SCREEN.

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4/8/22

City of Bellingham
Sportsplex Envelope Repairs
1225 Civic Field Way
Bellingham, WA 98229

Job No: 212840 Date: 2022-03-02
File No:
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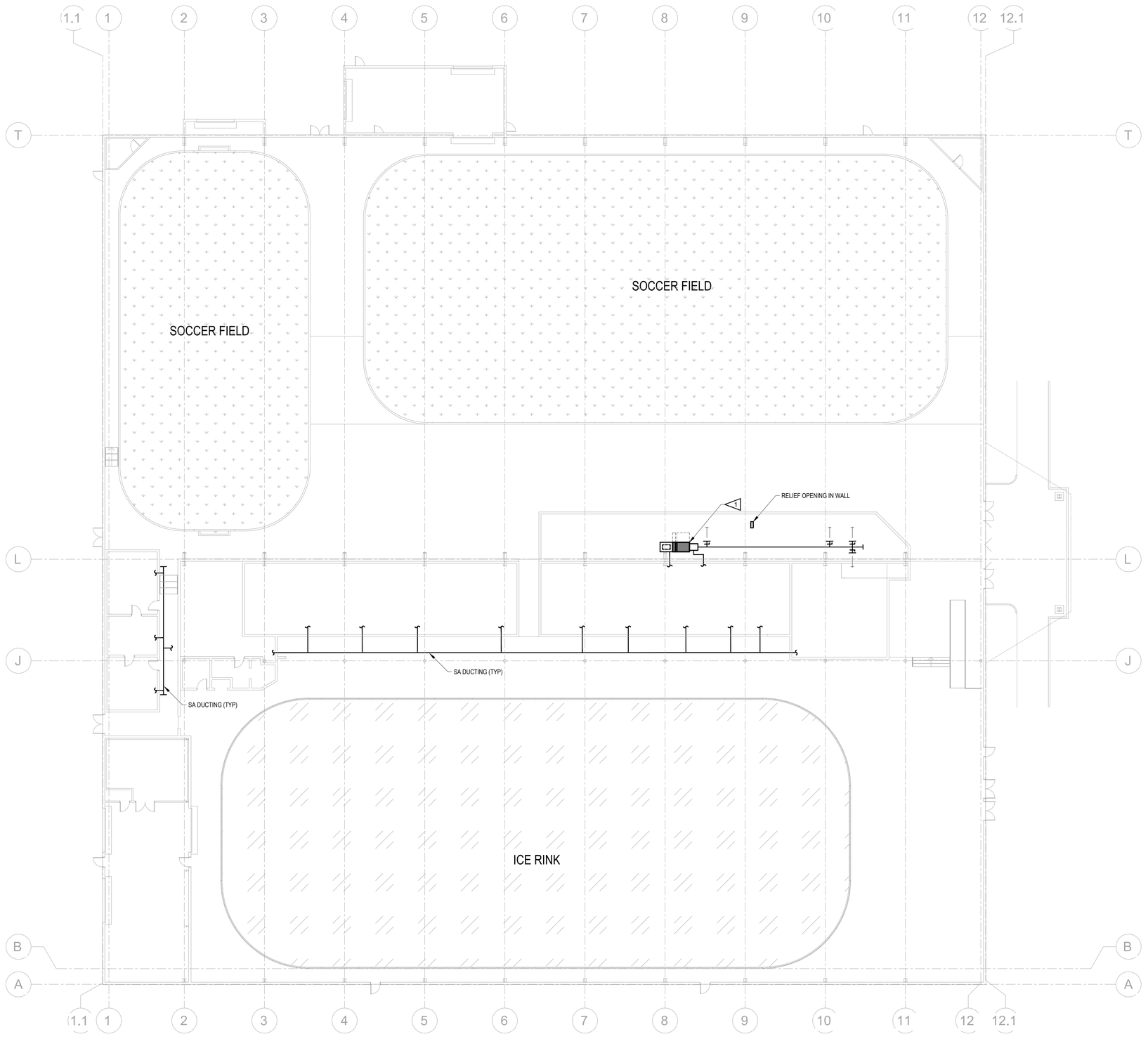
MECHANICAL SCHEDULES

M003



1 M101 Overall Existing HVAC Floor Plan

1/16" = 1'-0"

NORTH

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMATIC AND ARE MEANT TO PROVIDE A GENERAL SCHEMATIC REPRESENTATION OF THE EXISTING MECHANICAL SYSTEMS AND DO NOT NECESSARILY REFLECT ALL EXISTING CONDITIONS OR EQUIPMENT.

SHEET NOTES

1 TRANE XE 90 HORIZONTAL DUCTED FURNACE SERVING OFFICES AREAS, APPEARS TO BE IN WORKING ORDER.

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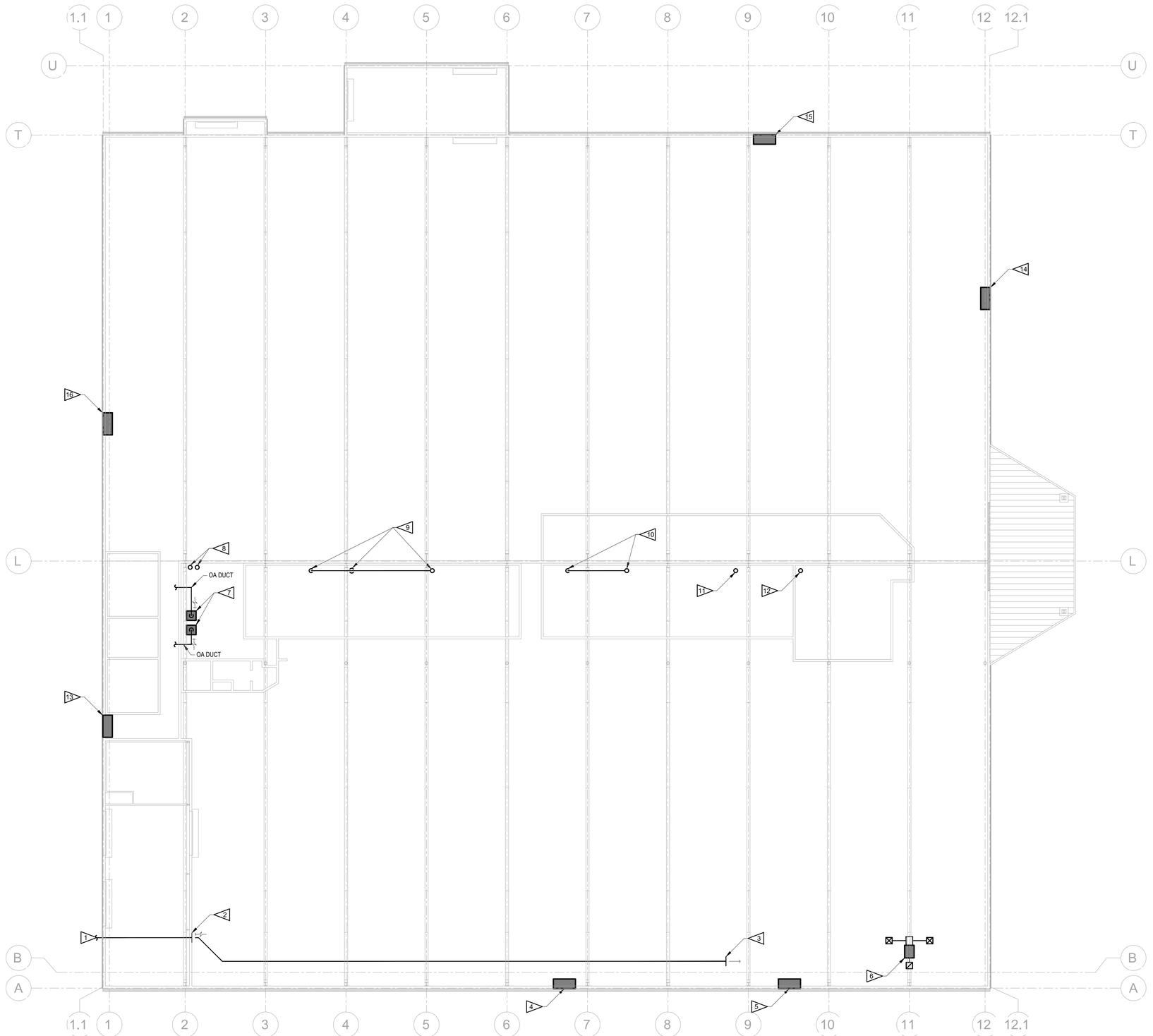
OVERALL EXISTING HVAC FLOOR PLAN

M101



1 M102 Overall Existing HVAC Mezzanine Plan

1/16" = 1'-0"

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMATIC AND ARE MEANT TO PROVIDE A GENERAL SCHEMATIC REPRESENTATION OF THE EXISTING MECHANICAL SYSTEMS AND DO NOT NECESSARILY REFLECT ALL EXISTING CONDITIONS OR EQUIPMENT.

SHEET NOTES

1. SA/RA TO DEHUMIDIFIER WITH HEAT RECOVERY WHEEL LOCATED OUTSIDE ON GRADE IN A FENCED AREA.
2. RETURN AIR GRILLE LOCATED IN WALL UP HIGH, SA DUCT PENETRATION THROUGH WALL BELOW RETURN AIR GRILLE.
3. DEHUMIDIFIER HAS A SINGLE SUPPLY AIR GRILLE LOCATED AT THE END OF THE DUCT.
4. EXHAUST FAN HAS BEEN ABANDONED IN PLACE. CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
5. OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE, CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
6. HORIZONTAL FAN COIL UNIT SERVING SKATE RENTAL AREA, APPEARS TO BE IN WORKING ORDER.
7. (2) LENNOX ML193DF DOWNFLOW GAS FURNACES SERVING ICE RINK ANCILLARY SPACES, APPEARS TO BE IN WORKING ORDER. RETURN AIR PLENUM AND INTAKE GRILLES LOCATED ON TOP OF UNIT, PLENUM AND SUPPLY AIR DUCTING TO CONCEALED CEALING SPACE BELOW.
8. (2) EXHAUST DUCTS FROM DRESSING ROOMS UP THROUGH ROOF.
9. (3) EXHAUST DUCTS FROM SHOWERS/RESTROOMS/DRESSING ROOMS COMBINE AND CONTINUE UP THROUGH ROOF.
10. (2) EXHAUST DUCTS FROM SHOWERS/DRESSING ROOMS COMBINE AND CONTINUE UP THROUGH ROOF.
11. EXHAUST DUCT FROM RESTROOMS UP THROUGH ROOF.
12. EXHAUST DUCT FROM KITCHEN UP THROUGH ROOF.
13. EXHAUST FAN HAS BEEN ABANDONED IN PLACE. CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
14. OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE, CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
15. EXHAUST FAN HAS BEEN ABANDONED IN PLACE. CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
16. EXHAUST FAN HAS BEEN ABANDONED IN PLACE. CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.

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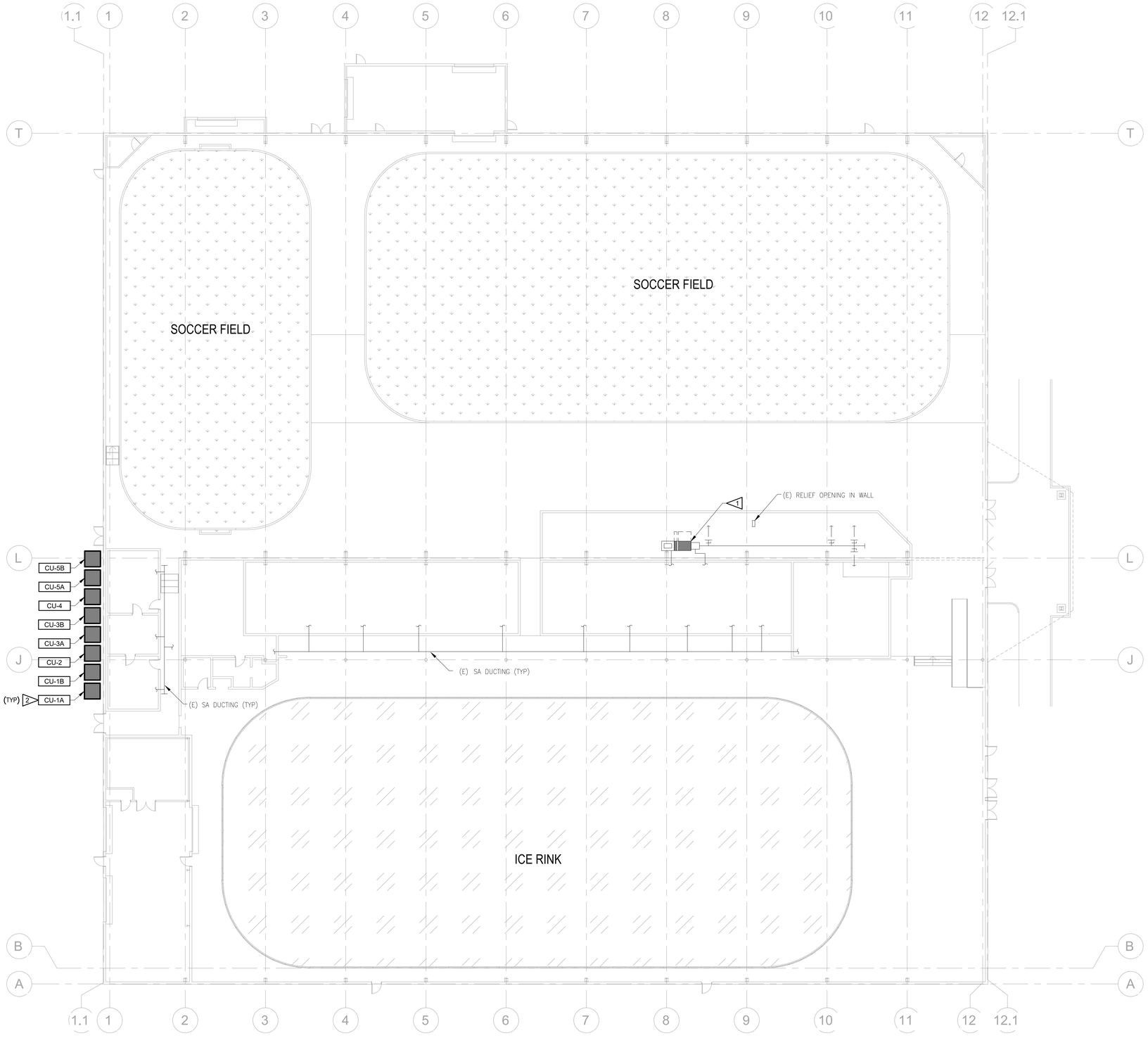
OVERALL EXISTING MEZZANINE PLAN

M102



SHEET NOTES

1. (E)TRANE XE 90 HORIZONTAL DUCTED FURNACE SERVING OFFICES AREAS, APPEARS TO BE IN WORKING ORDER.
2. LOCATE CONDENSING UNITS OUTSIDE ON GRADE, PROVIDE REFRIGERANT PIPING TO INDOOR AIR HANDLING UNIT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

1 M201 Overall HVAC Floor Plan

1/16" = 1'-0"

NORTH

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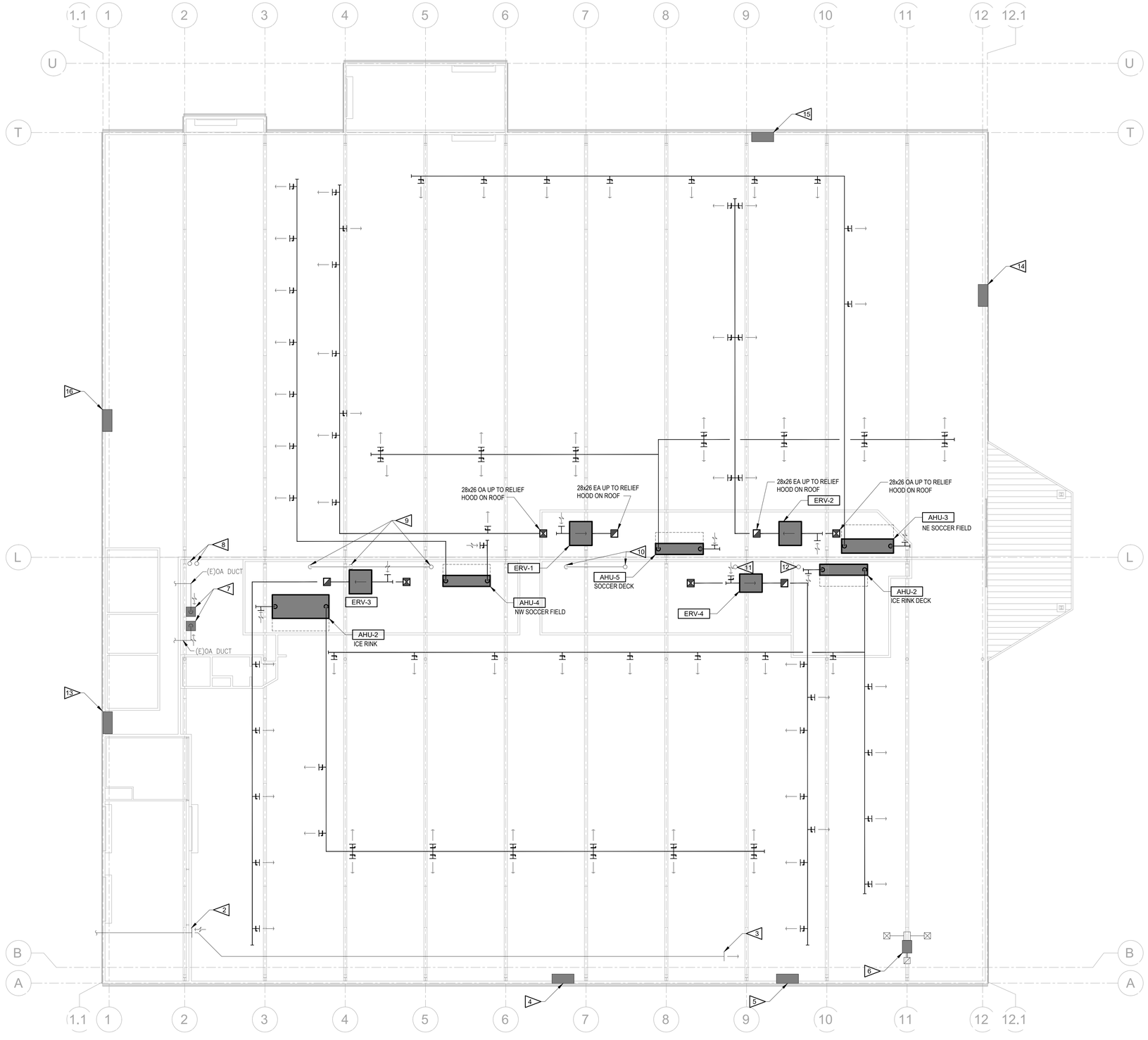
OVERALL HVAC FLOOR PLAN

M201



1 M202 Overall HVAC Mezzanine Plan

1/16" = 1'-0"

NORTH

SHEET NOTES

1. (E)SA/RA TO DEHUMIDIFIER WITH HEAT RECOVERY WHEEL LOCATED OUTSIDE ON GRADE IN A FENCED AREA.
2. (E)RETURN AIR GRILLE LOCATED IN WALL UP HIGH, SA DUCT PENETRATION THROUGH WALL BELOW RETURN AIR GRILLE.
3. (E)DEHUMIDIFIER HAS A SINGLE SUPPLY AIR GRILLE LOCATED AT THE END OF THE DUCT.
4. (E)EXHAUST FAN HAS BEEN ABANDONED IN PLACE. CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
5. (E)OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE. CONTRACTOR TO FIELD INVESTIGATE AND SEAL OPENING AS NEEDED.
6. (E)HORIZONTAL FAN COIL UNIT SERVING SKATE RENTAL AREA, APPEARS TO BE IN WORKING ORDER.
7. (E)(2) LENNOX ML193DF DOWNFLOW GAS FURNACES SERVING ICE RINK ANCILLARY SPACES, APPEARS TO BE IN WORKING ORDER. RETURN AIR PLENUM AND INTAKE GRILLES LOCATED ON TOP OF UNIT, PLENUM AND SUPPLY AIR DUCTING TO CONCEALED CEALING SPACE BELOW.
8. (E)(2) EXHAUST DUCTS FROM DRESSING ROOMS UP THROUGH ROOF.
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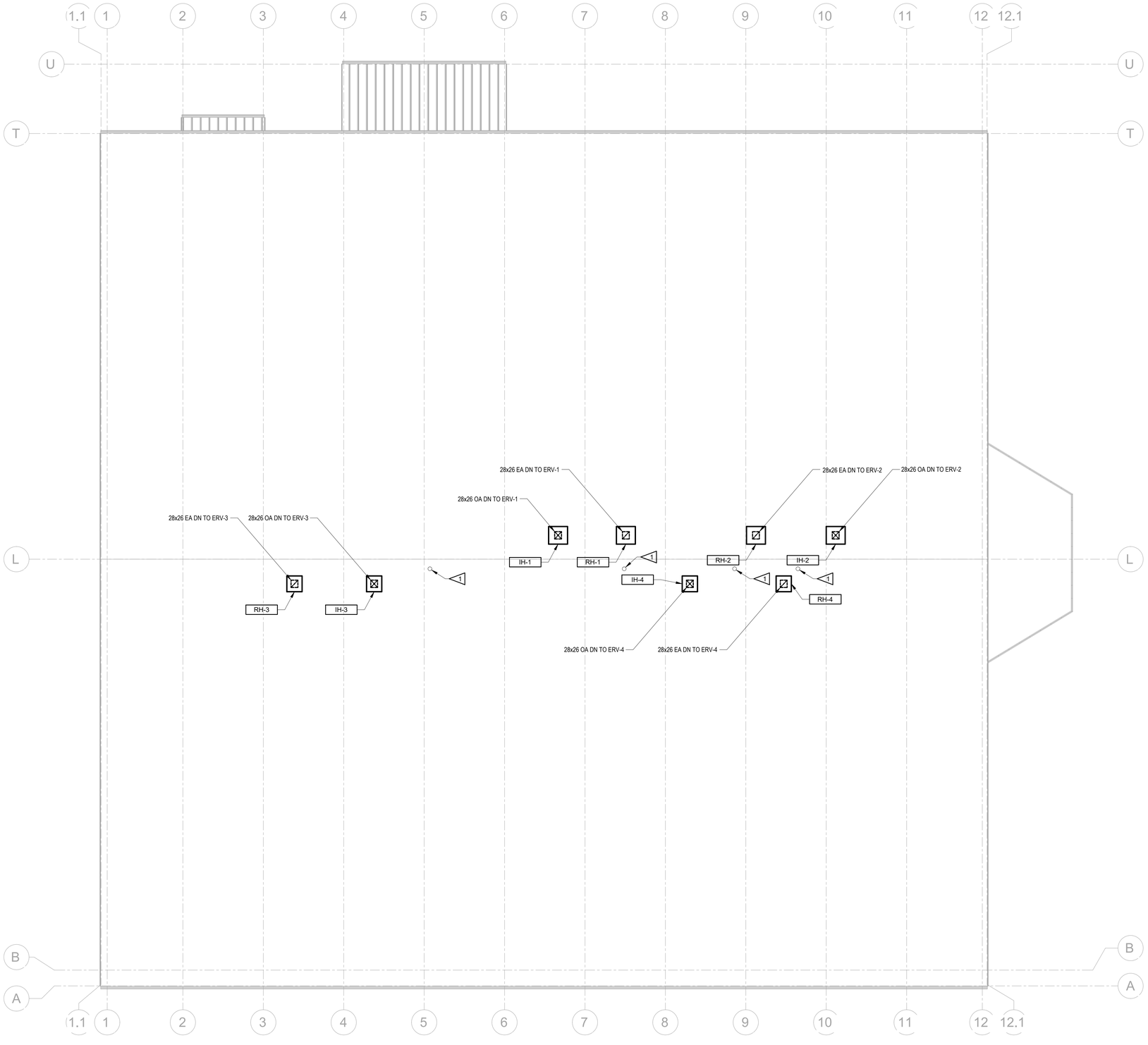
OVERALL HVAC MEZZANINE PLAN

M202



1 M203 Overall HVAC Roof Plan

1/16" = 1'-0"

NORTH

GENERAL NOTES

1. OUTSIDE AIR INTAKE OPENINGS SHALL BE LOCATED A MIN. 10' SEPARATION FROM EXHAUST AIR OUTLETS, LOT LINES (WHERE OPENINGS FRONT ON A STREET OR PUBLIC WAY, THE DISTANCE SHALL BE MEASURED FROM OPPOSITE SIDE OF THE STREET OR PUBLIC WAY), VENTS, STREETS, ALLEYS, PARKING LOTS, AND LOADING DOCKS.
2. COORDINATE ACCESS DOOR/ PANEL LOCATIONS FOR MAINTENANCE OF EQUIPMENT AND ACCESSORIES (INCLUDING FIRE/ SMOKE DAMPER, AND MOTORIZED DAMPERS.

SHEET NOTES

1 (E)EA TERMINATION LOCATION APPROXIMATED BY OBSERVED INDOOR DUCTING LOCATIONS. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND PROVIDE MINIMUM CODE CLEARANCES AS OUTLINES IN THE GENERAL NOTES.

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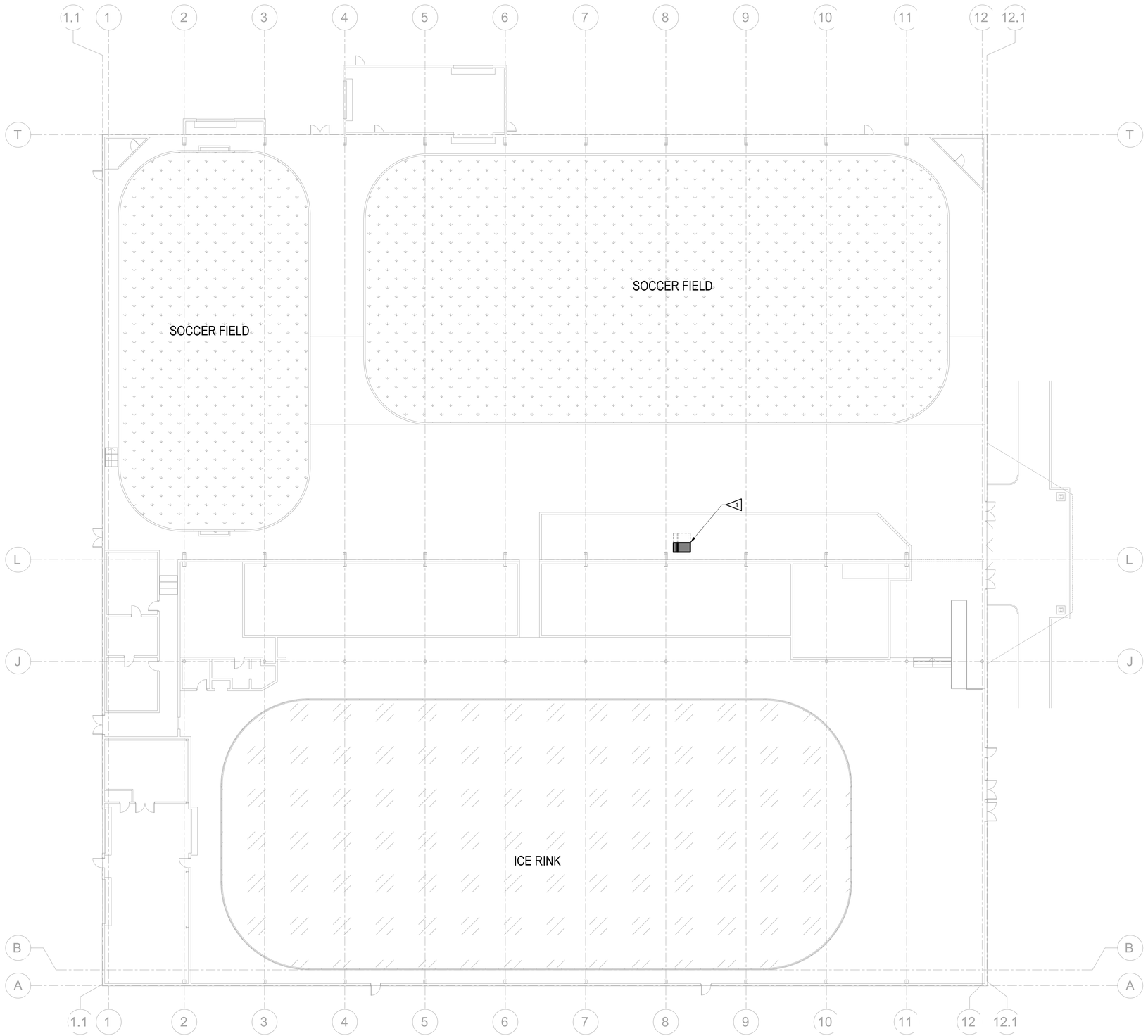
OVERALL HVAC ROOF PLAN

M203

Appendix D – Schematic Electrical Drawings



1 E101 Overall Existing Electrical Floor Plan

1/16" = 1'-0"

NORTH

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMATIC AND ARE MEANT TO PROVIDE A GENERAL SCHEMATIC REPRESENTATION OF THE EXISTING ELECTRICAL SYSTEMS AND DO NOT NECESSARILY REFLECT ALL EXISTING CONDITIONS OR EQUIPMENT.

SHEET NOTES

1 TRANE XE 90 HORIZONTAL DUCTED FURNACE SERVING OFFICES AREAS, APPEARS TO BE IN WORKING ORDER. VERIFY ELEC CONNECTION INTEGRITY. REPAIR CONNECTION AS REQUIRED.

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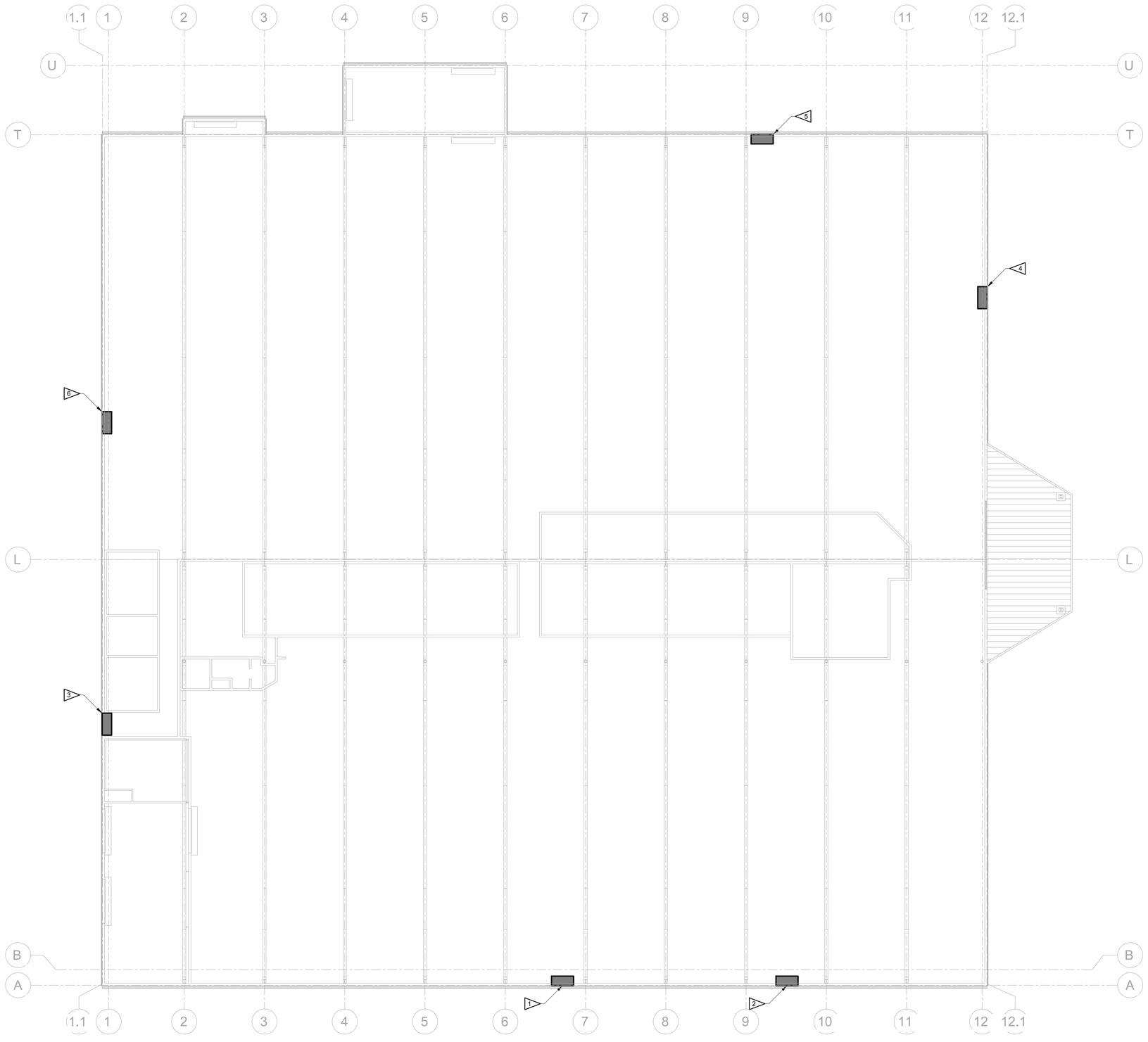
OVERALL EXISTING ELECTRICAL FLOOR PLAN

E101



1 / E102 Overall Existing Electrical Mezzanine Plan

1/16" = 1'-0"

NORTH

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMATIC AND ARE MEANT TO PROVIDE A GENERAL SCHEMATIC REPRESENTATION OF THE EXISTING ELECTRICAL SYSTEMS AND DO NOT NECESSARILY REFLECT ALL EXISTING CONDITIONS OR EQUIPMENT.

SHEET NOTES

1. EXHAUST FAN HAS BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
2. OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
3. EXHAUST FAN HAS BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
4. OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
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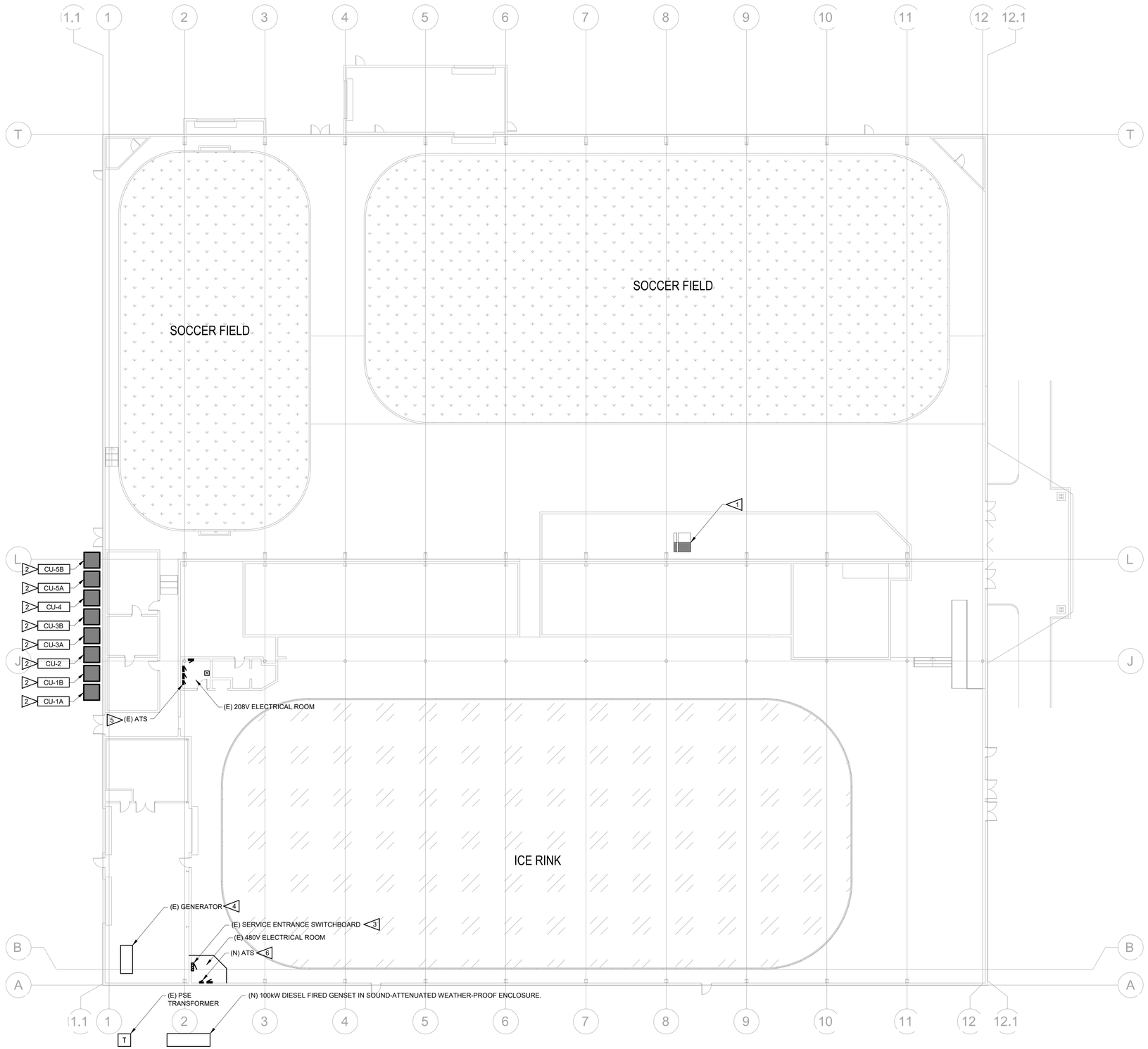
OVERALL EXISTING ELECTRICAL MEZZANINE PLAN

E102



1 / E201 Overall Electrical Floor Plan

1/16" = 1'-0"

NORTH

SHEET NOTES

1. (E)TRANE XE 90 HORIZONTAL DUCTED FURNACE TO REMAIN.
2. (N)CONDENSING UNITS OUTSIDE ON GRADE. PROVIDE ELEC CONNECTION. REFER TO MECH EQUIPMENT SCHEDULE, APPENDIX I.
3. EXISTING 480V 800A SWITCHBOARD TO BE REPLACED. PROVIDE (N) 480V 1200A SWITCHBOARD AND SERVICE UPGRADE. PROVIDE 4 SETS OF 4#350KCMIL SERVICE ENTRANCE CONDUCTORS FROM PSE TRANSFORMER. COORDINATE PSE SERVICE TRANFORMER REPLACEMENT AND REQUIREMENTS WITH PSE. PROVIDE CONNECTION TO (N) AND (E) PANELBOARDS AND (E) EQUIPMENT.
4. EXISTING 480V 30kW GENSET TO BE REMOVED.
5. EXISTING AUTOMATIC TRANSFER SWITCH TO BE REMOVED.
6. PROVIDE NEW AUTOMATIC TRANSFER SWITCH AND CONNECTION TO (N) SWITCHBOARD AND (N) 225A PANEL LOCATED ON MEZZANINE.

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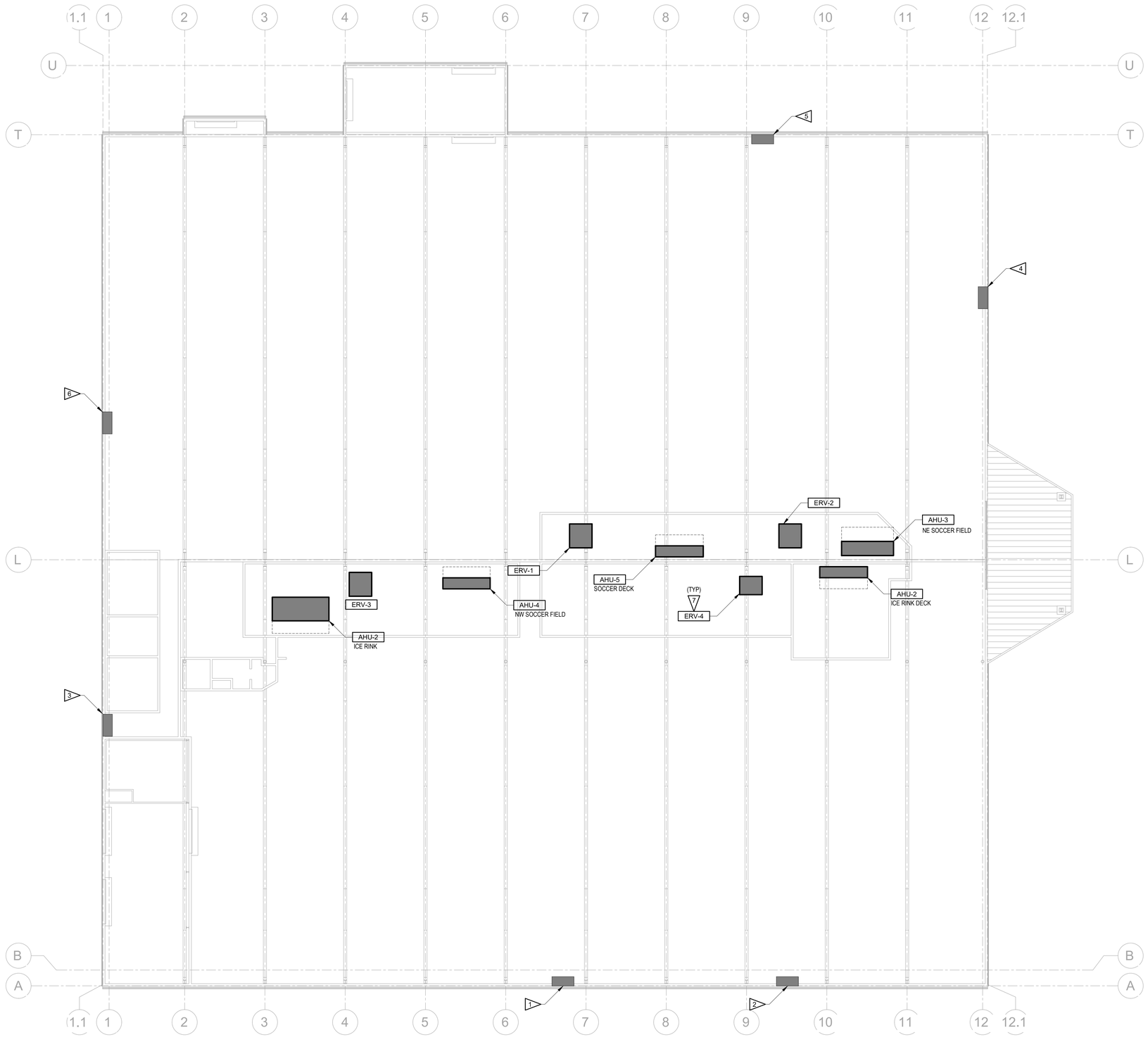
OVERALL ELECTRICAL FLOOR PLAN

E201



1 E202 Overall Electrical Mezzanine Plan

1/16" = 1'-0"

NORTH

SHEET NOTES

1. (E)EXHAUST FAN HAS BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
2. (E)OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
3. (E)EXHAUST FAN HAS BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
4. (E)OUTSIDE AIR INTAKE AND MOTOR DAMPER HAVE BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
5. (E)EXHAUST FAN HAS BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
6. (E)EXHAUST FAN HAS BEEN ABANDONED IN PLACE. REMOVE ELEC CONNECTION.
7. (N) MECH EQUIPMENT. PROVIDE ELECTRICAL CONNECTION. REFER TO MECH SCHEDULE, APPENDIX I.

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OVERALL ELECTRICAL MEZZANINE PLAN

E202

Appendix E – Recommended Mechanical Equipment

Base Bid

SUBMITTAL DATA

for

Sportsplex

Prepared for

Coffman Burlington

Job Number: 07PDJD	Customer PO#:

Prepared by

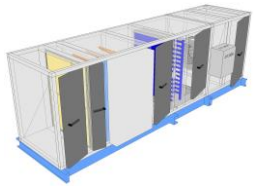
Ryan Brown

4/7/2022

Table of Contents

Technical Data Sheet for AHU-ICE RINK DECK

Job Information	Technical Data Sheet
Job Name	Sportsplex
Date	April 07 2022
Submitted By	RB
Software Version	12.71
Unit Tag	AHU-ICE RINK DECK



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH010GDQM	4000	1.50	3.21	54*	42*	182

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH010GDQM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	6" formed channel	**Wall Thickness:**	2 in
Shipping Stretch Wrap:	Yes	**Altitude:**	0 ft
Parts Warranty:	Standard One Year		

Plenum Section — Component: 1 — Length: 20 in — Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	16.00" x 38.00"	0.05 inWc

Door

Location	Width	Opening
Drive side	16 in	Outward

Panel Filter — Component: 2 — Length: 12 in — Shipping Section: 1

Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading
Pleated	MERV 8	355 ft/min	11.3 ft²	4000 cfm	Side

Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec				
0.15 inWc	**0.57** inWc	1.00 inWc	N/A	2	24 in	24 in	2 in
				2	24 in	12 in	2 in

Door

Location	Width	Opening
Drive side	8 in	Outward

Special Options

Sound Baffle	Filter Gauge
(As casing details)	Magnehelic 0-2"

Technical Data Sheet for AHU-ICE RINK DECK

Electric Heater	Component: 3	Length: 34 in	Shipping Section: 1

Voltage	Control Type	Temperature Control	Control Signal	Pressure Drop	kW	FLA	Steps	Disconnect	Delta T
480	SCR	Yes	0 - 10V	0.04	25.3	30.4	N/A	Yes	20.0

Access Section	Component: 4	Length: 24 in	Shipping Section: 1

Air Pressure Drop
0.00 inWc

Door		
Location	Width	Opening
Drive side	20 in	Outward

Direct Expansion Coil	Component: 5	Length: 40 in	Shipping Section: 1

Coil Model	Total Capacity	Sensible Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)
5EJ0706C	160561 Btu/hr	106797 Btu/hr	1	6	7	0.625 in	1.50 in x 1.299 in

Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
4000 cfm	80.0 °F	67.0 °F	55.6 °F	54.0 °F	0.99 insWg	42 in	29 in	8.46 ft²	473 ft/min

Fluid		Sub-Cooled Refrigerant Liquid Temp.	Suction Vapor Superheat Temp. at Coil Outlet	Design Saturated Condensing Temp.	Total Refrigerant Weight
Suction Temp.	Refrigerant				
44.0 °F	R410a	110.0 °F	8.0 °F	110.0 °F	28.00 lb

Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location	Material		
OD Sweat	1-0.63 in / 1-0.88	2-1.63 in	Drive side	Copper tube	32.0 °F	32.0 °F

Material				Drain Pan	Drain Side
Fin	Tube	Header	Case		
Aluminum .0075 in	Copper .020 in	Copper	Galv. steel	Stainless steel	Drive side

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification
Coil is NOT certified by AHRI

Door		
Location	Width	Opening
Drive side	24 in	Outward

Technical Data Sheet for AHU-ICE RINK DECK

Supply Fan Array	Component: 6	Length: 22 in	Shipping Section: 2

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
4000 cfm	1.50 inWc	3.21 inWc	0.00 inWc	-	-	3.74 HP	2608 rpm	3170 rpm	0.0 %	15.0 A	10.3 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Discharge	Motor Location
1x1 : 1	Airfoil / N/A	1	15.74 in	Axial	Integral-Front

Motor Data

Power*	Electrical Supply	Speed	Control Signal	Supplier	Full Load Current*
7.5 HP	460/60/3 V/Hz/Phase	3170 rpm	0-10V	Q-PAC	8.24 A

Fan Options

Isolation Backdraft Dampers:	None	Block Off Plate:	None
Isolator Type:	Rigid		

Control/Disconnect Data

Selection Type:	Premium (BACnet DDC)	Vendor:	Q-PAC
Voltage:	460 V	External Power Panel: Height x Width x Depth	20.00 in x 16.00 in x 10.00 in
Mounting:	Drive Side	Internal Quick Connect Panel: Height x Width x Depth	18.00 in x 6.50 in x 6.00 in
Enclosure:	NEMA 1	Disconnect:	100kAIC Fused Disconnect

Panel

Location	Width	Opening
Removable panels	- in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Plenum Section	Component: 7	Length: 30 in	Shipping Section: 2

Air Pressure Drop

0.06 inWc

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	Top	38 in	16 in	None

Door

Location	Width	Opening
Drive side	26 in	Outward

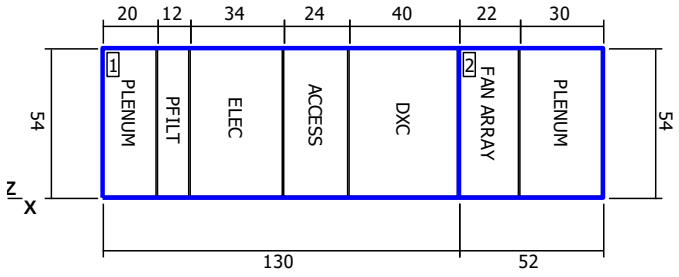
Unit Sound Power (dB)

Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	76	79	69	64	63	55	46	51
Unit Discharge:	81	84	81	79	79	77	73	67
Unit Return:	77	79	72	69	63	62	56	51

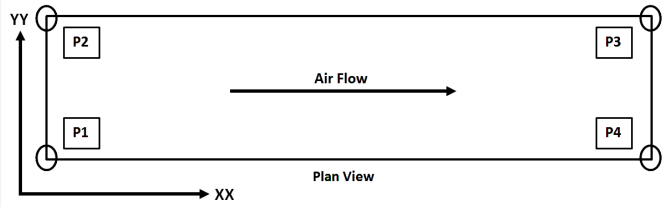
Technical Data Sheet for AHU-ICE RINK DECK

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	130	1961	611	340	369	641	67	15	30
2	52	618	191	191	117	117	20	21	28
Entire Unit	**182**	**2579**	**810**	**539**	**479**	**751**	**87**	**17**	**30**



Elevation View



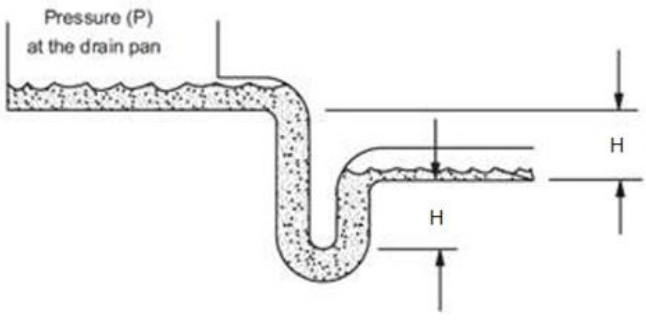
NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.05 insWg
Panel Filter	Panel Filter	0.57 insWg
Electric Heater	Electric Heater	0.04 insWg
Access Section	Access Section	
DX Coil	DX Coil	0.99 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.06 insWg
External Static	External Static	1.50 insWg
Total Supply Fan Static		3.21 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
1	DX Coil	3.82



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

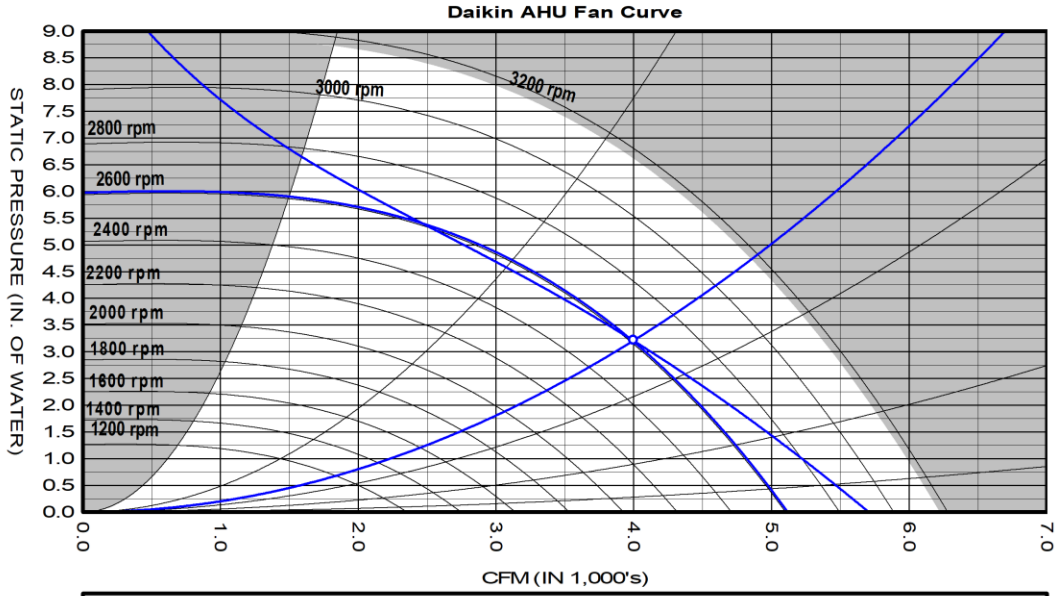
AHRI Certification

The air-handler is selected outside of the scope of AHRI Standard 430/431

Technical Data Sheet for AHU-ICE RINK DECK

Notes
Standard
1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

Fan Curve for AHU-ICE RINK DECK

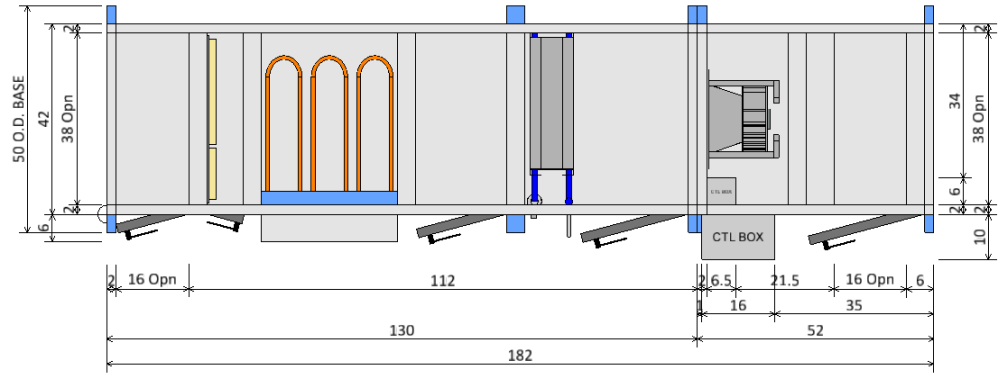


QPAC76 (1 Fans) Supply Fan at Standard Conditions					
Air volume	4000	cfm	Fan speed	2608	rpm
Total static	3.21	insWg	Max speed	3170	rpm
Total Fan Shaft Power	3.7	hp	Efficiency	54.3	%

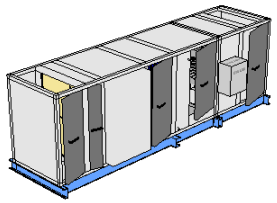
Unit tagging	AHU-ICE RINK DECK	Date	April-07-2022
Job name	Sportsplex	Time	13:04

Job Number: 07PDJD
Job Name: Sportsplex

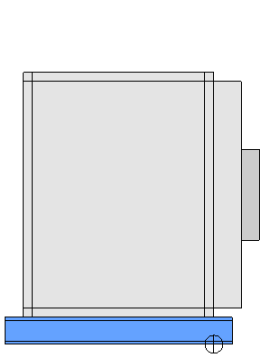
Drawing for AHU-ICE RINK DECK



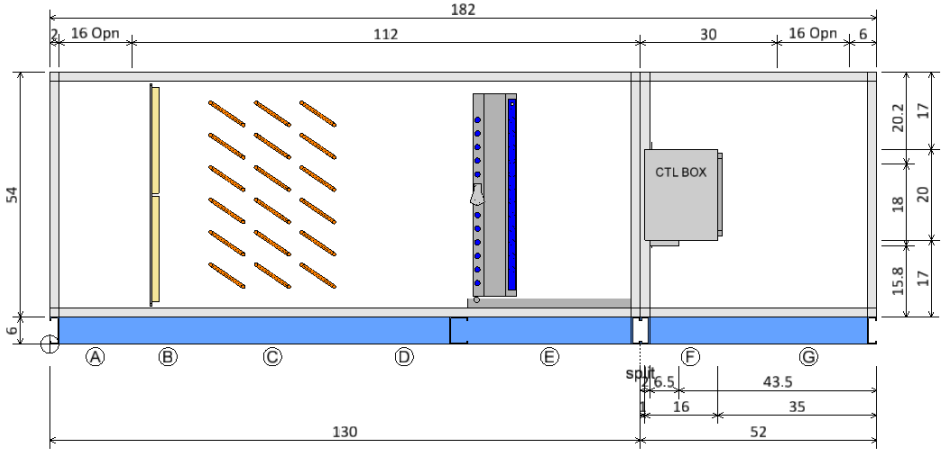
PLAN VIEW



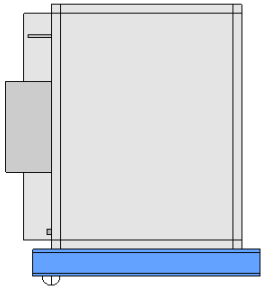
ISOMETRIC VIEW



FRONT END VIEW



ELEVATION VIEW



REAR END VIEW

Plan/Elevation	Unit Tag: AHU-ICE RINK DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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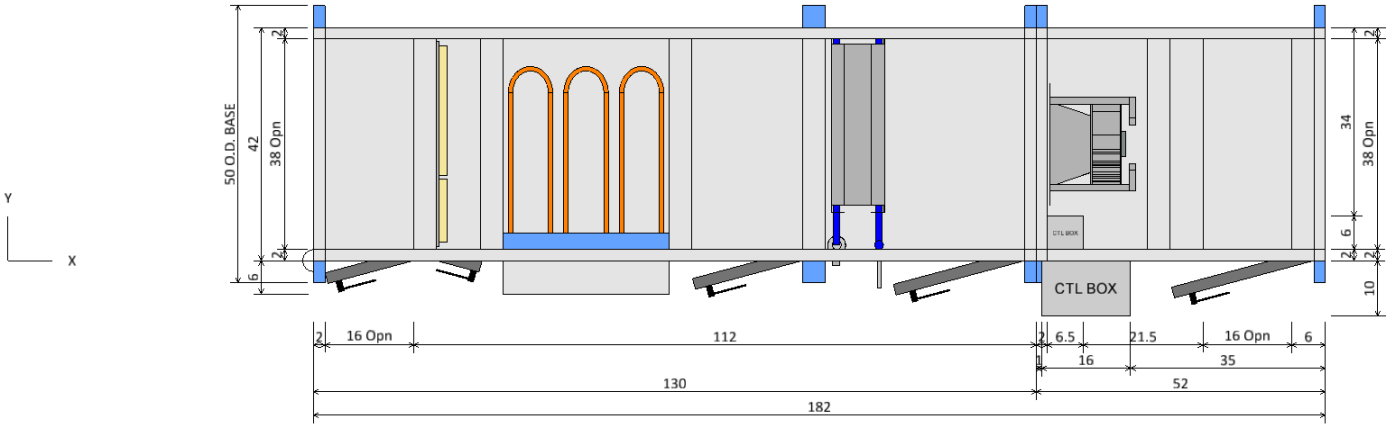
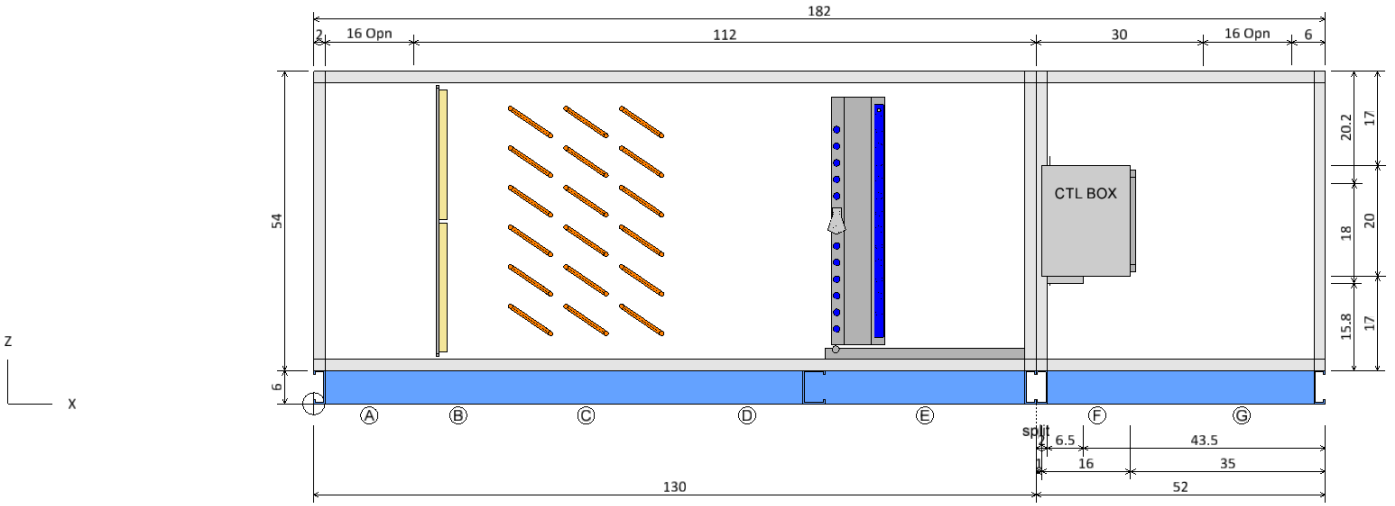
All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Drawing for AHU-ICE RINK DECK



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Plenum Section	
	Opening Location:	Top
	Opening Size:	16 ins x 38 ins
	Right Door (WxH):	16 ins x 50 ins
Ⓑ	Panel Filter	
	Filter Type:	Pleated (MERV 8)
	Right Door (WxH):	8 ins x 50 ins
Ⓒ	Electric Heater	
	Voltage:	480
	Control Type:	SCR
	Total Capacity:	25.30 kW
Ⓓ	Access Section	
	Right Door (WxH):	20 ins x 50 ins
Ⓔ	DX Coil	
	Coil Model:	5EJ0706C
	Total Capacity:	160561.0 Btu/hr
	Right Door (WxH):	24 ins x 44 ins
Ⓕ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	15 (2)
	Air Flowrate:	4000.0 cfm
	T.S.P:	3.2 insWg
	Motor Power:	7.5 HP
	Control box door swing:	16.00 ins
Ⓖ	Plenum Section	
	Right Door (WxH):	26 ins x 50 ins

Plan/Elevation - No Ends	Unit Tag: AHU-ICE RINK DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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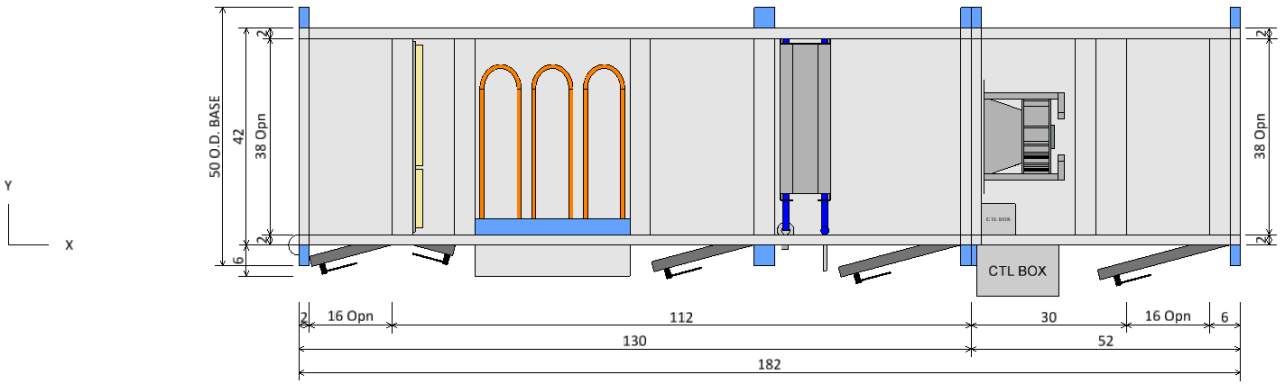
All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

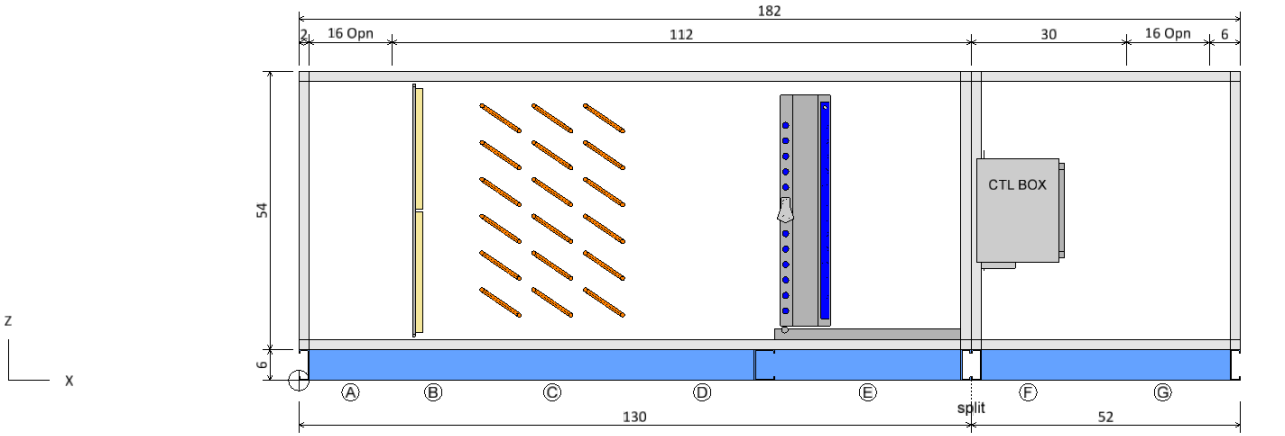
Job Number: 07PDJD
Job Name: Sportsplex

Prepared Date: 4/7/2022

Job Number: 07PDJD
Job Name: Sportsplex



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	2.00	2.00	60.00	38.00	16.00
Ⓖ	Plenum Section Opening	160.00	2.00	60.00	38.00	16.00

Note: Dimensions are measured from the origin point.

Drawing for AHU-ICE RINK DECK

Opening/Damper Connections	Unit Tag: AHU-ICE RINK DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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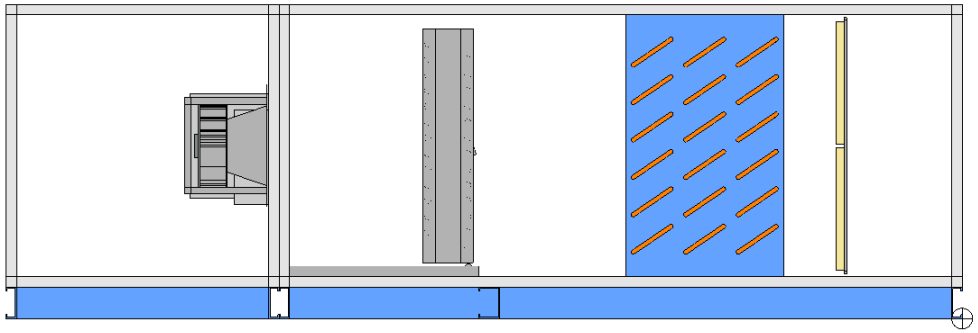
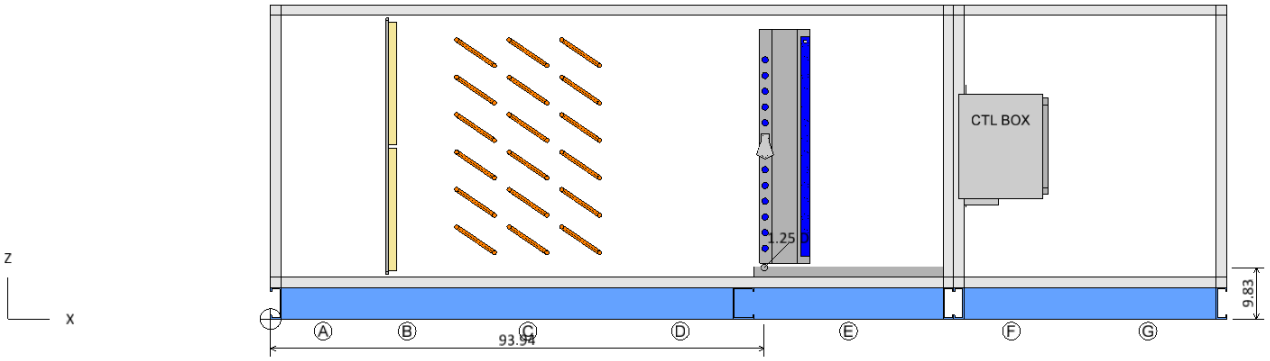
All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Drawing for AHU-ICE RINK DECK



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Coil and Drain Connections

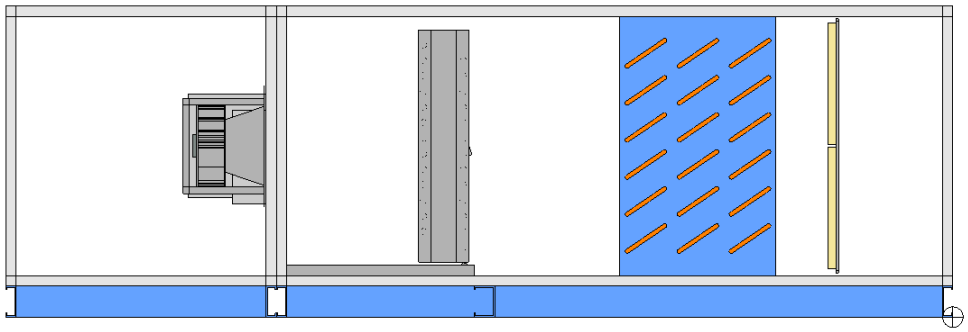
	Type	X	Y	Z	Diam
Ⓔ	DX Coil Condensate drain conn: DX suction: DX liquid conn:	 93.94 TBD TBD	 -2.90 TBD TBD	 9.83 TBD TBD	 1.25 2- 1.63 1- 0.63

Note: Dimensions are measured from the origin point.

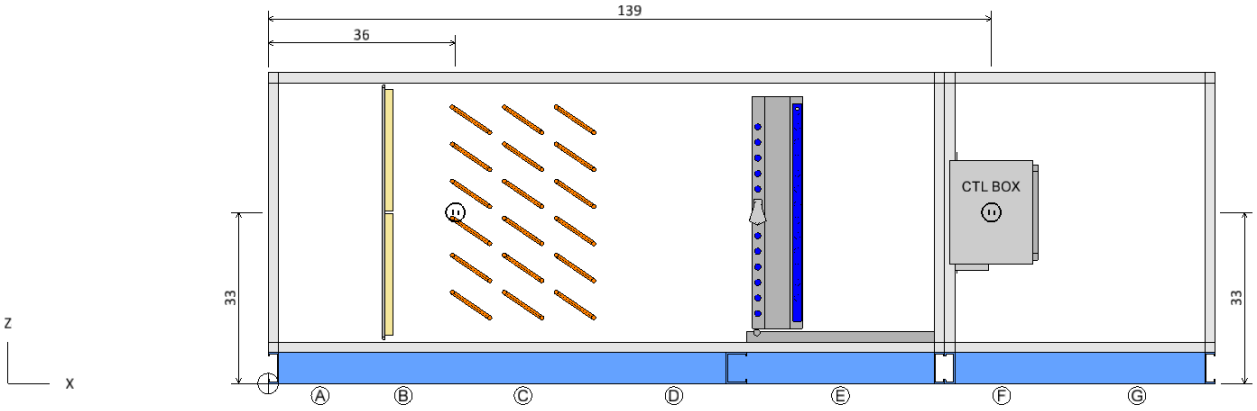
Coil and Drain Connections	Unit Tag: AHU-ICE RINK DECK			Sales Office: Air Reps, LLC			DAIKIN
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:			13600 Industrial Park Blvd, Minneapolis, MN 55441
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in	www.DaikinApplied.com Software Version: 12.71

All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Drawing for AHU-ICE RINK DECK



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Component Key

	Type	X	Y	Z	Volts	Phase
Ⓒ	Electric Heater Electric Heater	36.00	0.00	33.00	480	3
Ⓕ	Supply Fan Fan	139.00	0.00	33.00	460	3

Note: Dimensions are measured from the origin point.

Electrical Connections	Unit Tag: AHU-ICE RINK DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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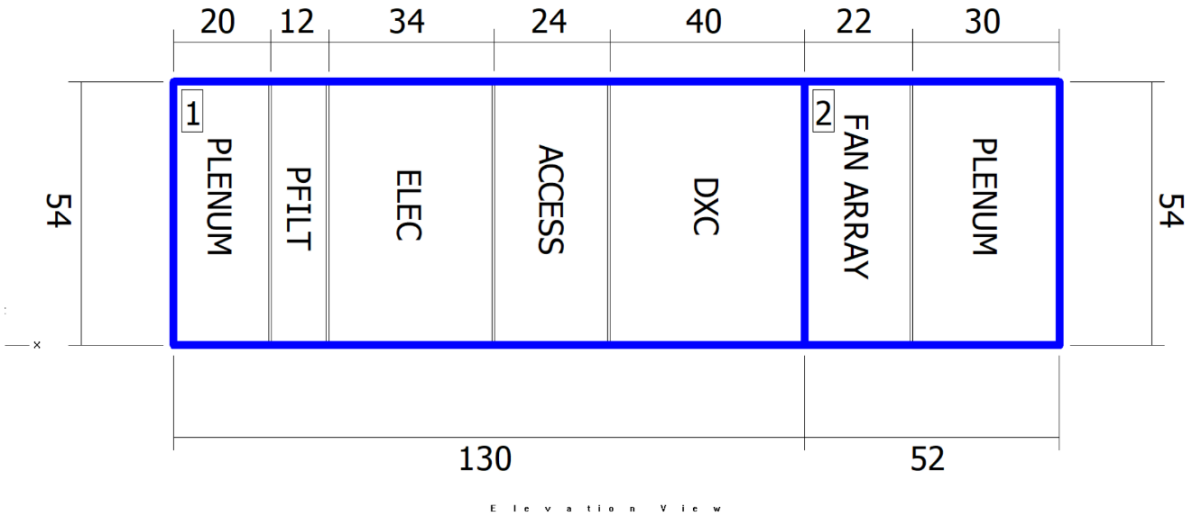
All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Job Number: 07PDJD
Job Name: Sportsplex

Prepared Date: 4/7/2022

www.DaikinApplied.com

Drawing for AHU-ICE RINK DECK



Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	1960.60	130	42	54
Section 2	617.86	52	42	54

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions.
Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-ICE RINK DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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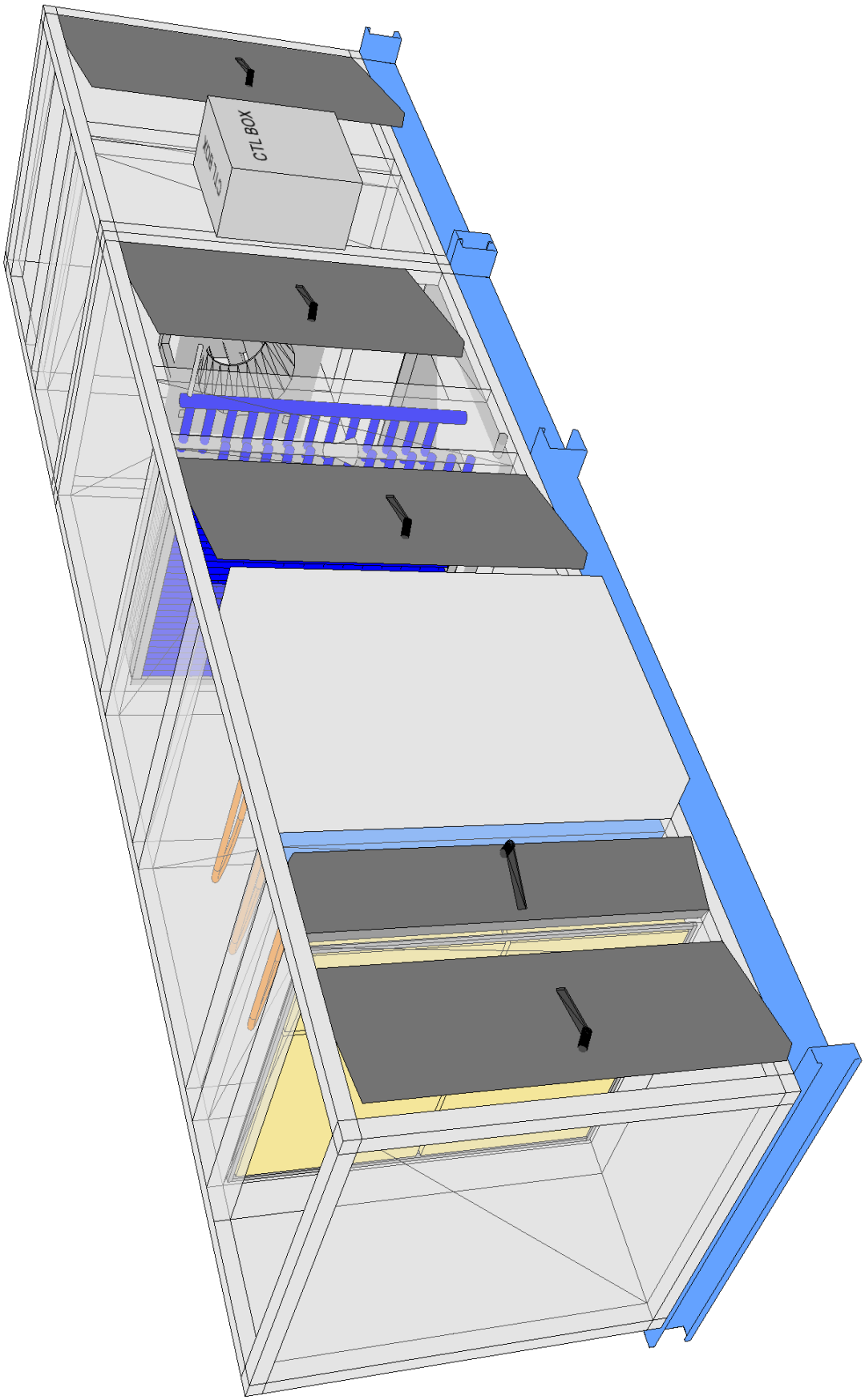
All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Drawing for AHU-ICE RINK DECK



Product Drawing	Unit Tag: AHU-ICE RINK DECK		Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex		Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

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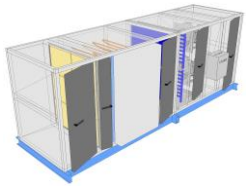
Technical Data Sheet for AHU-NE SOCCER

Job Information	Technical Data Sheet
Job Name	Sportsplex
Date	April 07 2022
Submitted By	RB
Software Version	12.71
Unit Tag	AHU-NE SOCCER



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH017GDQM	8000	1.50	3.13	66*	54*	198

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH017GDQM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	6" formed channel	**Wall Thickness:**	2 in
Shipping Stretch Wrap:	Yes	**Altitude:**	0 ft
Parts Warranty:	Standard One Year		

Plenum Section

Component: 1	Length: 28 in	Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	24.00" x 50.00"	0.06 inWc

Door

Location	Width	Opening
Drive side	24 in	Outward

Panel Filter

Component: 2	Length: 12 in	Shipping Section: 1

Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading
Pleated	MERV 8	424 ft/min	18.9 ft²	8000 cfm	Side

Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec				
0.18 inWc	**0.59** inWc	1.00 inWc	N/A	6	20 in	24 in	2 in

Door

Location	Width	Opening
Drive side	8 in	Outward

Special Options

Sound Baffle	Filter Gauge
(As casing details)	Magnehelic 0-2"

Technical Data Sheet for AHU-NE SOCCER

Electric Heater	Component: 3	Length: 42 in	Shipping Section: 1

Voltage	Control Type	Temperature Control	Control Signal	Pressure Drop	kW	FLA	Steps	Disconnect	Delta T
480	SCR	Yes	0 - 10V	0.04	50.6	60.9	N/A	Yes	20.0

Access Section	Component: 4	Length: 24 in	Shipping Section: 1

Air Pressure Drop
0.00 inWc

Door		
Location	Width	Opening
Drive side	20 in	Outward

Direct Expansion Coil	Component: 5	Length: 40 in	Shipping Section: 2

Coil Model	Total Capacity	Sensible Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)
5EJ0906B	320110 Btu/hr	212473 Btu/hr	2	6	9	0.625 in	1.50 in x 1.299 in

Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
8000 cfm	80.0 °F	67.0 °F	55.7 °F	54.0 °F	0.84 insWg	27 in	41 in	15.38 ft²	520 ft/min

Fluid		Sub-Cooled Refrigerant Liquid Temp.	Suction Vapor Superheat Temp. at Coil Outlet	Design Saturated Condensing Temp.	Total Refrigerant Weight
Suction Temp.	Refrigerant				
44.0 °F	R410a	110.0 °F	8.0 °F	110.0 °F	50.00 lb

Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location	Material		
OD Sweat	2-0.88 in	2-1.63 in	Drive side	Copper tube	32.0 °F	32.0 °F

Material				Drain Pan	Drain Side
Fin	Tube	Header	Case		
Aluminum .0075 in	Copper .020 in	Copper	Galv. steel	Stainless steel	Drive side

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification
Coil is NOT certified by AHRI

Door		
Location	Width	Opening
Drive side	20 in	Outward

Technical Data Sheet for AHU-NE SOCCER

Supply Fan Array	Component: 6	Length: 22 in	Shipping Section: 2

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
4000 cfm	1.50 inWc	3.13 inWc	0.00 inWc	-	-	3.67 HP	2594 rpm	3170 rpm	68.0 %	25.0 A	18.5 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Discharge	Motor Location
2x1 : 2	Airfoil / N/A	2	15.74 in	Axial	Integral-Front

Motor Data

Power*	Electrical Supply	Speed	Control Signal	Supplier	Full Load Current*
7.5 HP	460/60/3 V/Hz/Phase	3170 rpm	0-10V	Q-PAC	8.24 A

Fan Options

Isolation Backdraft Dampers:	None	Block Off Plate:	None
Isolator Type:	Rigid		

Control/Disconnect Data

Selection Type:	Premium (BACnet DDC)	Vendor:	Q-PAC
Voltage:	460 V	External Power Panel: Height x Width x Depth	20.00 in x 16.00 in x 10.00 in
Mounting:	Drive Side	Internal Quick Connect Panel: Height x Width x Depth	18.00 in x 6.50 in x 6.00 in
Enclosure:	NEMA 1	Disconnect:	100kAIC Fused Disconnect

Panel

Location	Width	Opening
Removable panels	- in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Plenum Section	Component: 7	Length: 30 in	Shipping Section: 2

Opening Location	Opening Size	Air Pressure Drop
Top	26.00" x 50.00"	0.10 inWc

Door

Location	Width	Opening
Drive side	22 in	Outward

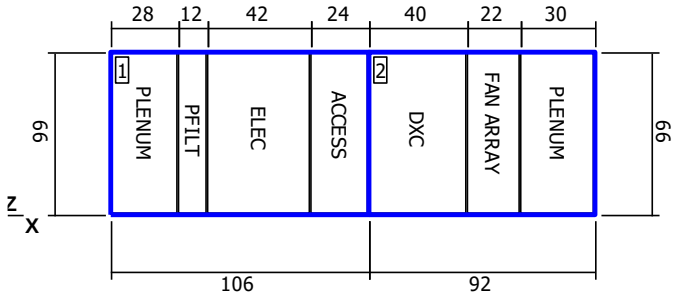
Unit Sound Power (dB)

Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	86	88	80	73	73	65	51	51
Unit Discharge:	91	93	92	88	89	87	83	77
Unit Return:	87	88	82	79	73	72	65	59

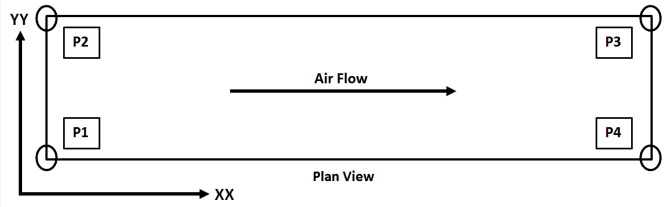
Technical Data Sheet for AHU-NE SOCCER

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	106	2010	560	206	445	799	66	17	37
2	92	1653	515	495	312	331	36	26	32
Entire Unit	**198**	**3663**	**1093**	**720**	**738**	**1112**	**100**	**21**	**35**



Elevation View



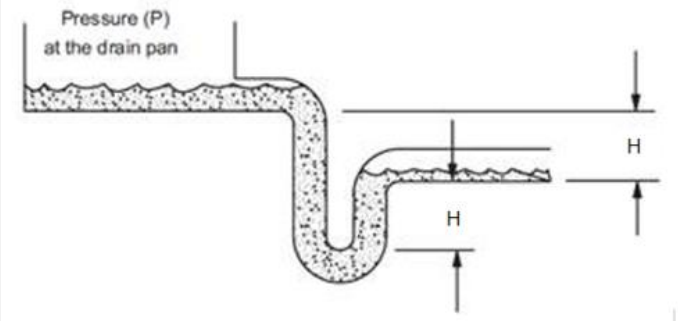
NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.06 insWg
Panel Filter	Panel Filter	0.59 insWg
Electric Heater	Electric Heater	0.04 insWg
Access Section	Access Section	
DX Coil	DX Coil	0.84 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.10 insWg
External Static	External Static	1.50 insWg
Total Supply Fan Static		3.13 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
2	DX Coil	3.56



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

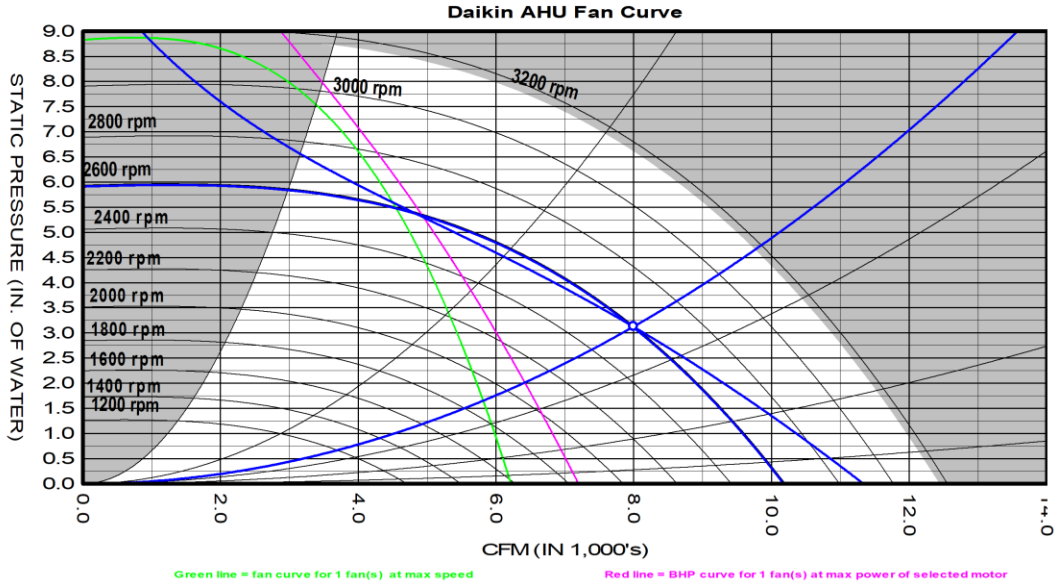
AHRI Certification

The air-handler is selected outside of the scope of AHRI Standard 430/431

Technical Data Sheet for AHU-NE SOCCER

Notes
Standard
1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

Fan Curve for AHU-NE SOCCER

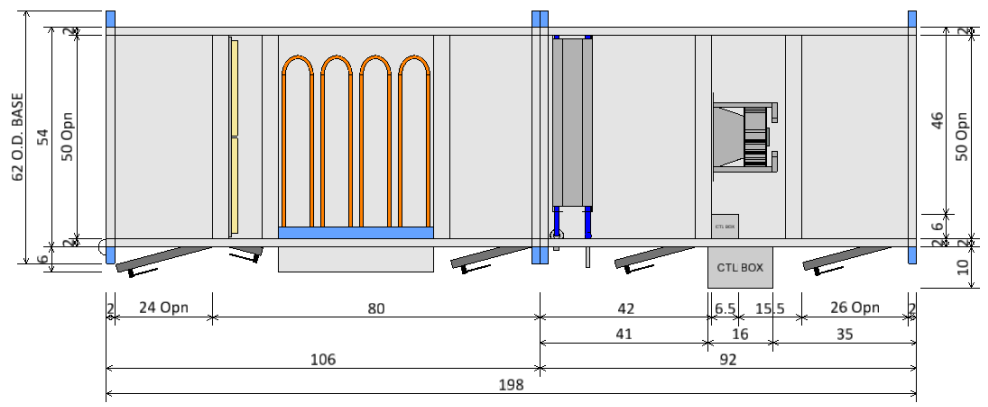


QPAC76 (2 Fans) Supply Fan at Standard Conditions					
Air volume	8000	cfm	Fan speed	2594	rpm
Total static	3.13	insWg	Max speed	3170	rpm
Total Fan Shaft Power	7.3	hp	Efficiency	53.9	%
Redundancy	68.0	%	Motor Speed	3170	rpm

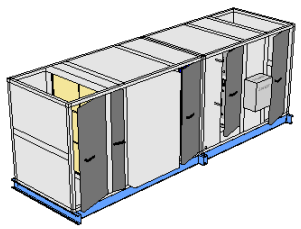
Unit tagging	AHU-NE SOCCER	Date	April-07-2022
Job name	Sportsplex	Time	13:05

Job Number: 07PDJD
Job Name: Sportsplex

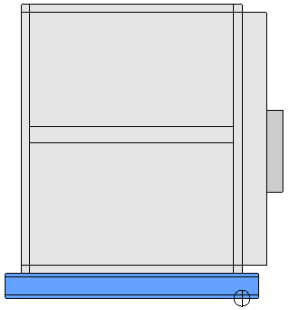
Drawing for AHU-NE SOCCER



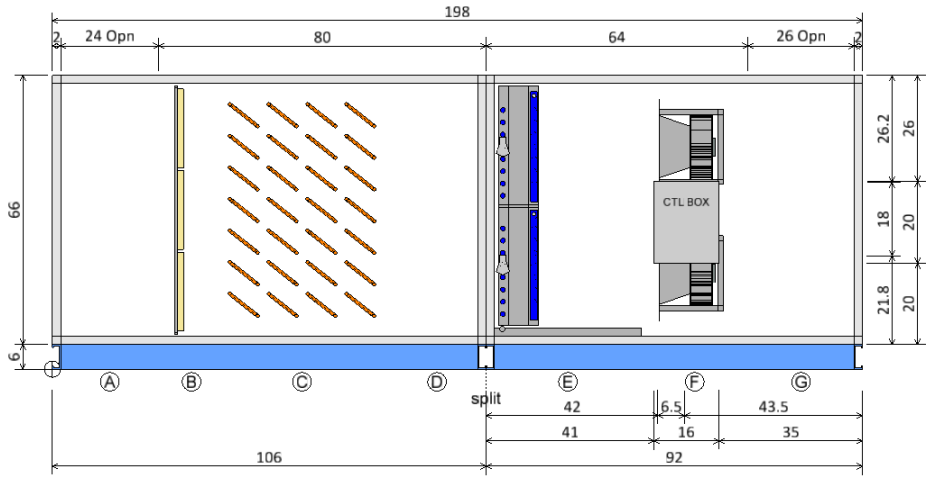
PLAN VIEW



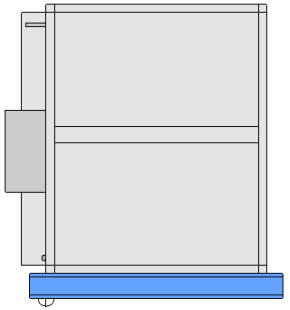
ISOMETRIC VIEW



FRONT END VIEW



ELEVATION VIEW



REAR END VIEW

Plan/Elevation	Unit Tag: AHU-NE SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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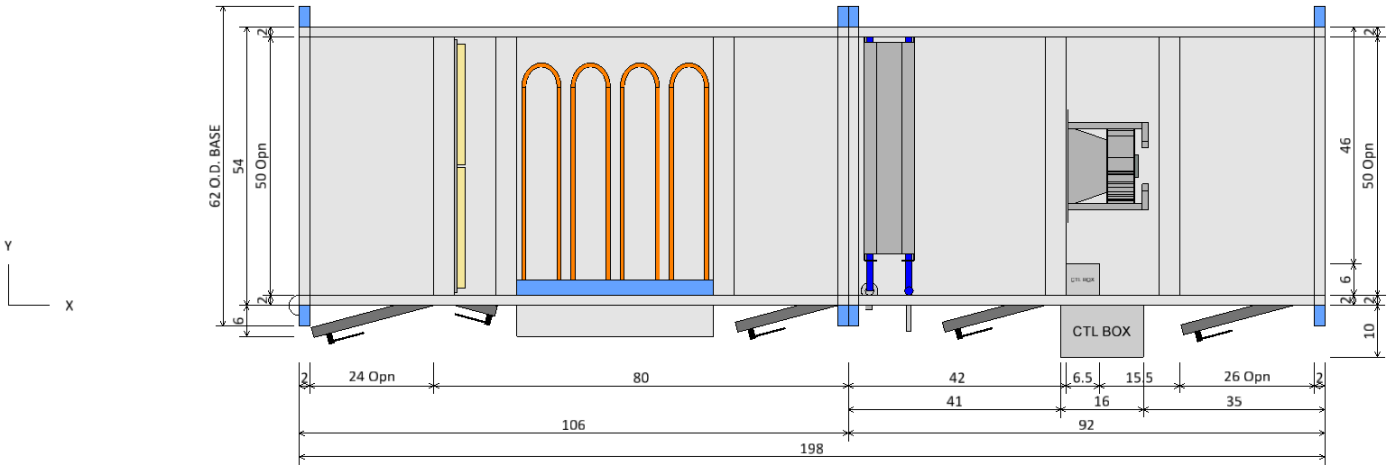
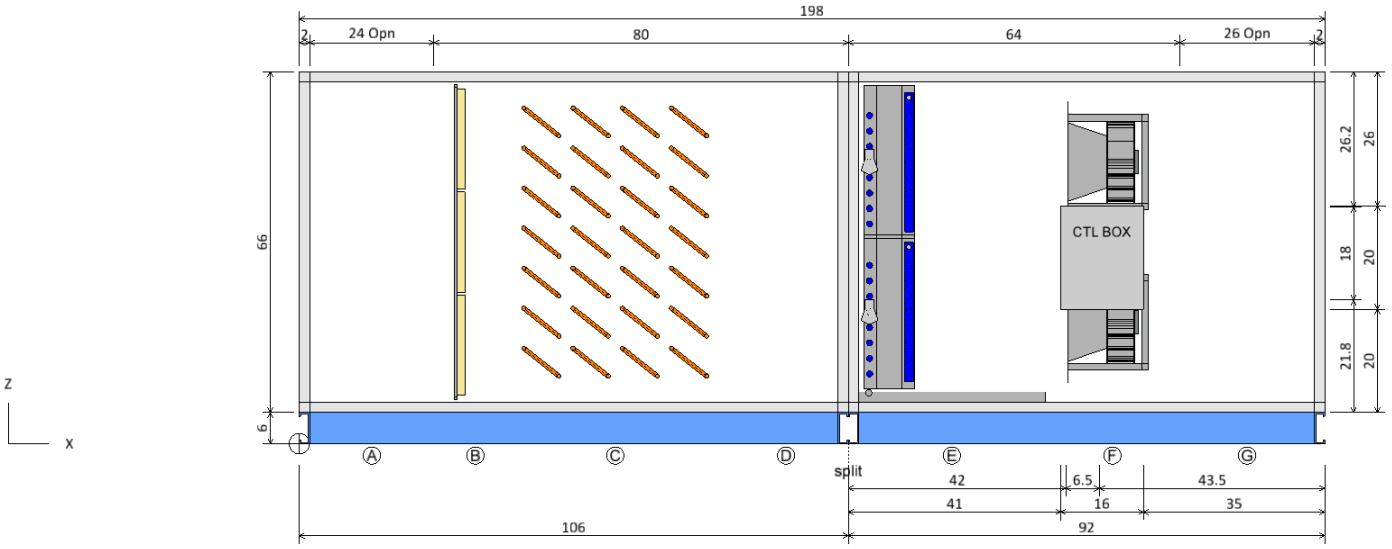
Drawing for AHU-NE SOCCER



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Plenum Section	
	Opening Location:	Top
	Opening Size:	24 ins x 50 ins
	Right Door (WxH):	24 ins x 62 ins
Ⓑ	Panel Filter	
	Filter Type:	Pleated (MERV 8)
	Right Door (WxH):	8 ins x 62 ins
Ⓒ	Electric Heater	
	Voltage:	480
	Control Type:	SCR
	Total Capacity:	50.60 kW
Ⓓ	Access Section	
	Right Door (WxH):	20 ins x 62 ins
Ⓔ	DX Coil	
	Coil Model:	5EJ0906B
	Total Capacity:	320110.0 Btu/hr
	Right Door (WxH):	20 ins x 56 ins
Ⓕ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	15 (2)
	Air Flowrate:	4000.0 cfm
	T.S.P:	3.1 insWg
	Motor Power:	7.5 HP
	Control box door swing:	16.00 ins
Ⓖ	Plenum Section	
	Opening Location:	Top
	Opening Size:	26 ins x 50 ins
	Right Door (WxH):	22 ins x 62 ins

Plan/Elevation - No Ends	Unit Tag: AHU-NE SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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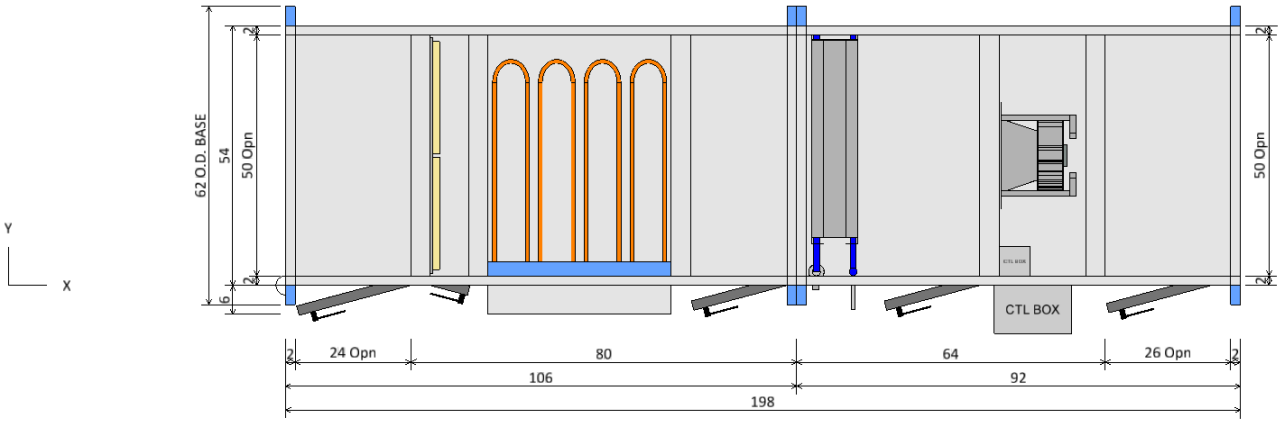
Job Number: 07PDJD
Job Name: Sportsplex

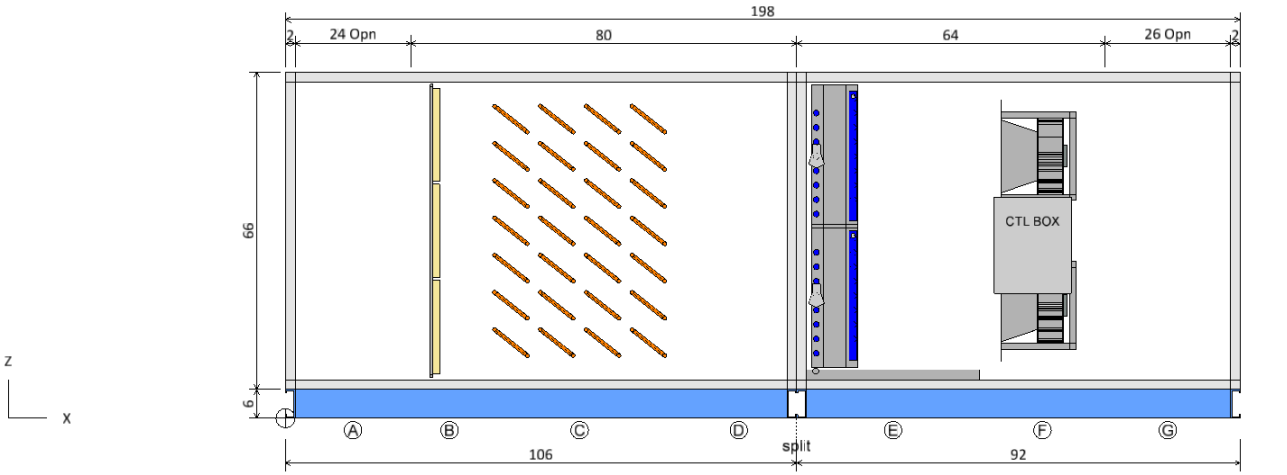
Prepared Date: 4/7/2022

Drawing for AHU-NE SOCCER

Job Number: 07PDJD
Job Name: Sportsplex



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	2.00	2.00	72.00	50.00	24.00
Ⓖ	Plenum Section Opening	170.00	2.00	72.00	50.00	26.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-NE SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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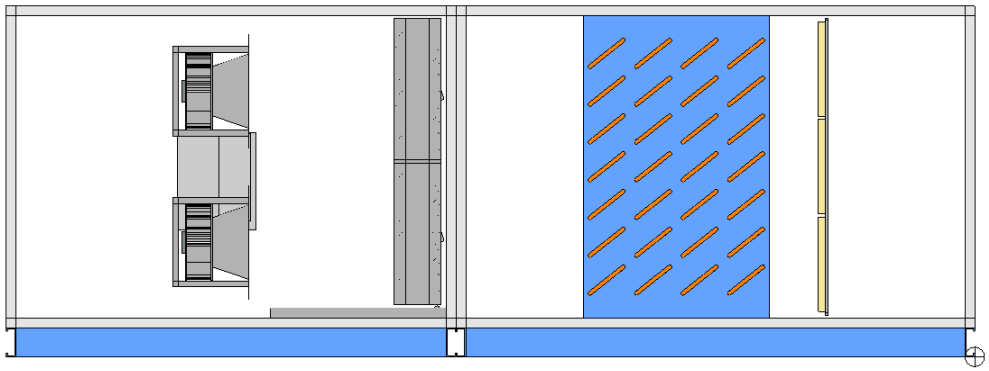
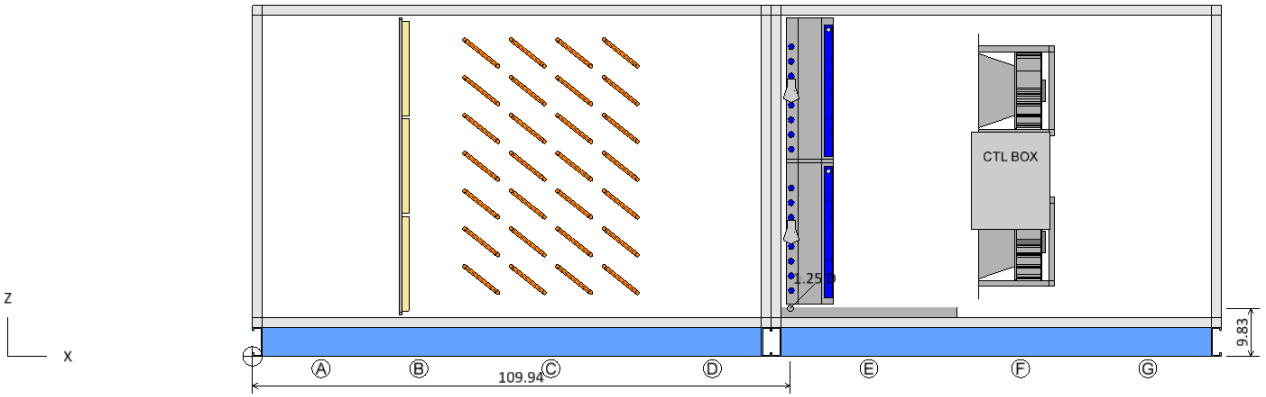
Drawing for AHU-NE SOCCER



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Coil and Drain Connections

	Type	X	Y	Z	Diam
Ⓔ	DX Coil Condensate drain conn:	109.94	-2.90	9.83	1.25
	DX suction:	TBD	TBD	TBD	2- 1.63
	DX liquid conn:	TBD	TBD	TBD	2- 0.88
	DX suction:	TBD	TBD	TBD	2- 1.63
	DX liquid conn:	TBD	TBD	TBD	2- 0.88

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-NE SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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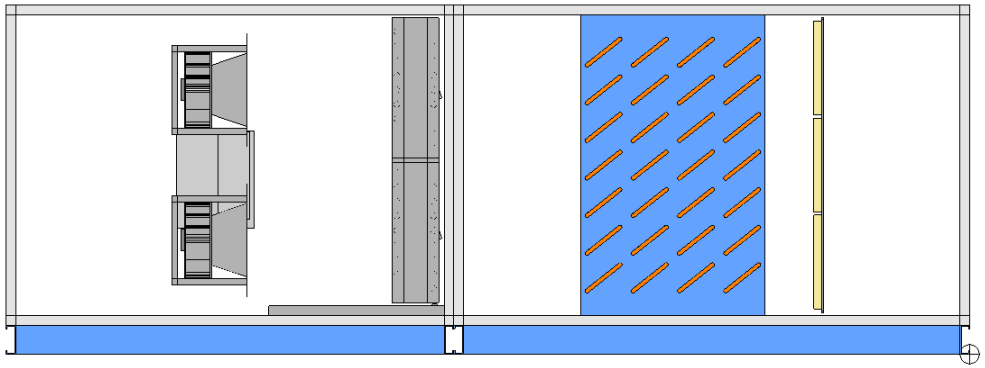
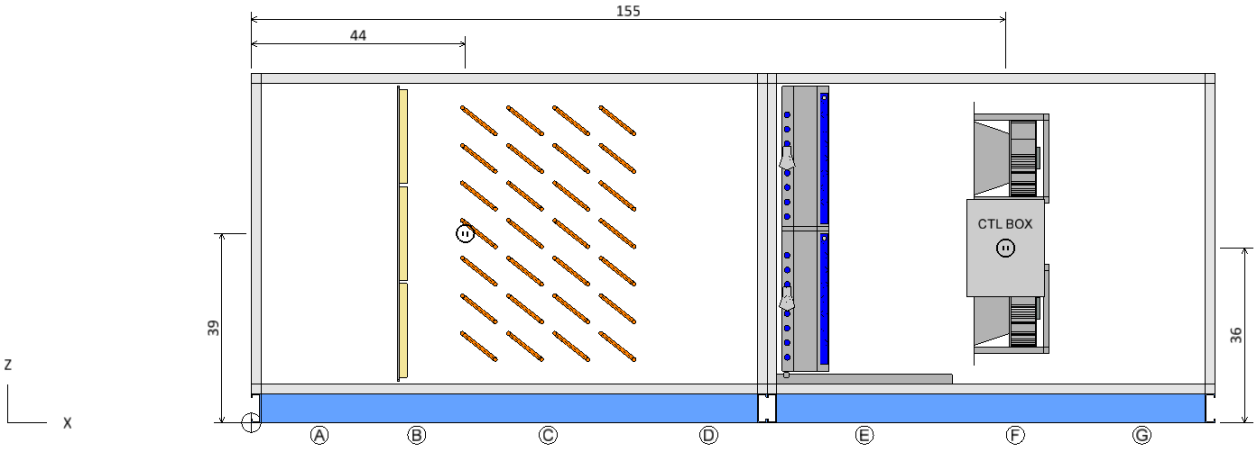
Drawing for AHU-NE SOCCER



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Component Key

	Type	X	Y	Z	Volts	Phase
Ⓒ	Electric Heater Electric Heater	44.00	0.00	39.00	480	3
Ⓕ	Supply Fan Fan	155.00	0.00	36.00	460	3

Note: Dimensions are measured from the origin point.

Electrical Connections	Unit Tag: AHU-NE SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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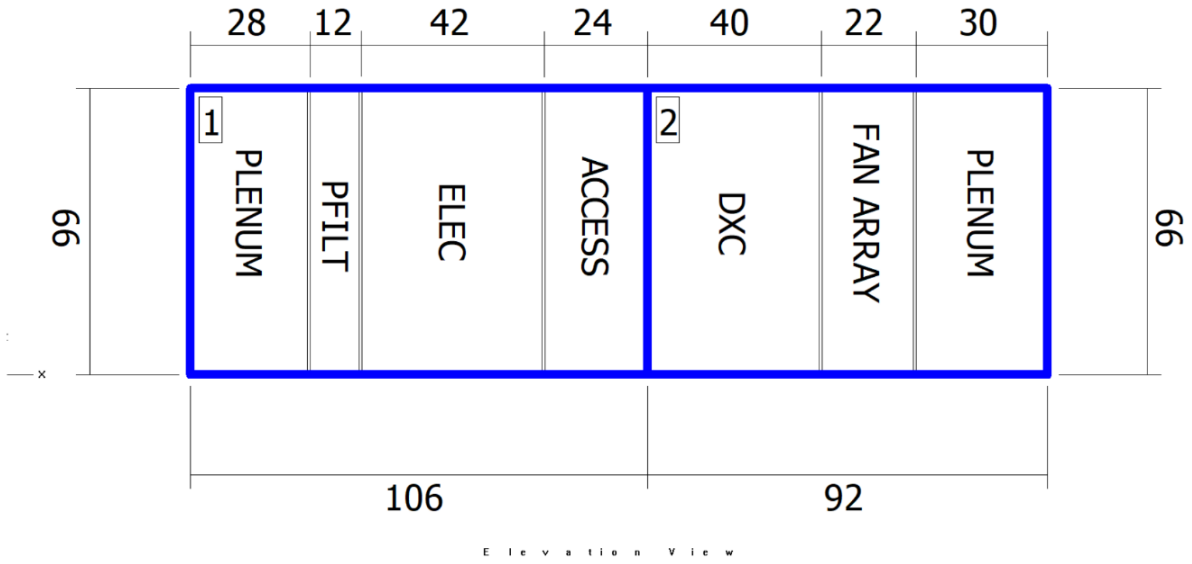
Drawing for AHU-NE SOCCER



Elevation View

Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	2010.11	106	54	66
Section 2	1653.46	92	54	66

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions.
Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-NE SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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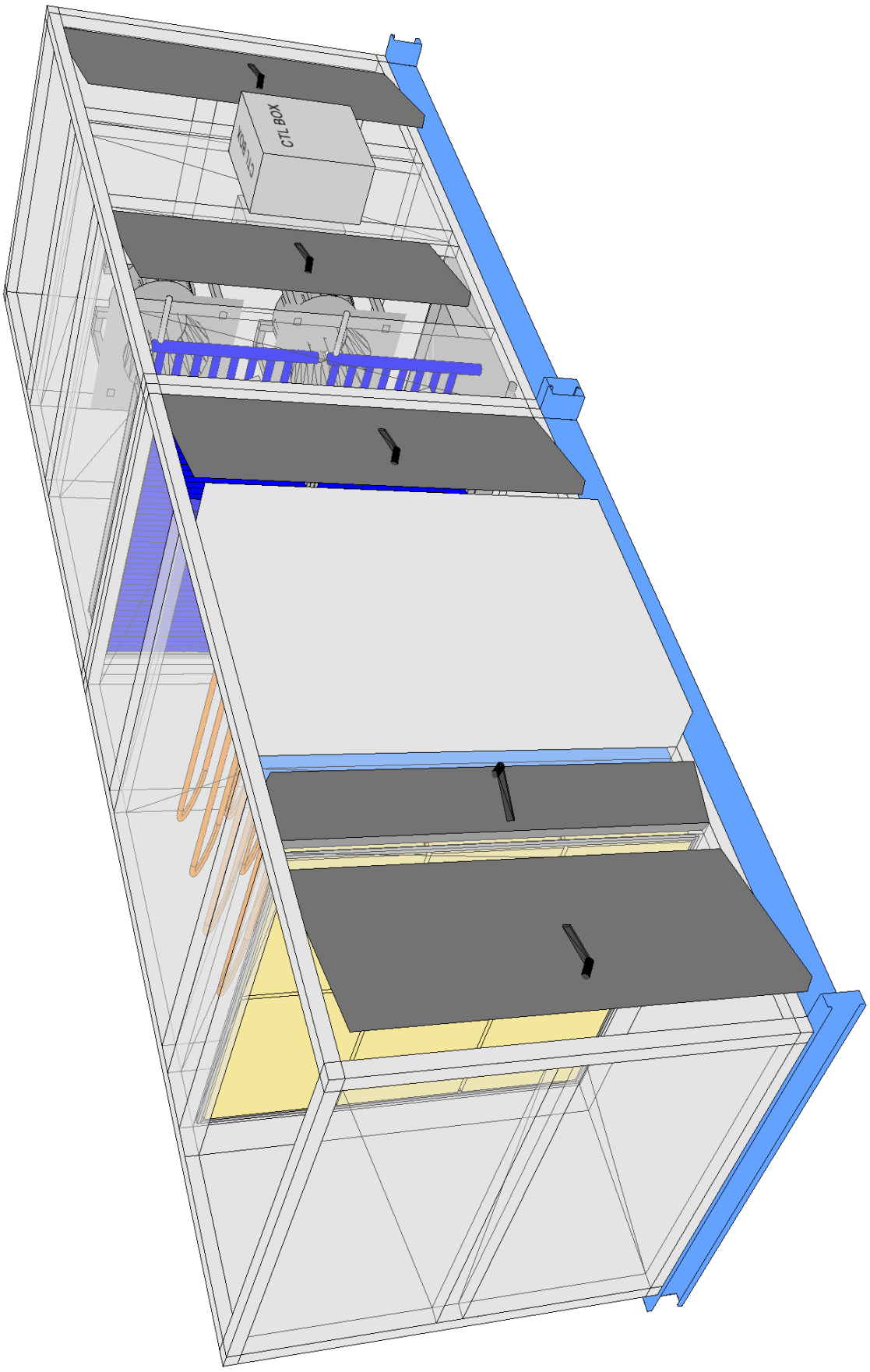

Product Drawing	Unit Tag: AHU-NE SOCCER		Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex		Sales Engineer:		
Model: CAH017GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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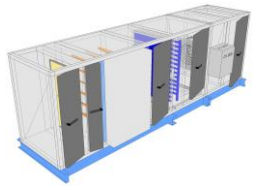
Technical Data Sheet for AHU-NW SOCCER

Job Information	Technical Data Sheet
Job Name	Sportsplex
Date	April 07 2022
Submitted By	RB
Software Version	12.71
Unit Tag	AHU-NW SOCCER



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH009GDQM	3400	1.50	3.10	54*	40*	180

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH009GDQM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	6" formed channel	**Wall Thickness:**	2 in
Shipping Stretch Wrap:	Yes	**Altitude:**	0 ft
Parts Warranty:	Standard One Year		

Plenum Section

Component: 1 | Length: 18 in | Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	14.00" x 36.00"	0.06 inWc

Door

Location	Width	Opening
Drive side	14 in	Outward

Panel Filter

Component: 2 | Length: 12 in | Shipping Section: 1

Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading
Pleated	MERV 8	541 ft/min	6.3 ft²	3400 cfm	Side

Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec				
0.26 inWc	**0.63** inWc	1.00 inWc	N/A	2	20 in	24 in	2 in

Door

Location	Width	Opening
Drive side	8 in	Outward

Special Options

Sound Baffle	Filter Gauge
(As casing details)	Magnehelic 0-2"

Technical Data Sheet for AHU-NW SOCCER

Electric Heater	Component: 3	Length: 34 in	Shipping Section: 1

Voltage	Control Type	Temperature Control	Control Signal	Pressure Drop	kW	FLA	Steps	Disconnect	Delta T
480	SCR	Yes	0 - 10V	0.04	21.5	25.9	N/A	Yes	20.0

Access Section	Component: 4	Length: 24 in	Shipping Section: 1

Air Pressure Drop
0.00 inWc

Door		
Location	Width	Opening
Drive side	20 in	Outward

Direct Expansion Coil	Component: 5	Length: 40 in	Shipping Section: 1

Coil Model	Total Capacity	Sensible Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)
5EJ1204C	136943 Btu/hr	91980 Btu/hr	1	4	12	0.625 in	1.50 in x 1.299 in

Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
3400 cfm	80.0 °F	67.0 °F	55.3 °F	53.9 °F	0.82 insWg	42 in	27 in	7.88 ft²	432 ft/min

Fluid		Sub-Cooled Refrigerant Liquid Temp.	Suction Vapor Superheat Temp. at Coil Outlet	Design Saturated Condensing Temp.	Total Refrigerant Weight
Suction Temp.	Refrigerant				
44.0 °F	R410a	110.0 °F	8.0 °F	110.0 °F	18.00 lb

Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location	Material		
OD Sweat	1-0.63 in / 1-0.88	2-1.63 in	Drive side	Copper tube	32.0 °F	32.0 °F

Material				Drain Pan	Drain Side
Fin	Tube	Header	Case		
Aluminum .0075 in	Copper .020 in	Copper	Galv. steel	Stainless steel	Drive side

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification
Coil is NOT certified by AHRI

Door		
Location	Width	Opening
Drive side	24 in	Outward

Technical Data Sheet for AHU-NW SOCCER

Supply Fan Array	Component: 6	Length: 22 in	Shipping Section: 2

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
3400 cfm	1.50 inWc	3.10 inWc	0.00 inWc	-	-	2.98 HP	2371 rpm	3170 rpm	0.0 %	15.0 A	10.3 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Discharge	Motor Location
1x1 : 1	Airfoil / N/A	1	15.74 in	Axial	Integral-Front

Motor Data

Power*	Electrical Supply	Speed	Control Signal	Supplier	Full Load Current*
7.5 HP	460/60/3 V/Hz/Phase	3170 rpm	0-10V	Q-PAC	8.24 A

Fan Options

Isolation Backdraft Dampers:	None	Block Off Plate:	None
Isolator Type:	Rigid		

Control/Disconnect Data

Selection Type:	Premium (BACnet DDC)	Vendor:	Q-PAC
Voltage:	460 V	External Power Panel: Height x Width x Depth	20.00 in x 16.00 in x 10.00 in
Mounting:	Drive Side	Internal Quick Connect Panel: Height x Width x Depth	18.00 in x 6.50 in x 6.00 in
Enclosure:	NEMA 1	Disconnect:	100kAIC Fused Disconnect

Panel

Location	Width	Opening
Removable panels	- in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Plenum Section	Component: 7	Length: 30 in	Shipping Section: 2

Air Pressure Drop

0.06 inWc

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	Top	36 in	14 in	None

Door

Location	Width	Opening
Drive side	26 in	Outward

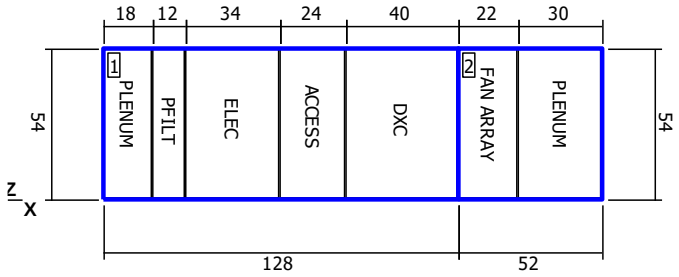
Unit Sound Power (dB)

Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	84	86	78	71	71	63	49	51
Unit Discharge:	89	91	90	86	87	85	81	75
Unit Return:	85	86	80	77	72	71	65	57

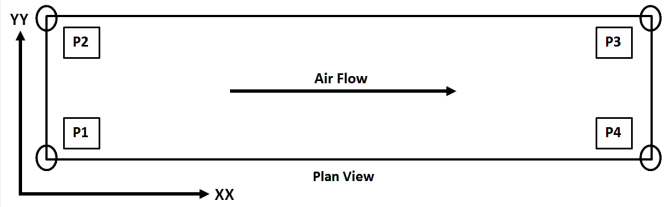
Technical Data Sheet for AHU-NW SOCCER

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	128	1908	608	338	347	616	65	14	30
2	52	608	189	189	115	115	20	20	28
Entire Unit	**180**	**2516**	**801**	**532**	**457**	**726**	**85**	**16**	**30**



Elevation View



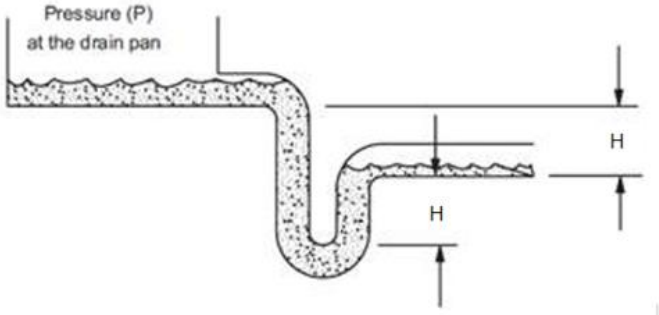
NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.06 insWg
Panel Filter	Panel Filter	0.63 insWg
Electric Heater	Electric Heater	0.04 insWg
Access Section	Access Section	
DX Coil	DX Coil	0.82 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.06 insWg
External Static	External Static	1.50 insWg
Total Supply Fan Static		3.10 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
1	DX Coil	3.58



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

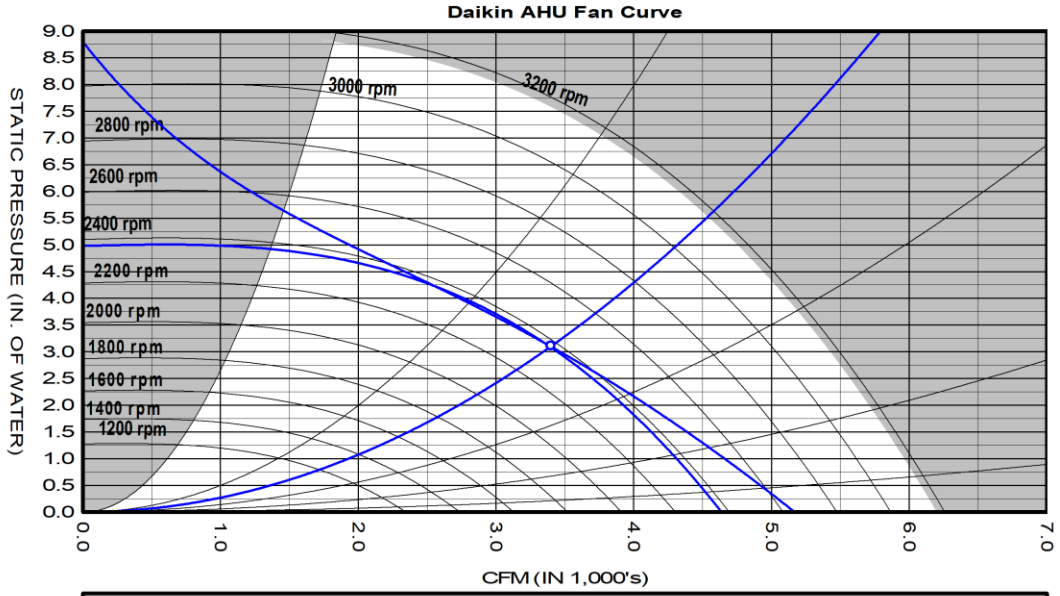
AHRI Certification

The air-handler is selected outside of the scope of AHRI Standard 430/431

Technical Data Sheet for AHU-NW SOCCER

Notes
Standard
1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

Fan Curve for AHU-NW SOCCER

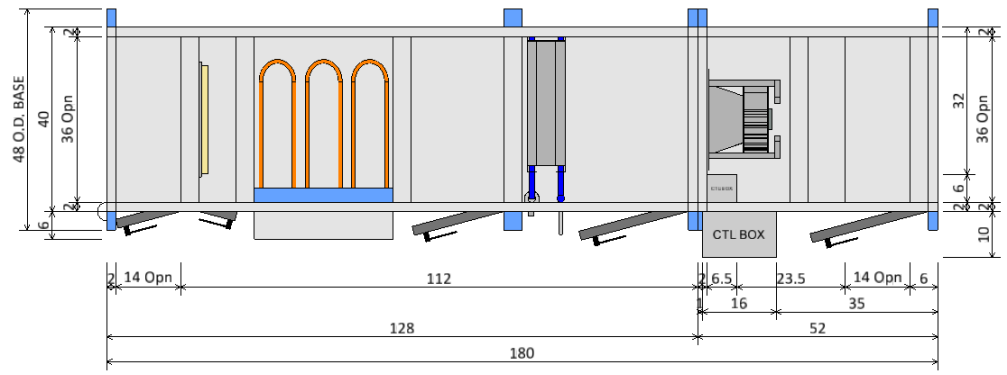


QPAC76 (1 Fans) Supply Fan at Standard Conditions					
Air volume	3400	cfm	Fan speed	2371	rpm
Total static	3.10	insWg	Max speed	3170	rpm
Total Fan Shaft Power	3.0	hp	Efficiency	56.0	%

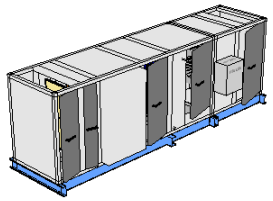
Unit tagging	AHU-NW SOCCER	Date	April-07-2022
Job name	Sportsplex	Time	13:05

Job Number: 07PDJD
Job Name: Sportsplex

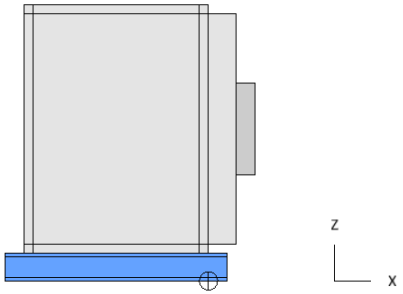
Drawing for AHU-NW SOCCER



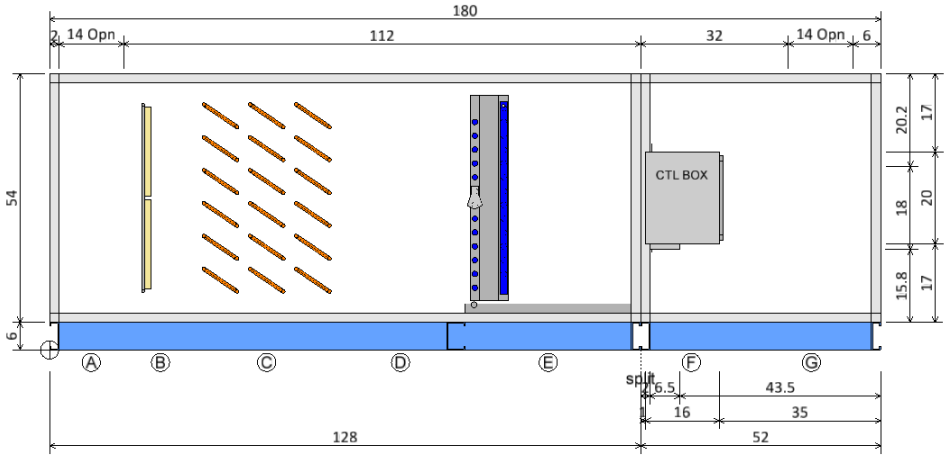
PLAN VIEW



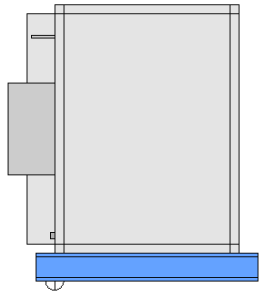
ISOMETRIC VIEW



FRONT END VIEW



ELEVATION VIEW



REAR END VIEW

Plan/Elevation	Unit Tag: AHU-NW SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH009GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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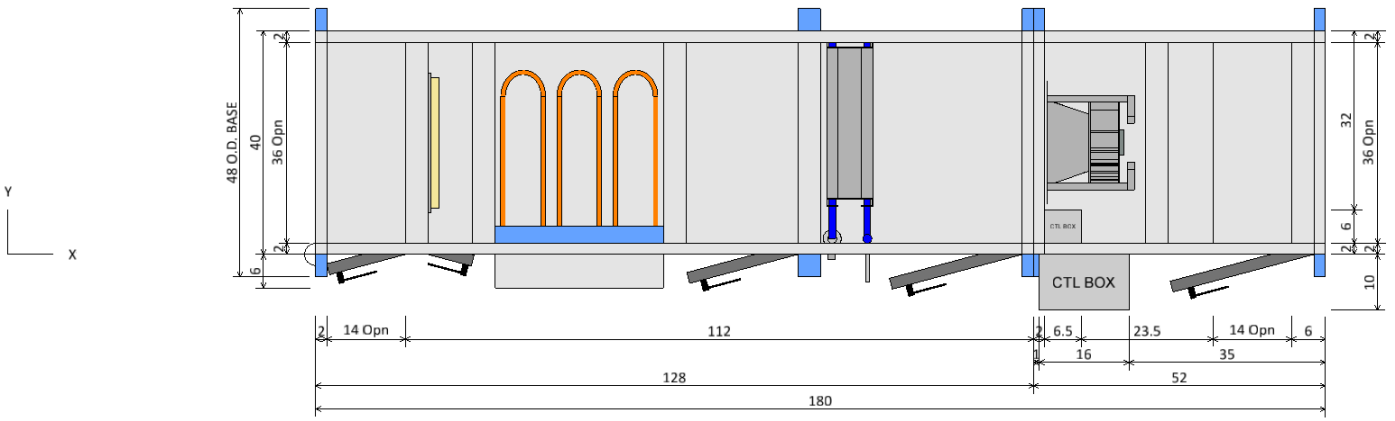
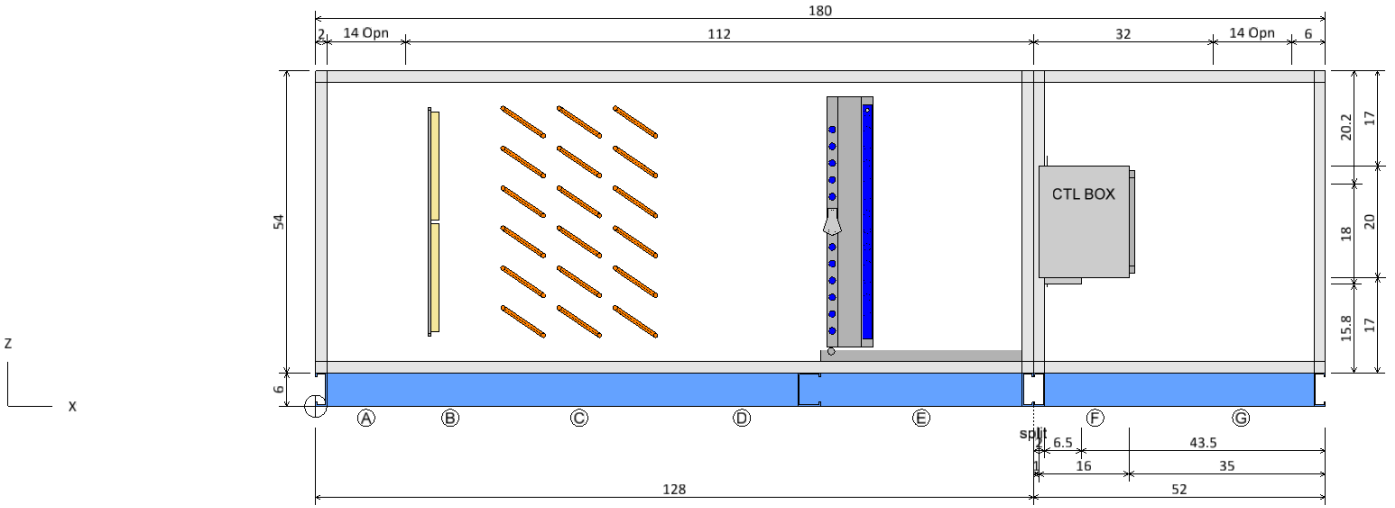
13600 Industrial Park Blvd, Minneapolis, MN 55441
www.DaikinApplied.com Software Version: 12.71

All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Drawing for AHU-NW SOCCER



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Plenum Section	
	Opening Location:	Top
	Opening Size:	14 ins x 36 ins
	Right Door (WxH):	14 ins x 50 ins
Ⓑ	Panel Filter	
	Filter Type:	Pleated (MERV 8)
	Right Door (WxH):	8 ins x 50 ins
Ⓒ	Electric Heater	
	Voltage:	480
	Control Type:	SCR
	Total Capacity:	21.50 kW
Ⓓ	Access Section	
	Right Door (WxH):	20 ins x 50 ins
Ⓔ	DX Coil	
	Coil Model:	5EJ1204C
	Total Capacity:	136943.0 Btu/hr
	Right Door (WxH):	24 ins x 44 ins
Ⓕ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	15 (2)
	Air Flowrate:	3400.0 cfm
	T.S.P:	3.1 insWg
	Motor Power:	7.5 HP
	Control box door swing:	16.00 ins
Ⓖ	Plenum Section	
	Right Door (WxH):	26 ins x 50 ins

Plan/Elevation - No Ends	Unit Tag: AHU-NW SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH009GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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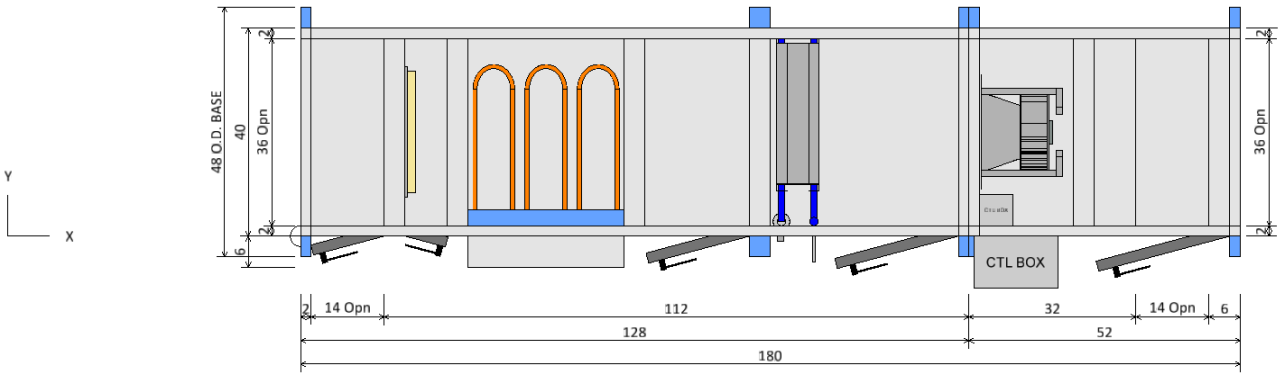
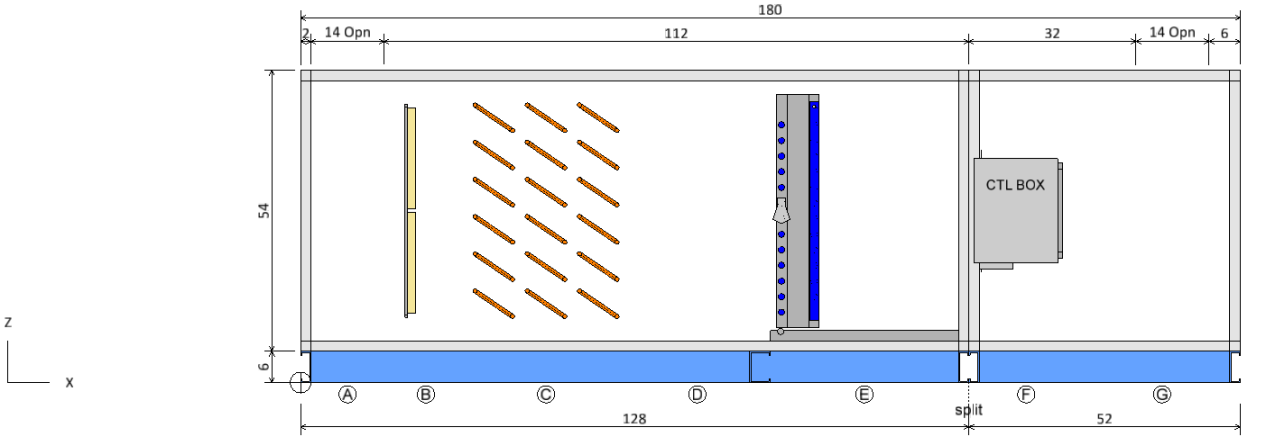
Job Number: 07PDJD
Job Name: Sportsplex

Drawing for AHU-NW SOCCER



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	2.00	2.00	60.00	36.00	14.00
Ⓖ	Plenum Section Opening	160.00	2.00	60.00	36.00	14.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-NW SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH009GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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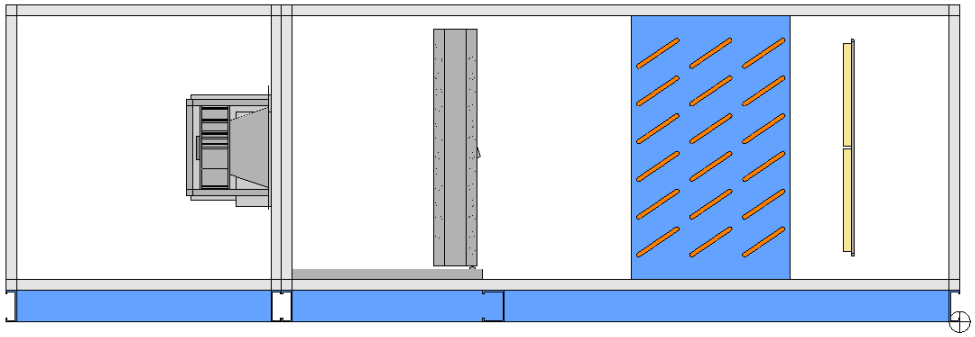
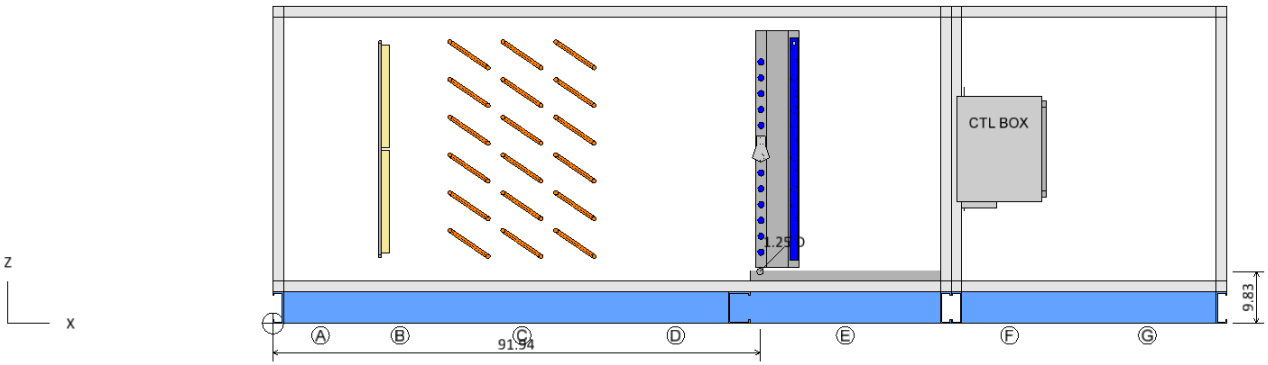
Drawing for AHU-NW SOCCER



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Coil and Drain Connections

	Type	X	Y	Z	Diam
Ⓔ	DX Coil Condensate drain conn: DX suction: DX liquid conn:	 91.94 TBD TBD	 -2.90 TBD TBD	 9.83 TBD TBD	 1.25 2- 1.63 1- 0.63

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-NW SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH009GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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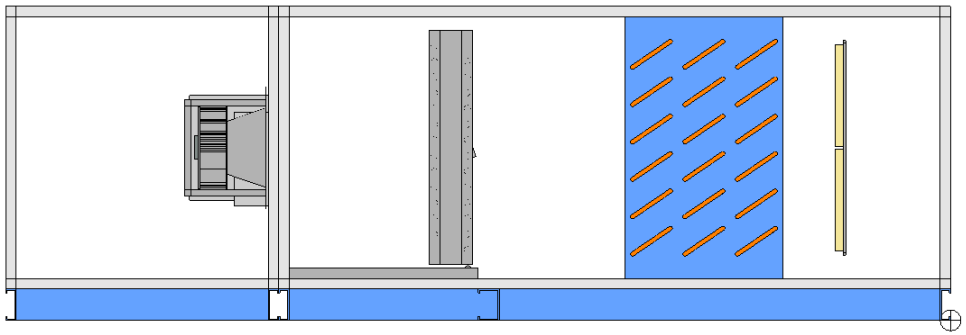
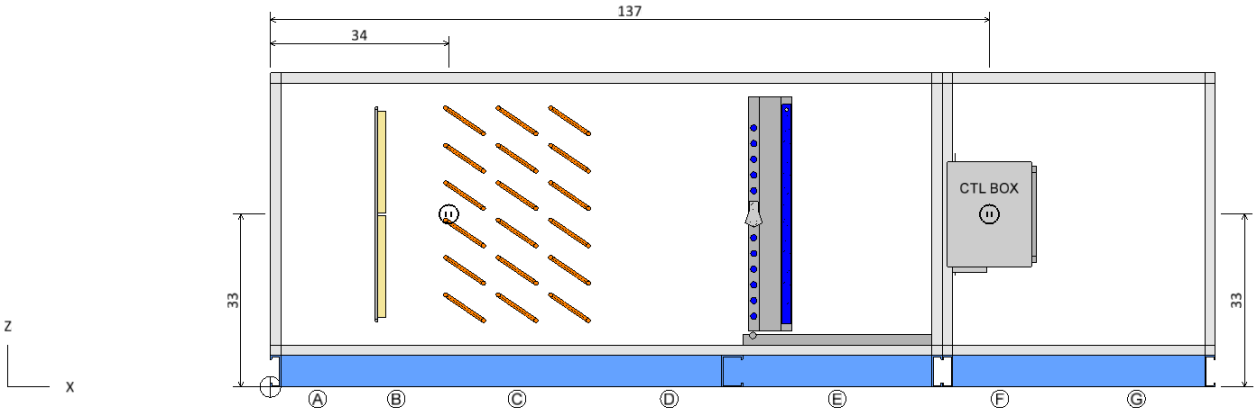
Drawing for AHU-NW SOCCER



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Component Key

	Type	X	Y	Z	Volts	Phase
Ⓒ	Electric Heater Electric Heater	34.00	0.00	33.00	480	3
Ⓕ	Supply Fan Fan	137.00	0.00	33.00	460	3

Note: Dimensions are measured from the origin point.

Electrical Connections	Unit Tag: AHU-NW SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH009GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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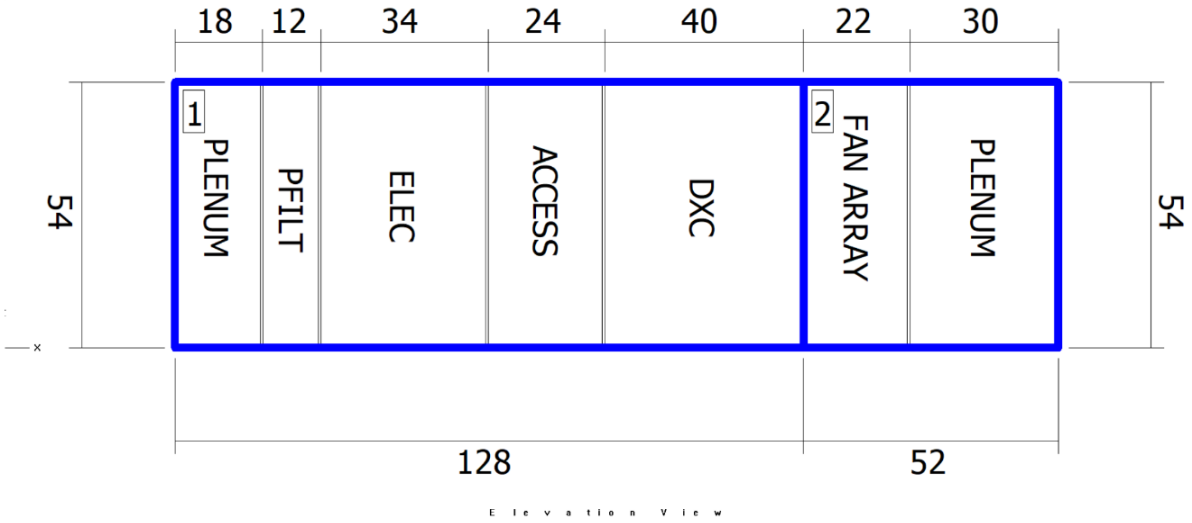
Drawing for AHU-NW SOCCER



Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	1908.39	128	40	54
Section 2	607.55	52	40	54

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions. Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-NW SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH009GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

DAIKIN
13600 Industrial Park Blvd, Minneapolis, MN 55441
www.DaikinApplied.com Software Version: 12.71

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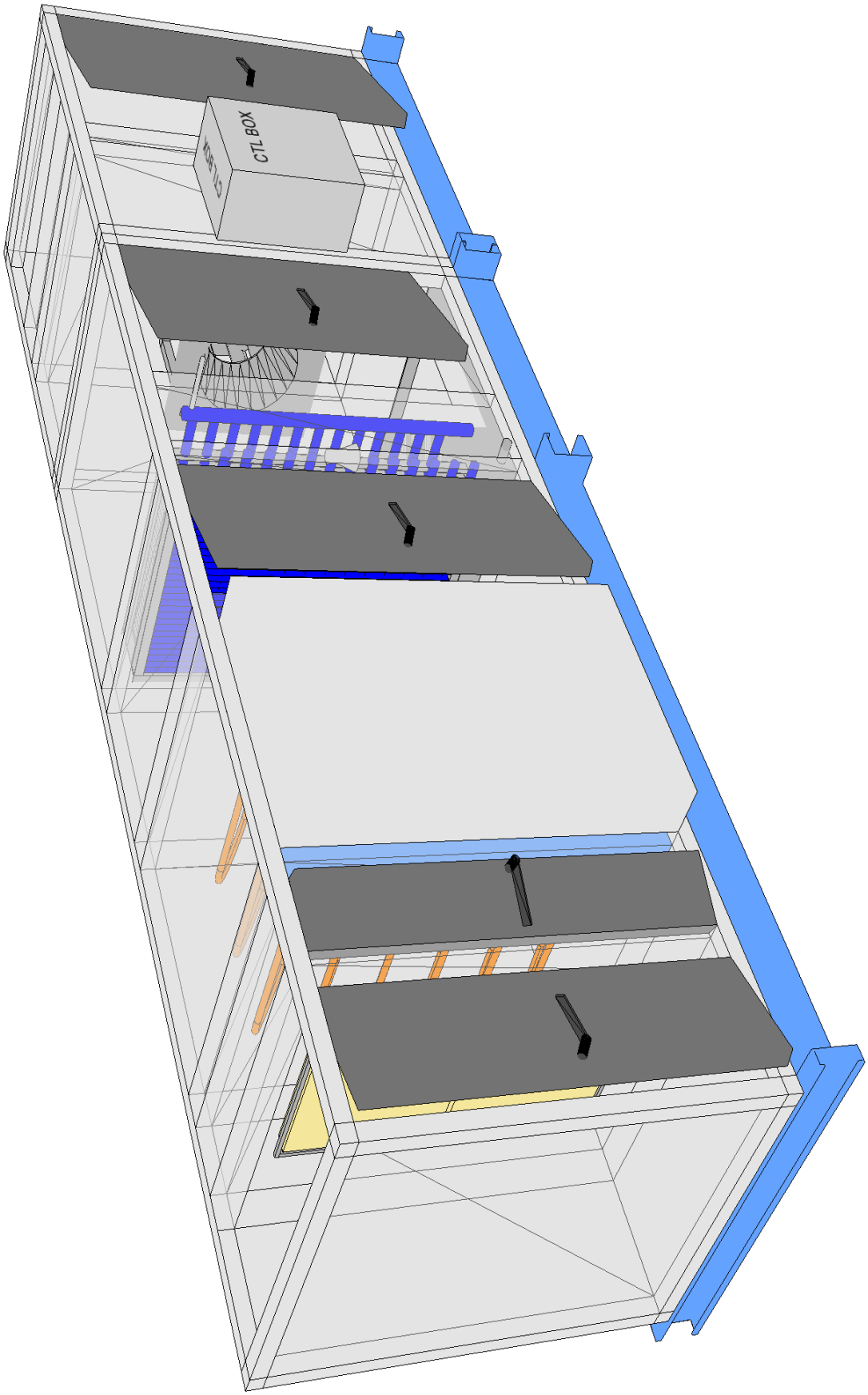
Drawing for AHU-NW SOCCER

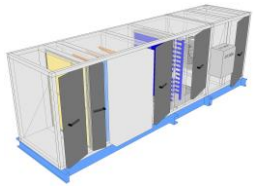


Product Drawing	Unit Tag: AHU-NW SOCCER	Sales Office: Air Reps, LLC	DAIKIN
Product: Vision Air Handler	Project Name: Sportsplex	Sales Engineer:	13600 Industrial Park Blvd, Minneapolis, MN 55441
Model: CAH009GDQM	Apr. 7, 2022 | Ver/Rev: | Sheet: 1 of 1	Scale: NTS | Tolerance: +/-0.25" | Dwg Units: in	www.DaikinApplied.com Software Version: 12.71

All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Technical Data Sheet for AHU-SOCCER DECK

Job Information	Technical Data Sheet
Job Name	Sportsplex
Date	April 07 2022
Submitted By	RB
Software Version	12.71
Unit Tag	AHU-SOCCER DECK



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH010GDQM	4000	1.50	3.21	54*	42*	182

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH010GDQM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	6" formed channel	**Wall Thickness:**	2 in
Shipping Stretch Wrap:	Yes	**Altitude:**	0 ft
Parts Warranty:	Standard One Year		

Plenum Section

Component: 1 | Length: 20 in | Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	16.00" x 38.00"	0.05 inWc

Door

Location	Width	Opening
Drive side	16 in	Outward

Panel Filter

Component: 2 | Length: 12 in | Shipping Section: 1

Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading
Pleated	MERV 8	355 ft/min	11.3 ft²	4000 cfm	Side

Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec				
0.15 inWc	**0.57** inWc	1.00 inWc	N/A	2	24 in	24 in	2 in
				2	24 in	12 in	2 in

Door

Location	Width	Opening
Drive side	8 in	Outward

Special Options

Sound Baffle	Filter Gauge
(As casing details)	Magnehelic 0-2"

Technical Data Sheet for AHU-SOCCER DECK

Electric Heater	Component: 3	Length: 34 in	Shipping Section: 1

Voltage	Control Type	Temperature Control	Control Signal	Pressure Drop	kW	FLA	Steps	Disconnect	Delta T
480	SCR	Yes	0 - 10V	0.04	25.3	30.4	N/A	Yes	20.0

Access Section	Component: 4	Length: 24 in	Shipping Section: 1

Air Pressure Drop
0.00 inWc

Door		
Location	Width	Opening
Drive side	20 in	Outward

Direct Expansion Coil	Component: 5	Length: 40 in	Shipping Section: 1

Coil Model	Total Capacity	Sensible Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)
5EJ0706C	160561 Btu/hr	106797 Btu/hr	1	6	7	0.625 in	1.50 in x 1.299 in

Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
4000 cfm	80.0 °F	67.0 °F	55.6 °F	54.0 °F	0.99 insWg	42 in	29 in	8.46 ft²	473 ft/min

Fluid		Sub-Cooled Refrigerant Liquid Temp.	Suction Vapor Superheat Temp. at Coil Outlet	Design Saturated Condensing Temp.	Total Refrigerant Weight
Suction Temp.	Refrigerant				
44.0 °F	R410a	110.0 °F	8.0 °F	110.0 °F	28.00 lb

Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location	Material		
OD Sweat	1-0.63 in / 1-0.88	2-1.63 in	Drive side	Copper tube	32.0 °F	32.0 °F

Material				Drain Pan	Drain Side
Fin	Tube	Header	Case		
Aluminum .0075 in	Copper .020 in	Copper	Galv. steel	Stainless steel	Drive side

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification
Coil is NOT certified by AHRI

Door		
Location	Width	Opening
Drive side	24 in	Outward

Technical Data Sheet for AHU-SOCCER DECK

Supply Fan Array	Component: 6	Length: 22 in	Shipping Section: 2

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
4000 cfm	1.50 inWc	3.21 inWc	0.00 inWc	-	-	3.74 HP	2608 rpm	3170 rpm	0.0 %	15.0 A	10.3 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Discharge	Motor Location
1x1 : 1	Airfoil / N/A	1	15.74 in	Axial	Integral-Front

Motor Data

Power*	Electrical Supply	Speed	Control Signal	Supplier	Full Load Current*
7.5 HP	460/60/3 V/Hz/Phase	3170 rpm	0-10V	Q-PAC	8.24 A

Fan Options

Isolation Backdraft Dampers:	None	Block Off Plate:	None
Isolator Type:	Rigid		

Control/Disconnect Data

Selection Type:	Premium (BACnet DDC)	Vendor:	Q-PAC
Voltage:	460 V	External Power Panel: Height x Width x Depth	20.00 in x 16.00 in x 10.00 in
Mounting:	Drive Side	Internal Quick Connect Panel: Height x Width x Depth	18.00 in x 6.50 in x 6.00 in
Enclosure:	NEMA 1	Disconnect:	100kAIC Fused Disconnect

Panel

Location	Width	Opening
Removable panels	- in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Plenum Section	Component: 7	Length: 30 in	Shipping Section: 2

Air Pressure Drop

0.06 inWc

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	Top	38 in	16 in	None

Door

Location	Width	Opening
Drive side	26 in	Outward

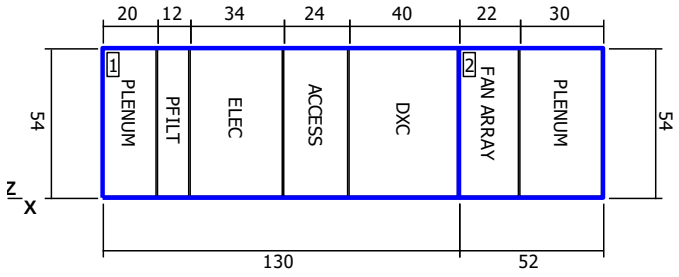
Unit Sound Power (dB)

Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	76	79	69	64	63	55	46	51
Unit Discharge:	81	84	81	79	79	77	73	67
Unit Return:	77	79	72	69	63	62	56	51

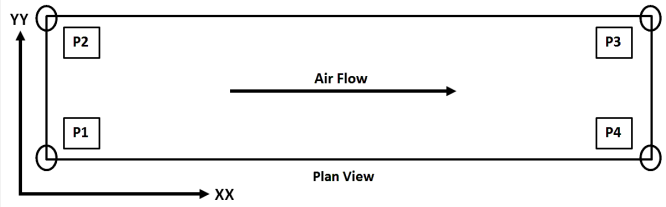
Technical Data Sheet for AHU-SOCCER DECK

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	130	1961	611	340	369	641	67	15	30
2	52	618	191	191	117	117	20	21	28
Entire Unit	**182**	**2579**	**810**	**539**	**479**	**751**	**87**	**17**	**30**



Elevation View



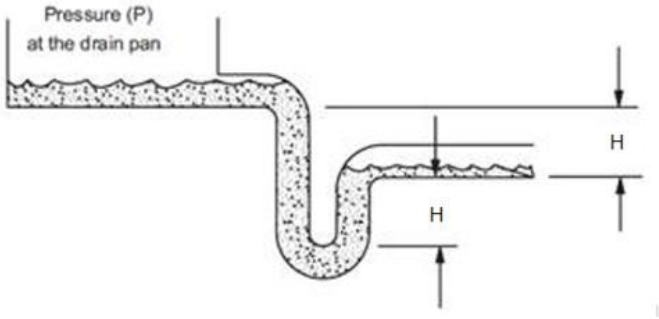
NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.05 insWg
Panel Filter	Panel Filter	0.57 insWg
Electric Heater	Electric Heater	0.04 insWg
Access Section	Access Section	
DX Coil	DX Coil	0.99 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.06 insWg
External Static	External Static	1.50 insWg
Total Supply Fan Static		3.21 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
1	DX Coil	3.82



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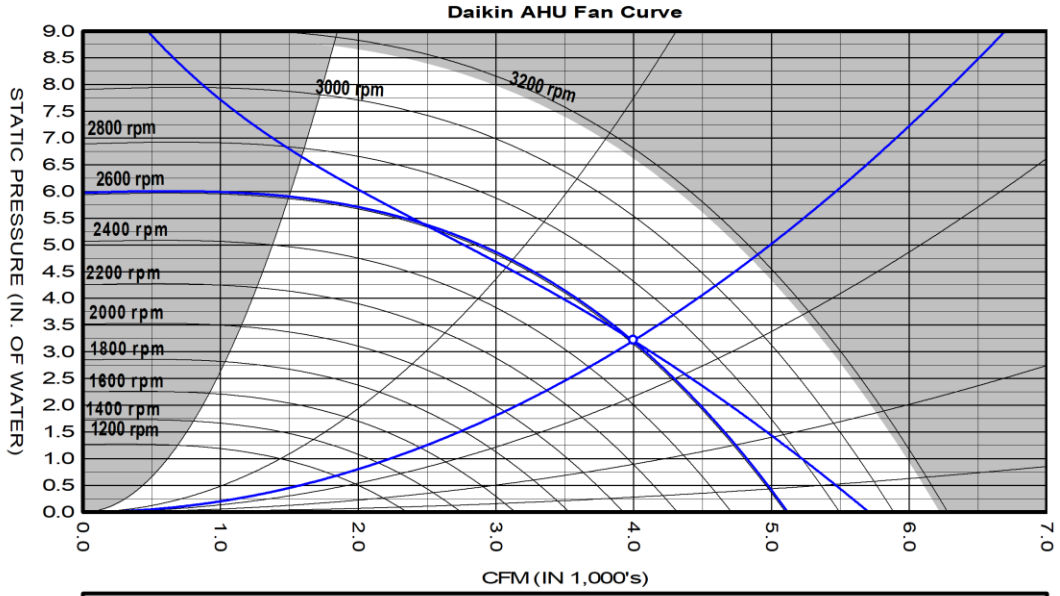
Technical Data Sheet for AHU-SOCCER DECK

Notes
Standard
1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

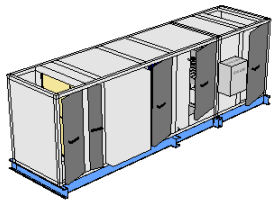
Fan Curve for AHU-SOCCER DECK

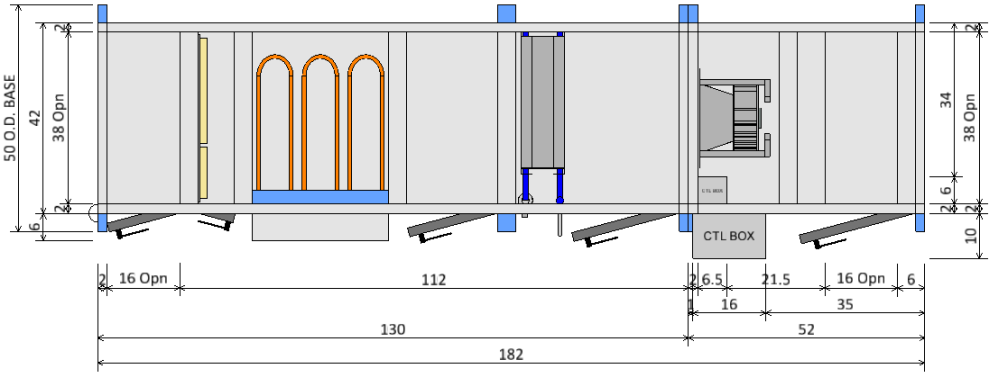


QPAC76 (1 Fans) Supply Fan at Standard Conditions					
Air volume	4000	cfm	Fan speed	2608	rpm
Total static	3.21	insWg	Max speed	3170	rpm
Total Fan Shaft Power	3.7	hp	Efficiency	54.3	%

Unit tagging	AHU-SOCCER DECK	Date	April-07-2022
Job name	Sportsplex	Time	13:05

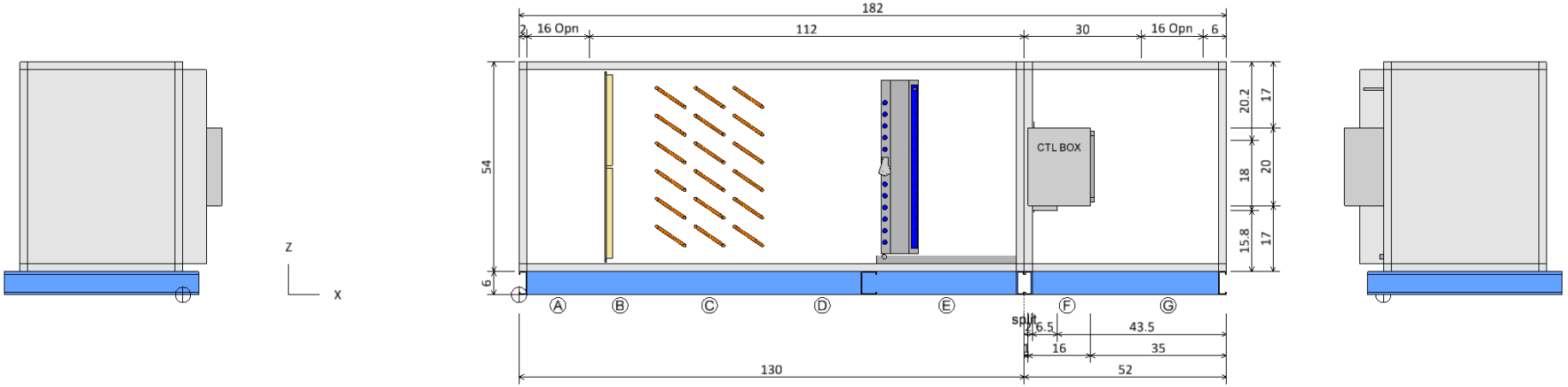
Drawing for AHU-SOCCER DECK





PLAN VIEW

ISOMETRIC VIEW



FRONT END VIEW

ELEVATION VIEW

REAR END VIEW

Plan/Elevation	Unit Tag: AHU-SOCCER DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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13600 Industrial Park Blvd, Minneapolis, MN 55441
www.DaikinApplied.com Software Version: 12.71

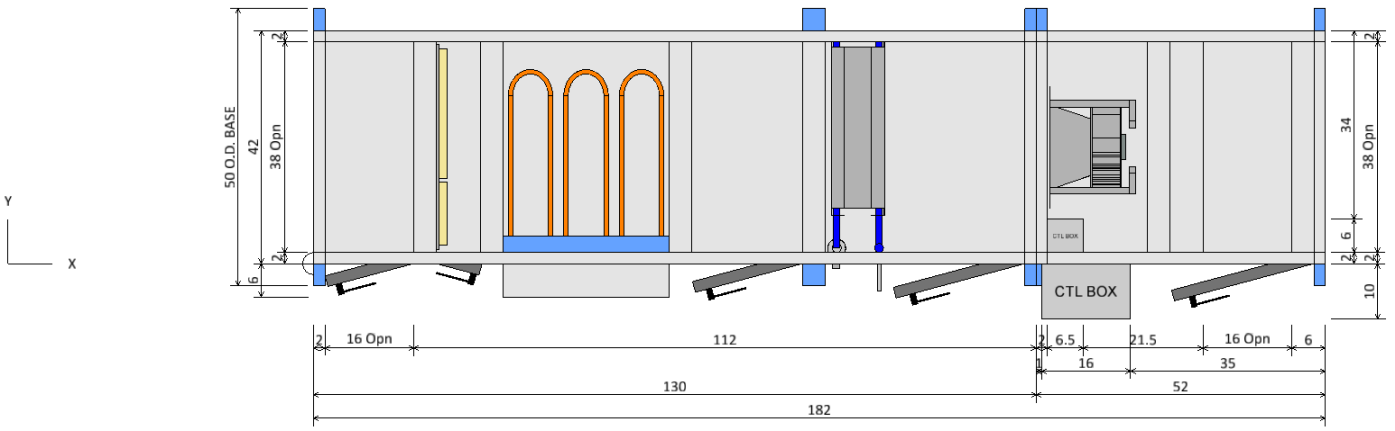
All opening dimensions have a 1" mounting flange along the inner edge. The actual airflow area of the opening is 2" smaller in each dimension.

Job Number: 07PDJD
Job Name: Sportsplex

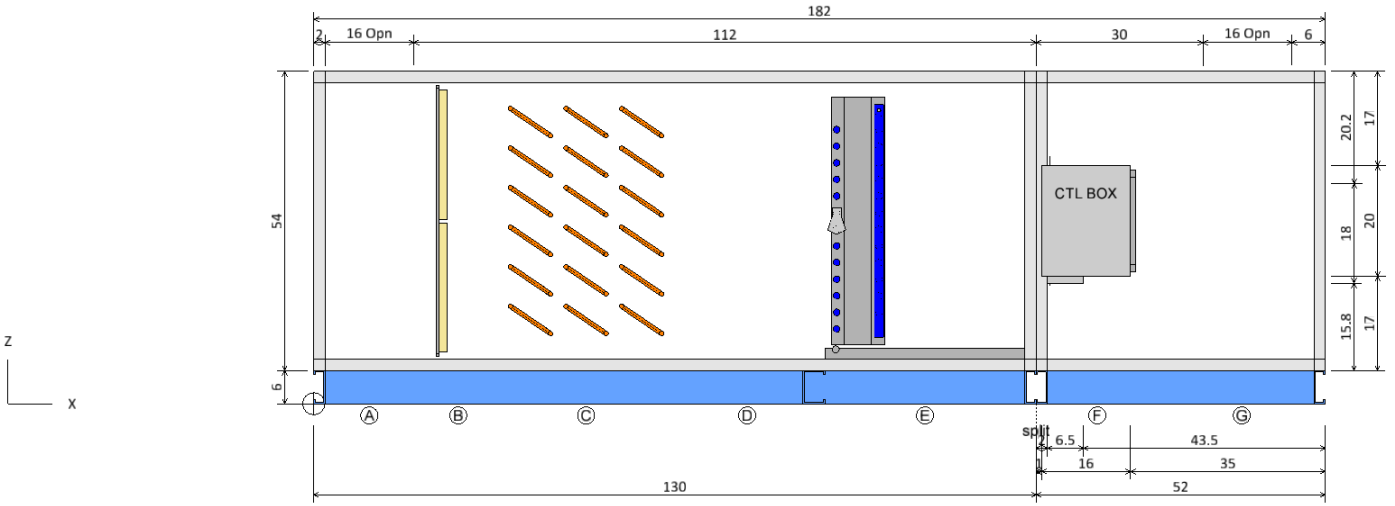
Prepared Date: 4/7/2022

Job Number: 07PDJD
Job Name: Sportsplex

Drawing for AHU-SOCCER DECK



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Plenum Section	
	Opening Location:	Top
	Opening Size:	16 ins x 38 ins
	Right Door (WxH):	16 ins x 50 ins
Ⓑ	Panel Filter	
	Filter Type:	Pleated (MERV 8)
	Right Door (WxH):	8 ins x 50 ins
Ⓒ	Electric Heater	
	Voltage:	480
	Control Type:	SCR
	Total Capacity:	25.30 kW
Ⓓ	Access Section	
	Right Door (WxH):	20 ins x 50 ins
Ⓔ	DX Coil	
	Coil Model:	5EJ0706C
	Total Capacity:	160561.0 Btu/hr
	Right Door (WxH):	24 ins x 44 ins
Ⓕ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	15 (2)
	Air Flowrate:	4000.0 cfm
	T.S.P:	3.2 insWg
	Motor Power:	7.5 HP
	Control box door swing:	16.00 ins
Ⓖ	Plenum Section	
	Right Door (WxH):	26 ins x 50 ins

Plan/Elevation - No Ends	Unit Tag: AHU-SOCCER DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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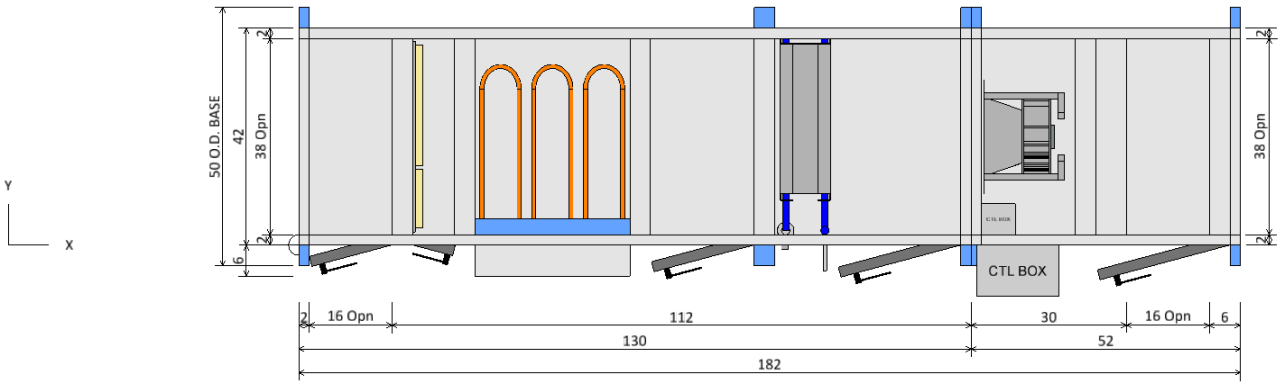
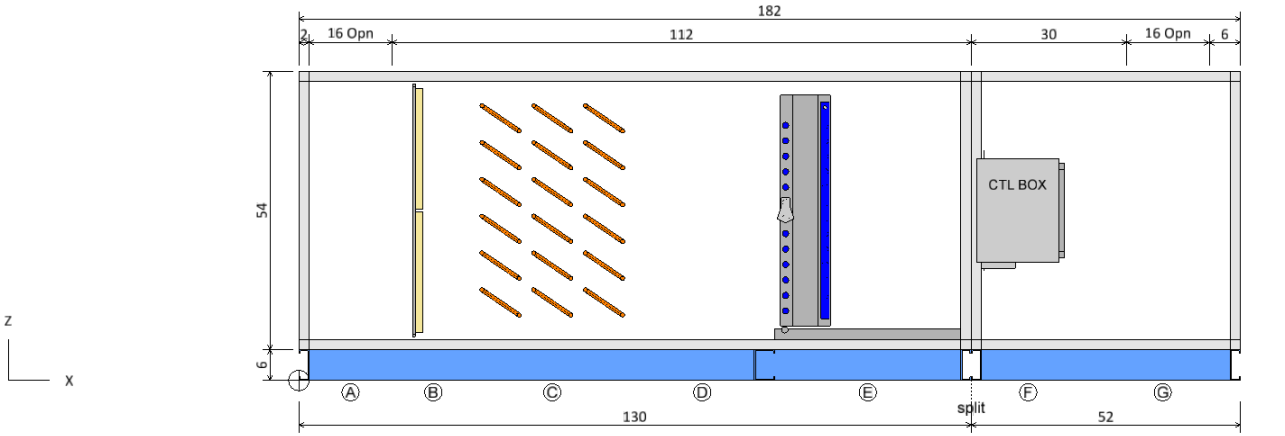
Drawing for AHU-SOCCER DECK



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	2.00	2.00	60.00	38.00	16.00
Ⓖ	Plenum Section Opening	160.00	2.00	60.00	38.00	16.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-SOCCER DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

DAIKIN
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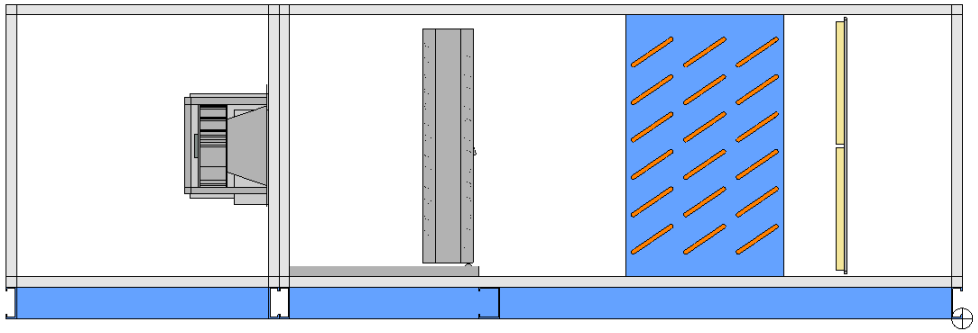
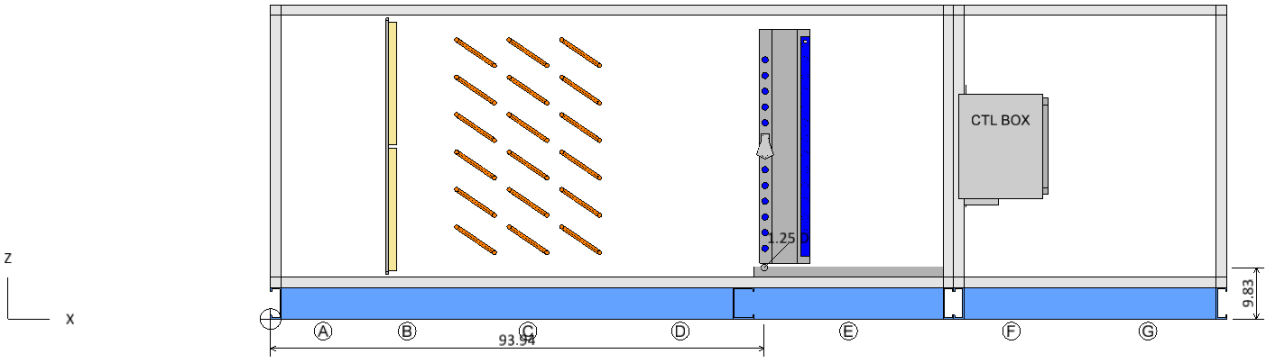
Drawing for AHU-SOCCER DECK



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Coil and Drain Connections

	Type	X	Y	Z	Diam
Ⓔ	DX Coil Condensate drain conn: DX suction: DX liquid conn:	 93.94 TBD TBD	 -2.90 TBD TBD	 9.83 TBD TBD	 1.25 2- 1.63 1- 0.63

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-SOCCER DECK			Sales Office: Air Reps, LLC			DAIKIN
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:			13600 Industrial Park Blvd, Minneapolis, MN 55441
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in	www.DaikinApplied.com Software Version: 12.71

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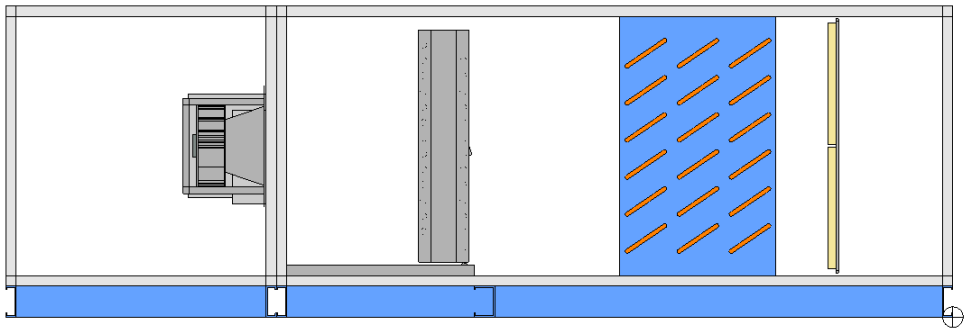
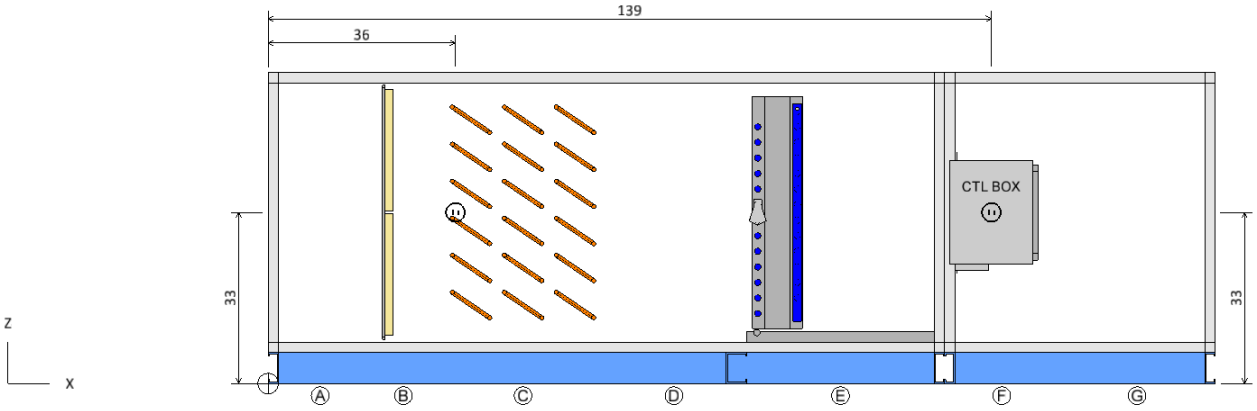
Drawing for AHU-SOCCER DECK



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Component Key

	Type	X	Y	Z	Volts	Phase
Ⓒ	Electric Heater Electric Heater	36.00	0.00	33.00	480	3
Ⓕ	Supply Fan Fan	139.00	0.00	33.00	460	3

Note: Dimensions are measured from the origin point.

Electrical Connections	Unit Tag: AHU-SOCCER DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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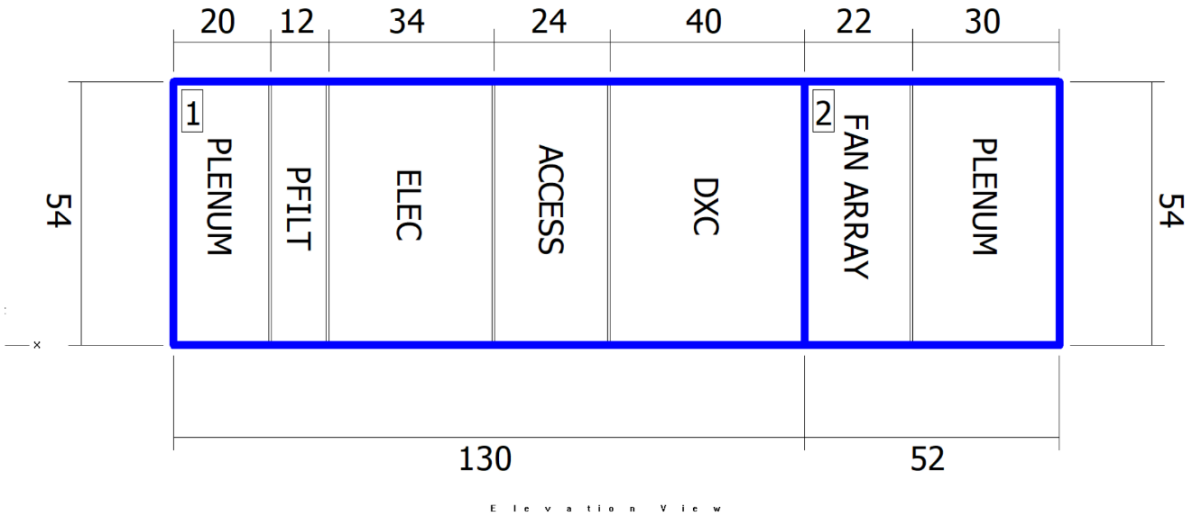
Drawing for AHU-SOCCER DECK



Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	1960.60	130	42	54
Section 2	617.86	52	42	54

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions. Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-SOCCER DECK			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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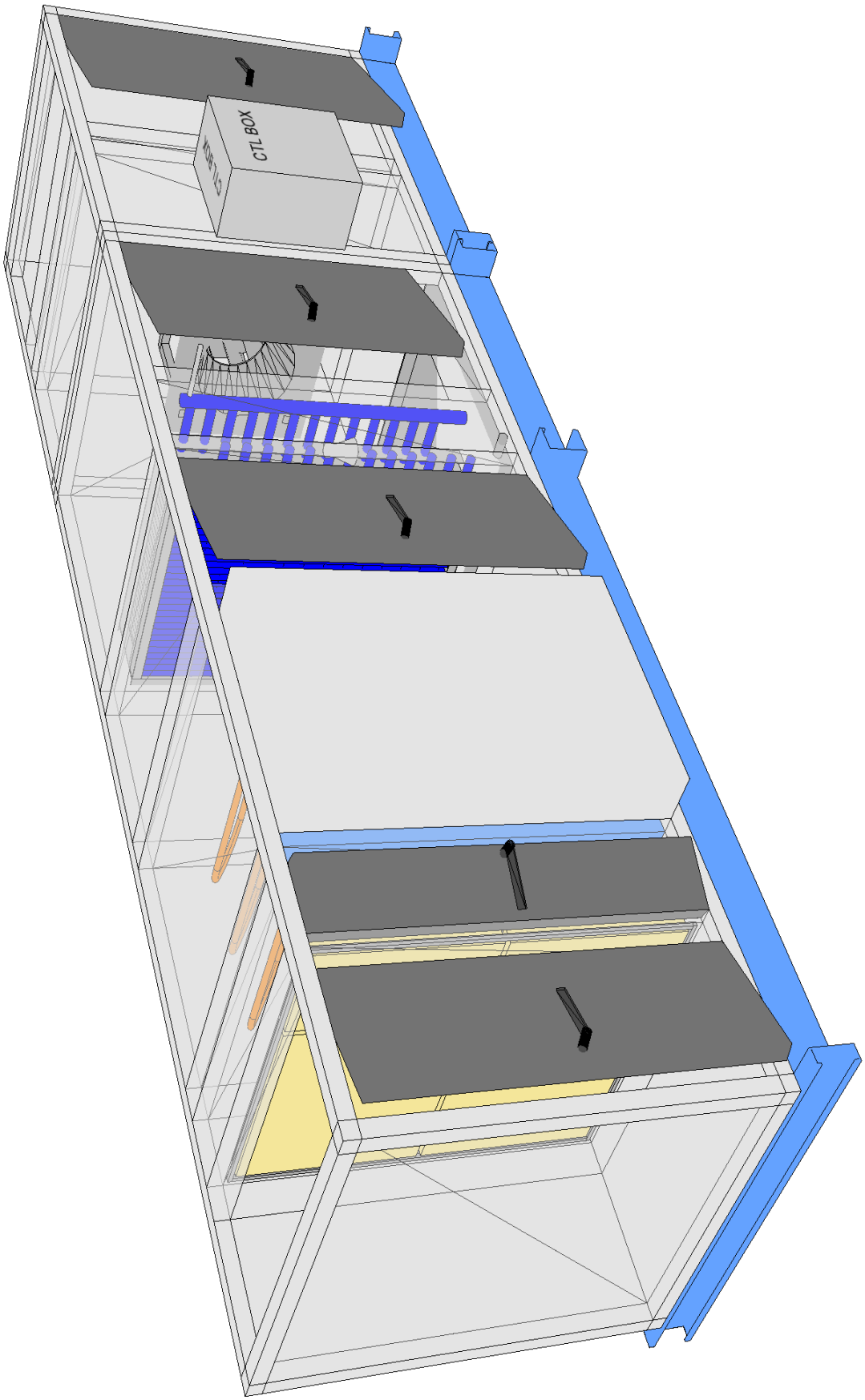
Drawing for AHU-SOCCER DECK



Product Drawing	Unit Tag: AHU-SOCCER DECK		Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex		Sales Engineer:		
Model: CAH010GDQM	Apr. 7, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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DAIKIN AAF | Flanders

PerfectPleat® HC M8 2" Filter

Description

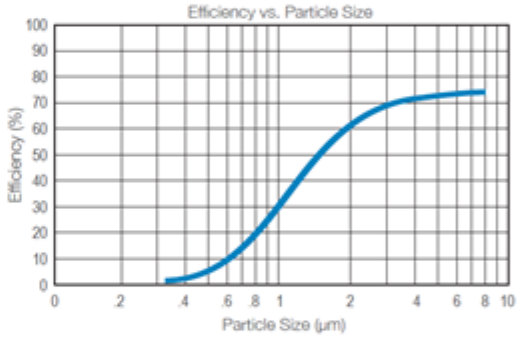
The PerfectPleat HC M8 filter is designed to consistently increase efficiency throughout the service life of the filter. The PerfectPleat HC M8 filter is ideal for applications where pleated filters are currently used and higher performance is desired. It has an initial MERV 8 rating and the efficiency increases significantly when dust holding begins. PerfectPleat HC M8 filters have distinctive self-supporting characteristics that allow a pleating pattern, which promotes airflow and maximizes dust holding capacity (DHC). Lower pressure drop and higher DHC translate to reductions in energy consumption and operating costs.

Support straps on the air-entering side are used in combination with uniquely designed pleat stabilizers on the air-leaving side of this 2" filter to provide additional strength. The support straps and pleat stabilizers ensure integrity against turbulent airflow. The 2" filter resists crushing and abuse and provides excellent lateral stability for installation in side-access systems.

Performance Data

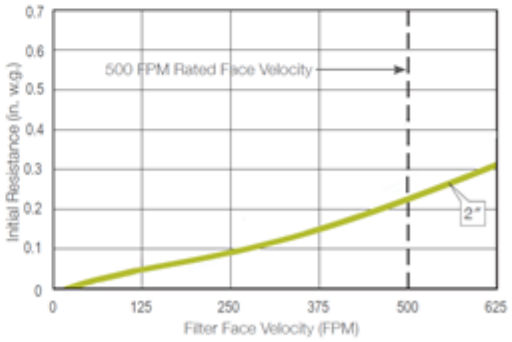
PerfectPleat HC M8 2" Filter		
Pleats per lineal foot		15.0
Rated initial resistance (in. W.g.)	330 fpm	0.12
	500 fpm	0.23
	625 fpm	0.31
Recommended final resistance (in. W.g.)		1.0
MERV		8.0
Continuous operating temperature limits		150°F (66°C)

Composite Minimum Efficiency Curve



Tested in accordance with ASHRAE Standard 52.2.

Initial Resistance vs. Filter Face Velocity



CSD-00209-00 (Jan-18)

AHU-NW SOCCER, AHU-NE SOCCER, AHU-SOCCER DECK, AHU-ICE RINK DECK

Magnehelic® Differential Pressure Gauge

Description

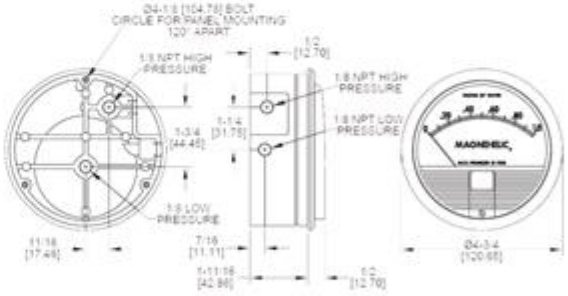
Dwyer's simple, frictionless Magnehelic® Gauge movement quickly indicates air or noncorrosive gas pressures--either positive, negative (vacuum) or differential. The design resists shock, vibration, over-pressures, and is weatherproof to IP67.

Features

- Offered in 0 – 1", 0 – 2", 0 – 3", and 0 – 5" measurements
- Easy to read gauge through undistorted plastic face permits viewing from far away
- Patented design provides quick response to pressure changes, meaning no delay in assessing critical situations
- Durable housing and high-quality components combine to provide long service life and minimized down-time
- Pointer stops of molded rubber prevent pointer over-travel without damage
- Jeweled bearings are shock-resistant mounted, providing virtually frictionless motion for the helix
- Motion is damped with high viscosity silicone fluid
- Zero adjustment screw is located in the plastic cover and can be accessed without removing the cover
- Diecast aluminum case is precision made and iridite-dipped to withstand a 168 hour salt spray corrosion test
- Overpressure protection blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gauge interior when over pressure reaches approximately 25 psig (1.7 bar)
- O-ring seal for cover assures pressure integrity of case
- Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages

Magnehelic® Differential Pressure Gauge (0 - 1" model shown)

Dimensions



CSD-00205-00 (Jan-18)

AHU-NW SOCCER, AHU-NE SOCCER, AHU-SOCCER DECK, AHU-ICE RINK DECK

DAIKIN

Brasch Electric Heat with SCR Vernier Control

Heater shown with control panel cover removed.

Description

The Brasch electric heater is a slip-in heater built to Daikin's specifications with stringent quality control testing. When Daikin provided controls are specified, they are mounted in the terminal box of the drive side of the heater section.

Brasch Quality Assurance

Heaters are dielectrically tested for 1000V plus twice the rated voltage or 2000V, whichever is higher. The resistance of each heater is measured and recorded and must be within 5% of rated value. Electrical components are tested and inspected after installation in the heater. Every heater is checked twice by Brasch; once in production and once by a trained Quality Control inspector who gives each heater a thorough inspection.

Features

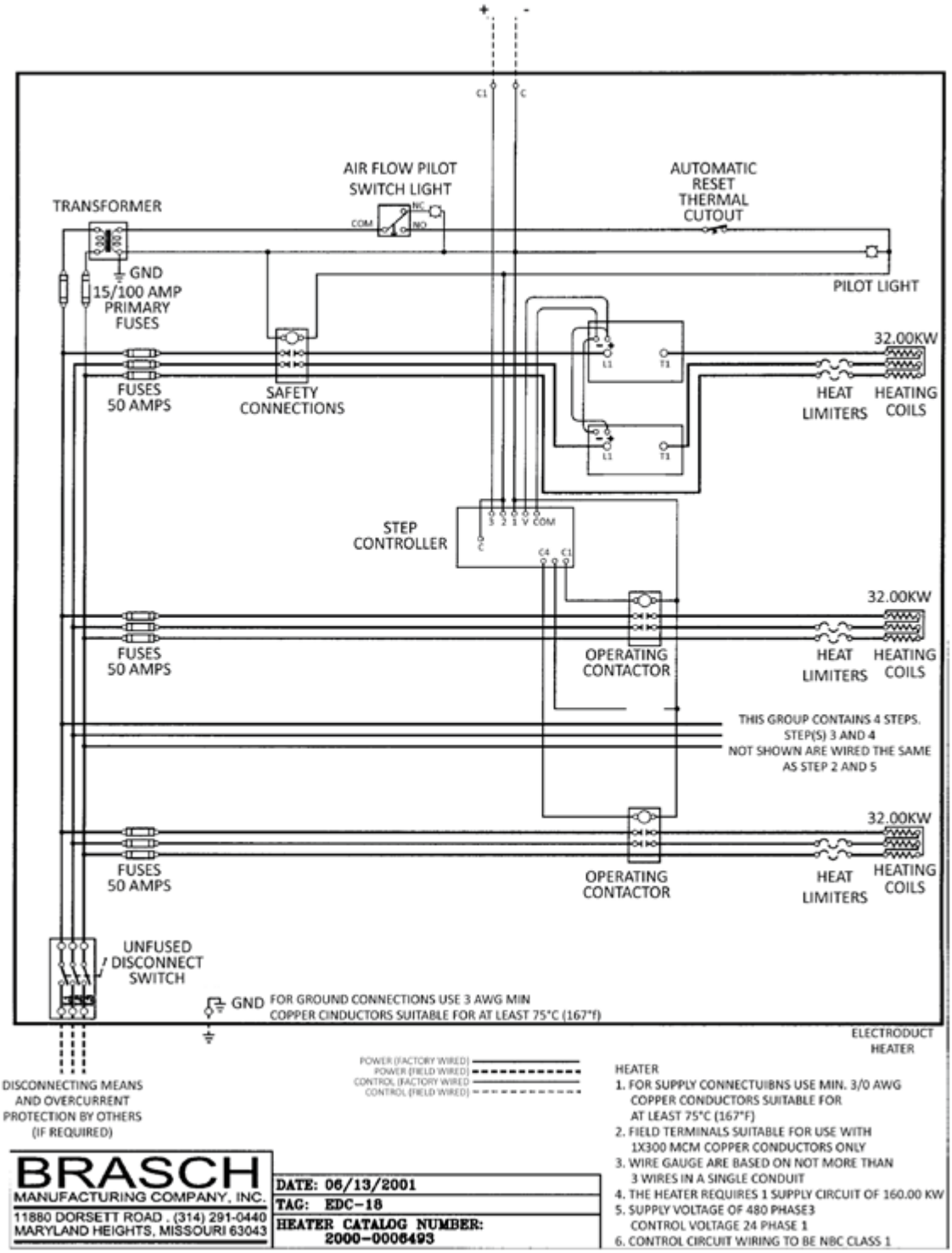
- Designed by Brasch to Daikin specifications
- 80/20 A Grade resistance wire
- ETL listed as part of the Daikin unit

SCR Vernier Controllers

SCR Vernier systems are used on larger kW heaters where very close heat control is required. The SCR Vernier system uses a combination of SCR and non-SCR steps. For electric/electronic controls, a step controller energizes the SCR and non-SCR steps. The system is more economical for larger KW heaters than full SCR control while providing the same precise heat control as the full SCR system. This is accomplished by satisfying most of the heat requirement through pre-determined non-SCR steps with the modulating (SCR) step as both the initial step and fills in between step controller steps to "fine-tune" and satisfy heat demand. The SCR step is nominally equal to the kW of a non-SCR step to provide an even transition between steps.

CSD-00276-00 (Mar-18)

Multi-step Heater with SCR Vernier Control



2 of 2

Document Summary Page

VRV Selection

Project Report

Report details

Produced on: 4/7/2022

Application version: 2022.4.5.2

Project details

Project name: Sportsplex

Solution name: Unnamed solution (1)

Client Name:

Customer reference:

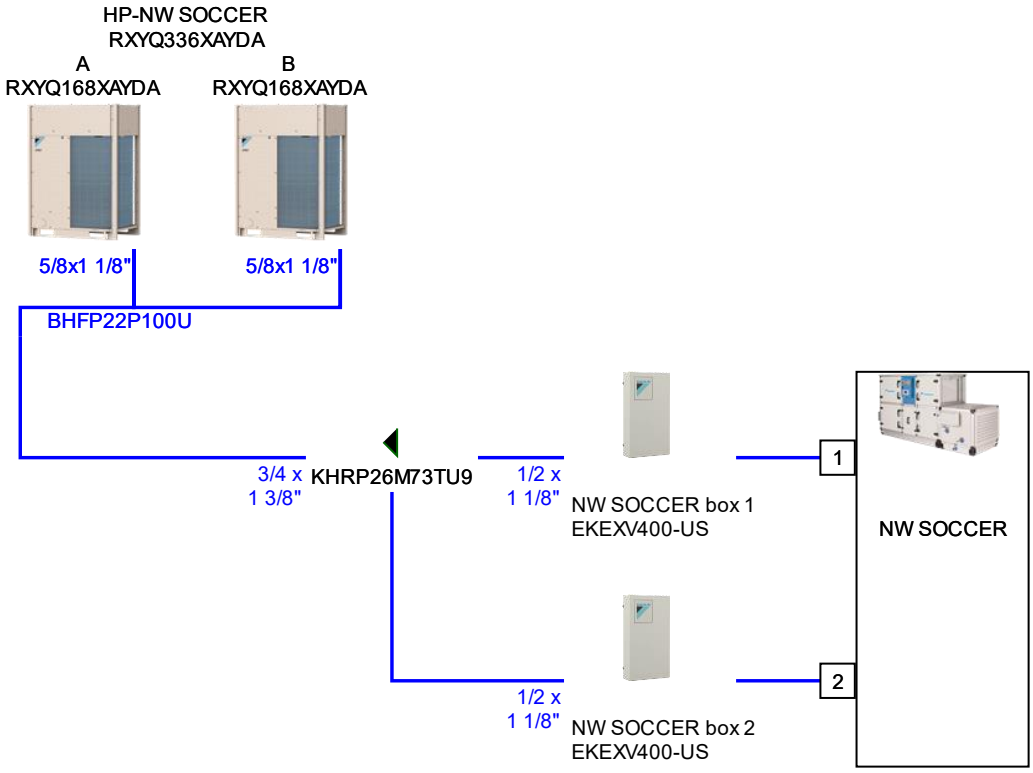
Quotation reference:

Project number: 526432/643857

Selection parameters of the indoor units can be found in the Engineering Data Books
Selection parameters of the outdoor units can be found in the Engineering Data Books
Only the data published in the data book are correct. This program uses close approximations of these data.

Piping diagrams

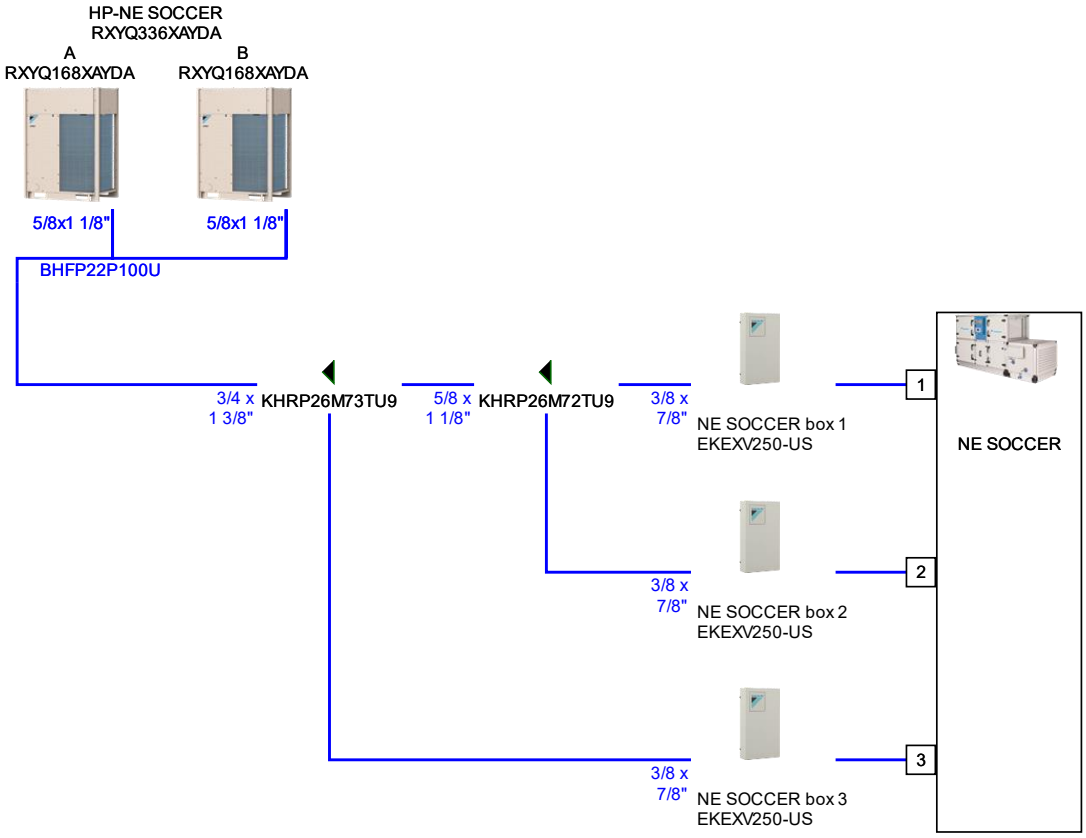
Piping HP-NW SOCCER



Piping

Warning: The pipe diameter values are purely indicative. Depending on the required pipe lengths, a different pipe diameter might be required.

Piping HP-NE SOCCER



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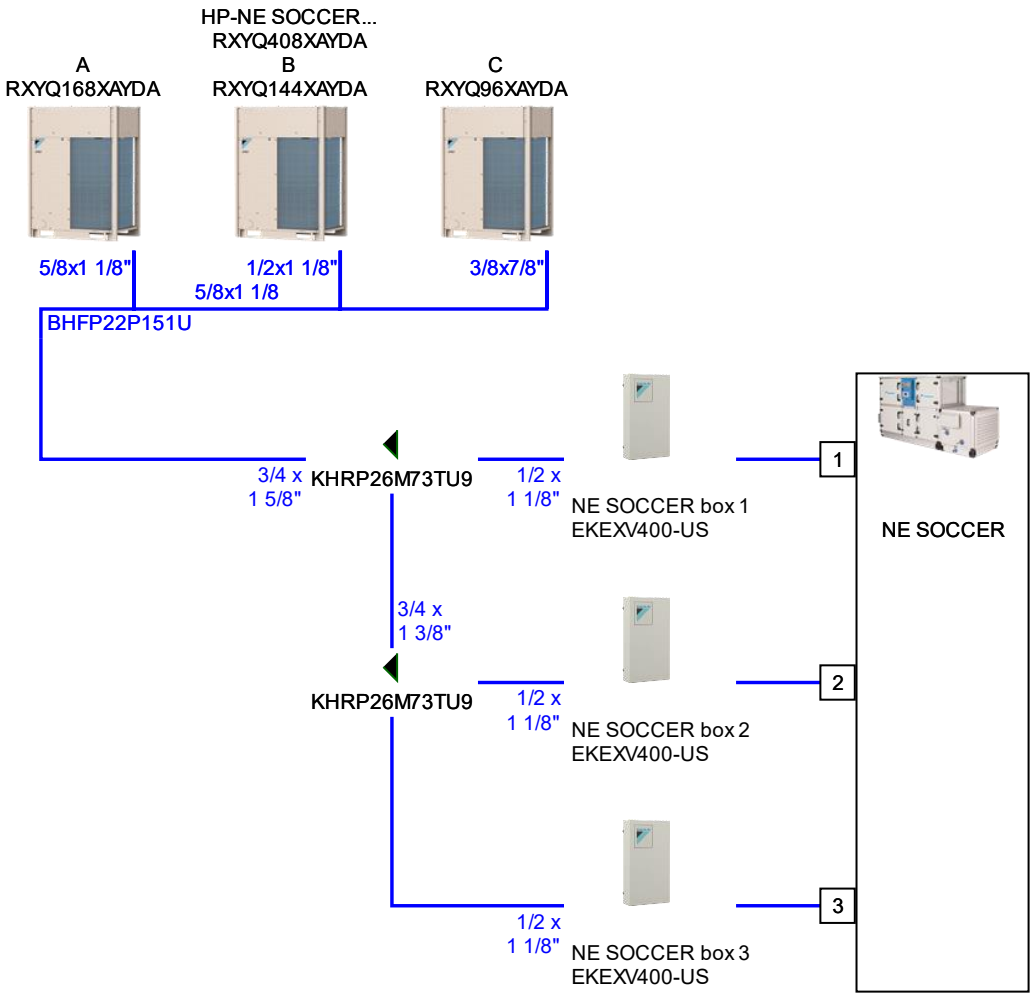

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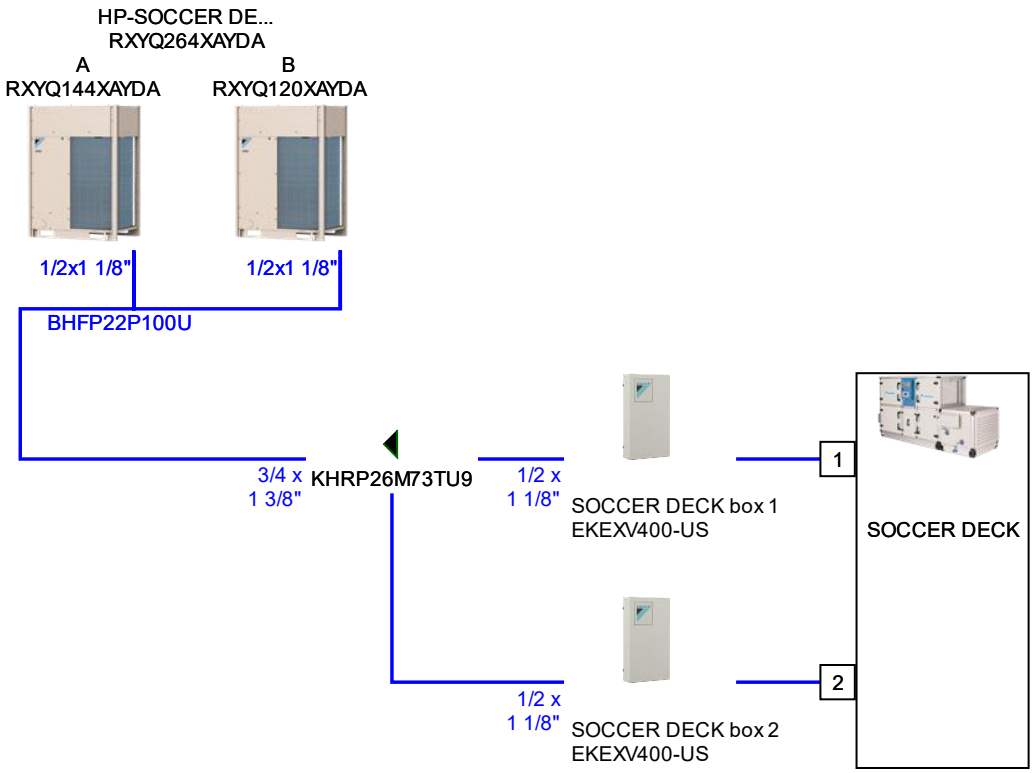
Piping HP-SOCCER DECK 1



Piping

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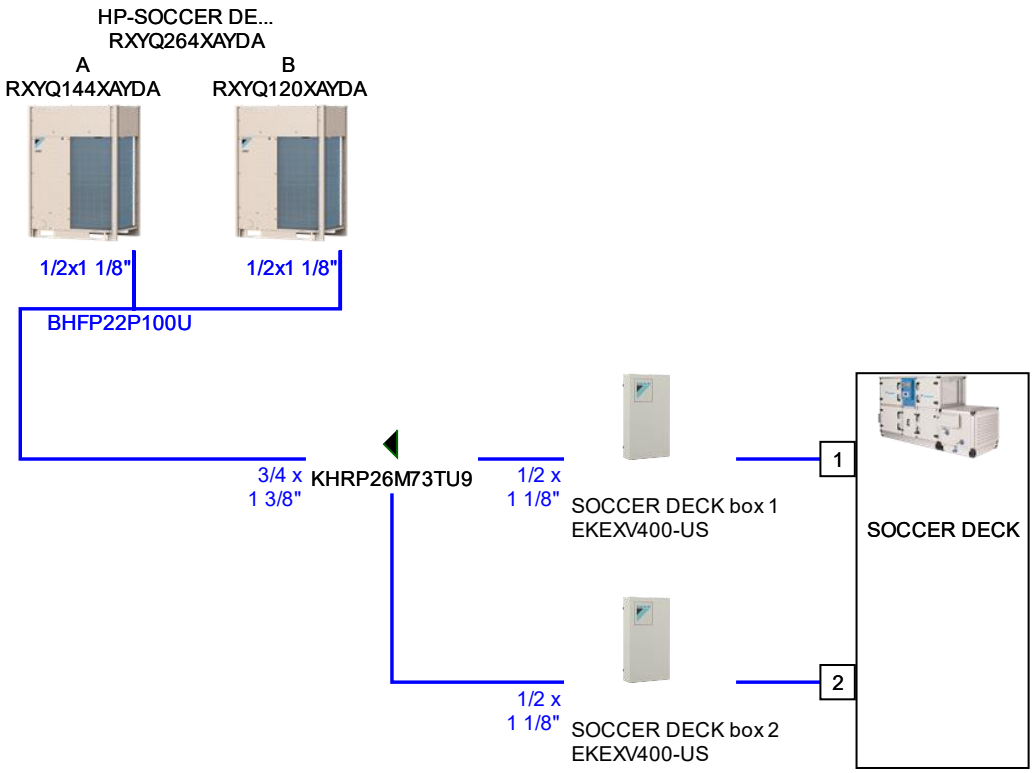
Piping HP-SOCCER DECK 2



Piping

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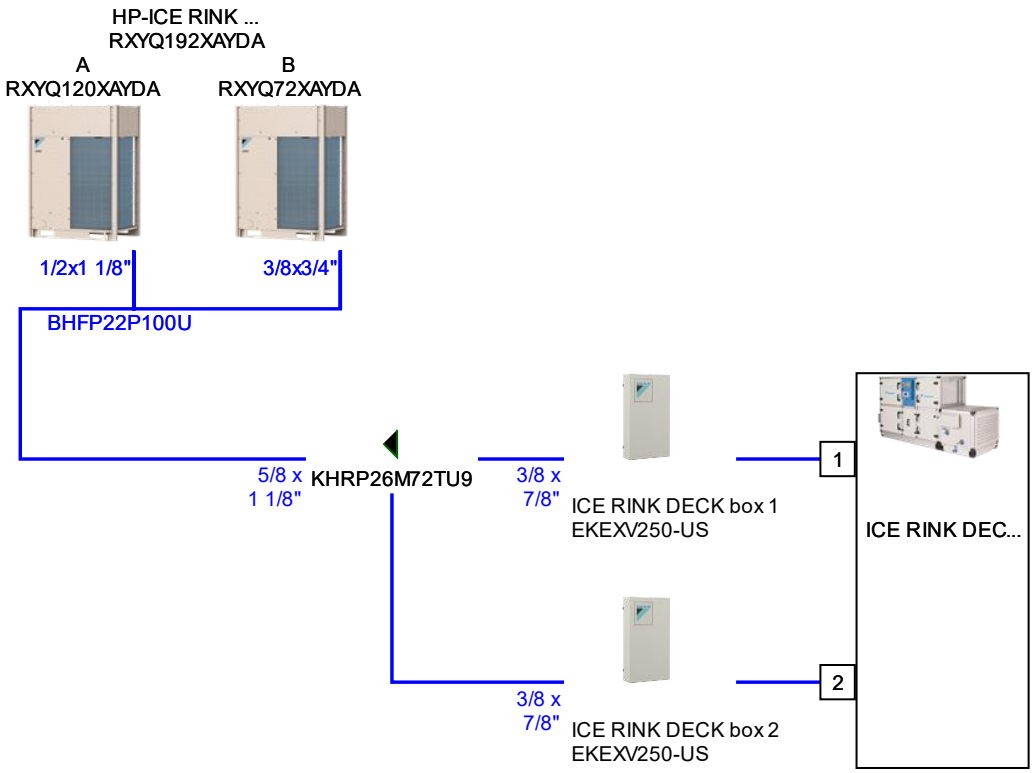

Piping

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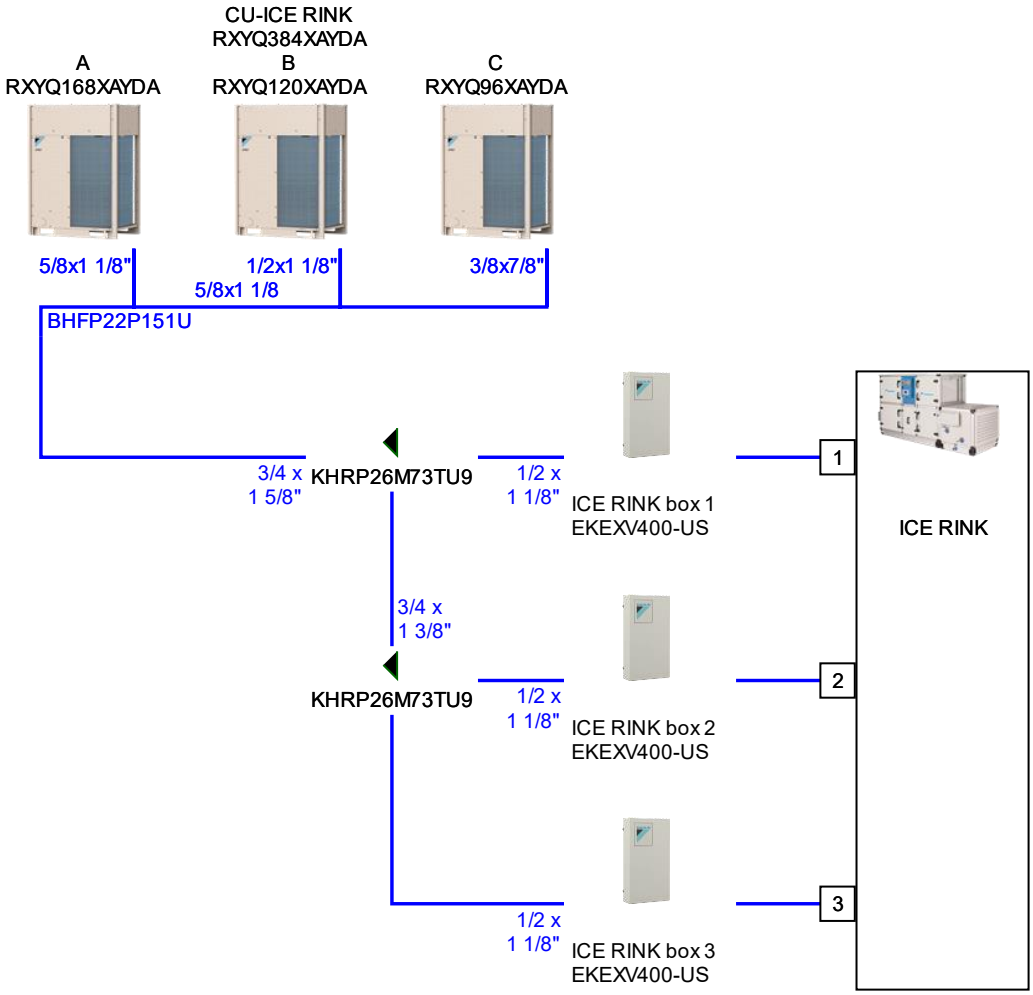

Piping

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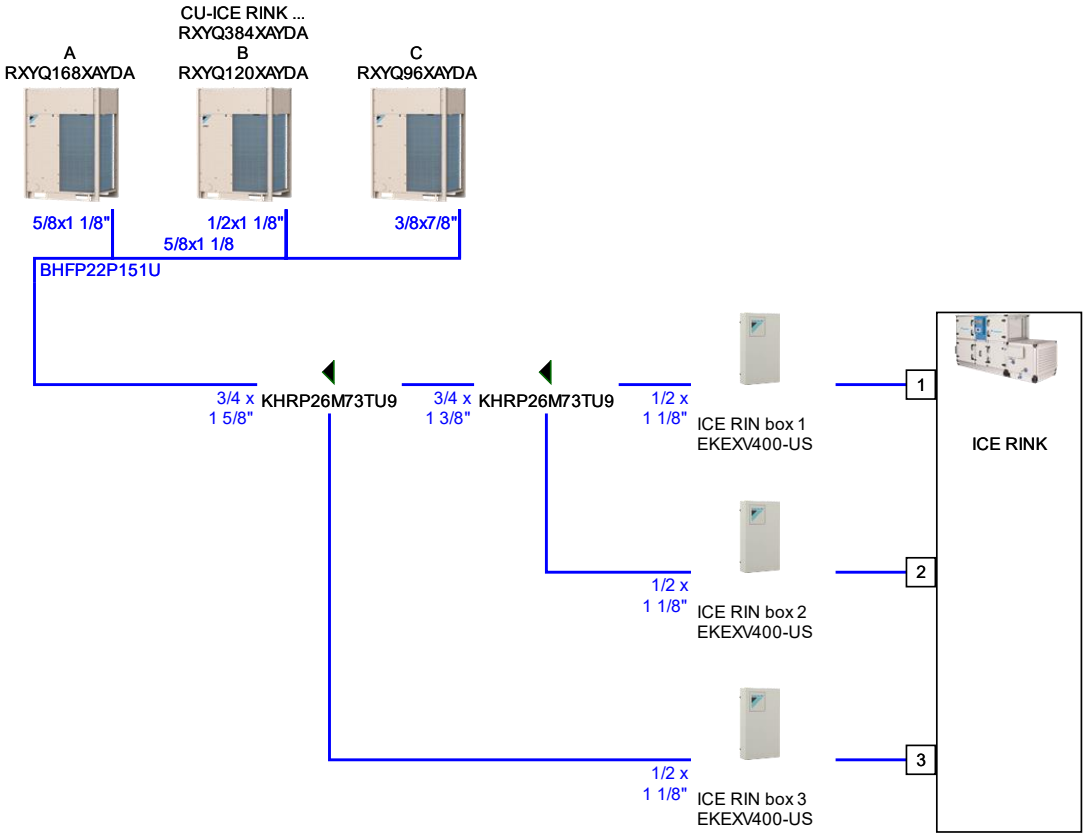
Piping CU-ICE RINK 2



Piping

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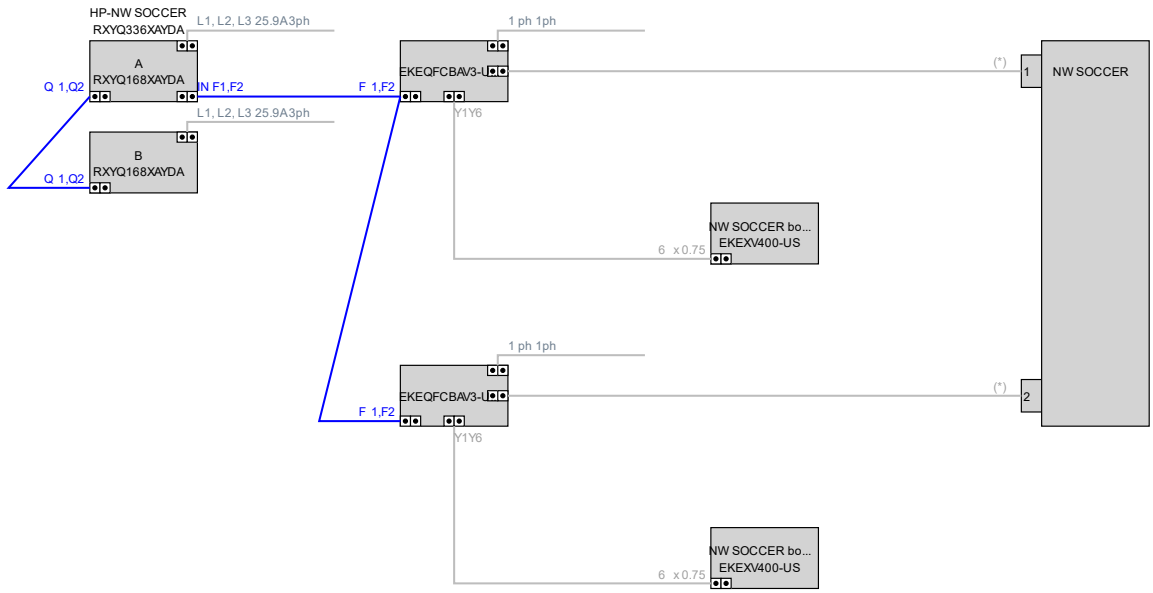
Wiring diagrams

Wiring HP-NW SOCCER



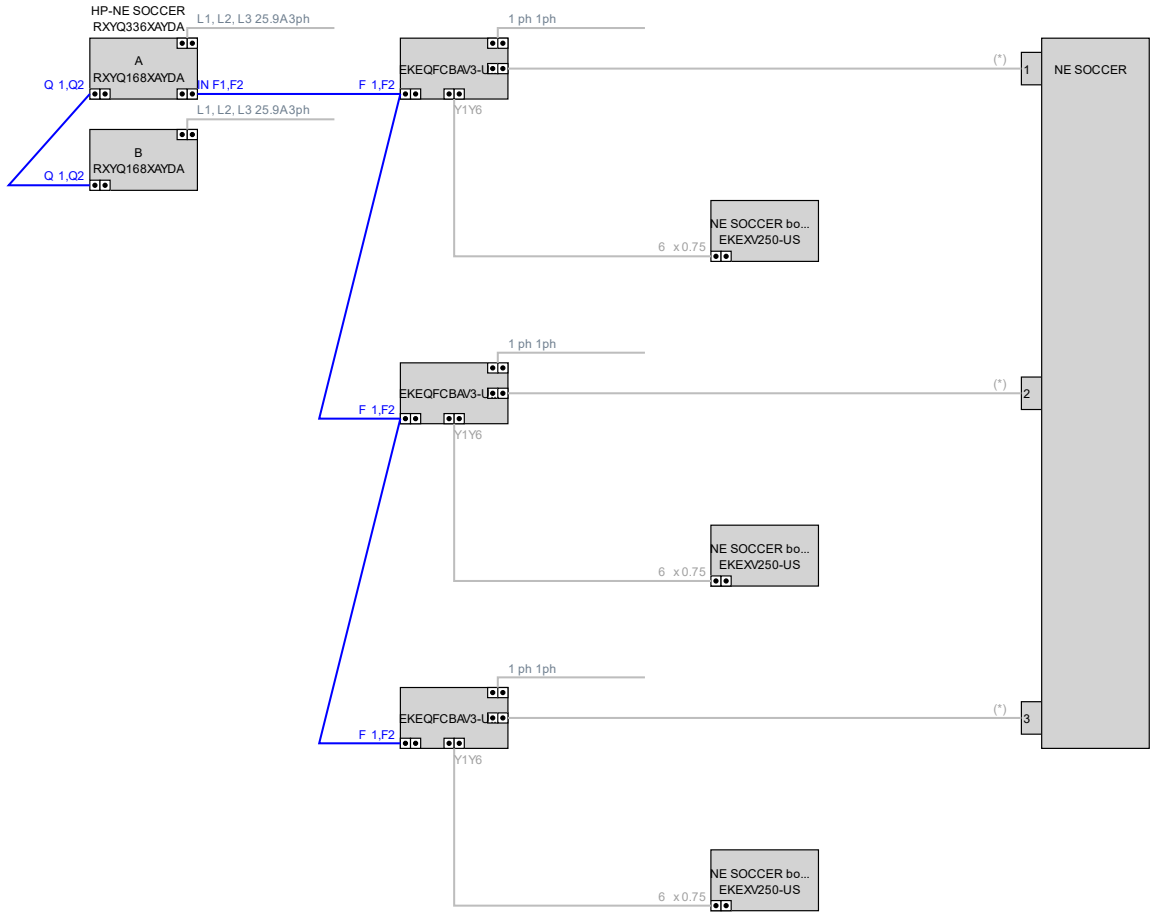
In case of D-AHU the EKEQ and EKEXV are built in the AHU and are pre-cabled.
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring HP-NE SOCCER



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(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

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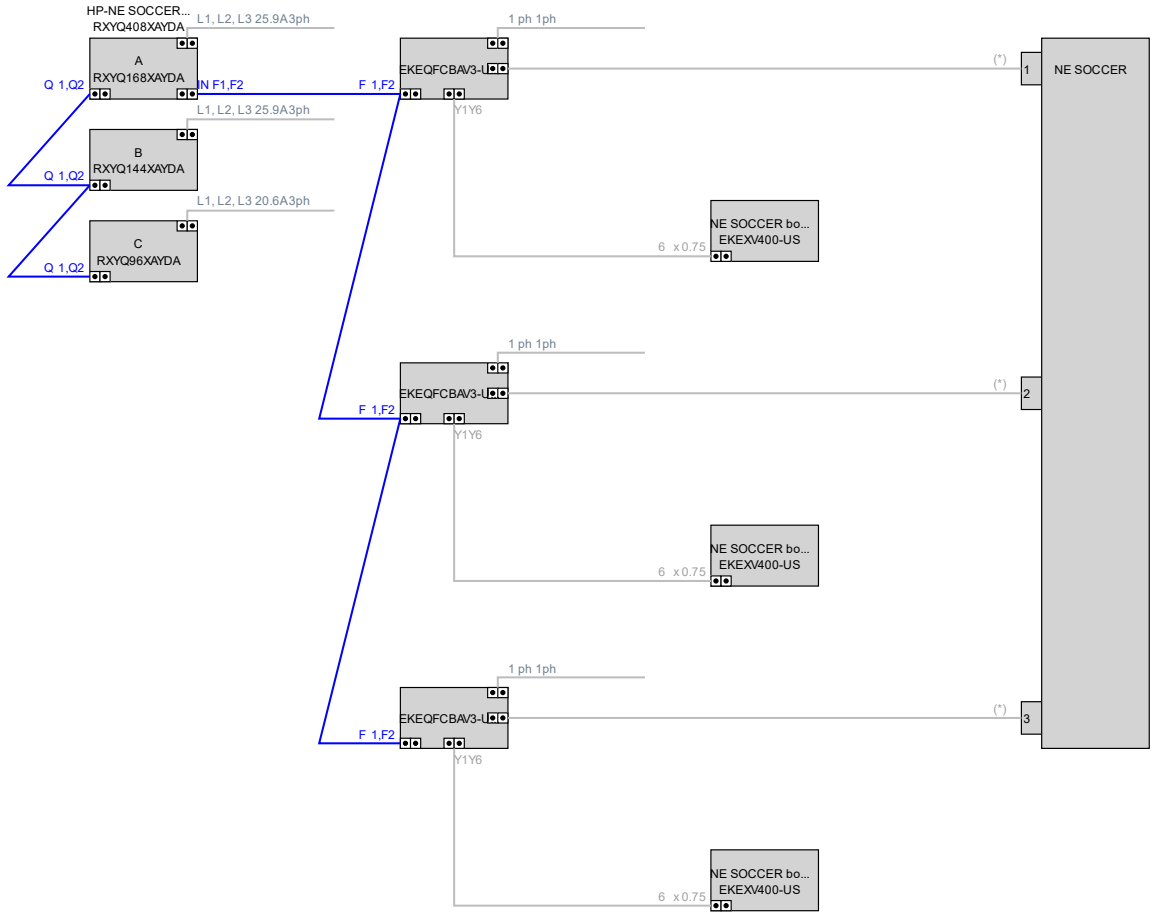
Note:

Wiring HP-NE SOCCER 2



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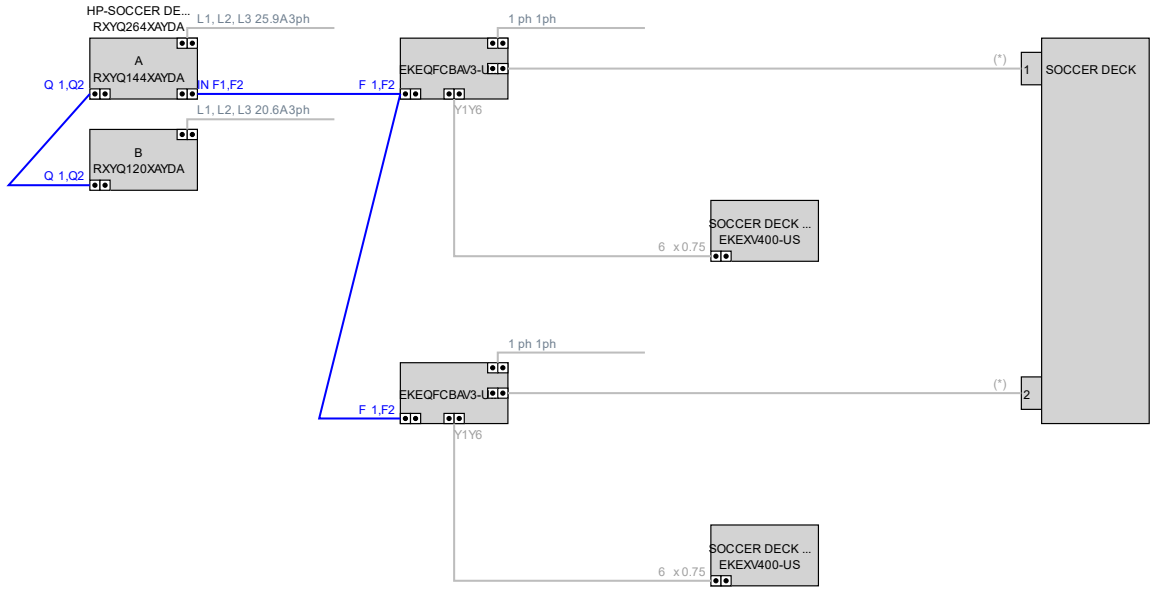
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring HP-SOCCER DECK 1



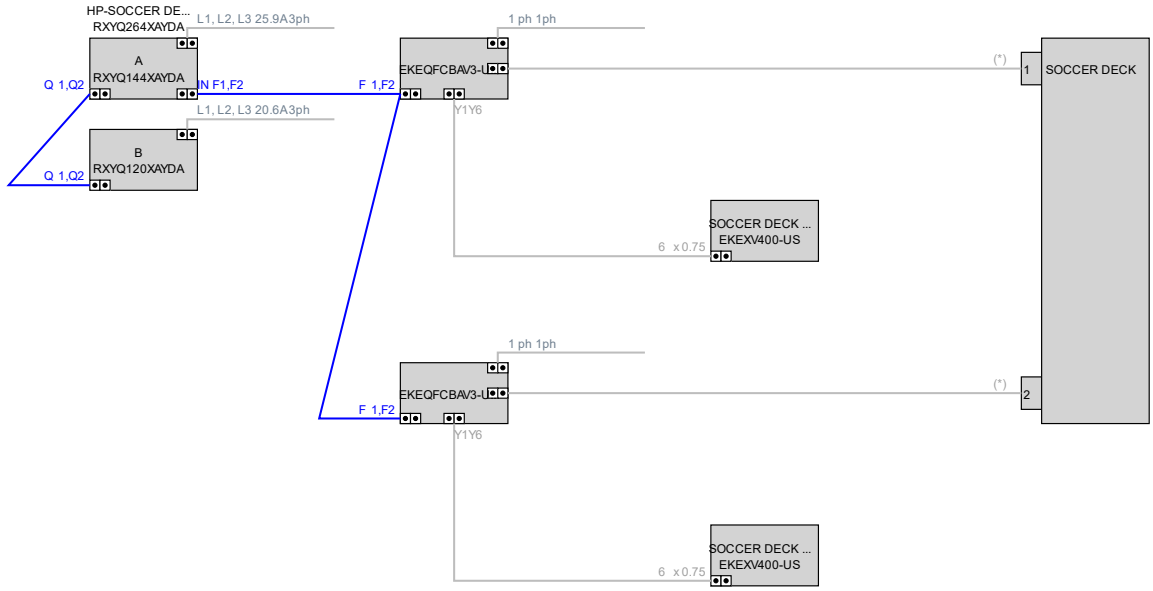
In case of D-AHU the EKEQ and EKEXV are built in the AHU and are pre-cabled.
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring HP-SOCCER DECK 2



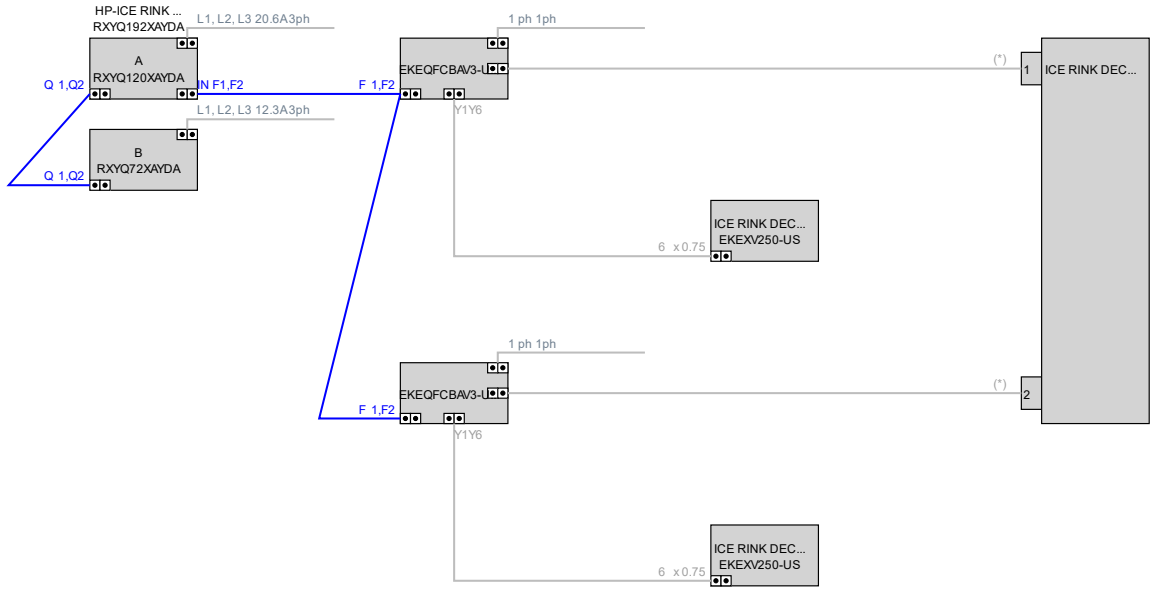
In case of D-AHU the EKEQ and EKEXV are built in the AHU and are pre-cabled.
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring HP-ICE RINK DECK



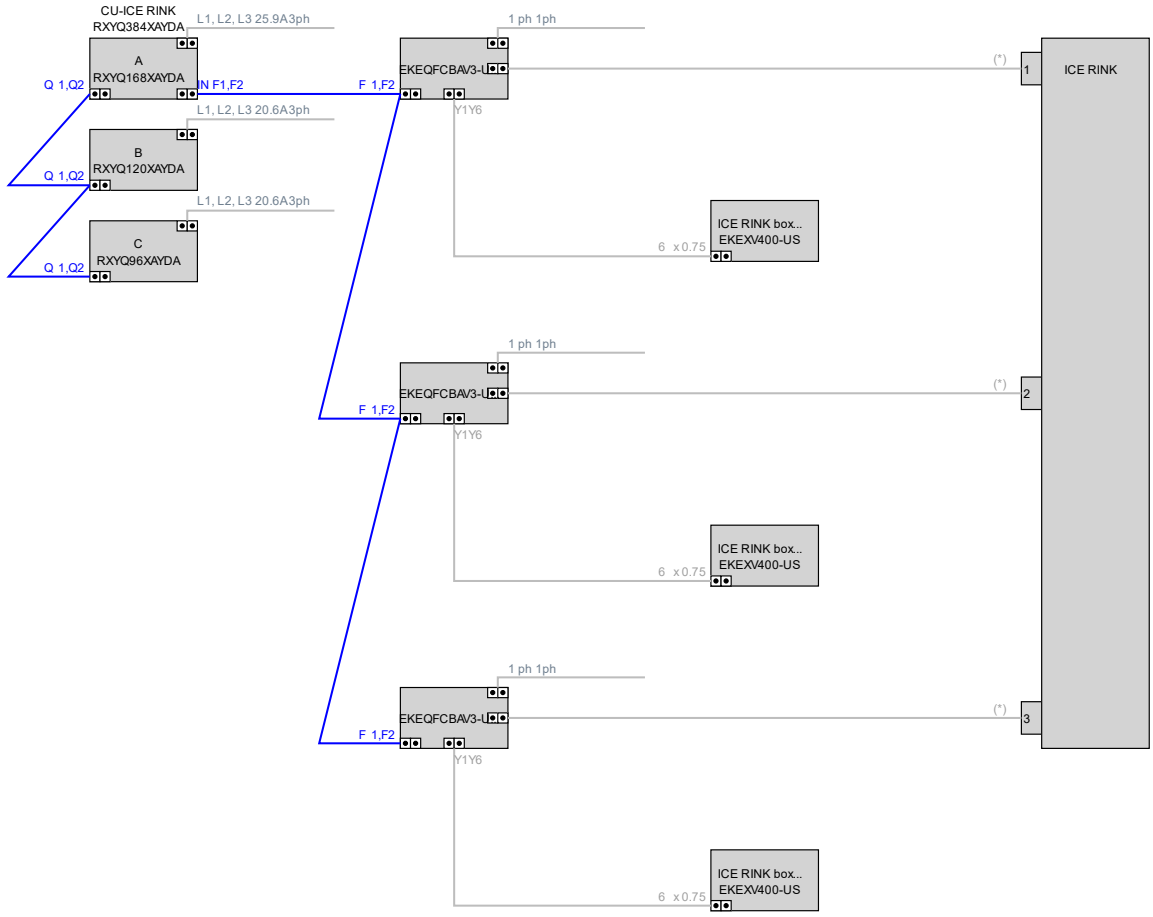
In case of D-AHU the EKEQ and EKEXV are built in the AHU and are pre-cabled.
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring CU-ICE RINK



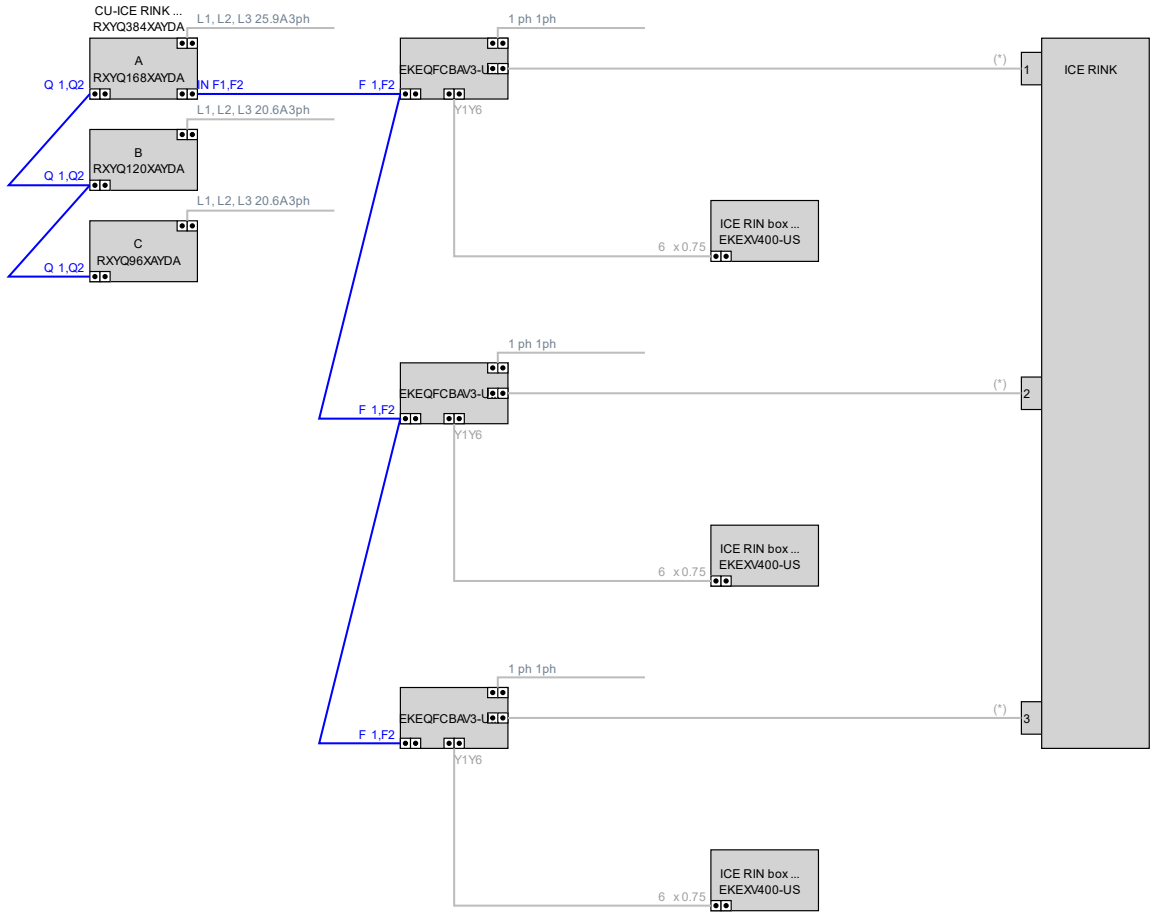
In case of D-AHU the EKEQ and EKEXV are built in the AHU and are pre-cabled.
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring CU-ICE RINK 2



In case of D-AHU the EKEQ and EKEXV are built in the AHU and are pre-cabled.
(*) For more details about wiring towards AHU, please refer to the installation manual.

Remarks

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Climate by Design
INTERNATIONAL

ARID-Ice®
Dehumidification Series

Keep it Dry with CDI

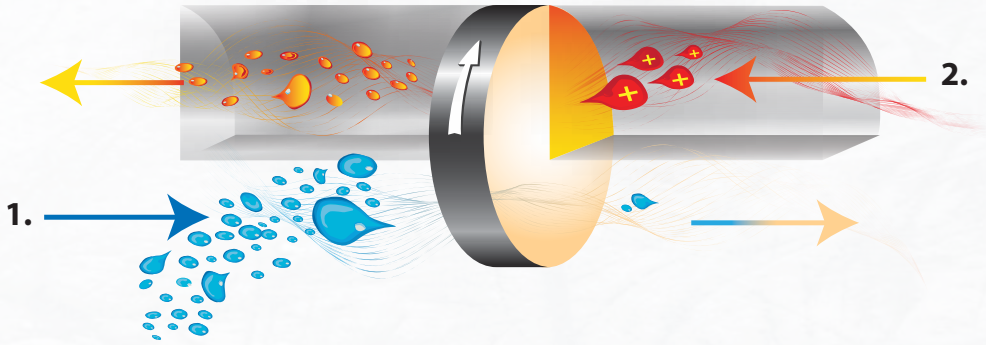
Keep it Dry with CDI

Why Use Desiccant Technology?

- Very dry air can be achieved.
- **Thermodynamic efficiency:** Achieved because no change of phase (condensation) is necessary.
- **Better construction:** Double-wall insulated casing suitable for indoor or outdoor mounting.
- **Simple maintenance:** Simply replace filters regularly and performance is assured. A yearly inspection by our service technicians is recommended to head off unscheduled outages.

Desiccant Technology

Creating the climate you need to achieve your critical mission



Dedicated desiccant air-supply units provide low-humidity conditions necessary to maintain a dry environment. It's a simple solution to an old problem.

The solid desiccant rotor adsorbs moisture from process air **[1]**. The moisture is taken out of the rotor by a second and separate reactivating airstream **[2]**. This process enables the rotor to continually take moisture out of the airstream without interruption.

ARID-Ice® Dehumidification Series

- **More Sizes:** Process air flow range of 1,500 to 15,000 SCFM.
- **More Support:** Application engineering assistance, start-up and owner training, and preventative maintenance programs offered by CDI.

Configurable Components *Match Your Critical Process*

Typical Components:

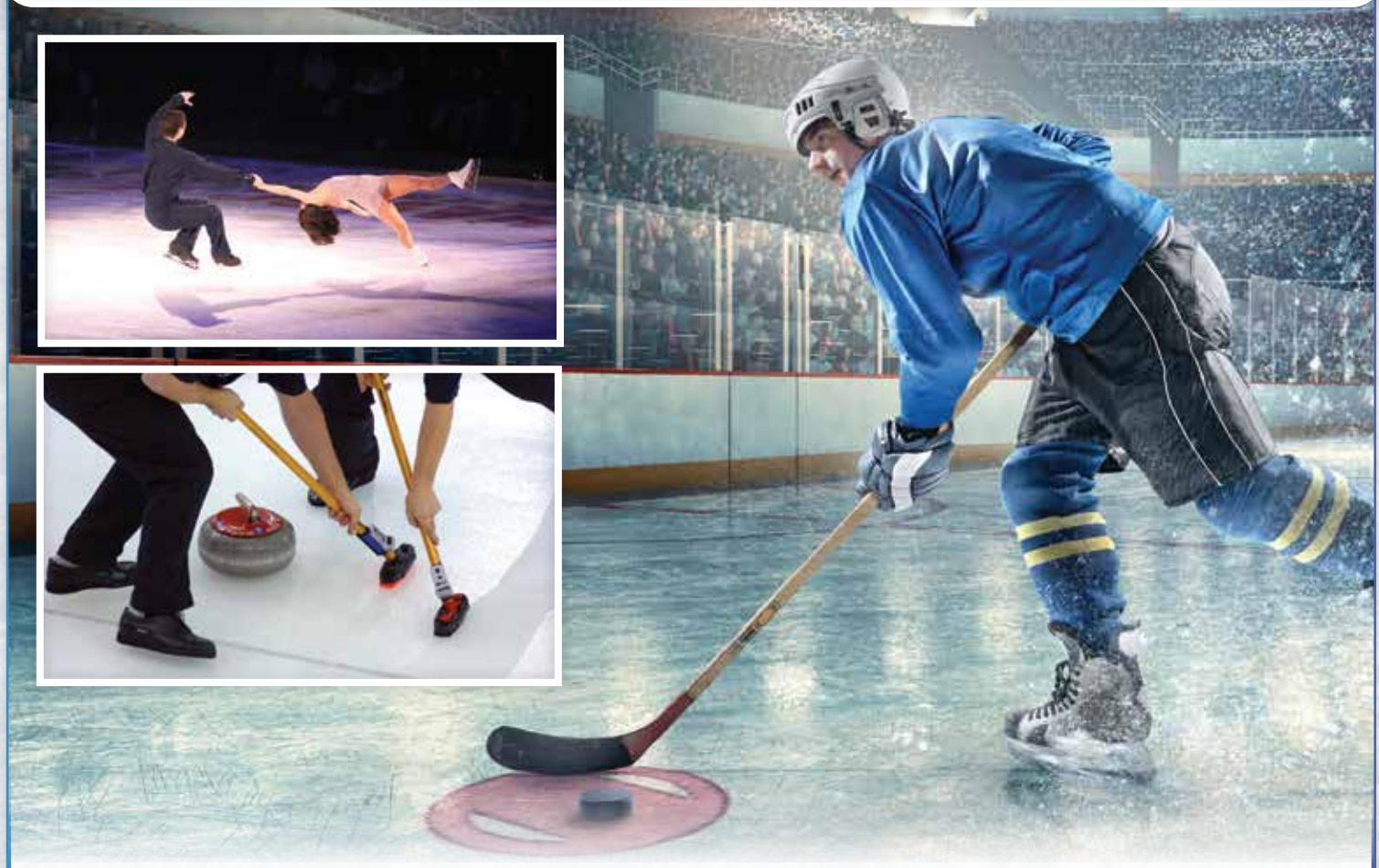
- Process and reactivation MERV 8 filters.
- Direct gas fired, steam, or electric reactivation.
- Heat Recovery.
- 2" double wall insulated casings.
- Standard intelligent microprocessor controllers with "Fail Capable" mode and full building integration capable of using BACnet™, Modbus®, or LonWorks®.

Desiccant Technology at Work

ARID-Ice® Dehumidification Series

Uncontrolled humidity does not need to be a problem. By providing dry air, you can control threats to health, safety, product and a myriad of costs. Dry air is a solution to corrosion, bacteria, and mold. By Using a CDI *ARID-Ice®* Dehumidification Series unit, you can have independent control of humidity.

Ice Arenas



- Controls humidity to stop fog, mold growth, and dripping ceilings.
- Skaters appreciate improved ice conditions and spectators are more comfortable.
- Minimizes the cost of running rink refrigeration systems while eliminating humidity concerns.
- Most efficient and economical solution to ice arena humidity.
- Resurfacing is needed less frequently.
- Low dewpoint capability provides the best method to dehumidify indoor ice arenas for hockey, figure skating, speed skating and curling.

Why Buy CDI?

Application Knowledge

We don't just offer fine equipment! With years of ice arena experience, we know what makes your arena tick. Services range from dehumidifier sizing to installation and other factors about your arena that affect the outcome of your project. We can work with your design team or engineer to prevent common errors.

Configurability

Simply put, have it your way!

Quality

Our goal is to provide our customers with superior, energy-efficient solutions for indoor air quality.

Service

With our trained and equipped field service technicians there is always someone near you to assist. Services range from preventative maintenance to prescriptive plans for a specific application. 24/7 customer service hotline available.

Who We Are

Climate by Design International, Inc., formerly Concepts and Designs, Inc. (CDI) was founded in 1991 in Owatonna, Minnesota.

CDI provides customers with a broad array of custom HVAC options. Years of HVAC industry experience established the foundation for today's thriving company.

Our products offer indoor air quality solutions for numerous markets: Hospital Surgical Suites, Food Processing, Ice Arenas, Water Treatment Plants, Pharmaceuticals, Automotive, Rental, Aviation and all types of facilities requiring controlled air climates. We have provided climate control products to numerous countries including: USA, Canada, Mexico, Australia, Guinea, Russia, China, India, and Israel.

We offer catalogued standard product for application specific projects, as well as configurable or custom built solutions.

We serve our customers well by producing quality products and services while building and maintaining relationships based on honesty and integrity.

Contact our application specialists to learn how you can benefit from Desiccant Dehumidification.

Climate by Design
INTERNATIONAL

sales@cdihvac.com

SPORTSPLEX BELLINGHAM

Revision #: 1

Created Date: 2022-03-08

Revised Date: 2022-03-09

Company Name: Air Reps Washington

Contact Name: Ryan Brown

Performance

Unit Tag: ERV-1

Summary

Unit Details

Unit Tag:	ERV-1	Orientation:	Vertical
Model:	C70IN-BP - (5500 - 8100 CFM)	ESP SA / RA (inH2O):	1 / 1
Qty:	2	Filters OA / RA:	2" 85% MERV-13 / 2" 30% MERV-8
Location:	Indoor	Controls Preference:	Constant Volume
Altitude (ft):	138	Dampers & Actuator:	No Casing - Field Mounted and Wired
Bypass:	Yes		

Electrical Requirements

Total Number of Connections Required: 2

Unit	
Voltage:	460V/3ph/60Hz
Range:	380 - 480V
FLA:	34.94
MCA:	39.29
RFS:	50A

Heating Electric Heater	
Std. Coil:	1
Controls:	SCR
Voltage:	460V/3ph/60Hz
Range:	414.0 - 483.0V
FLA:	47.88
MCA:	60
RFS:	60A
Max KW:	38

Heat Exchanger

Design Condtions	Outdoor Air	Return Air
SCFM:	7150	7150
Summer DB (F) / WB (F) / RH (%):	82.2 / 66 / 42.6	75 / 63 / 51.2
Winter DB (F) / WB (F) / RH (%):	20.7 / 20.6 / 98.5	70 / 52.9 / 30

Performance Leaving Air	Supply Air	Exhaust Air
SCFM:	7150	7150
Summer DB (F) / WB (F) / RH (%):	77.5 / 64.2 / 48.7	79.7 / 64.9 / 45
Winter DB (F) / WB (F) / RH (%):	53 / 42.4 / 38.9	37.7 / 34.7 / 74.5

Performance	Summer	Winter
Supply Air PD (inH2O):	0.85	0.85
Exhaust Air PD (inH2O):	1.6	1.6
Sensible Effectiveness %:	65.6	65.6
Latent Effectiveness %:	45.3	45.3
Total Effectiveness %:	61.4	61.9
EATR %:	0.5	0.5
OACF:	1.00	1.00
Net Supply Airflow (SCFM):	7150	7150
Energy Recover Ratio %:	61.4	61.77
BTU/H Saved	43776	289363

Summer performance: Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Winter performance: Application rating is outside the scope of the AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.

Heating Electric Heater

Electric Heater	
Outdoor Air (CFM):	7150
Voltage:	460V/3ph/60Hz
kW:	27.1
Entering Temp (F):	53
Leaving Temp (F):	65
Installation:	In Casing – Field Mounted and Wired

*Separate electrical connection required for heater

Supply Fan

Fan

Model:	GR35C-ZID.DG.CR

Nominal values for single fan

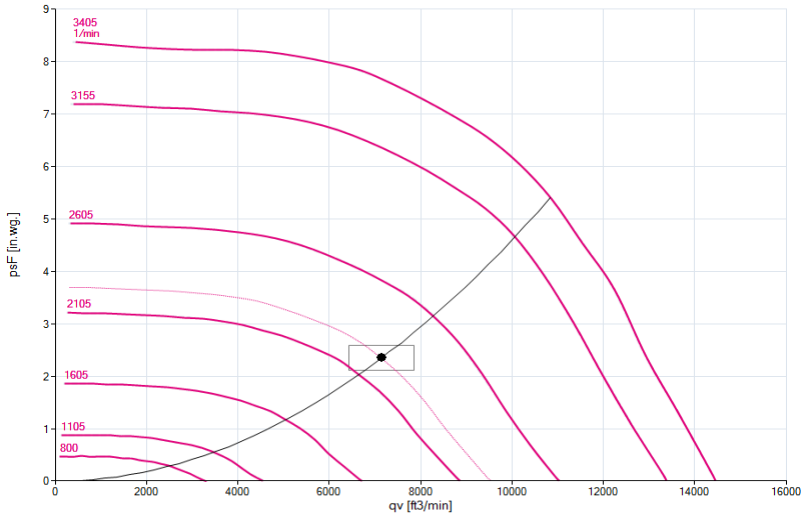
Power Input (KW):	3.70
FLA (A):	5.80

Operating point for three fans

Power Input (KW):	3.23
Current (A):	4.42
RPM:	2264
SFP (W/CFM):	0.45

Filter Pressure Drop:

Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.50
Dirty filter (in w.g.):	1.00



Exhaust Fan

Fan

Model:	GR35C-ZID.DG.CR

Nominal values for single fan

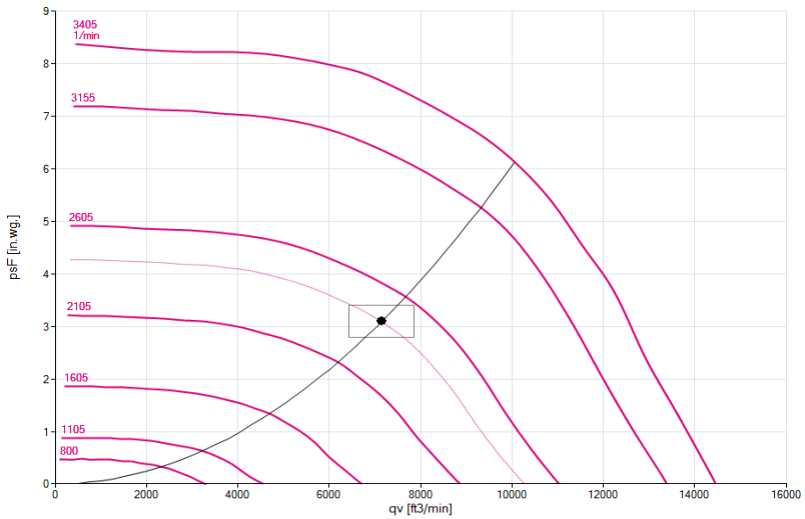
Power Input (KW):	3.70
FLA (A):	5.80

Operating point for three fans

Power Input (KW):	4.11
Current (A):	5.52
RPM:	2431
SFP (W/CFM):	0.57

Filter Pressure Drop:

Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.14
Dirty filter (in w.g.):	1.00



Unit Sound Data

	63	125	250	500	1000	2000	4000	8000	dB (A)
Unit Radiated	76	77	78	71	67	65	57	52	74
Supply Fan Lw: 7150 CFM	81	78	88	85	87	83	77	74	90
Exhaust Fan Lw: 7150 CFM	82	78	89	86	88	84	78	75	91

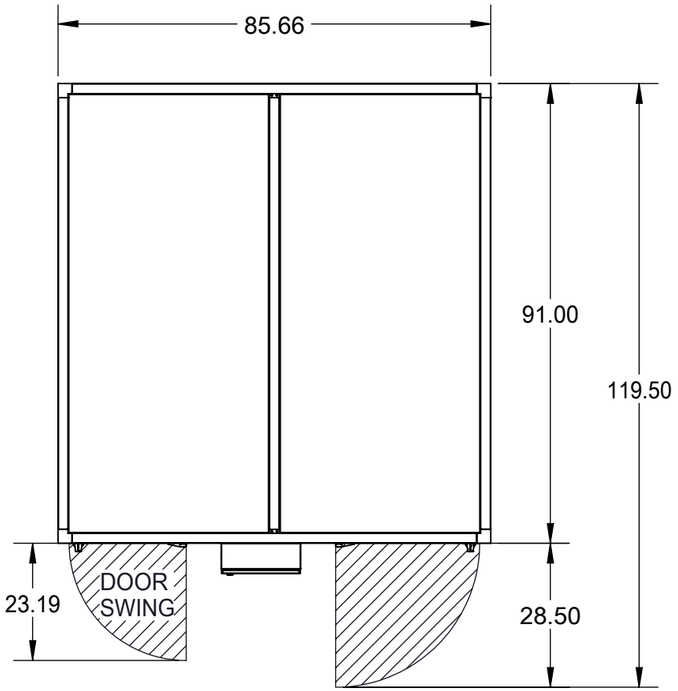
NOMENCLATURE:

SA - SUPPLY AIR
RA - RETURN AIR
OA - OUTDOOR AIR
EA - EXHAUST AIR

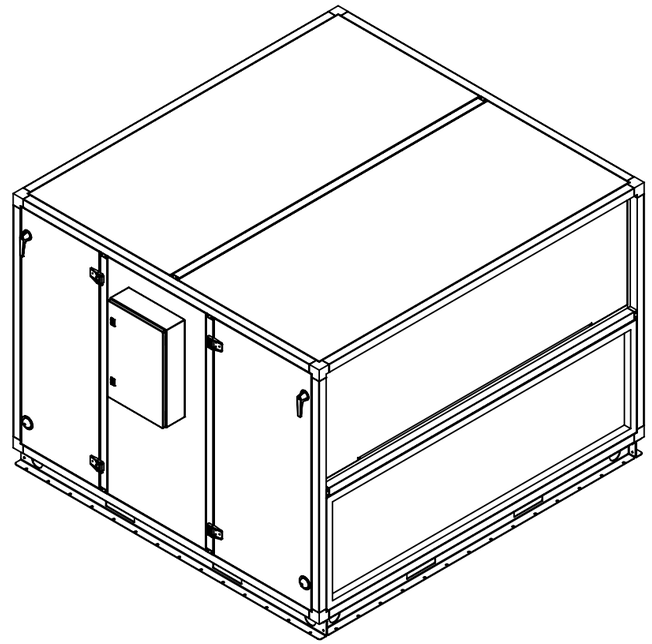
NOTES:

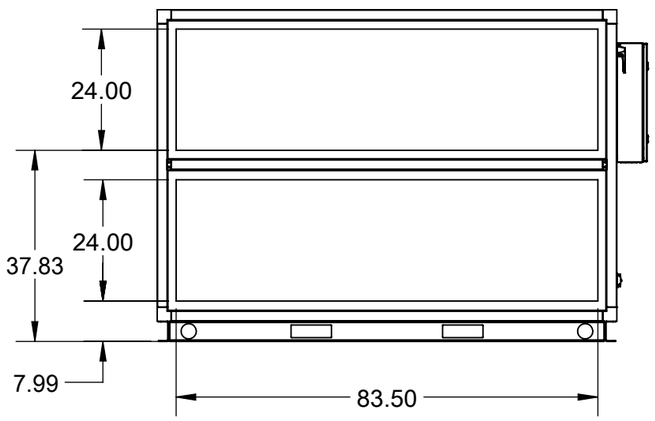
36" OF CLEARANCE MUST BE MAINTAINED PERPENDICULAR TO THE ELECTRICAL BOX AS PER THE NATIONAL ELECTRIC CODE (NEC).

OVERALL UNIT DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

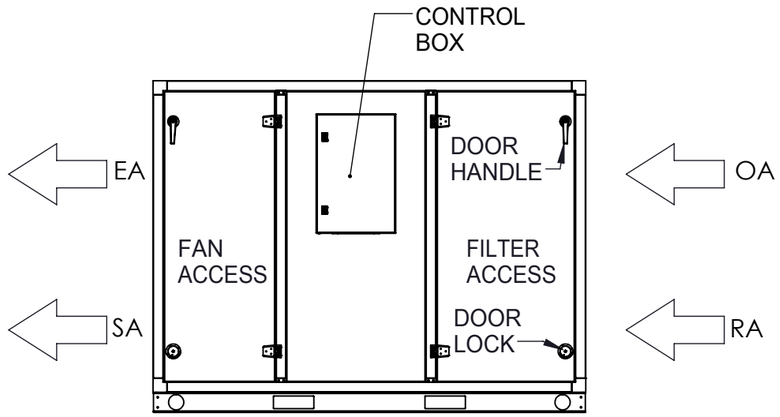


TOP VIEW

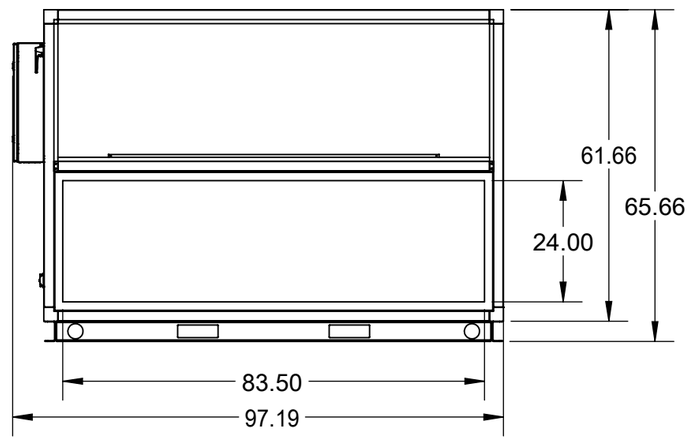




LEFT VIEW



FRONT VIEW



RIGHT VIEW

ALL DIMENSIONS ARE IN INCHES

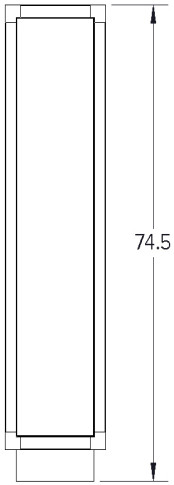
UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND BREAK ALL SHARP EDGES

OXYGEN 8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

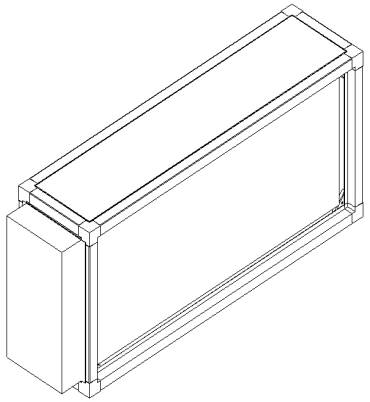
ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:30
Description: NOVA C70 ERV Bypass LH Vertical S2 01_02_3B_04			
Drawing №: NOVA_C70_ERV_B_I_L_V_S2_NP_01_02_3B_04		Weight: 2000 Lbs	
Drawn By: B. K.	Drawn Date: 2021-10-13	Installation: Floor Mounted	
Appd By: M. D.	Appd Date: 2021-10-13		Sheet 1 of 1

NOTES:

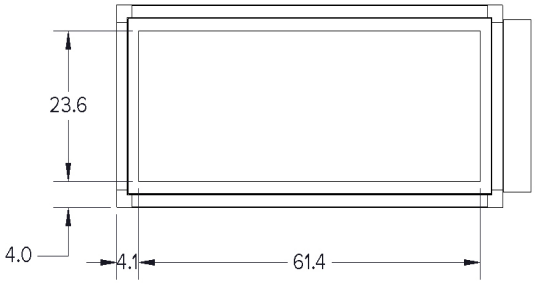
OVERALL UNIT DIMENSIONS ARE SUBJECT
TO CHANGE WITHOUT NOTICE.



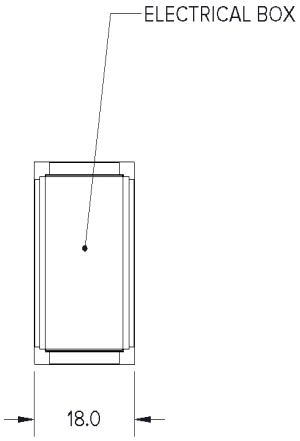
TOP VIEW



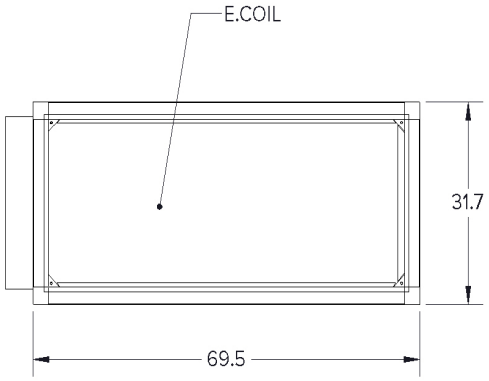
ISO VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW

ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:22
Description: ACCESSORY NOVA C70 INDOOR COUPLED VERTICAL LH 4603_38			
Drawing №: ACC_NOVA_C70_I_PV_L_EC_4603_38		Weight: 258 Lbs	
Drawn By: B. K.	Drawn Date: 2021-09-07	Application: FLOOR MOUNTED	
Appd By: M. D.	Appd Date: 2021-09-10		Sheet 1 of 1

ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND
BREAK ALL SHARP EDGES

OXYGEN 8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

Performance

Unit Tag: ERV-2

Summary

Unit Details

Unit Tag:	ERV-2	Orientation:	Vertical
Model:	C48IN-BP - (3500 - 5400 CFM)	ESP SA / RA (inH2O):	1 / 1
Qty:	2	Filters OA / RA:	2" 85% MERV-13 / 2" 30% MERV-8
Location:	Indoor	Controls Preference:	Constant Volume
Altitude (ft):	138	Dampers & Actuator:	No Casing - Field Mounted and Wired
Bypass:	Yes		

Electrical Requirements

Total Number of Connections Required: 2

Unit	
Voltage:	460V/3ph/60Hz
Range:	380 - 480V
FLA:	23.34
MCA:	26.24
RFS:	35A

Heating Electric Heater	
Std. Coil:	1
Controls:	SCR
Voltage:	460V/3ph/60Hz
Range:	414.0 - 483.0V
FLA:	32.76
MCA:	41
RFS:	50A
Max KW:	26

Heat Exchanger

Design Condtions	Outdoor Air	Return Air
SCFM:	5000	5000
Summer DB (F) / WB (F) / RH (%):	82.2 / 66 / 42.6	75 / 63 / 51.2
Winter DB (F) / WB (F) / RH (%):	20.7 / 20.6 / 98.5	70 / 52.9 / 30

Performance Leaving Air	Supply Air	Exhaust Air
SCFM:	5000	5000
Summer DB (F) / WB (F) / RH (%):	77.5 / 64.2 / 48.6	79.7 / 64.8 / 45.1
Winter DB (F) / WB (F) / RH (%):	52.7 / 42.2 / 39.1	38 / 34.9 / 74

Performance	Summer	Winter
Supply Air PD (inH2O):	0.91	0.91
Exhaust Air PD (inH2O):	1.7	1.7
Sensible Effectiveness %:	65.0	65.0
Latent Effectiveness %:	44.5	44.5
Total Effectiveness %:	60.8	61.3
EATR %:	0.5	0.5
OACF:	1.00	1.00
Net Supply Airflow (SCFM):	5000	5000
Energy Recover Ratio %:	60.77	61.14
BTU/H Saved	30296	200291

Summer performance: Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Winter performance: Application rating is outside the scope of the AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.

Heating Electric Heater

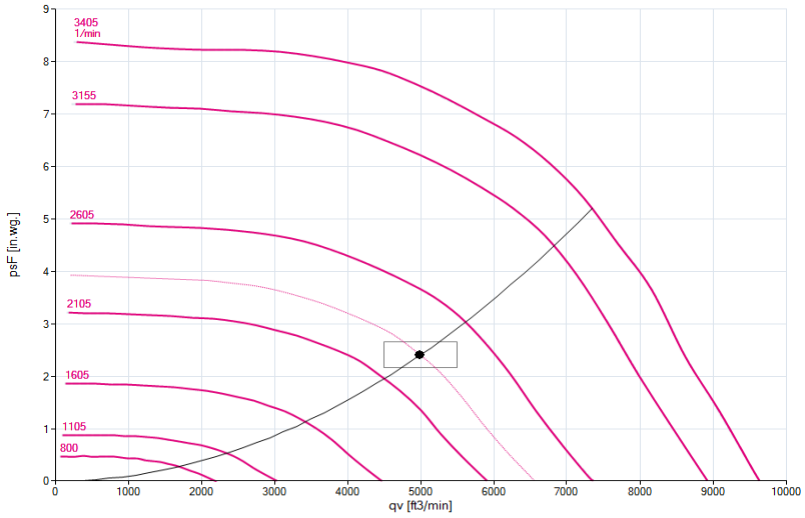
Electric Heater	
Outdoor Air (CFM):	5000
Voltage:	460V/3ph/60Hz
kW:	19.4
Entering Temp (F):	52.7
Leaving Temp (F):	65
Installation:	In Casing – Field Mounted and Wired

*Separate electrical connection required for heater

Supply Fan

Fan

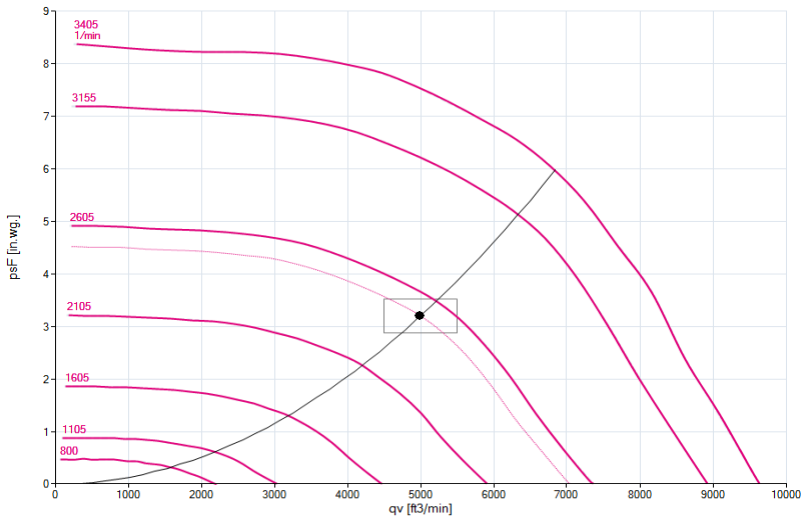
Model:	GR35C-ZID.DG.CR
Nominal values for single fan	
Power Input (KW):	3.70
FLA (A):	5.80
Operating point for two fans	
Power Input (KW):	2.33
Current (A):	3.16
RPM:	2333
SFP (W/CFM):	0.47
Filter Pressure Drop:	
Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.50
Dirty filter (in w.g.):	1.00



Exhaust Fan

Fan

Model:	GR35C-ZID.DG.CR
Nominal values for single fan	
Power Input (KW):	3.70
FLA (A):	5.80
Operating point for two fans	
Power Input (KW):	2.97
Current (A):	3.97
RPM:	2502
SFP (W/CFM):	0.59
Filter Pressure Drop:	
Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.14
Dirty filter (in w.g.):	1.00



Unit Sound Data

	63	125	250	500	1000	2000	4000	8000	dB (A)
Unit Radiated	75	75	76	69	65	63	55	50	72
Supply Fan Lw: 5000 CFM	78	75	84	82	84	80	74	71	87
Exhaust Fan Lw: 5000 CFM	79	75	85	82	85	81	75	72	88

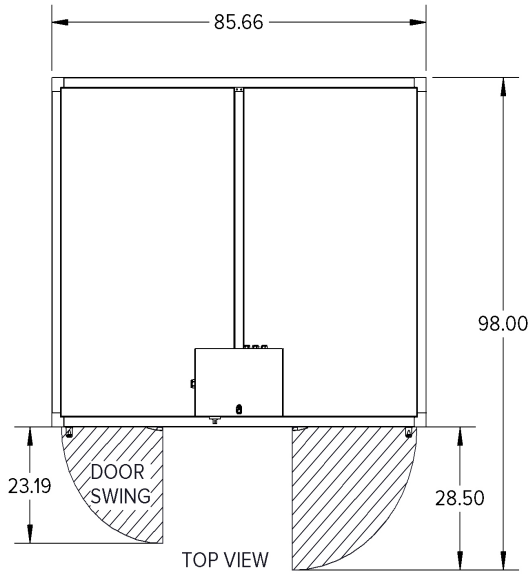
NOMENCLATURE:

SA - SUPPLY AIR
RA - RETURN AIR
OA - OUTDOOR AIR
EA - EXHAUST AIR

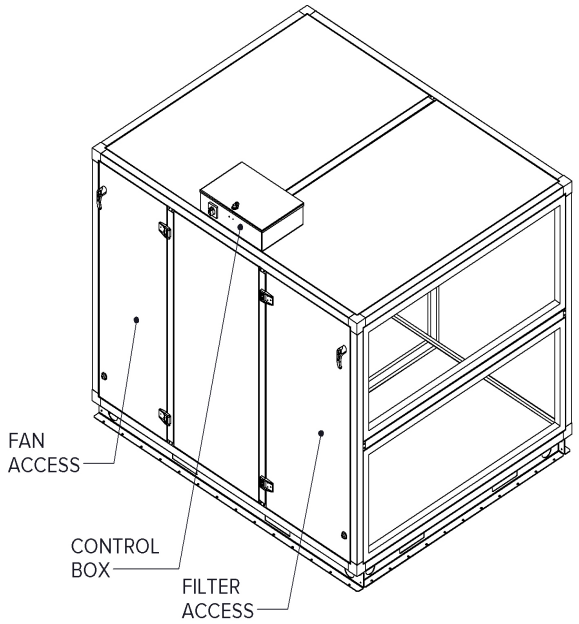
NOTES:

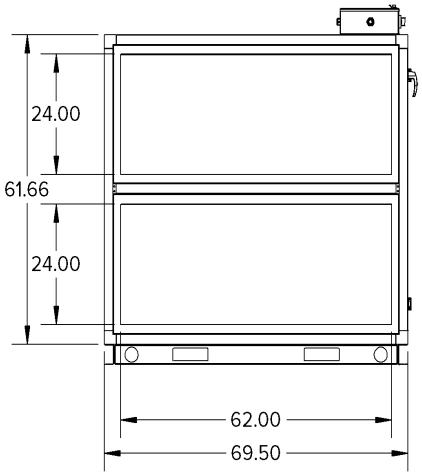
36" OF CLEARANCE MUST BE MAINTAINED PERPENDICULAR TO THE ELECTRICAL BOX AS PER THE NATIONAL ELECTRIC CODE (NEC).

OVERALL UNIT DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

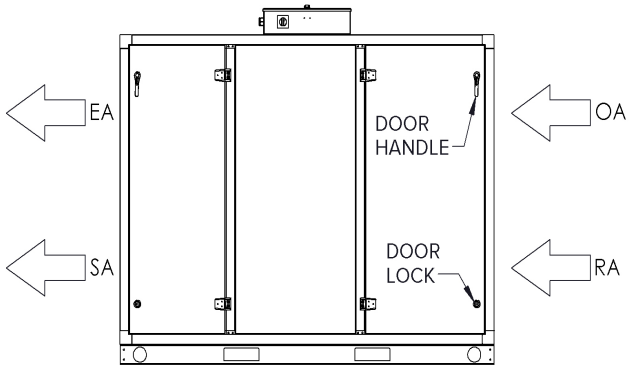


TOP VIEW

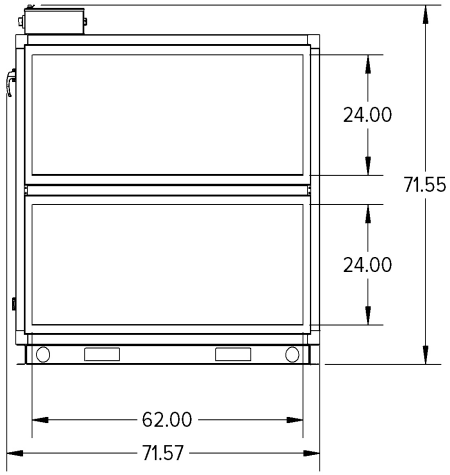




LEFT VIEW



FRONT VIEW



RIGHT VIEW

ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:28
Description: NOVA C48 ERV BYPASS LH VERTICAL S2 ND 01_02_03_04			
Drawing №: NOVA_C48_ERV_B_I_L_V_S2_ND_01_02_03_04		Weight: 1425.50 Lbs	
Drawn By: B. K.	Drawn Date: 2021-06-29	Installation: Floor Mounted	
Appd By: M. D.	Appd Date: 2021-06-29		Sheet 1 of 1

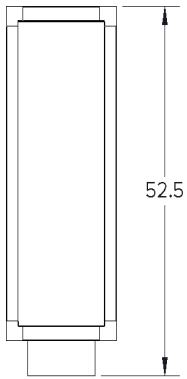
ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND BREAK ALL SHARP EDGES

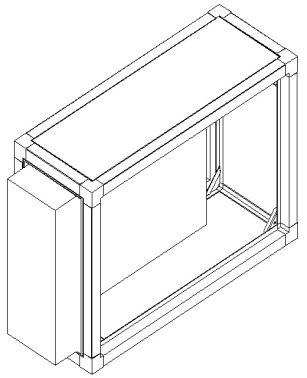
OXYGEN8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

NOTES:

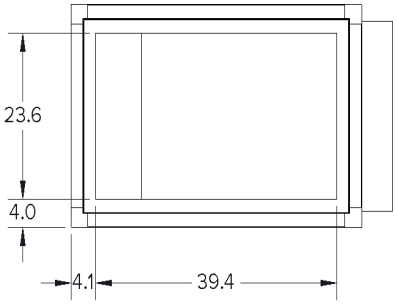
OVERALL UNIT DIMENSIONS ARE SUBJECT
TO CHANGE WITHOUT NOTICE.



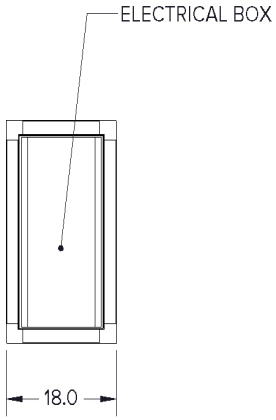
TOP VIEW



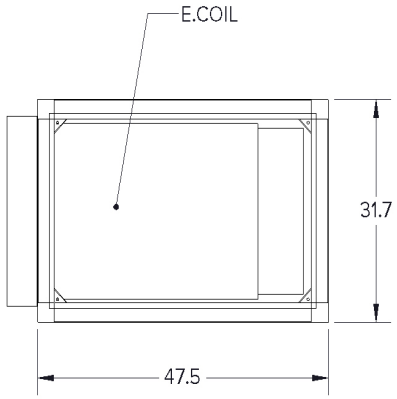
ISO VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW

ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:20
Description: ACCESSORY NOVA C48 INDOOR COUPLED VERTICAL LH 4603_26			
Drawing №: ACC_NOVA_C48_I_CV_L_EC_4603_26		Weight: 160 Lbs	
Drawn By: B. K.	Drawn Date: 2021-09-07	Application: FLOOR MOUNTED	
Appd By: M. D.	Appd Date: 2021-09-10		Sheet 1 of 1

ALL DIMENSIONS ARE IN INCHES

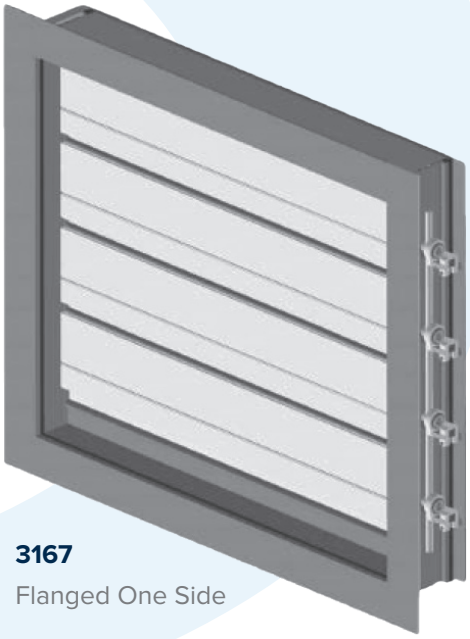
UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND
BREAK ALL SHARP EDGES

OXYGEN 8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

Airfoil Blade Control Dampers

Model: 3167

OXYGEN8



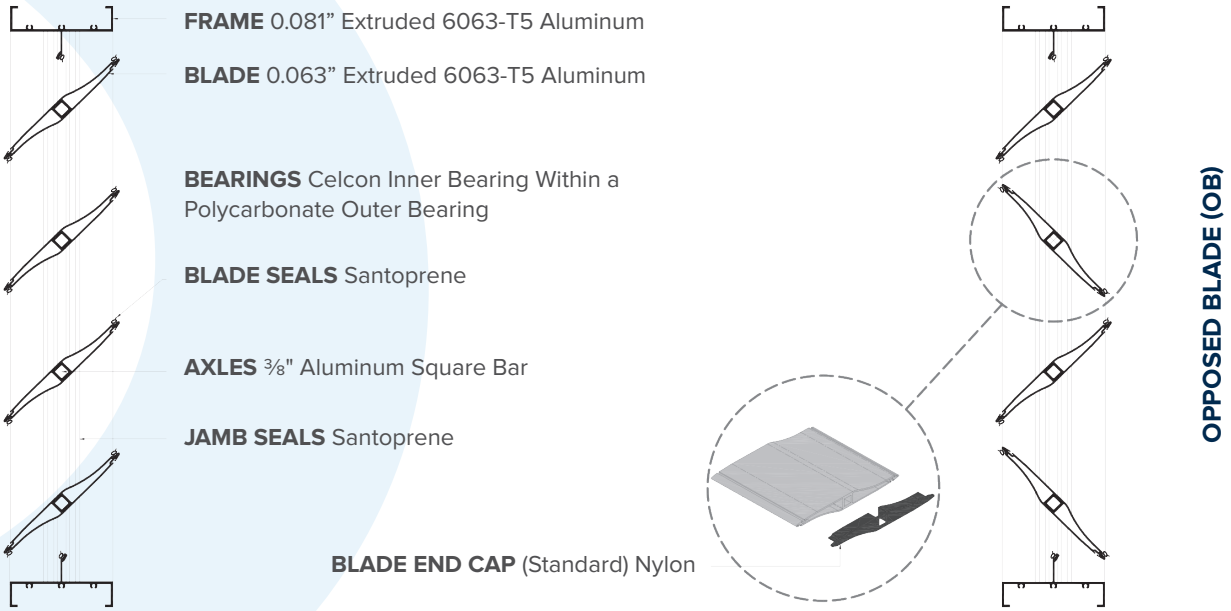
3167
Flanged One Side

STANDARD CONSTRUCTION

Depth	4” (101 mm) - 3167
Depth with Blades Open	6.125” (156 mm)
Minimum Height	8” (203 mm) - Single Blade 15” (381 mm) - Multiple Blade
Maximum Panel Width	48” (1219 mm)
Maximum Panel Height	60” (1524 mm)
Maximum Panel Size	20 sq. ft.
Maximum System Pressure	See chart on page 2.
Operating Temperature Range	-40° to +180°F
Standard Finish	Mill
Standard Motor Installation	6” Side Shaft Direct Drive
Linkage	Outside of Frame
Blade End Cap	Nylon

AVAILABLE ACCESSORIES

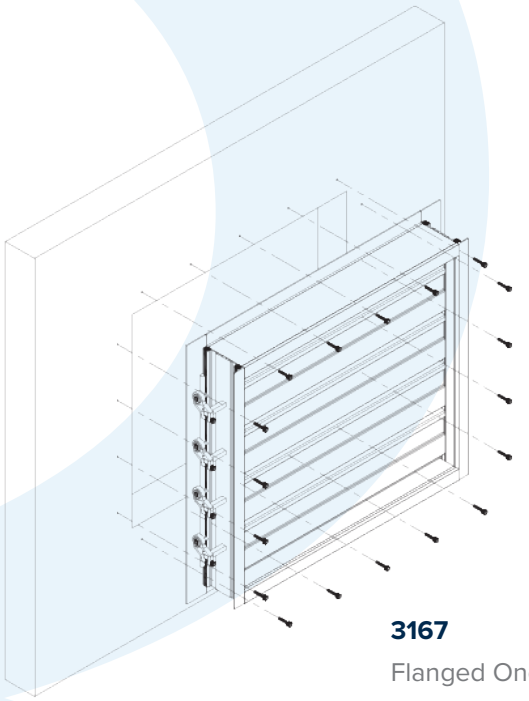
Factory supplied actuators
End switch for signaling peripheral devices
Jack shaft
Hand quadrants
Chain operation for manual operation spring closed
Silicone blade and jamb seals
4” blade construction



Oxygen8 Solutions Inc.
300-638 Smithe St., Vancouver, BC V6B 1E3

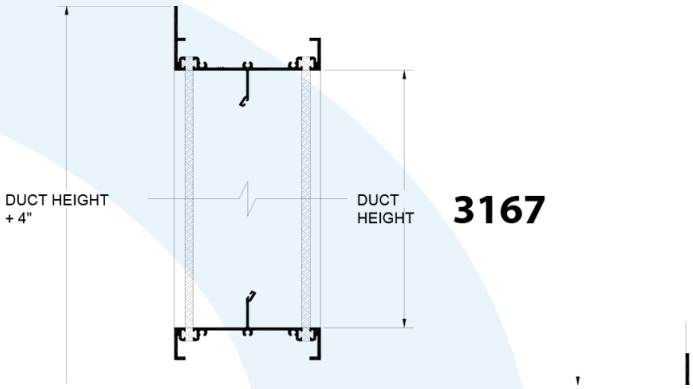
Airfoil Blade Control Dampers

Model: 3167



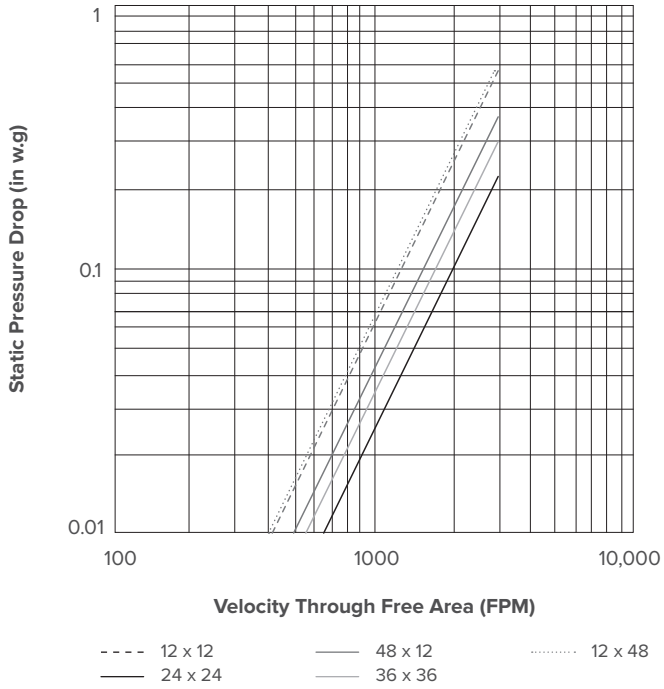
3167

Flanged One Side

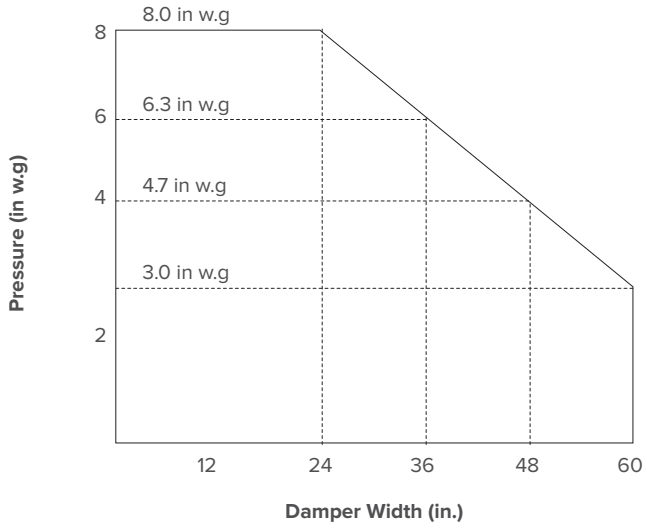


Clearance = ¼" Overall for Single Panel Construction
Clearance = ½" Overall for Multiple Panel Construction

PRESSURE DROP



PRESSURE LIMITATIONS



RECOMMENDED SPECIFICATION

Furnish and install control damper models 3167 as manufactured by Alumavent, Bolton Ontario. Dampers shall be 4” (101 mm) deep. Blades shall be 0.063” (1.60 mm) thick, hollow airfoil shape. Frames shall be 0.081” (2.06 mm) thick. Axles shall be 0.375” (9.53 mm) thick, Aluminum square bar. Blade and Jamb seals shall be Santoprene. Linkage is concealed outside of frame for model 3167. Air leakage through a 48”x ” damper shall not exceed 8 CFM/ ft2 (40.6 L/s/m2) against 4” w.g (1 kPa) static pressure at standard air. Operating temperature range shall be -40° to +180°F.

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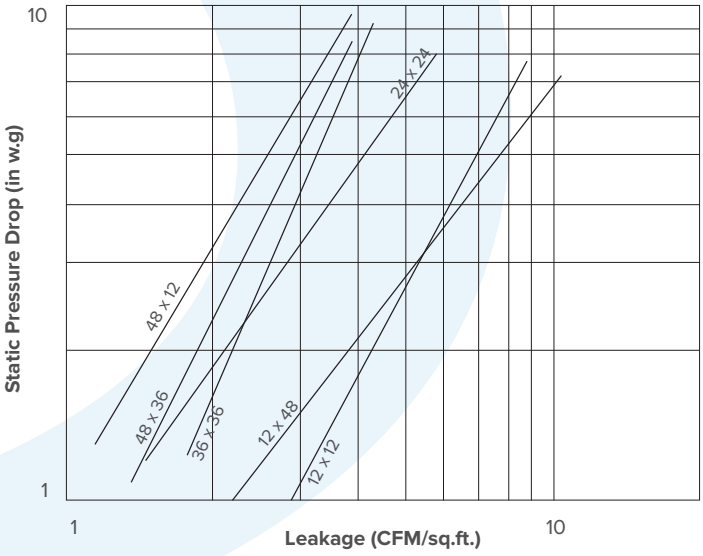
Airfoil Blade Control Dampers

Model: 3167

OXYGEN8

LEAKAGE



Leakage test was conducted in accordance with AMCA Standard 500-D-98. Holding torque applied was 6 in - lbs/sq.ft on parallel blade dampers. Air leakage is based on operation between 0°C - 49°C (32°F - 120°F).

DAMPER LEAKAGE RATING

Damper Size	Pressure in w.g (kPa)		
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)
12" x 12" (305 x 305 mm)	1A	1	1
24" x 24" (610 x 610 mm)	1A	1	1
36" x 36" (914 x 914 mm)	1A	1	1
12" x 48" (305 x 1219 mm)	1A	1	1
48" x 12" (1219 x 305 mm)	1A	1	1
48" x 36" (1219 x 914 mm)	1A	1	1

DEFINITION OF LEAKAGE CLASSIFICATION

Class	Leakage $ft^2/min/ft^2$ ($L/s/m^2$)		
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)
1A	3 (15.2)	N/A	N/A
1	4 (20.3)	8 (40.6)	14 (71.1)
2	10 (50.8)	20 (102)	35 (178)
3	40 (203)	80 (406)	140 (711)

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300-638 Smithe St., Vancouver, BC V6B 1E3

Rotary actuator fail-safe for adjusting dampers in technical building installations

- **Air damper size up to approx. 0.5 m²**
- **Torque motor 2.5 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control Open/close**

Technical data

Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	2.5 W
	Power consumption in rest position	1.5 W
	Power consumption for wire sizing	5 VA
	Connection supply / control	Cable 1 m, 2 x 0.75 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	2.5 Nm
	Torque fail-safe	2.5 Nm
	Direction of motion motor	selectable by mounting L/R
	Direction of motion fail-safe	selectable by mounting L/R
	Manual override	No
	Angle of rotation	Max. 95°
	Angle of rotation note	adjustable starting at 37% in 2.5% steps (with mechanical end stop)
	Running time motor	75 s / 90°
	Running time fail-safe	<25 s / 90°
	Sound power level, motor	50 dB(A)
	Mechanical interface	Universal shaft clamp 6...12.7 mm
	Position indication	Mechanical
	Service life	Min. 60'000 fail-safe positions
Safety	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Degree of protection IEC/EN	IP42
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1.AA
	Overvoltage category	III
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Storage temperature	-40...80°C
	Ambient humidity	Max. 95% r.H., non-condensing
	Servicing	maintenance-free
Weight	Weight	1.5 kg

Safety notes

- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Outdoor application: only possible in case that no (sea) water, snow, ice, insolation or aggressive gases interfere directly with the actuator and that is ensured that the ambient conditions remain at any time within the thresholds according to the data sheet.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- Cables must not be removed from the device.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Mode of operation
The actuator moves the damper to the operating position at the same time as tensioning the return spring. The damper is turned back to the safety position by spring energy when the supply voltage is interrupted.

Simple direct mounting
Simple direct mounting on the damper shaft with a universal shaft clamp, supplied with an anti-rotation device to prevent the actuator from rotating.

Adjustable angle of rotation
Adjustable angle of rotation with mechanical end stops.

High functional reliability
The actuator is overload protected and automatically stops when the end stop is reached.

Accessories

Mechanical accessories

Description	Type
Actuator arm	AH-TF
Shaft extension 170 mm Ø10 mm for damper shaft Ø 6...16 mm	AV6-20
Ball joint suitable for damper crank arm KH8 / KH10	KG10A
Ball joint suitable for damper crank arm KH8	KG8
Damper crank arm Slot width 8.2 mm, clamping range Ø10...18 mm	KH8
Screw fastening kit	SB-TF
Angle of rotation limiter, with end stop	ZDB-TF
Form fit adapter 8x8 mm	ZF8-TF
Mounting kit for linkage operation for flat and side installation	ZG-TF1
Anti-rotation mechanism 180 mm, Multipack 20 pcs.	Z-ARS180

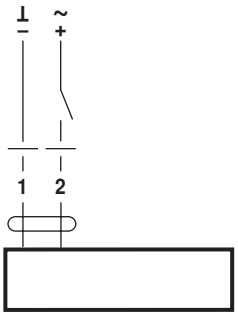
Electrical installation

Notes
- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.

Electrical installation

Wiring diagrams

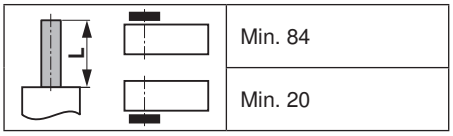
AC/DC 24 V, open/close



Cable colours:
1 = black
2 = red

Dimensions [mm]

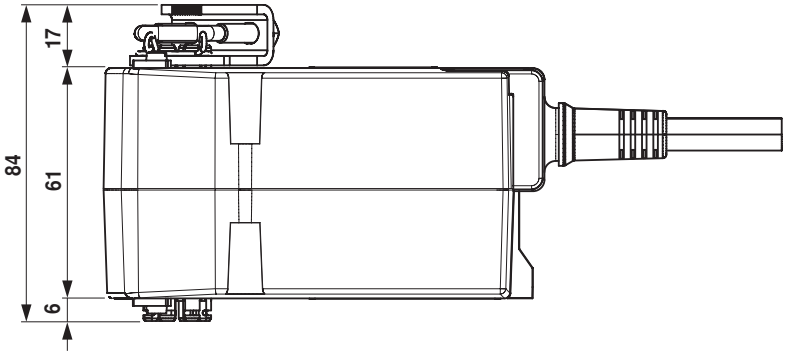
Spindle length

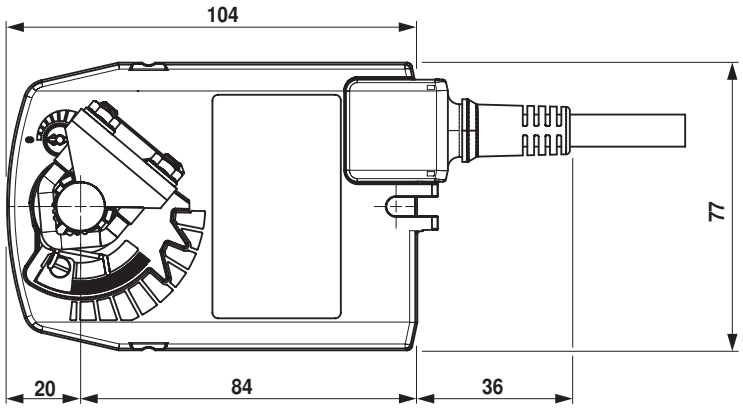


Clamping range

6...12.7	6...12.7

Dimensional drawings





Appendix E – Recommended Mechanical Equipment

Value Engineering Alternate

SUBMITTAL DATA

for

Sportsplex Bellingham

Prepared for

Coffman Burlington

Job Number: 07PDJD	Customer PO#:

Prepared by

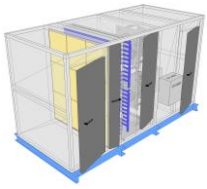
AirReps – Ryan Brown

3/16/2022

Table of Contents

Technical Data Sheet for AHU-SOCCER

Job Information	Technical Data Sheet
Job Name	Sportsplex
Date	March 16 2022
Submitted By	RB
Software Version	12.71
Unit Tag	AHU-SOCCER



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH025GDQM	11600	1.50	3.05	78*	64*	142

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH025GDQM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	6" formed channel	**Wall Thickness:**	2 in
Shipping Stretch Wrap:	Yes	**Altitude:**	0 ft
Parts Warranty:	Standard One Year		

Plenum Section

Component: 1 | Length: 32 in | Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	28.00" x 60.00"	0.06 inWc

Door

Location	Width	Opening
Drive side	28 in	Outward

Panel Filter

Component: 2 | Length: 12 in | Shipping Section: 1

Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading
Pleated	MERV 8	407 ft/min	28.5 ft²	11600 cfm	Side

Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec				
0.17 inWc	**0.59** inWc	1.00 inWc	N/A	9	24 in	20 in	2 in

Door

Location	Width	Opening
Drive side	8 in	Outward

Technical Data Sheet for AHU-SOCCER

Direct Expansion Coil

Component: 3 | Length: 40 in | Shipping Section: 1

Coil Model	Total Capacity	Sensible Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)
5EJ0906B	473523 Btu/hr	312519 Btu/hr	2	6	9	0.625 in	1.50 in x 1.299 in

Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
11600 cfm	80.0 °F	67.0 °F	55.4 °F	53.7 °F	0.78 insWg	33 in	51 in	23.38 ft²	496 ft/min

Fluid		Sub-Cooled Refrigerant Liquid Temp.	Suction Vapor Superheat Temp. at Coil Outlet	Design Saturated Condensing Temp.	Total Refrigerant Weight
Suction Temp.	Refrigerant				
44.0 °F	R410a	110.0 °F	8.0 °F	110.0 °F	74.00 lb

Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location	Material		
OD Sweat	2-0.88 in	2-1.63 in	Drive side	Copper tube	32.0 °F	32.0 °F

Material				Drain Pan	Drain Side
Fin	Tube	Header	Case		
Aluminum .0075 in	Copper .020 in	Copper	Galv. steel	Stainless steel	Drive side

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification

Coil is NOT certified by AHRI

Door

Location	Width	Opening
Drive side	20 in	Outward

Supply Fan Array

Component: 4 | Length: 26 in | Shipping Section: 1

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
5800 cfm	1.50 inWc	3.05 inWc	0.00 inWc	-	-	4.16 HP	1500 rpm	1750 rpm	70.6 %	20.0 A	16.6 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Discharge	Motor Location
2x1 : 2	Airfoil / N/A	2	22.04 in	Axial	Integral-Front

Motor Data

Power*	Electrical Supply	Speed	Control Signal	Supplier	Full Load Current*
6.7 HP	460/60/3 V/Hz/Phase	1750 rpm	0-10V	Q-PAC	7.36 A

Fan Options

Isolation Backdraft Dampers:	None	Block Off Plate:	None
Isolator Type:	Rigid		

Control/Disconnect Data

Selection Type:	Premium (BACnet DDC)	Vendor:	Q-PAC
Voltage:	460 V	External Power Panel: Height x Width x Depth	20.00 in x 16.00 in x 10.00 in
Mounting:	Drive Side	Internal Quick Connect Panel: Height x Width x Depth	18.00 in x 6.50 in x 6.00 in
Enclosure:	NEMA 1	Disconnect:	100kAIC Fused Disconnect

Panel

Location	Width	Opening
Removable panels	- in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Technical Data Sheet for AHU-SOCCER

Plenum Section	Component: 5	Length: 32 in	Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	28.00" x 60.00"	0.13 inWc

Door

Location	Width	Opening
Drive side	24 in	Outward

Special Options

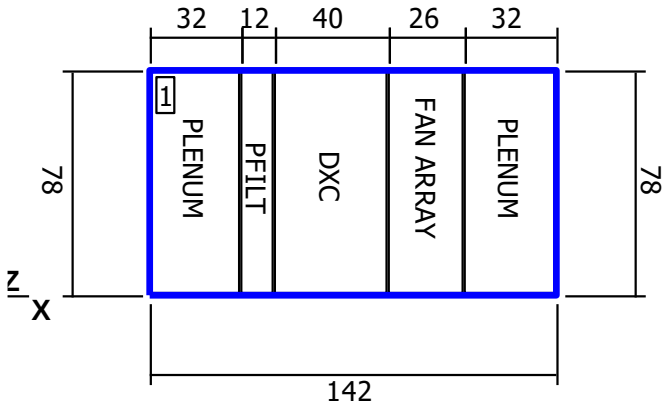
Tread Plate Floor Liner	Sound Baffle
Tread plate installed	(As casing details)

Unit Sound Power (dB)

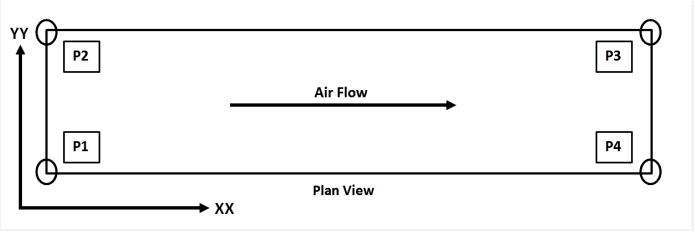
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	81	84	74	68	68	59	46	51
Unit Discharge:	86	89	86	83	84	81	77	72
Unit Return:	81	84	76	74	68	66	60	54

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	142	2675	693	669	645	669	70	31	38
Entire Unit	**142**	**2675**	**693**	**669**	**645**	**669**	**70**	**31**	**38**



Elevation View



NOTE: Special components aren't included in the corner weights and center of gravity data.

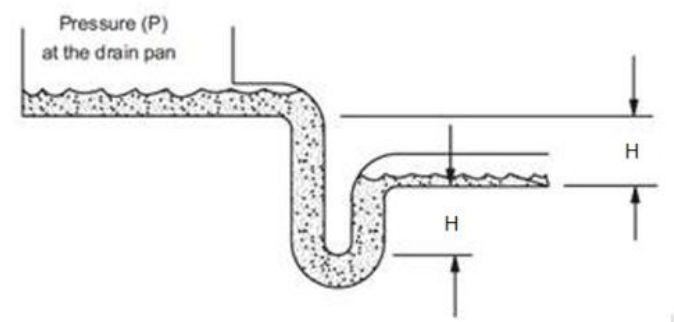
Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.06 insWg
Panel Filter	Panel Filter	0.59 insWg
DX Coil	DX Coil	0.78 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.13 insWg
External Static	External Static	1.50 insWg
Total Supply Fan Static		3.05 insWg

Technical Data Sheet for AHU-SOCCER

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
1	DX Coil	3.36



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

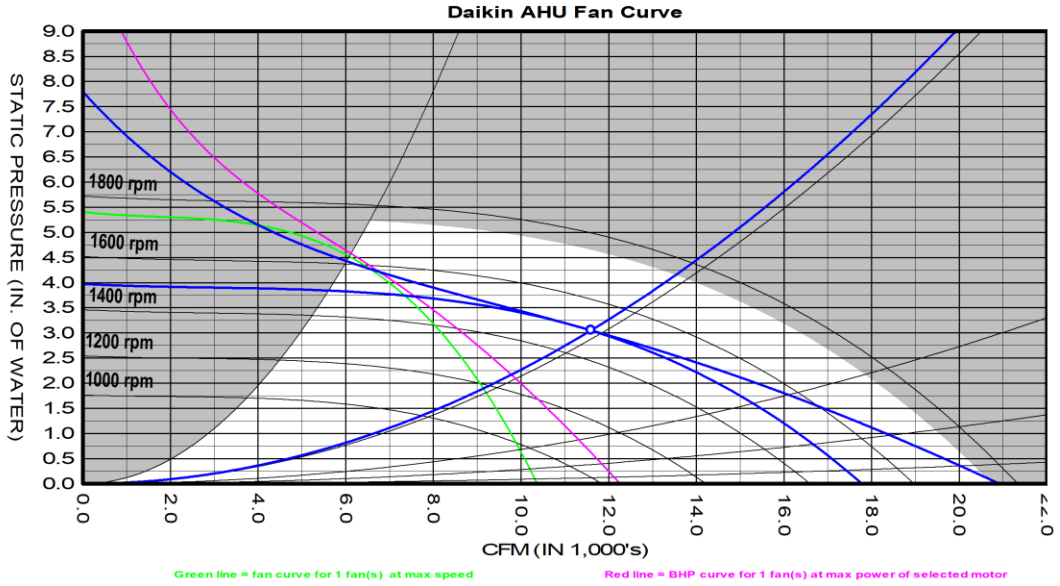
AHRI Certification

The air-handler is selected outside of the scope of AHRI Standard 430/431

Notes

Standard
1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

Fan Curve for AHU-SOCCER

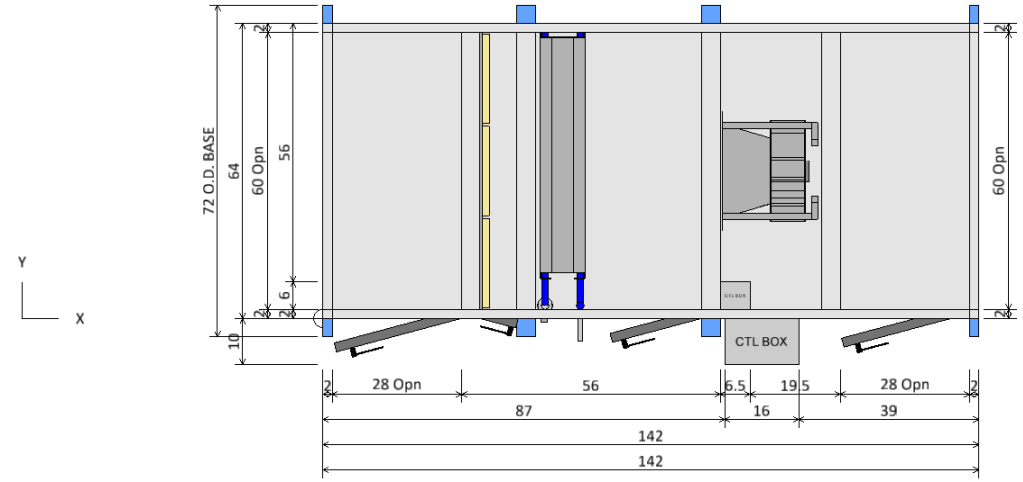


QPAC81 (2 Fans) Supply Fan at Standard Conditions					
Air volume	11600	cfm	Fan speed	1500	rpm
Total static	3.05	insWg	Max speed	1750	rpm
Total Fan Shaft Power	8.3	hp	Efficiency	67.3	%
Redundancy	70.6	%	Motor Speed	1750	rpm

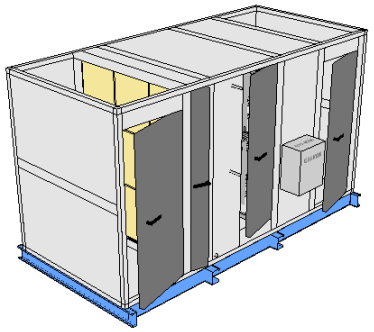
Unit tagging	AHU-SOCCER	Date	March-16-2022
Job name	Sportsplex	Time	12:50

Job Number: 07PDJD
Job Name: Sportsplex

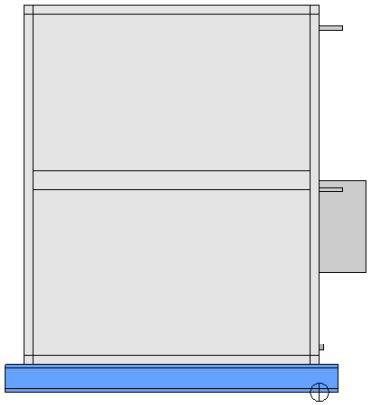
Drawing for AHU-SOCCER



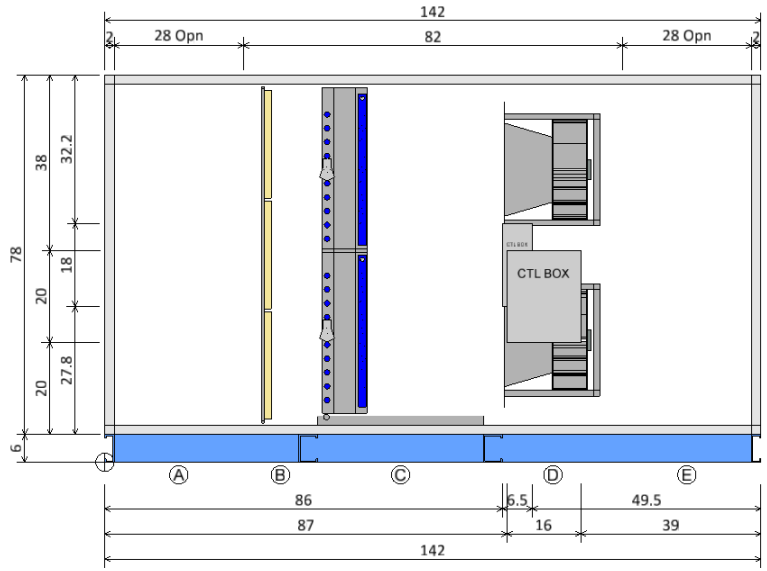
PLAN VIEW



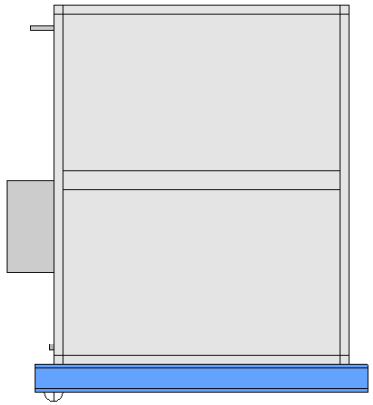
ISOMETRIC VIEW



FRONT END VIEW



ELEVATION VIEW



REAR END VIEW

Plan/Elevation	Unit Tag: AHU-SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH025GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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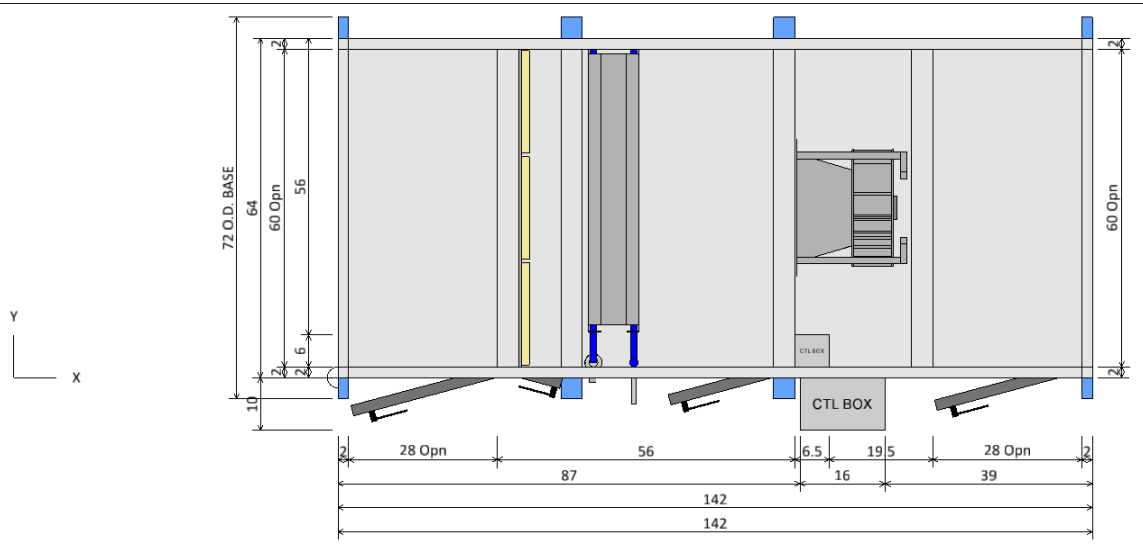
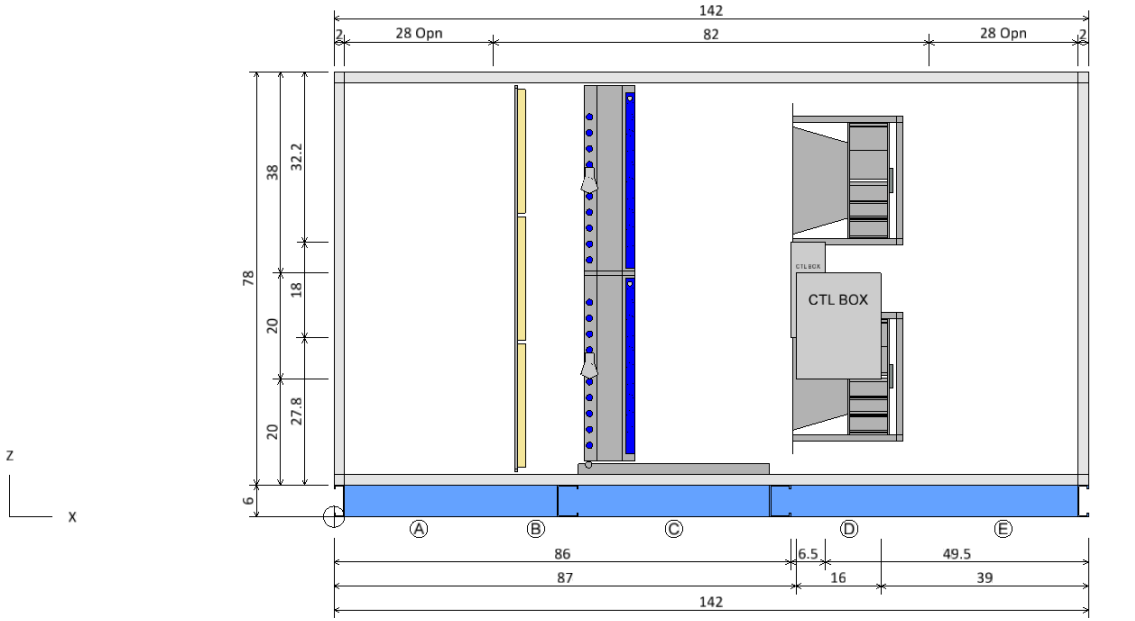
Job Number: 07PDJD
Job Name: Sportsplex

Drawing for AHU-SOCCER



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Plenum Section	
	Opening Location:	Top
	Opening Size:	28 ins x 60 ins
	Right Door (WxH):	28 ins x 68 ins
Ⓑ	Panel Filter	
	Filter Type:	Pleated (MERV 8)
	Right Door (WxH):	8 ins x 74 ins
Ⓒ	DX Coil	
	Coil Model:	5EJ0906B
	Total Capacity:	473523.0 Btu/hr
	Right Door (WxH):	20 ins x 68 ins
Ⓓ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	22 (2)
	Air Flowrate:	5800.0 cfm
	T.S.P:	3.0 insWg
	Motor Power:	6.7 HP
	Control box door swing:	16.00 ins
Ⓔ	Plenum Section	
	Opening Location:	Top
	Opening Size:	28 ins x 60 ins
	Right Door (WxH):	24 ins x 68 ins

Plan/Elevation - No Ends	Unit Tag: AHU-SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH025GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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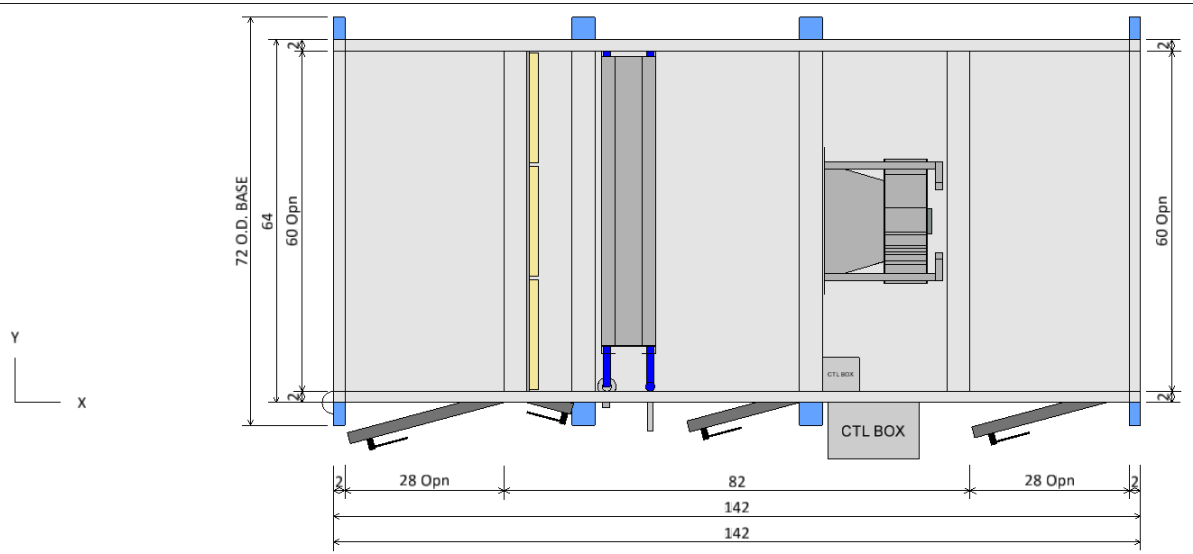
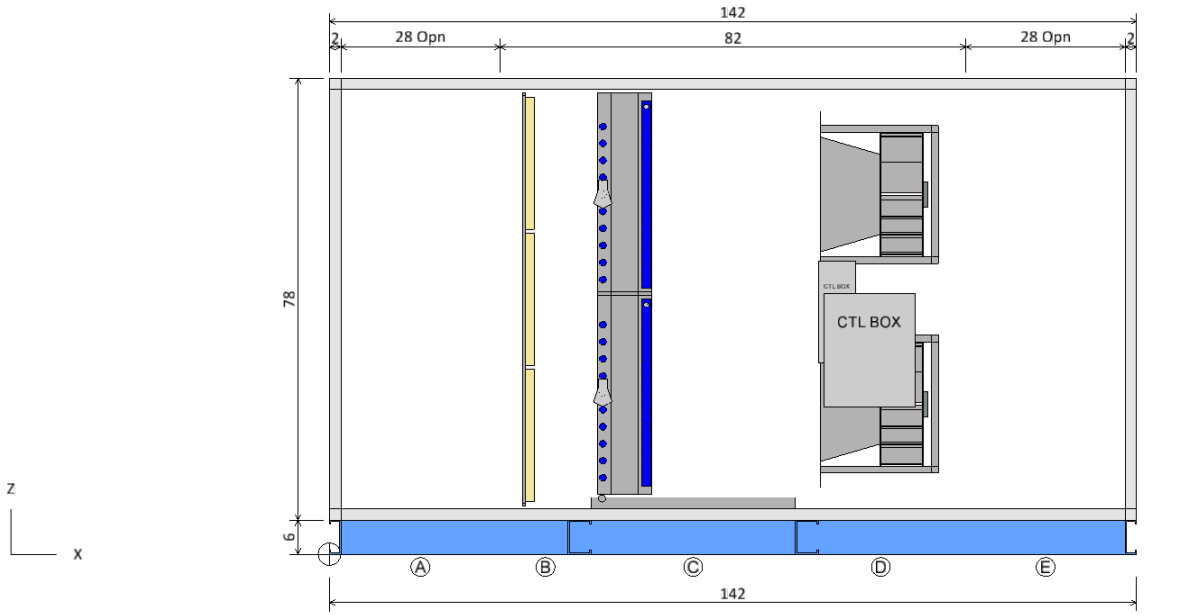
Drawing for AHU-SOCCER



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	2.00	2.00	84.00	60.00	28.00
Ⓔ	Plenum Section Opening	112.00	2.00	84.00	60.00	28.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH025GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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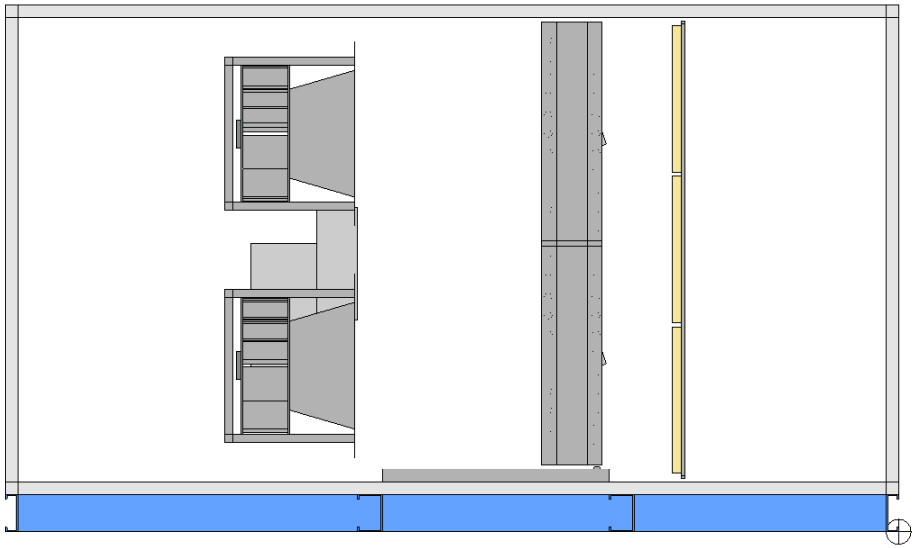
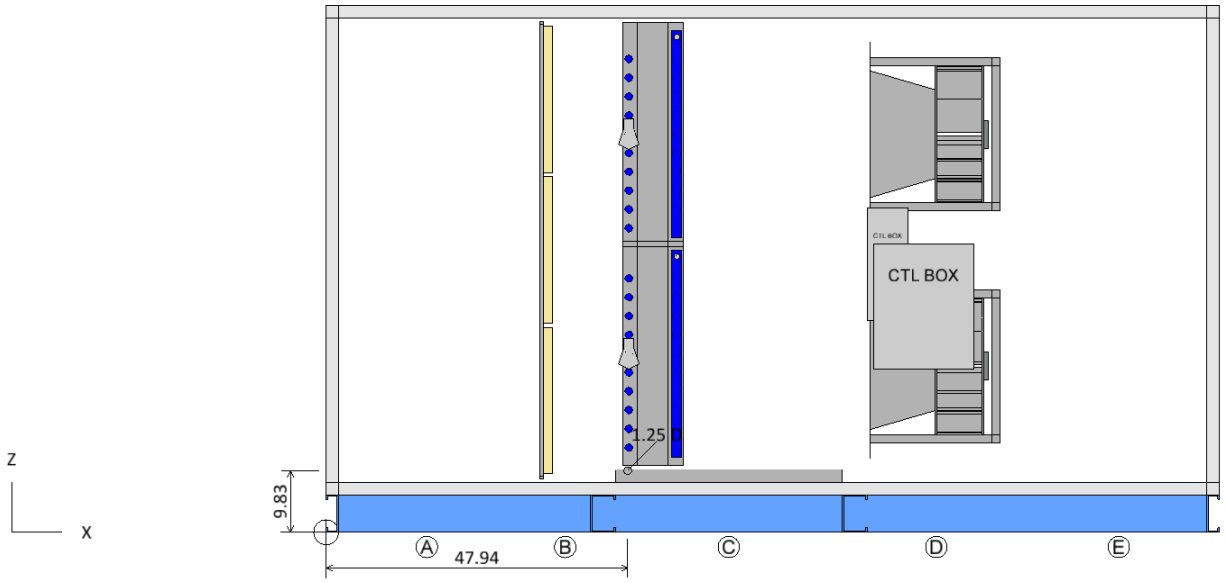
Drawing for AHU-SOCCER



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Coil and Drain Connections

	Type	X	Y	Z	Diam
Ⓒ	DX Coil Condensate drain conn:	47.94	-2.90	9.83	1.25
	DX suction:	TBD	TBD	TBD	2- 1.63
	DX liquid conn:	TBD	TBD	TBD	2- 0.88
	DX suction:	TBD	TBD	TBD	2- 1.63
	DX liquid conn:	TBD	TBD	TBD	2- 0.88

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH025GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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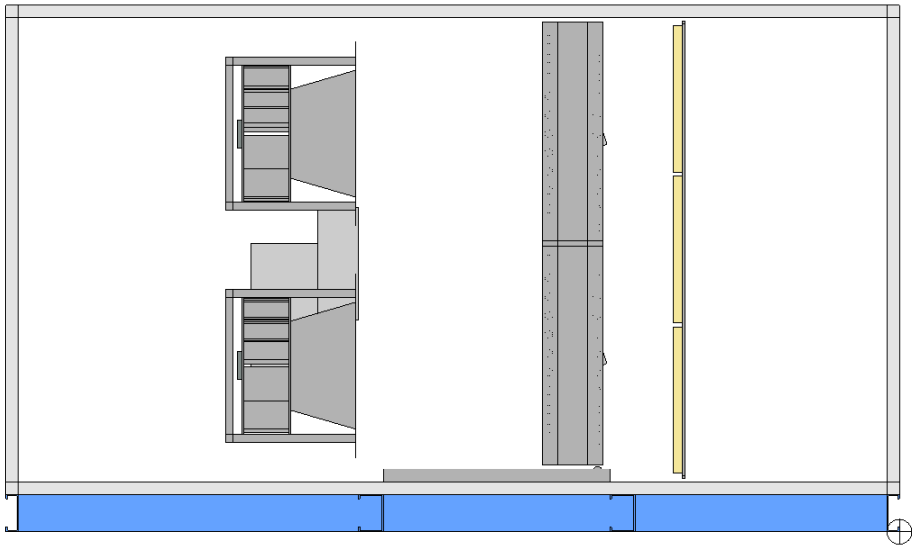
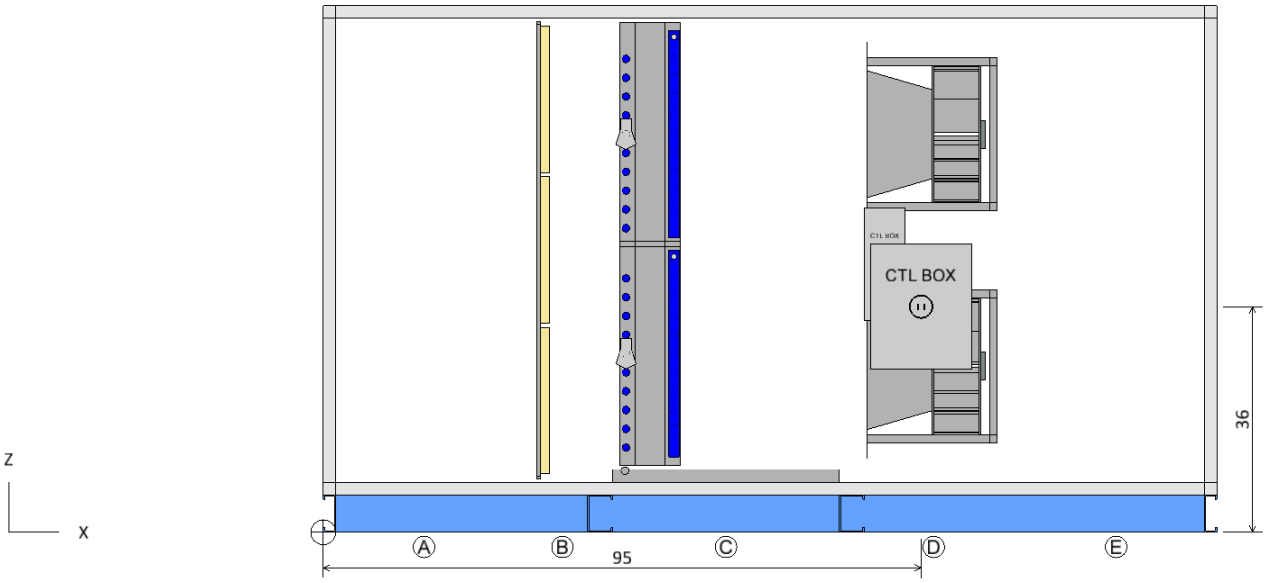
Drawing for AHU-SOCCER



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Component Key

	Type	X	Y	Z	Volts	Phase
Ⓓ	Supply Fan Fan	95.00	0.00	36.00	460	3

Note: Dimensions are measured from the origin point.

Electrical Connections	Unit Tag: AHU-SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH025GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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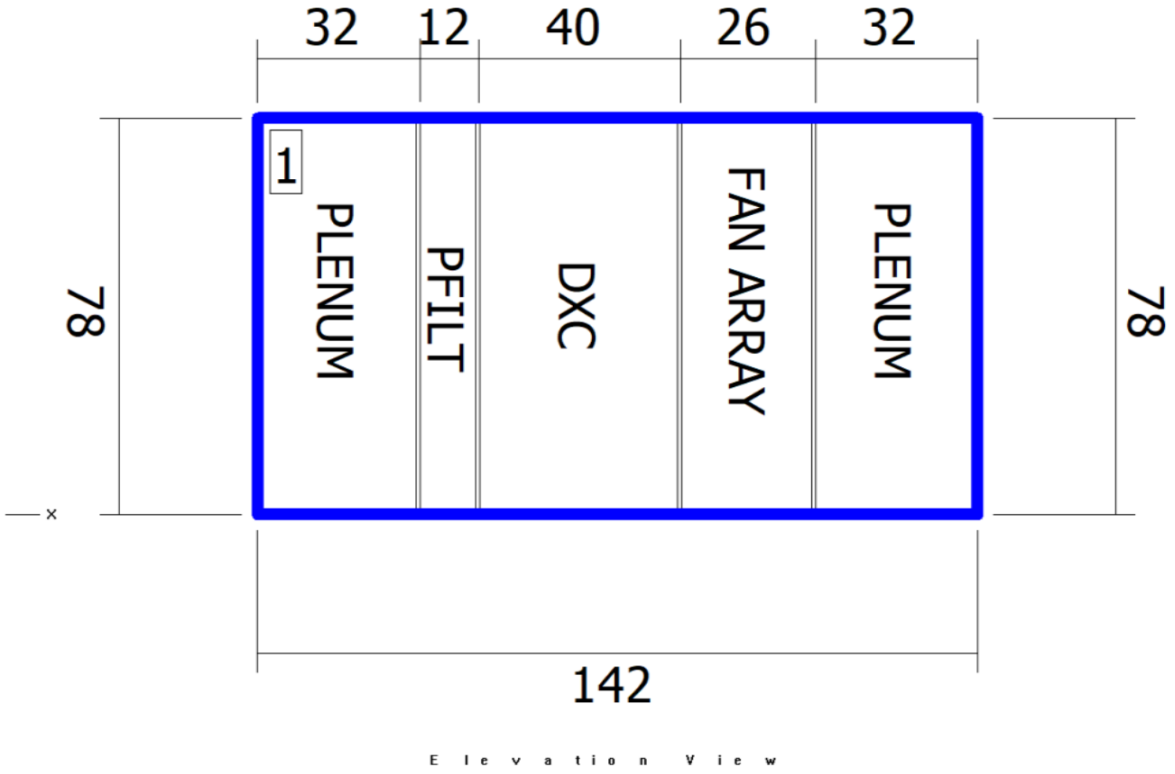
Drawing for AHU-SOCCER



Elevation View

Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	2674.75	142	64	78

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions. Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-SOCCER			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH025GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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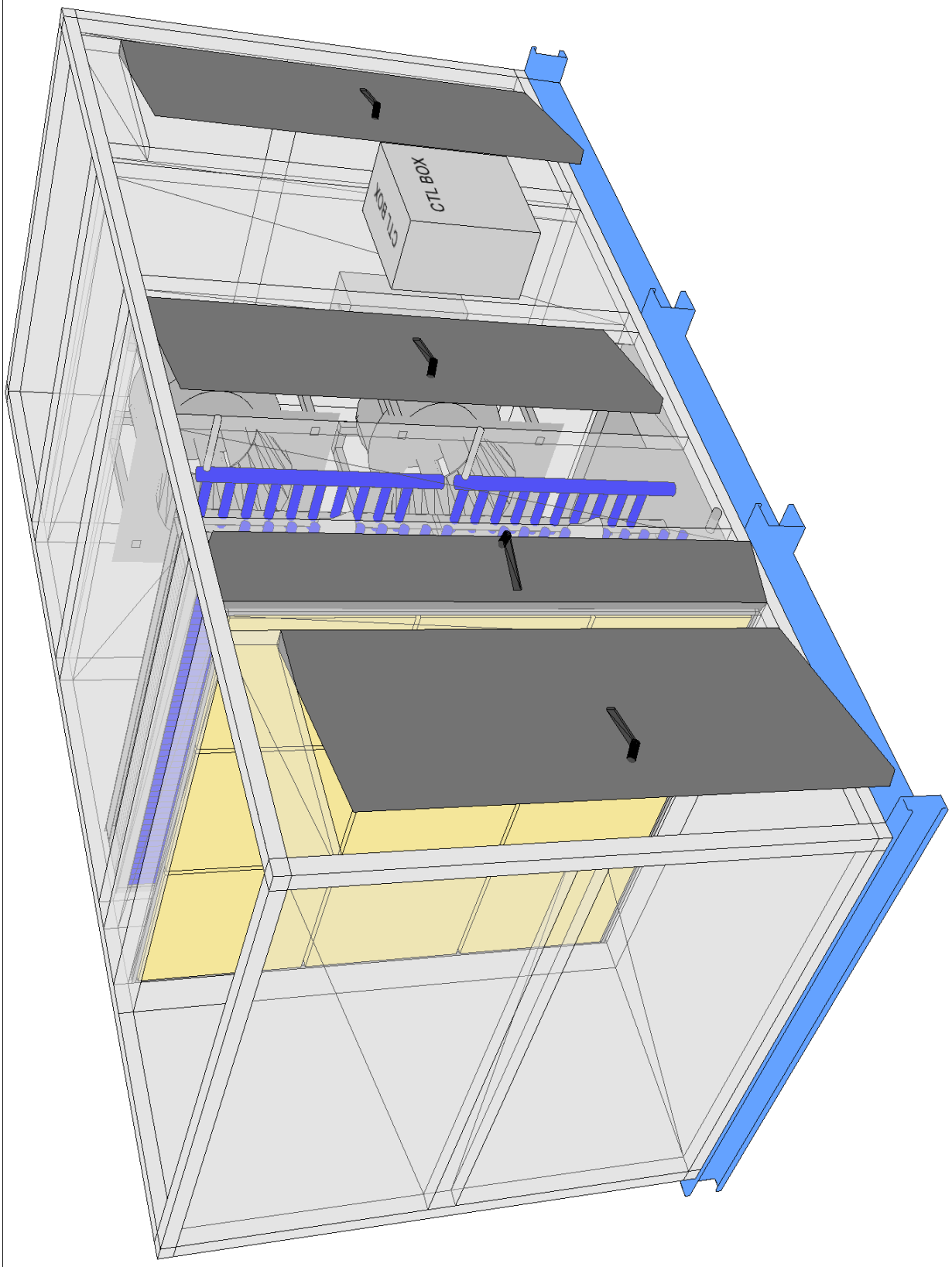
Drawing for AHU-SOCCER



Product Drawing	Unit Tag: AHU-SOCCER	Sales Office: Air Reps, LLC	
Product: Vision Air Handler	Project Name: Sportsplex	Sales Engineer:	
Model: CAH025GDQM	Mar. 16, 2022 | Ver/Rev:	Sheet: 1 of 1	Scale: NTS | Tolerance: +/-0.25" | Dwg Units: in

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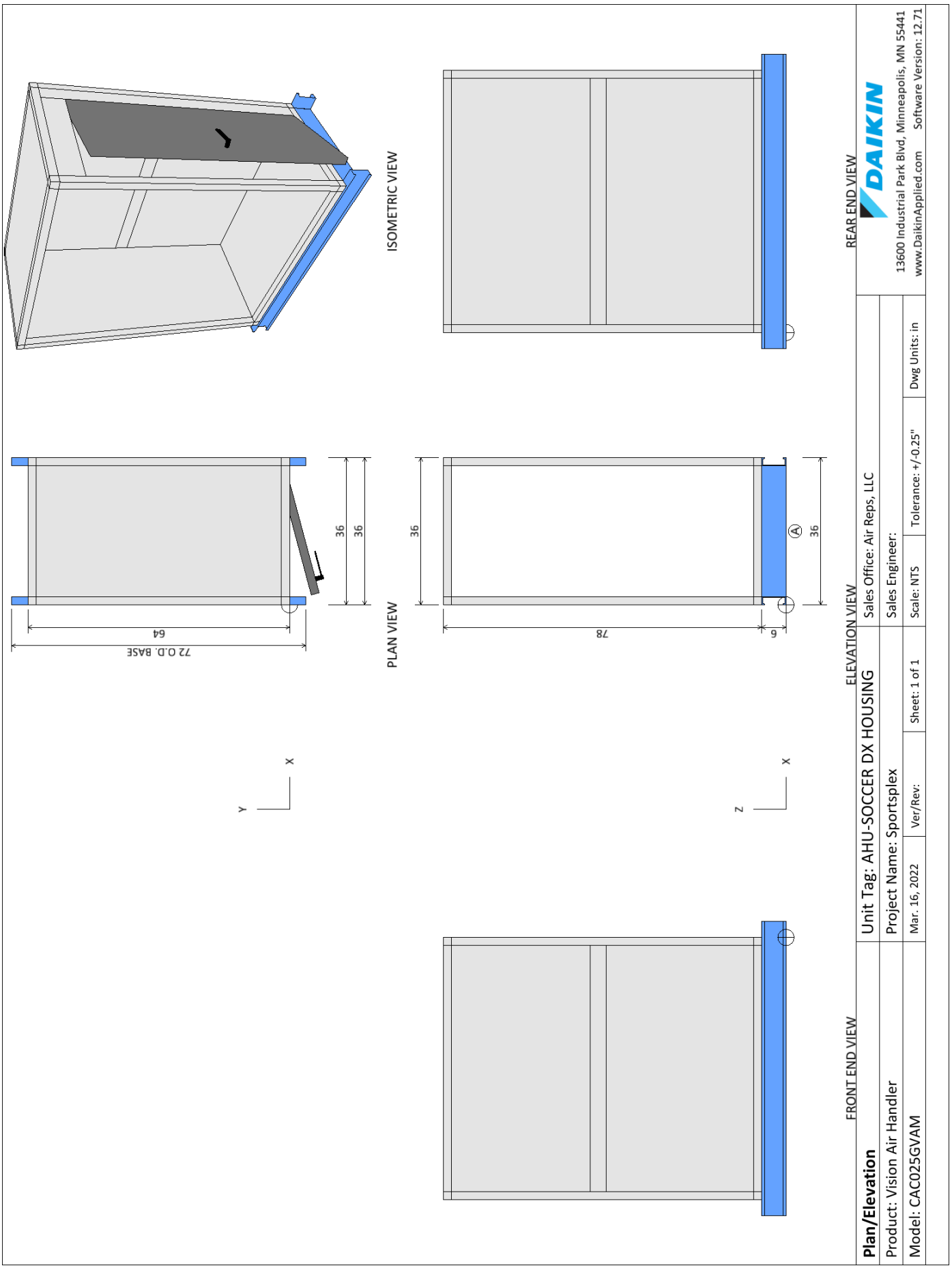
Drawing for AHU-SOCCER DX HOUSING



Drawing for AHU-SOCCER DX HOUSING

PLAN VIEW

ELEVATION VIEW

Component Key	
Ⓐ	Plenum Section Opening Location: None Opening Size: N/A Right Door (WxH): 28 ins x 68 ins

Plan/Elevation - No Ends	Unit Tag: AHU-SOCCER DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC025GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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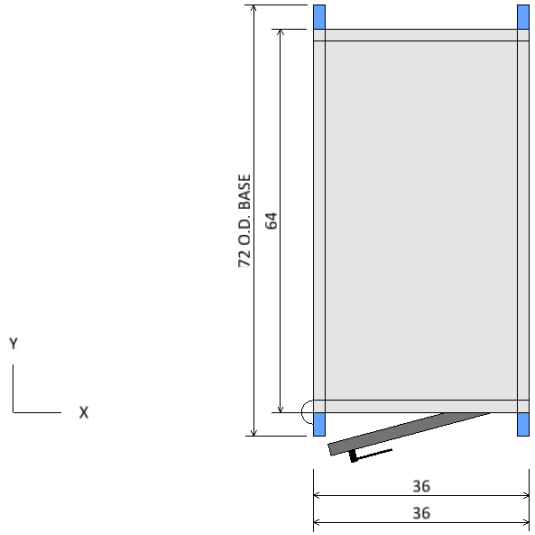
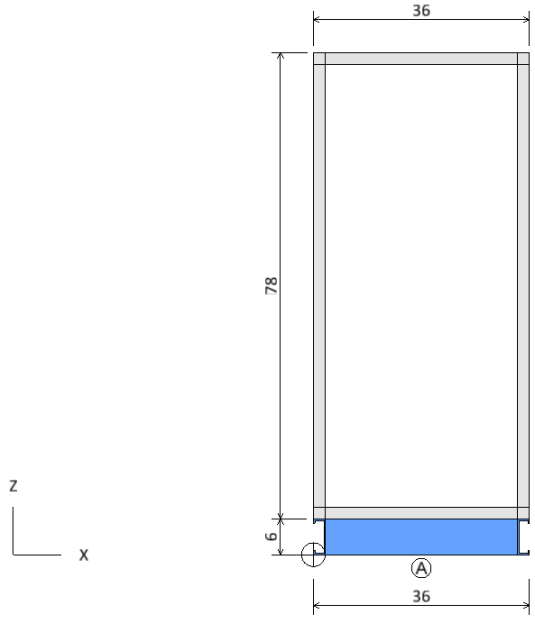
Drawing for AHU-SOCCER DX HOUSING



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	0.00	2.00	8.00	60.00	74.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-SOCCER DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC025GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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Drawing for AHU-SOCCER DX HOUSING

LEFT ELEVATION VIEW

RIGHT ELEVATION VIEW

Coil and Drain Connections

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-SOCCER DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC025GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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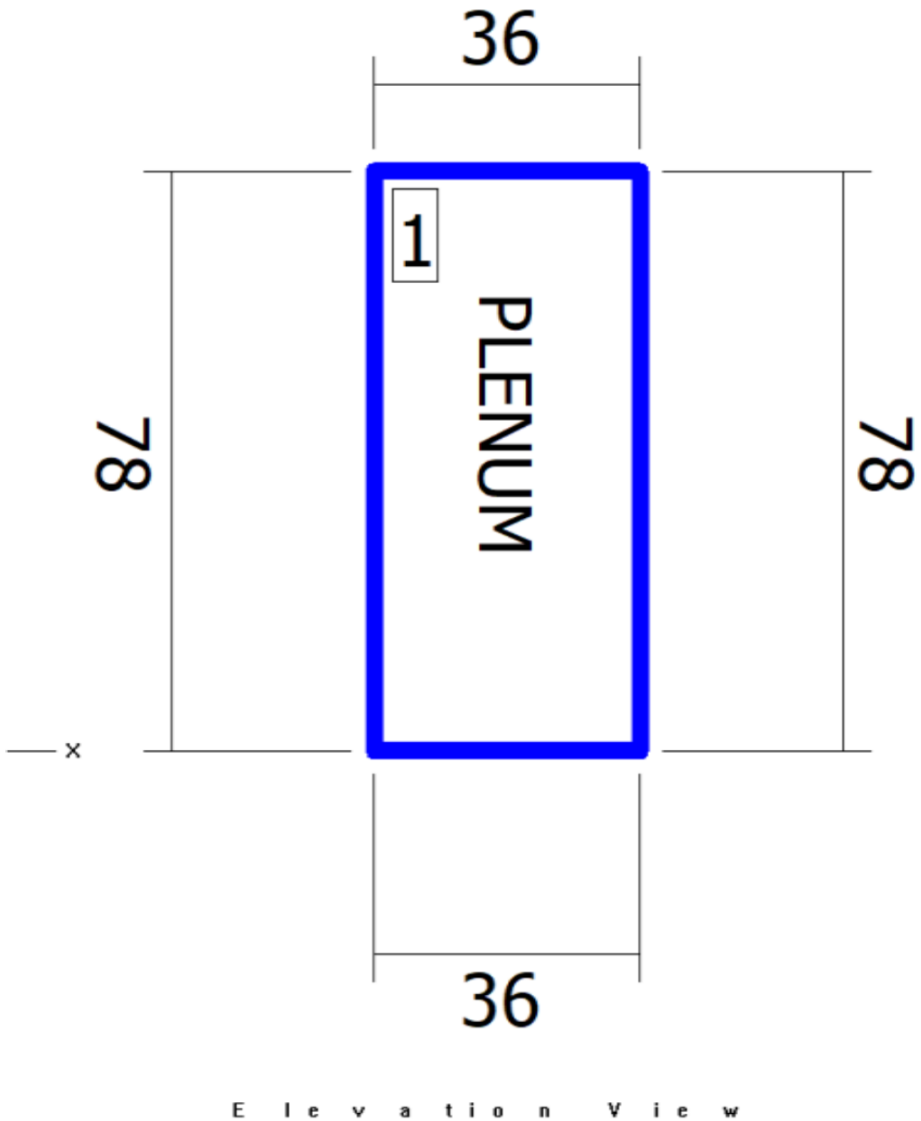
Drawing for AHU-SOCCER DX HOUSING



Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	425.08	36	64	78

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions. Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-SOCCER DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC025GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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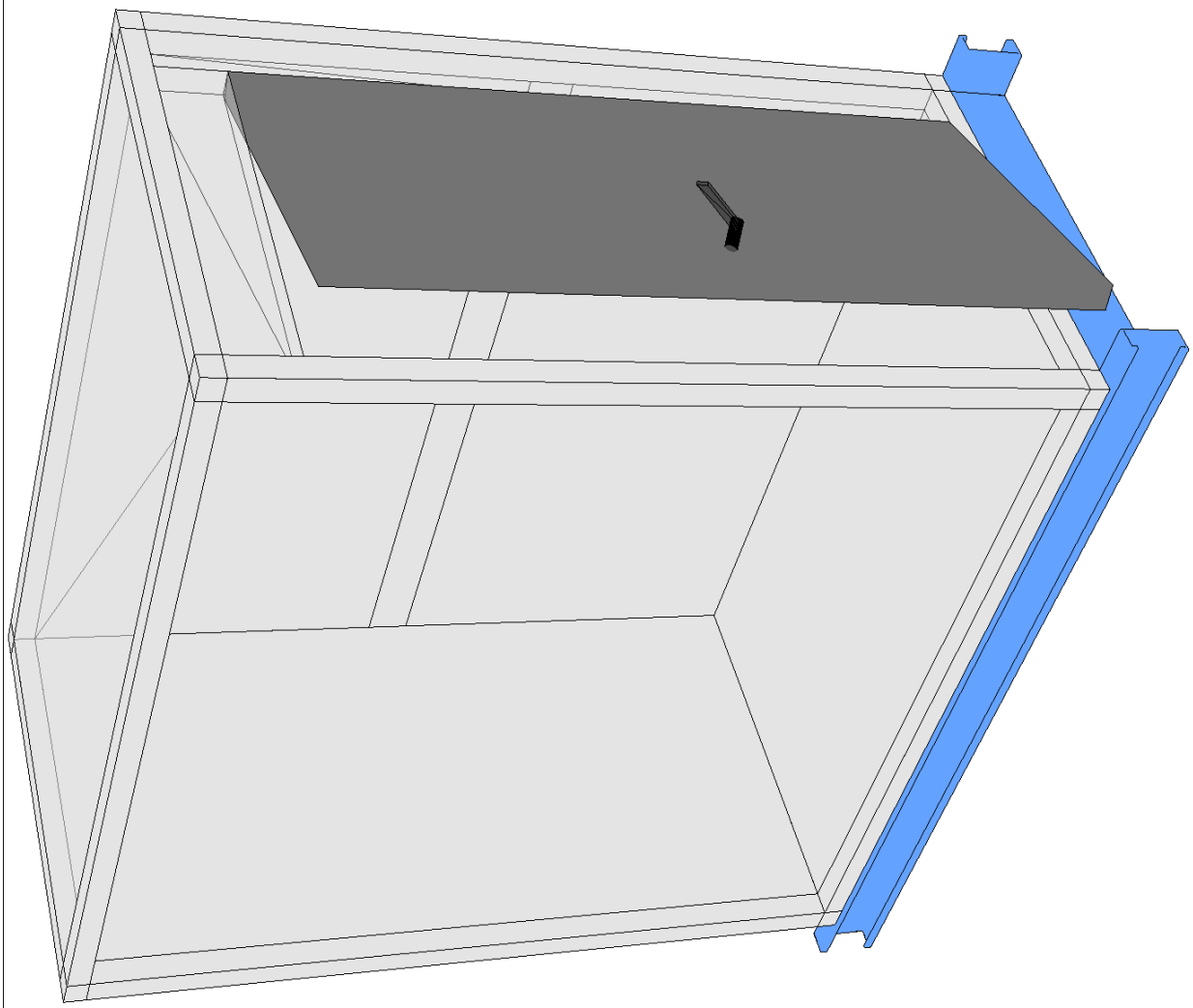
Drawing for AHU-SOCCER DX HOUSING



Product Drawing	Unit Tag: AHU-SOCCER DX HOUSING	Sales Office: Air Reps, LLC	
Product: Vision Air Handler	Project Name: Sportsplex	Sales Engineer:	
Model: CAC025GVAM	Mar. 16, 2022 | Ver/Rev:	Sheet: 1 of 1	Scale: NTS | Tolerance: +/-0.25" | Dwg Units: in

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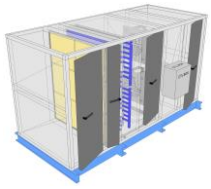
Technical Data Sheet for AHU-ICE

Job Information	Technical Data Sheet
Job Name	Sportsplex
Date	March 16 2022
Submitted By	RB
Software Version	12.71
Unit Tag	AHU-ICE



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH017GDQM	7600	1.50	3.04	66*	54*	126

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH017GDQM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	6" formed channel	**Wall Thickness:**	2 in
Shipping Stretch Wrap:	Yes	**Altitude:**	0 ft
Parts Warranty:	Standard One Year		

Plenum Section

Component: 1 | Length: 26 in | Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	22.00" x 50.00"	0.06 inWc

Door

Location	Width	Opening
Drive side	22 in	Outward

Panel Filter

Component: 2 | Length: 12 in | Shipping Section: 1

Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading
Pleated	MERV 8	403 ft/min	18.9 ft²	7600 cfm	Side

Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec				
0.17 inWc	**0.59** inWc	1.00 inWc	N/A	6	20 in	24 in	2 in

Door

Location	Width	Opening
Drive side	8 in	Outward

Technical Data Sheet for AHU-ICE

Direct Expansion Coil	Component: 3	Length: 40 in	Shipping Section: 1

Coil Model	Total Capacity	Sensible Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)
5EJ0906B	309613 Btu/hr	204510 Btu/hr	2	6	9	0.625 in	1.50 in x 1.299 in

Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
7600 cfm	80.0 °F	67.0 °F	55.4 °F	53.7 °F	0.77 insWg	27 in	41 in	15.38 ft²	494 ft/min

Fluid		Sub-Cooled Refrigerant Liquid Temp.	Suction Vapor Superheat Temp. at Coil Outlet	Design Saturated Condensing Temp.	Total Refrigerant Weight
Suction Temp.	Refrigerant				
44.0 °F	R410a	110.0 °F	8.0 °F	110.0 °F	50.00 lb

Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location	Material		
OD Sweat	2-0.88 in	2-1.63 in	Drive side	Copper tube	32.0 °F	32.0 °F

Material				Drain Pan	Drain Side
Fin	Tube	Header	Case		
Aluminum .0075 in	Copper .020 in	Copper	Galv. steel	Stainless steel	Drive side

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification

Coil is NOT certified by AHRI

Door

Location	Width	Opening
Drive side	20 in	Outward

Supply Fan Array	Component: 4	Length: 22 in	Shipping Section: 1

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
3800 cfm	1.50 inWc	3.04 inWc	0.00 inWc	-	-	3.37 HP	2503 rpm	3170 rpm	71.9 %	25.0 A	18.5 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Discharge	Motor Location
2x1 : 2	Airfoil / N/A	2	15.74 in	Axial	Integral-Front

Motor Data

Power*	Electrical Supply	Speed	Control Signal	Supplier	Full Load Current*
7.5 HP	460/60/3 V/Hz/Phase	3170 rpm	0-10V	Q-PAC	8.24 A

Fan Options

Isolation Backdraft Dampers:	None	Block Off Plate:	None
Isolator Type:	Rigid		

Control/Disconnect Data

Selection Type:	Premium (BACnet DDC)	Vendor:	Q-PAC
Voltage:	460 V	External Power Panel: Height x Width x Depth	20.00 in x 16.00 in x 10.00 in
Mounting:	Drive Side	Internal Quick Connect Panel: Height x Width x Depth	18.00 in x 6.50 in x 6.00 in
Enclosure:	NEMA 1	Disconnect:	100kAIC Fused Disconnect

Panel

Location	Width	Opening
Removable panels	- in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Technical Data Sheet for AHU-ICE

Plenum Section	Component: 5	Length: 26 in	Shipping Section: 1

Opening Location	Opening Size	Air Pressure Drop
Top	22.00" x 50.00"	0.13 inWc

Door

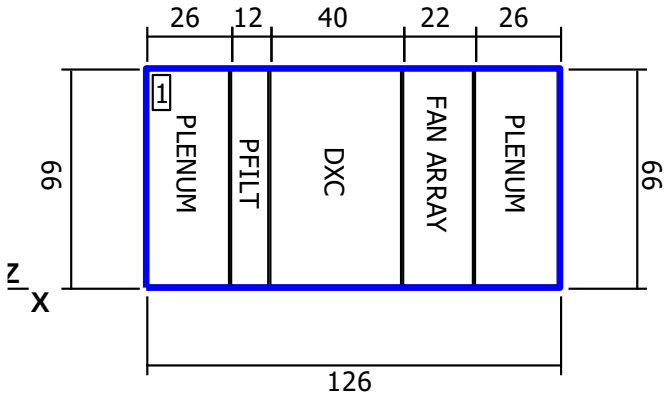
Location	Width	Opening
Drive side	18 in	Outward

Unit Sound Power (dB)

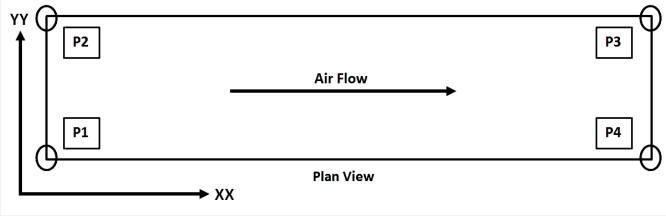
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	86	89	80	74	74	65	51	51
Unit Discharge:	91	94	92	89	90	87	83	77
Unit Return:	87	89	82	79	74	72	66	59

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	126	1995	515	495	483	502	62	26	33
Entire Unit	**126**	**1995**	**515**	**495**	**483**	**502**	**62**	**26**	**33**



Elevation View



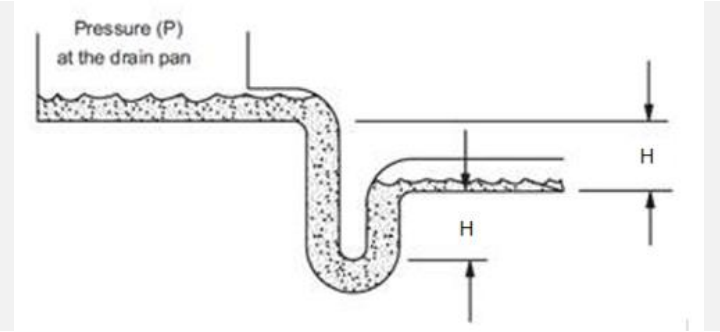
NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.06 insWg
Panel Filter	Panel Filter	0.59 insWg
DX Coil	DX Coil	0.77 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.13 insWg
External Static	External Static	1.50 insWg
Total Supply Fan Static		3.04 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
1	DX Coil	3.34



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

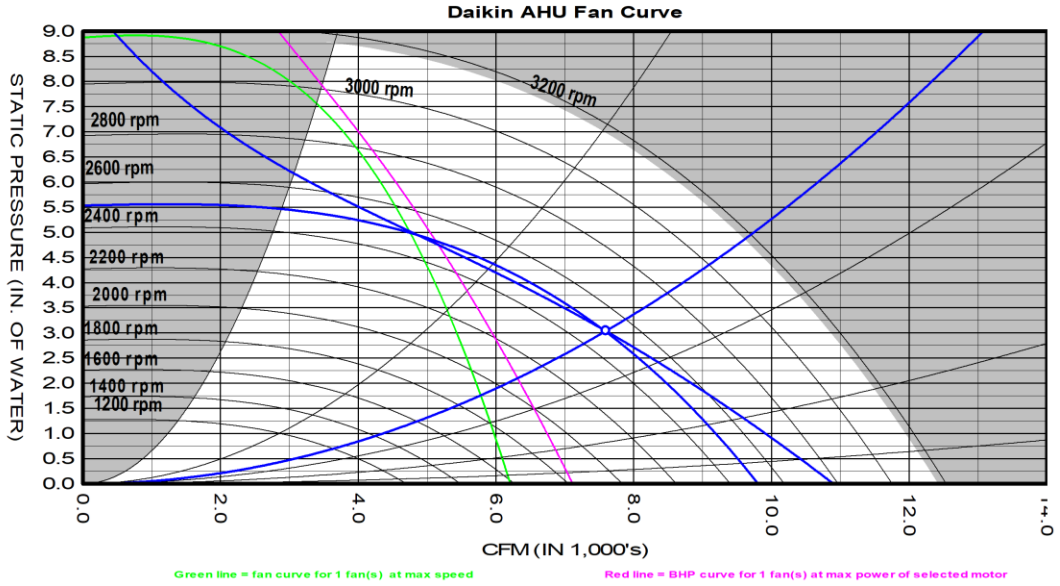
AHRI Certification

The air-handler is selected outside of the scope of AHRI Standard 430/431

Notes

Standard
1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

Fan Curve for AHU-ICE

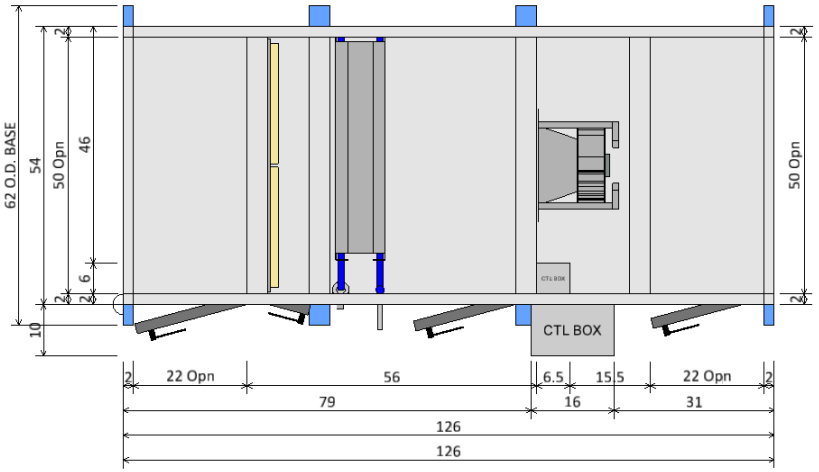


QPAC76 (2 Fans) Supply Fan at Standard Conditions					
Air volume	7600	cfm	Fan speed	2503	rpm
Total static	3.04	insWg	Max speed	3170	rpm
Total Fan Shaft Power	6.7	hp	Efficiency	54.1	%
Redundancy	71.9	%	Motor Speed	3170	rpm

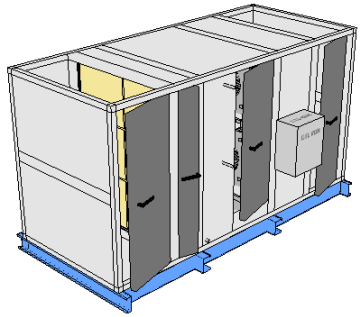
Unit tagging	AHU-ICE	Date	March-16-2022
Job name	Sportsplex	Time	12:50

Job Number: 07PDJD
Job Name: Sportsplex

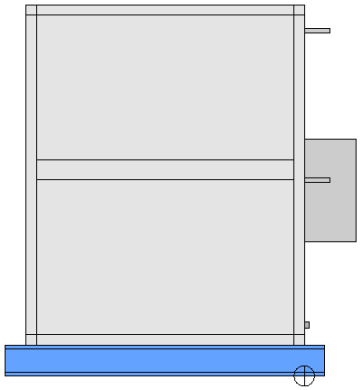
Drawing for AHU-ICE



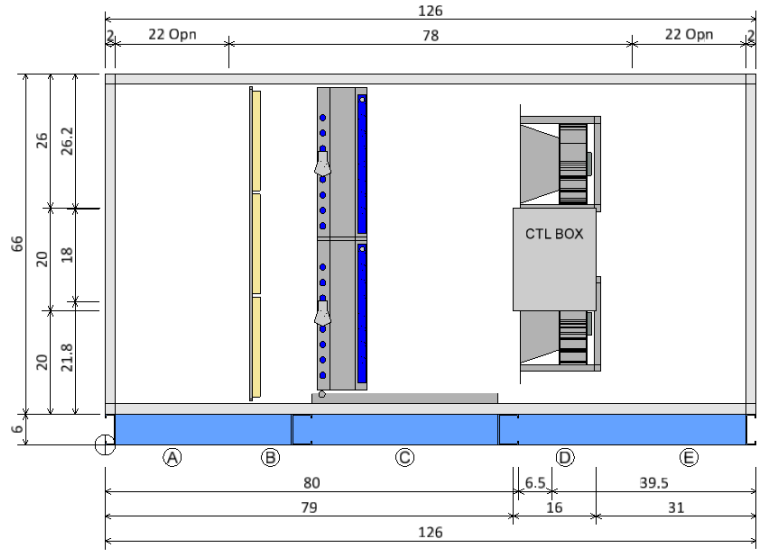
PLAN VIEW



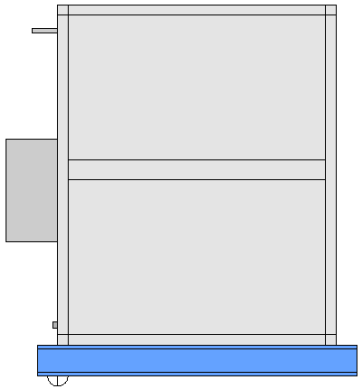
ISOMETRIC VIEW



FRONT END VIEW



ELEVATION VIEW



REAR END VIEW

Plan/Elevation	Unit Tag: AHU-ICE			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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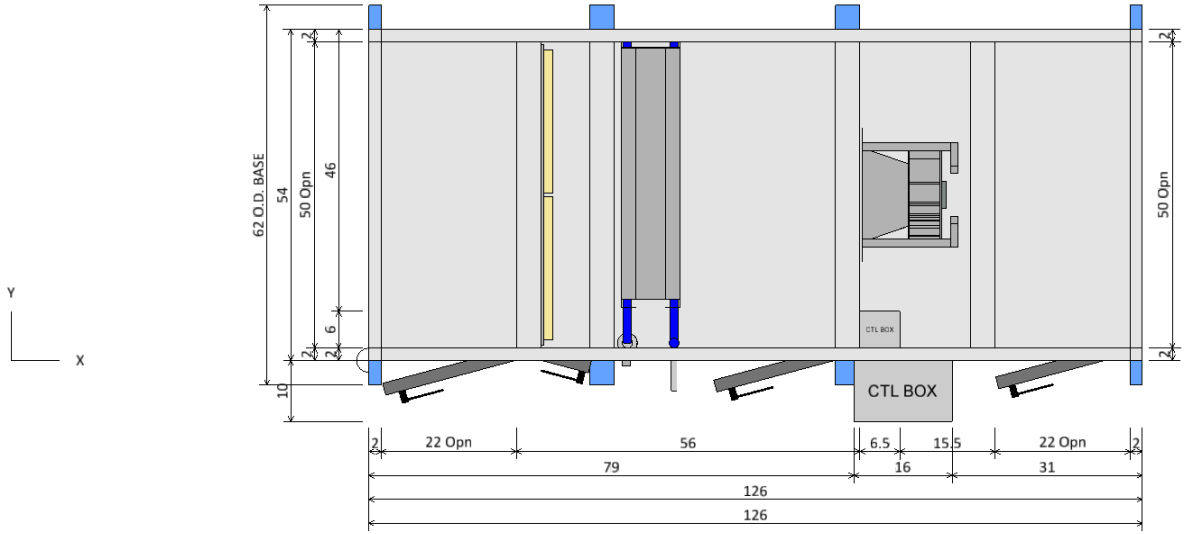
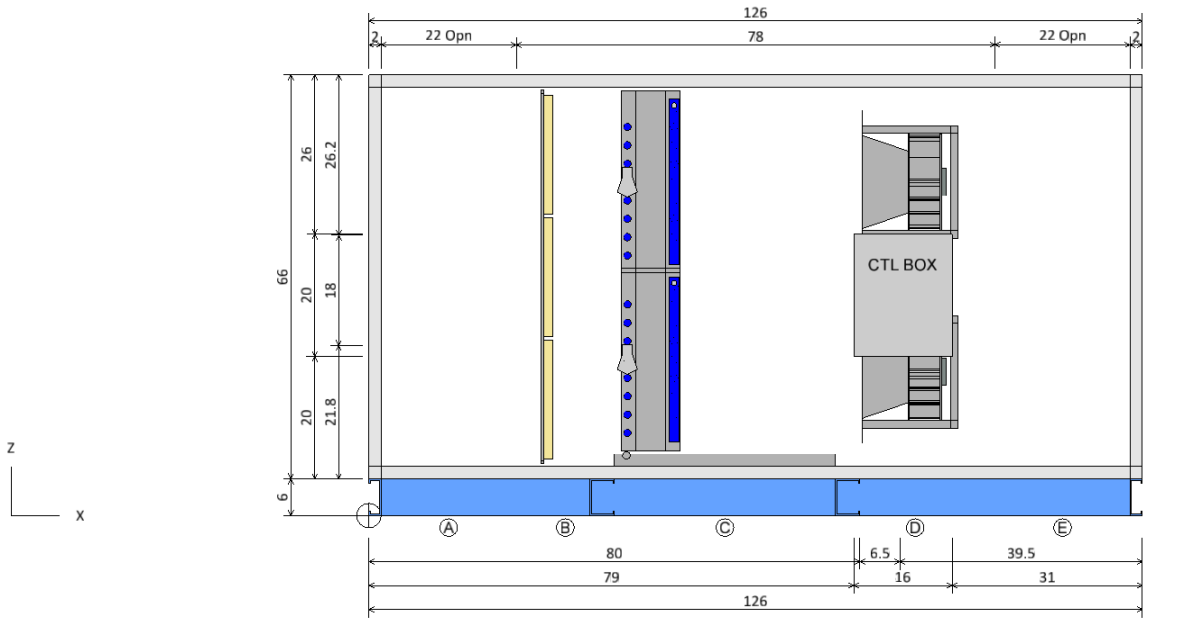
Job Number: 07PDJD
Job Name: Sportsplex

Drawing for AHU-ICE



PLAN VIEW



ELEVATION VIEW

Component Key		
Ⓐ	Plenum Section	
	Opening Location:	Top
	Opening Size:	22 ins x 50 ins
	Right Door (WxH):	22 ins x 62 ins
Ⓑ	Panel Filter	
	Filter Type:	Pleated (MERV 8)
	Right Door (WxH):	8 ins x 62 ins
Ⓒ	DX Coil	
	Coil Model:	5EJ0906B
	Total Capacity:	309613.0 Btu/hr
	Right Door (WxH):	20 ins x 56 ins
Ⓓ	Supply Fan	
	Fan Type:	Centrifugal - Plenum
	Fan Size (Class):	15 (2)
	Air Flowrate:	3800.0 cfm
	T.S.P:	3.0 insWg
	Motor Power:	7.5 HP
	Control box door swing:	16.00 ins
Ⓔ	Plenum Section	
	Opening Location:	Top
	Opening Size:	22 ins x 50 ins
	Right Door (WxH):	18 ins x 62 ins

Plan/Elevation - No Ends	Unit Tag: AHU-ICE			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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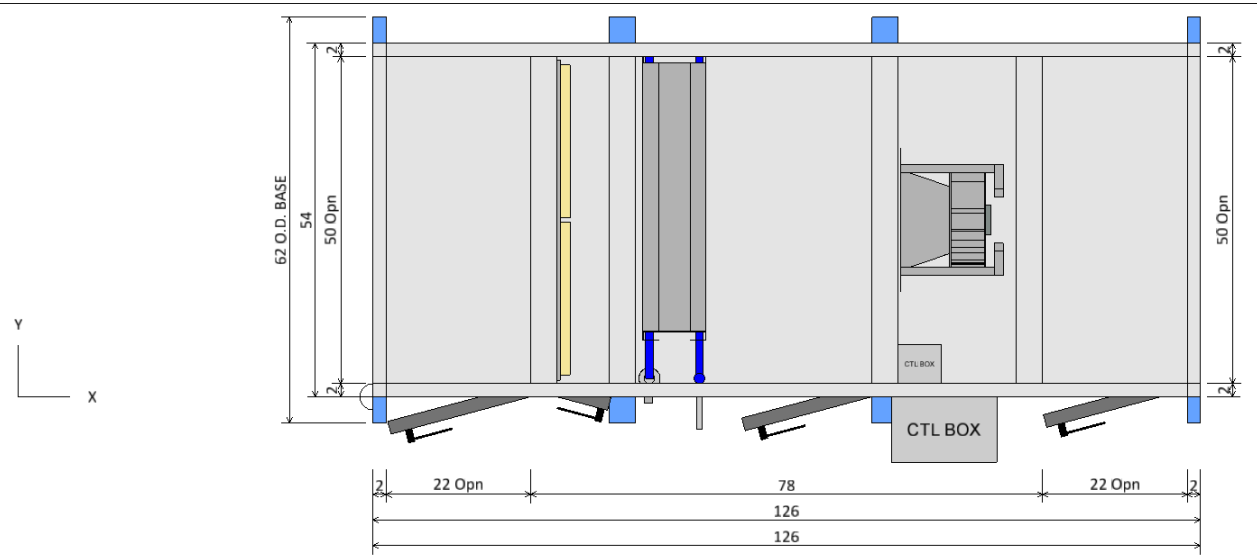
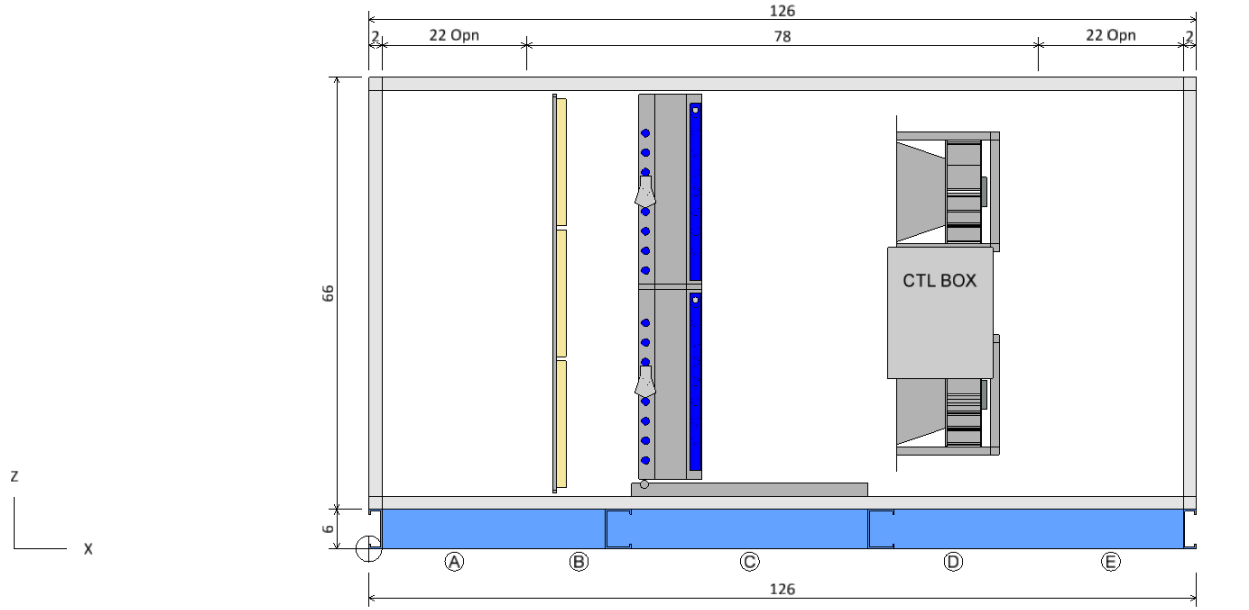
Drawing for AHU-ICE



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	2.00	2.00	72.00	50.00	22.00
Ⓔ	Plenum Section Opening	102.00	2.00	72.00	50.00	22.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-ICE			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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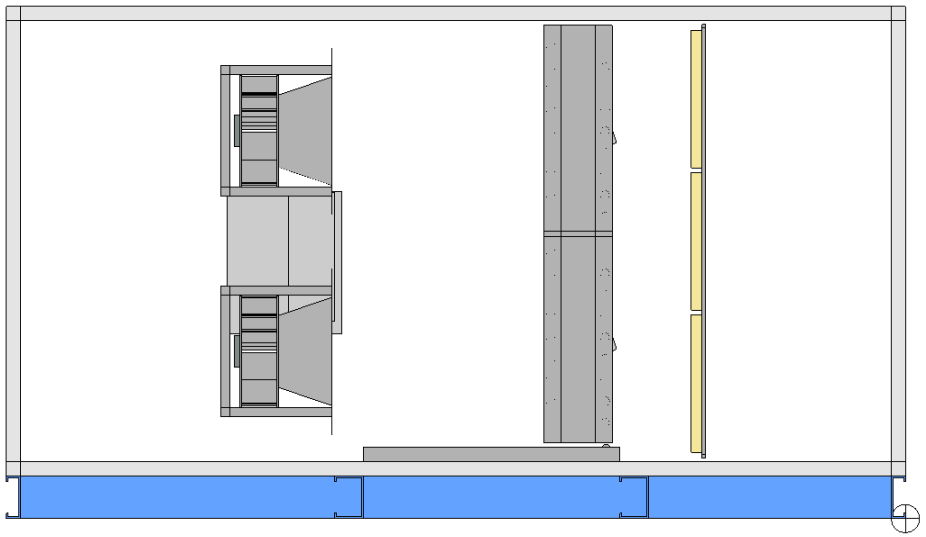
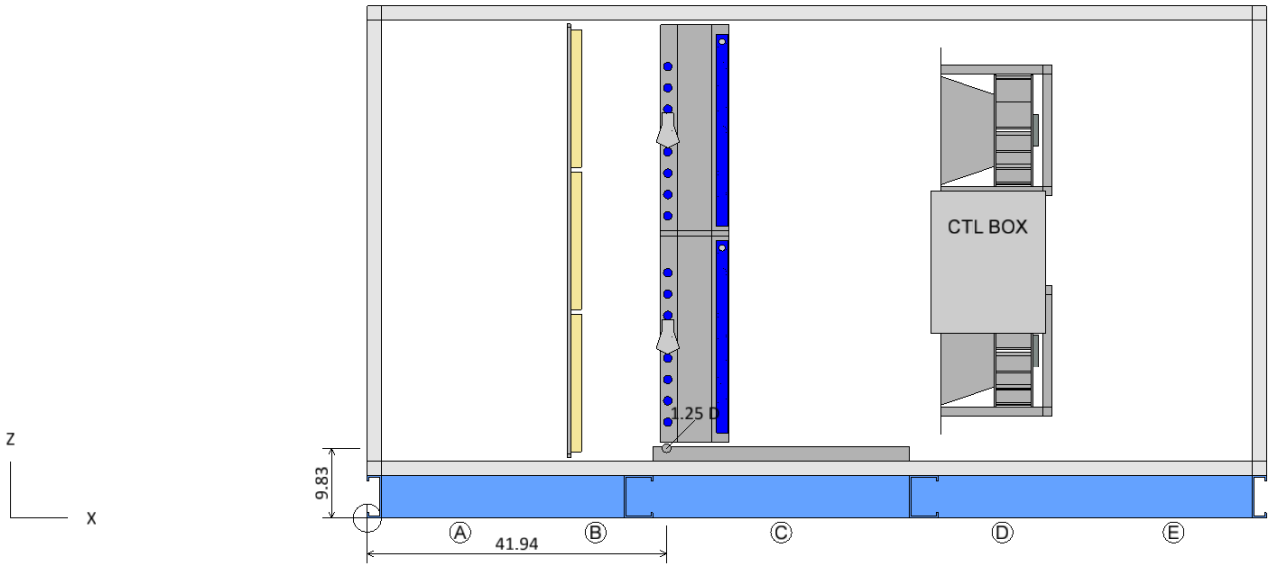
Drawing for AHU-ICE



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Coil and Drain Connections

	Type	X	Y	Z	Diam
	DX Coil				
	Condensate drain conn:	41.94	-2.90	9.83	1.25
©	DX suction:	TBD	TBD	TBD	2- 1.63
	DX liquid conn:	TBD	TBD	TBD	2- 0.88
	DX suction:	TBD	TBD	TBD	2- 1.63
	DX liquid conn:	TBD	TBD	TBD	2- 0.88

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-ICE			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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Job Number: 07PDJD
Job Name: Sportsplex

Prepared Date: 3/16/2022

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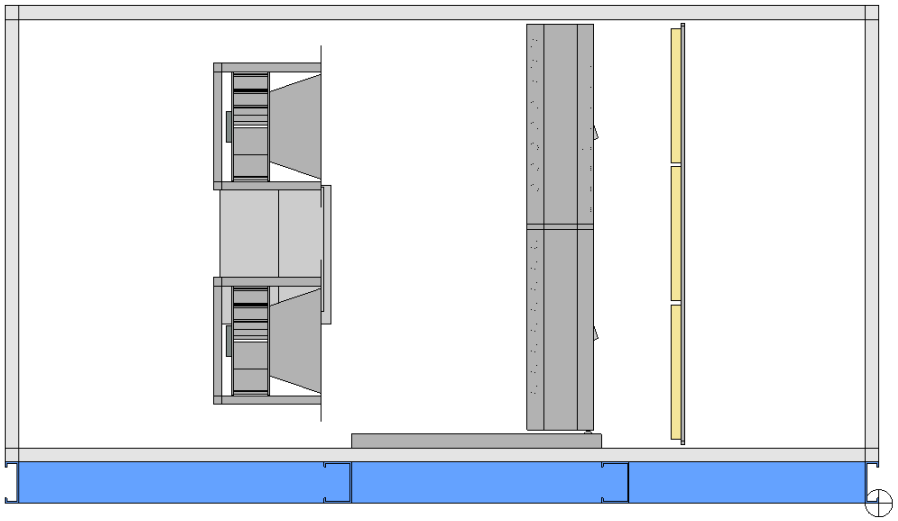
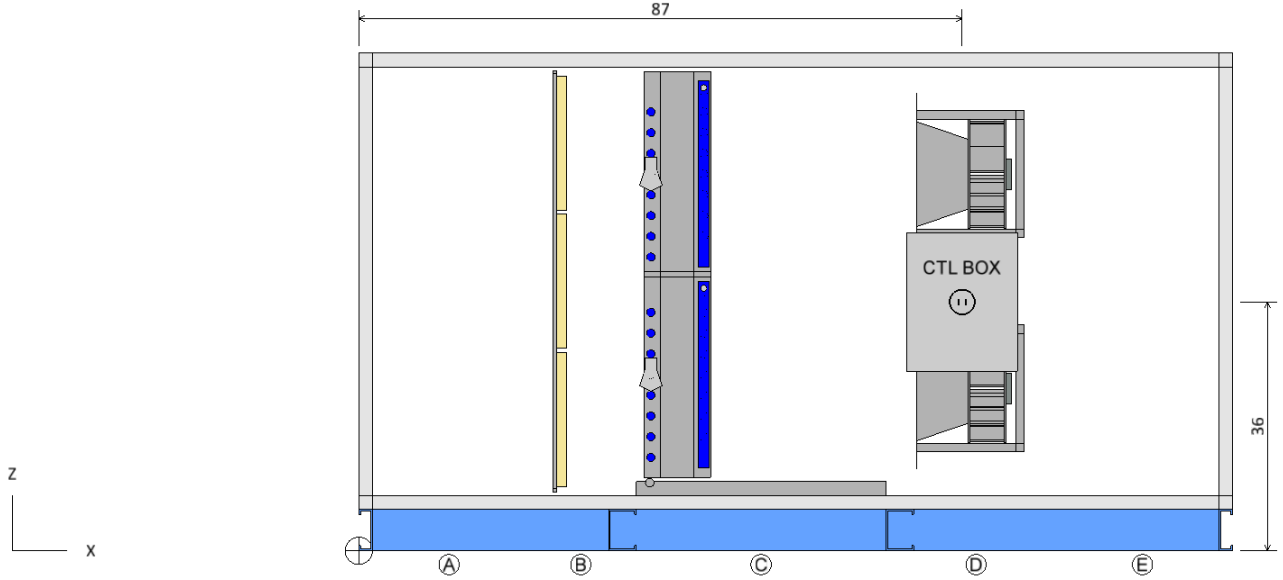
Drawing for AHU-ICE



LEFT ELEVATION VIEW



RIGHT ELEVATION VIEW

Component Key

	Type	X	Y	Z	Volts	Phase
Ⓓ	Supply Fan Fan	87.00	0.00	36.00	460	3

Note: Dimensions are measured from the origin point.

Electrical Connections	Unit Tag: AHU-ICE			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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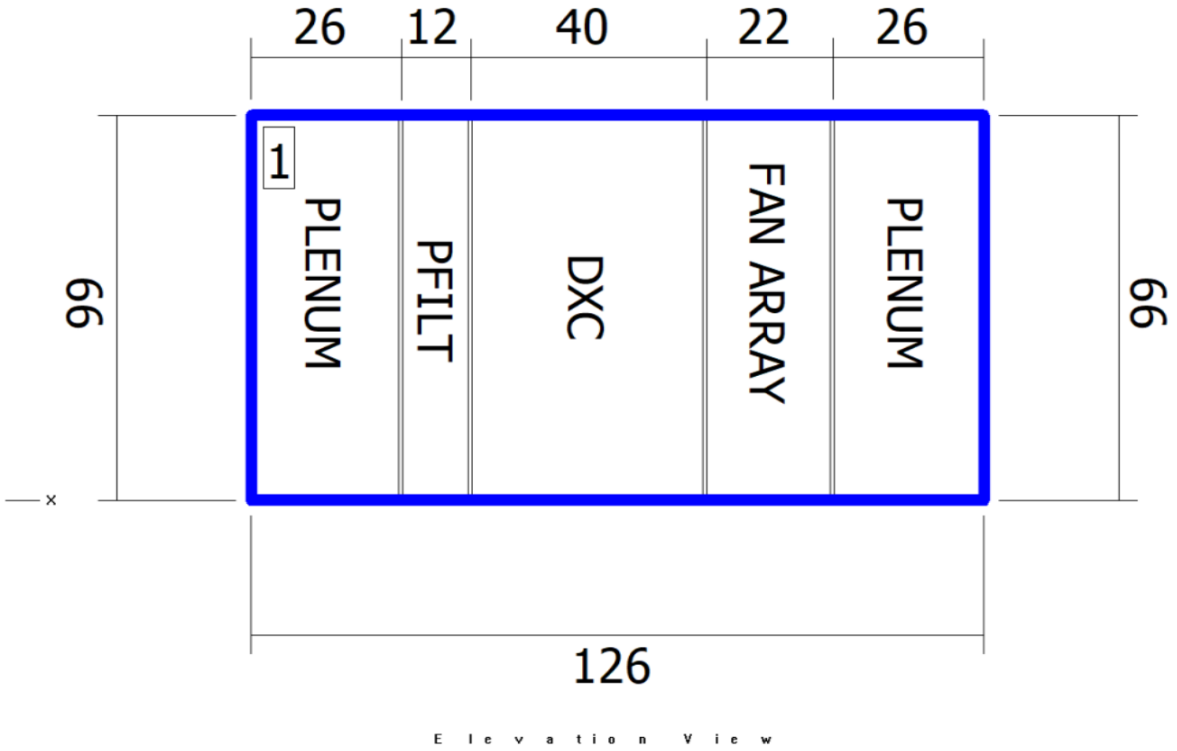
Drawing for AHU-ICE



Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	1994.73	126	54	66

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions. Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-ICE			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAH017GDQM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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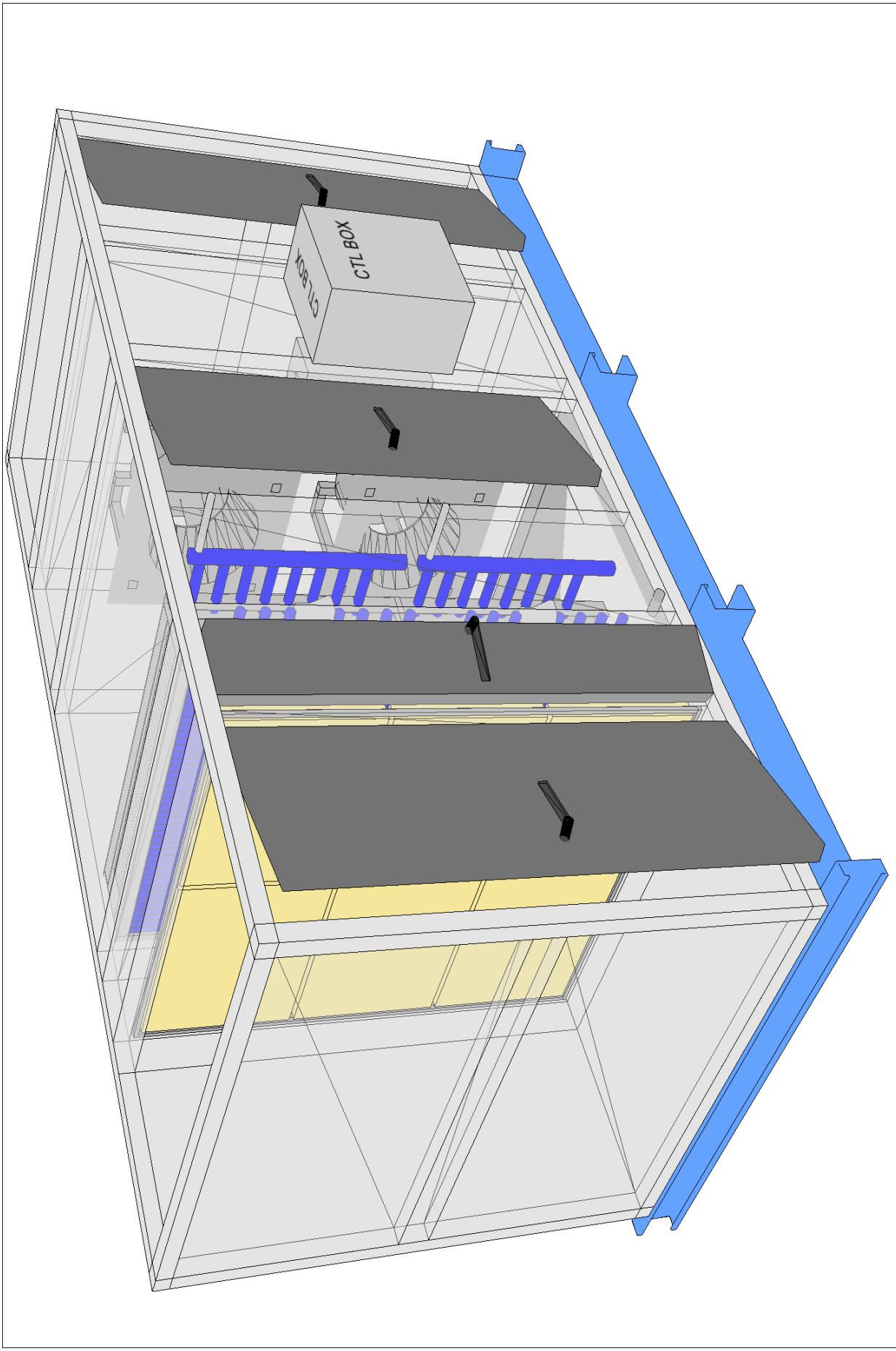
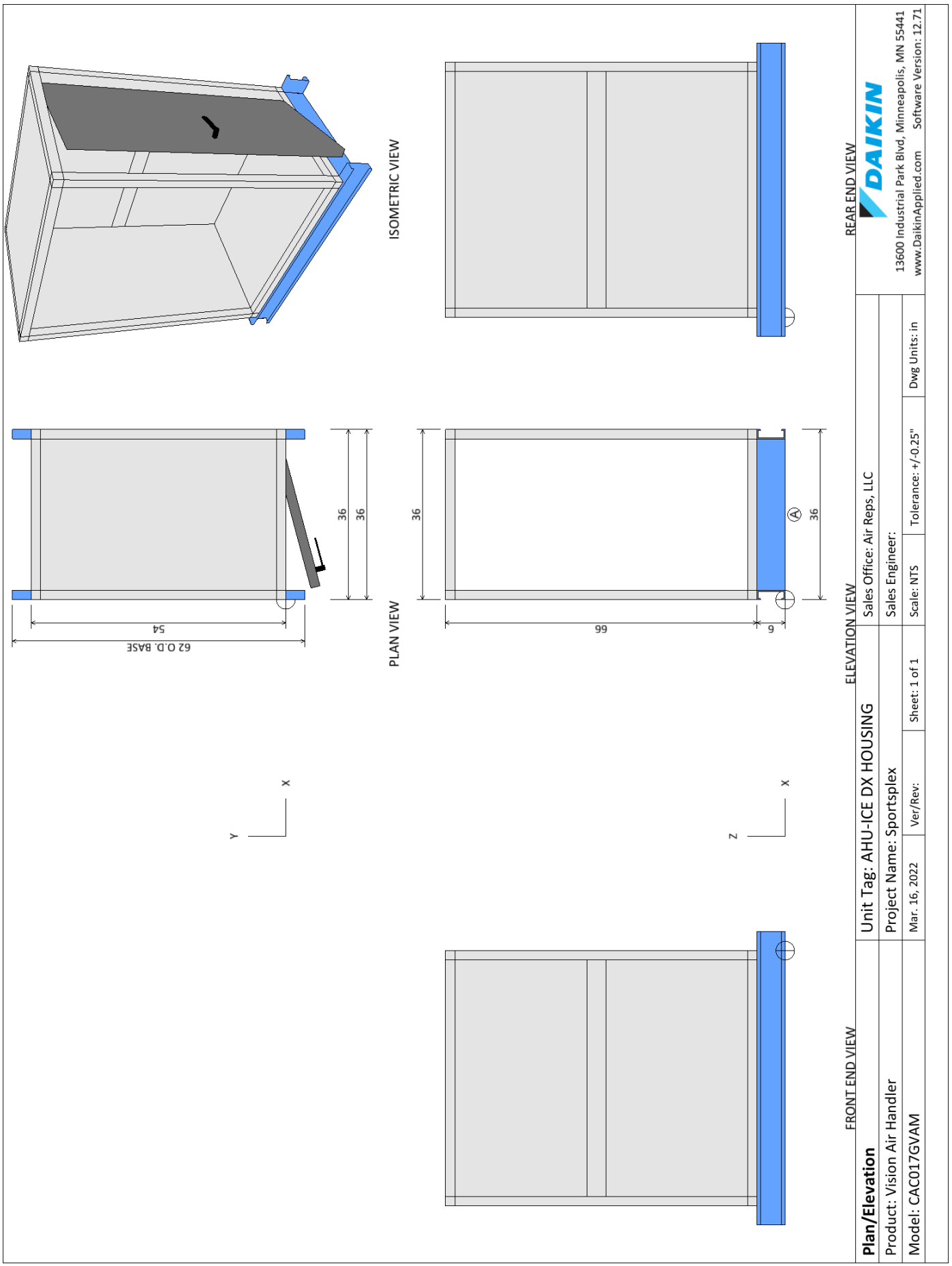
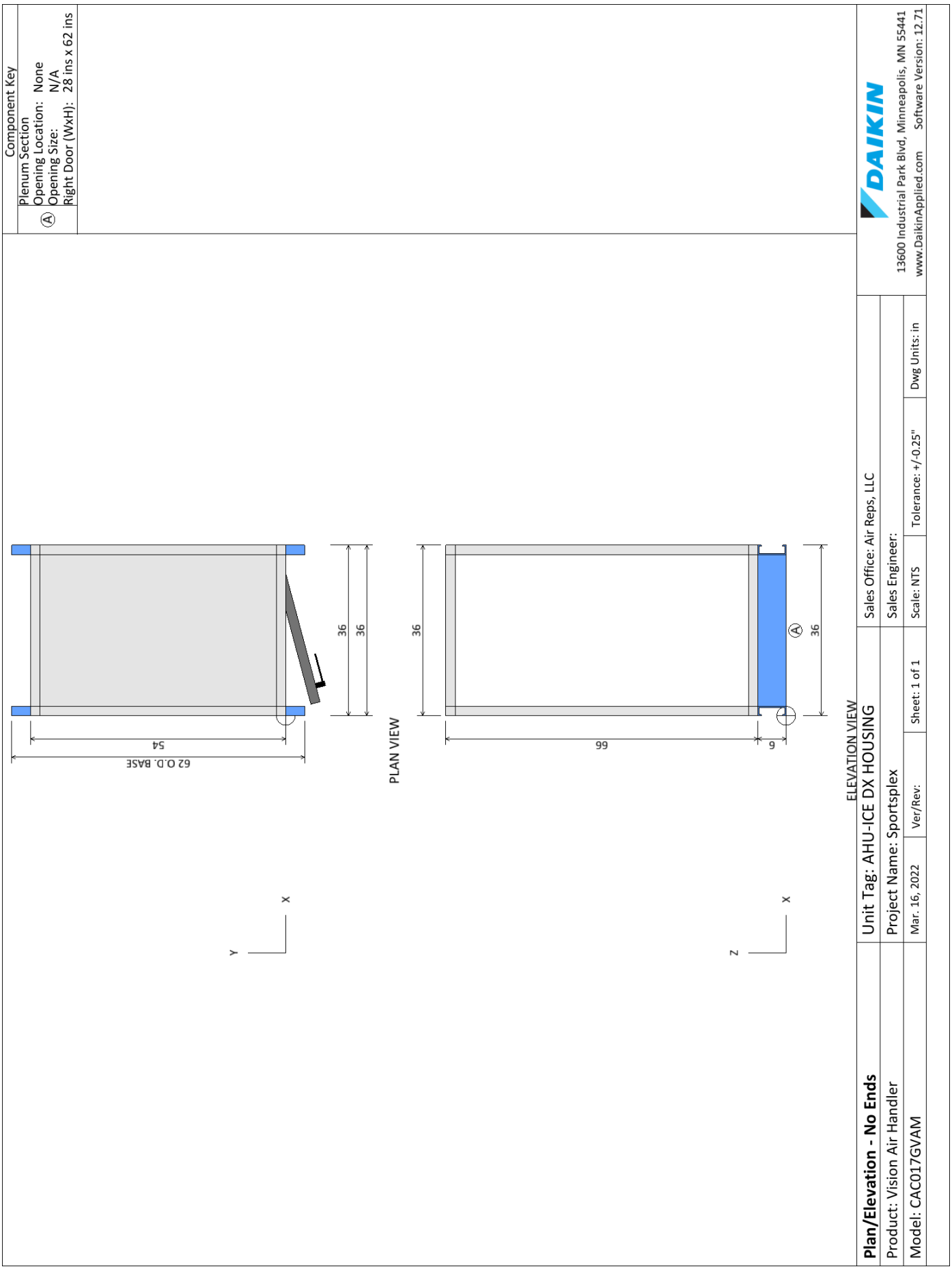


Product Drawing	Unit Tag: AHU-ICE	Sales Office: Air Reps, LLC	DAIKIN
Product: Vision Air Handler	Project Name: Sportsplex	Sales Engineer:	13600 Industrial Park Blvd, Minneapolis, MN 55441
Model: CAH017GDQM	Mar. 16, 2022 | Ver/Rev: | Sheet: 1 of 1	Scale: NTS | Tolerance: +/-0.25" | Dwg Units: in	www.DaikinApplied.com Software Version: 12.71

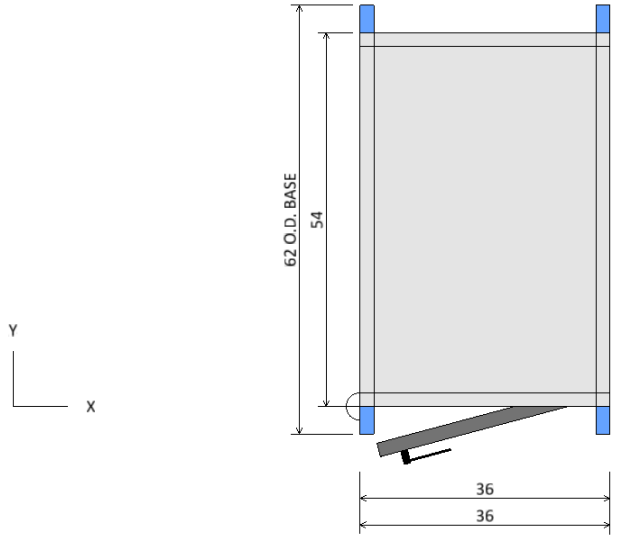
Drawing for AHU-ICE DX HOUSING



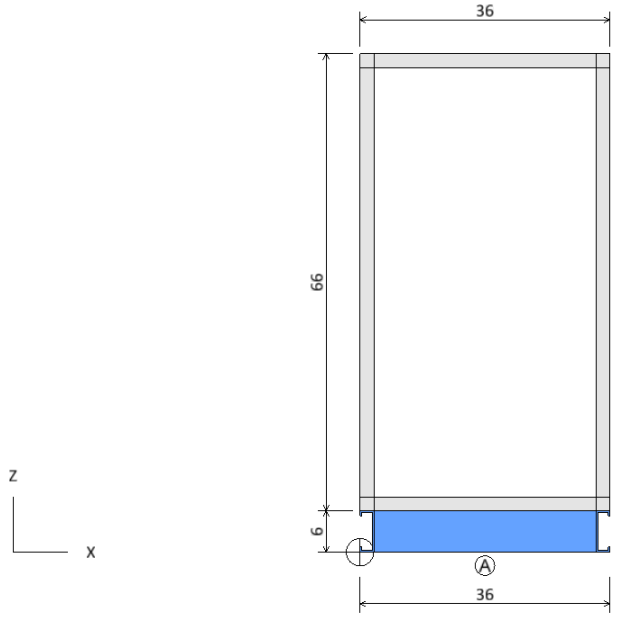
Drawing for AHU-ICE DX HOUSING



Drawing for AHU-ICE DX HOUSING



PLAN VIEW



ELEVATION VIEW

Component Key

	Type	X	Y	Z	Wid	Hgt
Ⓐ	Plenum Section Opening	0.00	2.00	8.00	50.00	62.00

Note: Dimensions are measured from the origin point.

Opening/Damper Connections	Unit Tag: AHU-ICE DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC017GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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Job Number: 07PDJD
Job Name: Sportsplex

Prepared Date: 3/16/2022

Drawing for AHU-ICE DX HOUSING

LEFT ELEVATION VIEW

RIGHT ELEVATION VIEW

Coil and Drain Connections

Note: Dimensions are measured from the origin point.

Coil and Drain Connections	Unit Tag: AHU-ICE DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC017GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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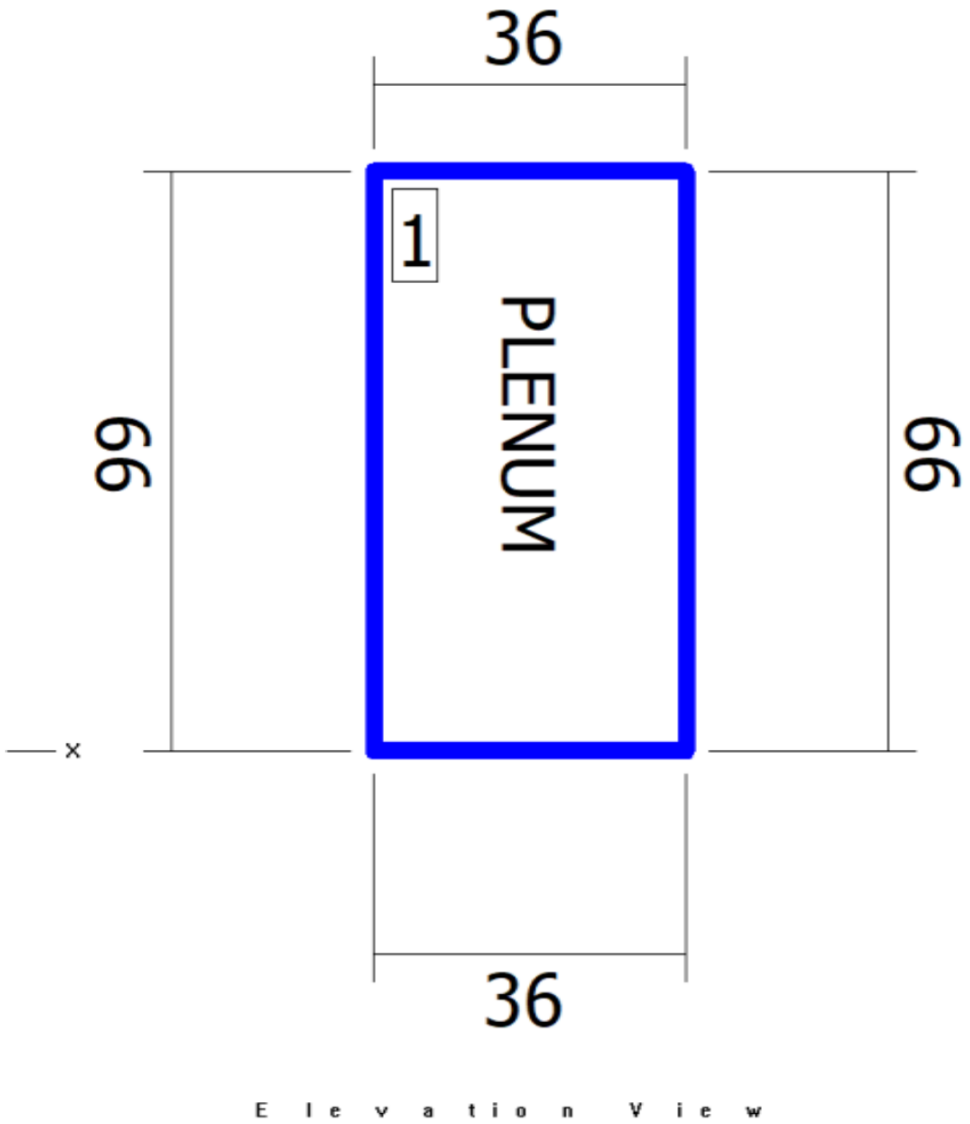
Drawing for AHU-ICE DX HOUSING



Shipping Sections

Section	Weight (lb)	X	Y	Z
Section 1	352.61	36	54	66

Note: Base rails, curb ready base, coil connectors, drain connectors, and control boxes not included in height X, Y, Z dimensions. Shipping section may be 2" longer in air flow direction due to internal splice joint.

Shipping Sections	Unit Tag: AHU-ICE DX HOUSING			Sales Office: Air Reps, LLC		
Product: Vision Air Handler	Project Name: Sportsplex			Sales Engineer:		
Model: CAC017GVAM	Mar. 16, 2022	Ver/Rev:	Sheet: 1 of 1	Scale: NTS	Tolerance: +/-0.25"	Dwg Units: in

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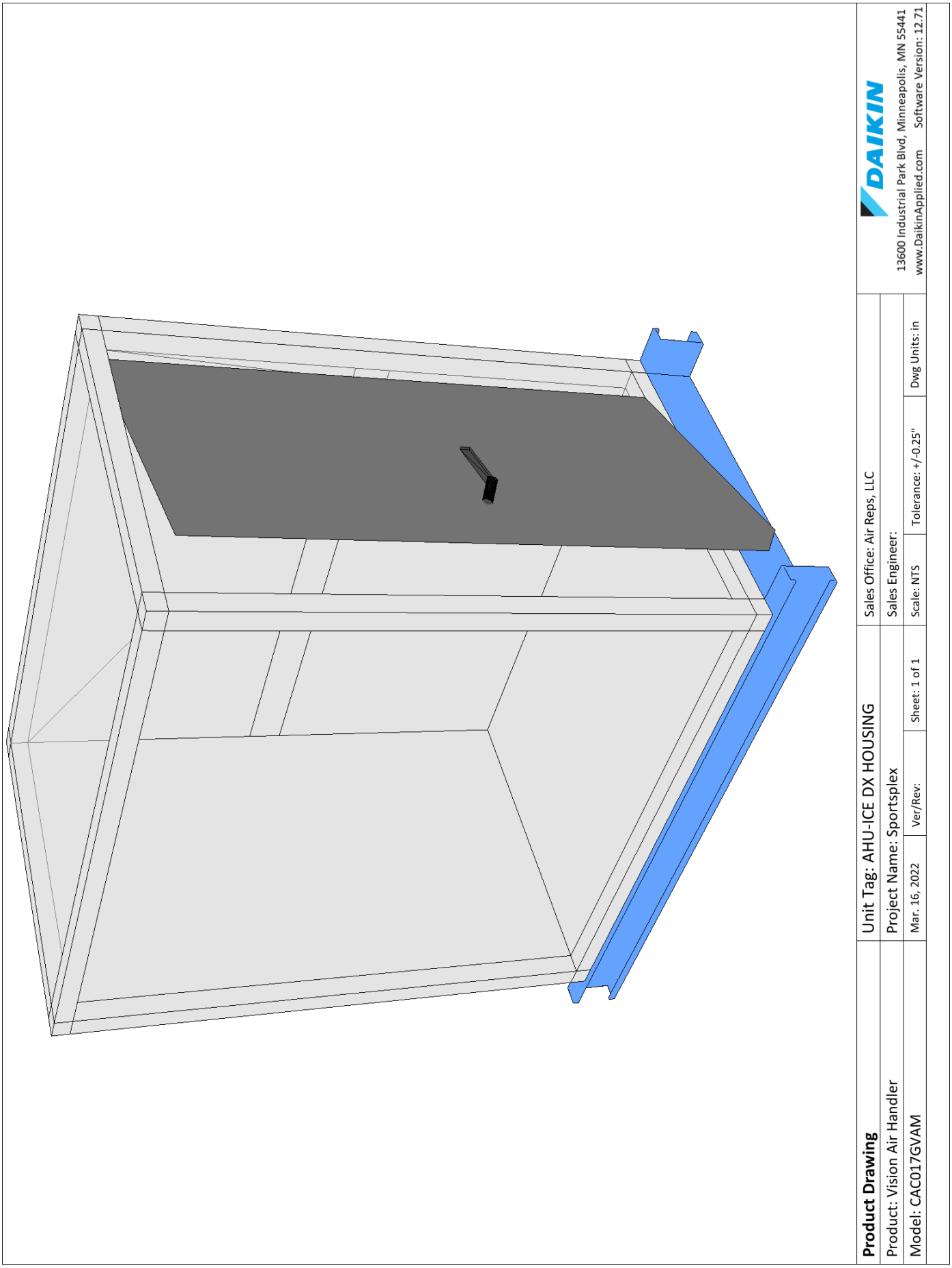
Drawing for AHU-ICE DX HOUSING



Document Summary Page

Customer Address Not Assigned

Heat Pump Coil Report

Customer Name		**Date**	3/16/2022, 11:15:49 AM
Contact		**Reference**	
Phone		**PreparedBy**	
Email		**Project**	Sportsplex Bellingham

Model Number: 38H61x53-13-3-W-Z-R

Tag: CU-Ice

Coil Data			**Per Coil**	**Total**
Bank Quantity:	1	Circuiting:	18/10/3/SE	
Fin Height (each coil):	61 In	Suction Conn. #xSize/Type/Header Mat:	3 x 1 1/8" Sweat Copper / Copper	
Fin Length (each coil):	53 In	Distributor Qty:	3	
Fins Per Inch:	13	Circuit Design:	Intertwined	
Rows:	3	Tubes Tall:	61	
Fin Material:	Aluminum 0.006/Waffle	Internal Volume: Coil+Hdr/Fin Pack	1228.02/1077.02 in³	1228.02/1077.02 in³
Tube Dia/Material:	3/8 Copper 0.016 (Smooth)	Coil Weight (bare):	176.56 lb	176.56 lb
Tube Surface:	Smooth	Coil Weight (crated):	447.62 lb	
Casing Material:	16 ga. Galvanized	**Cooling Total Capacity:**	**259,663 Btu/hr**	**259,663 Btu/hr**
Coating:	None	**Cooling Sensible Capacity:**	**198,335 Btu/hr**	**198,335 Btu/hr**
Refrigerant:	R410a	**Heating Total Capacity:**	**256,631 Btu/hr**	**256,631 Btu/hr**

Cooling Air Data

Face Velocity/Bank:	338.51 FPM	Air Flow @ Sea Level:	7600 SCFM	7600 SCFM
Entering Dry/Wet Bulb:	81.0 / 66.0 °F	**Leaving Dry/Wet Bulb:**	**57.0 / 54.7 °F**	
Air Side Fouling Factor:	0.0000 ft² °F h/Btu	**Air Pressure Drop:**	**0.16 inWG**	

Cooling Refrigerant Data

Suction Temp:	43 °F	**Refrigerant Pressure Drop:**	**7.03 PSIG**
Liquid Temp:	77 °F	Refrigerant Charge:	6.59 lb
Superheat:	9 °F	Refrigerant Mass Flow:	3196 lb/h
		Refrigerant Velocity (connection):	1473 FPM
		Refrigerant Velocity (tube):	1782 FPM

Heating Air Data

Face Velocity/Bank:	338.51 FPM	Air Flow @ Sea Level:	7600 SCFM	7600 SCFM
Entering Dry:	68.0 °F	**Leaving Dry:**	**98.9 °F**	
Air Side Fouling Factor:	0.0000 ft² °F h/Btu	**Air Pressure Drop:**	**0.1 inWG**	

Heating Refrigerant Data

Vapor Temp:	140 °F	**Refrigerant Pressure Drop:**	**2.42 PSIG**
Condensing Temp:	115 °F	Refrigerant Mass Flow:	3507 lb/h
Subcooling:	5.4 °F	Refrigerant Velocity (connection):	1571 FPM
		Refrigerant Velocity (tube):	588 FPM

AHRI Limit - Fin Height (61 in. [1549.4 mm]) is outside of the range of 12 in. thru 60 in. [304.8 mm thru 1524 mm].
Coil is outside of the scope of AHRI Standard 410.
All ratings assume a standard coil orientation with horizontal tubes and a vertical coil face with horizontal airflow.
User assumes responsibility for material compatibility and for reasonable operating conditions/parameters for the special fluid.

Version:6.27.2017.1

Customer Address Not Assigned

Heat Pump Coil Report

Customer Name		**Date**	3/16/2022, 11:17:23 AM
Contact		**Reference**	
Phone		**PreparedBy**	
Email		**Project**	Sportsplex Bellingham

Model Number: 38H35x60-16-3-W-Z-R

Tag: CU-Soccer Coil #1

Coil Data			**Per Coil**	**Total**
Bank Quantity:	1	Circuiting:	13/8/1/SE	
Fin Height (each coil):	35 In	Suction Conn. #xSize/Type/Header Mat:	2 x 1 3/8" Sweat Copper / Copper	
Fin Length (each coil):	60 In	Distributor Qty:	2	
Fins Per Inch:	16	Circuit Design:	Intertwined	
Rows:	3	Tubes Tall:	35	
Fin Material:	Aluminum 0.006/Waffle	Internal Volume: Coil+Hdr/Fin Pack	781.17/693.19 in³	781.17/693.19 in³
Tube Dia/Material:	3/8 Copper 0.016 (Smooth)	Coil Weight (bare):	132.67 lb	132.67 lb
Tube Surface:	Smooth	Coil Weight (crated):	336.7 lb	
Casing Material:	16 ga. Galvanized	**Cooling Total Capacity:**	**203,757 Btu/hr**	**203,757 Btu/hr**
Coating:	None	**Cooling Sensible Capacity:**	**156,919 Btu/hr**	**156,919 Btu/hr**
Refrigerant:	R410a	**Heating Total Capacity:**	**201,233 Btu/hr**	**201,233 Btu/hr**

Cooling Air Data

Face Velocity/Bank:	397.71 FPM	Air Flow @ Sea Level:	5800 SCFM	5800 SCFM
Entering Dry/Wet Bulb:	81.0 / 66.0 °F	**Leaving Dry/Wet Bulb:**	**56.2 / 54.3 °F**	
Air Side Fouling Factor:	0.0000 ft² °F h/Btu	**Air Pressure Drop:**	**0.24 inWG**	

Cooling Refrigerant Data

Suction Temp:	43 °F	**Refrigerant Pressure Drop:**	**7.22 PSIG**
Liquid Temp:	77 °F	Refrigerant Charge:	4.21 lb
Superheat:	9 °F	Refrigerant Mass Flow:	2508 lb/h
		Refrigerant Velocity (connection):	1597 FPM
		Refrigerant Velocity (tube):	1942 FPM

Heating Air Data

Face Velocity/Bank:	397.71 FPM	Air Flow @ Sea Level:	5800 SCFM	5800 SCFM
Entering Dry:	68.0 °F	**Leaving Dry:**	**99.7 °F**	
Air Side Fouling Factor:	0.0000 ft² °F h/Btu	**Air Pressure Drop:**	**0.16 inWG**	

Heating Refrigerant Data

Vapor Temp:	140 °F	**Refrigerant Pressure Drop:**	**2.48 PSIG**
Condensing Temp:	115 °F	Refrigerant Mass Flow:	2750 lb/h
Subcooling:	5.4 °F	Refrigerant Velocity (connection):	2100 FPM
		Refrigerant Velocity (tube):	639 FPM

AHRI Limit - Fins per inch (16 FPI) is outside of the range of 6 thru 14.
Coil is outside of the scope of AHRI Standard 410.
All ratings assume a standard coil orientation with horizontal tubes and a vertical coil face with horizontal airflow.
User assumes responsibility for material compatibility and for reasonable operating conditions/parameters for the special fluid.

Version:6.27.2017.1

VRV Selection

Project Report

Report details

Produced on: 3/16/2022

Application version: 2022.3.14.2

Project details

Project name: Sportsplex

Solution name: Unnamed solution (1)

Client Name:

Customer reference:

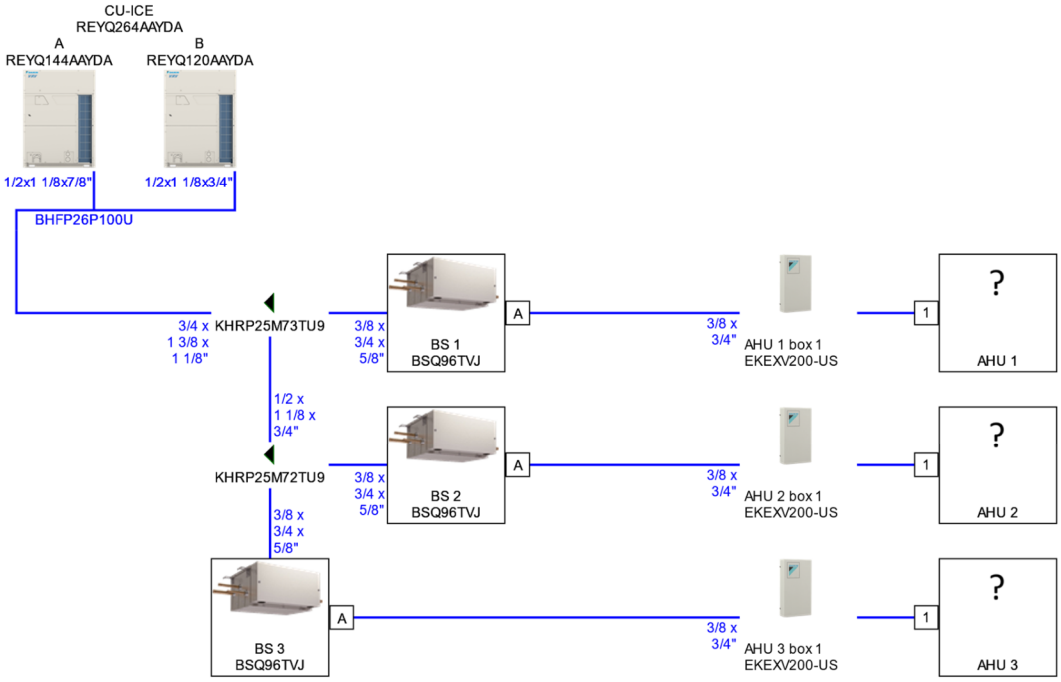
Quotation reference:

Project number: 526432/643857

Selection parameters of the indoor units can be found in the Engineering Data Books
Selection parameters of the outdoor units can be found in the Engineering Data Books
Only the data published in the data book are correct. This program uses close approximations of these data.

Piping diagrams

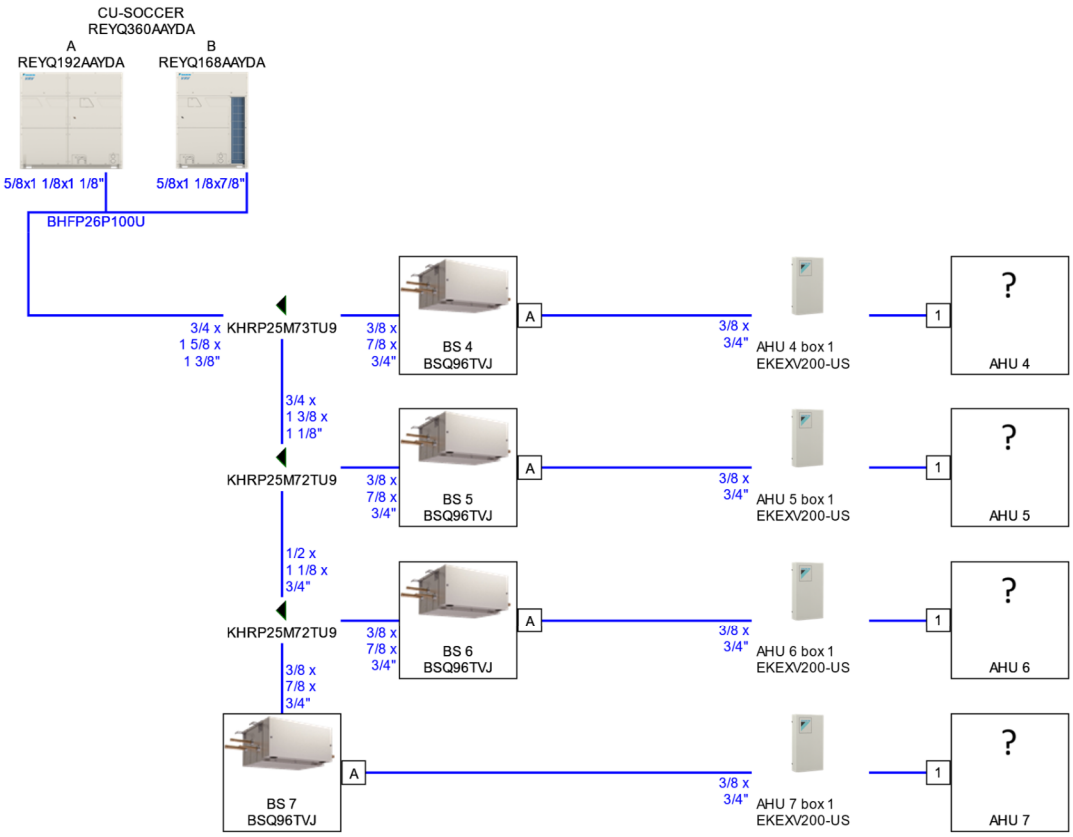
Piping CU-ICE



Piping

Warning: The pipe diameter values are purely indicative. Depending on the required pipe lengths, a different pipe diameter might be required.

Piping CU-SOCCER

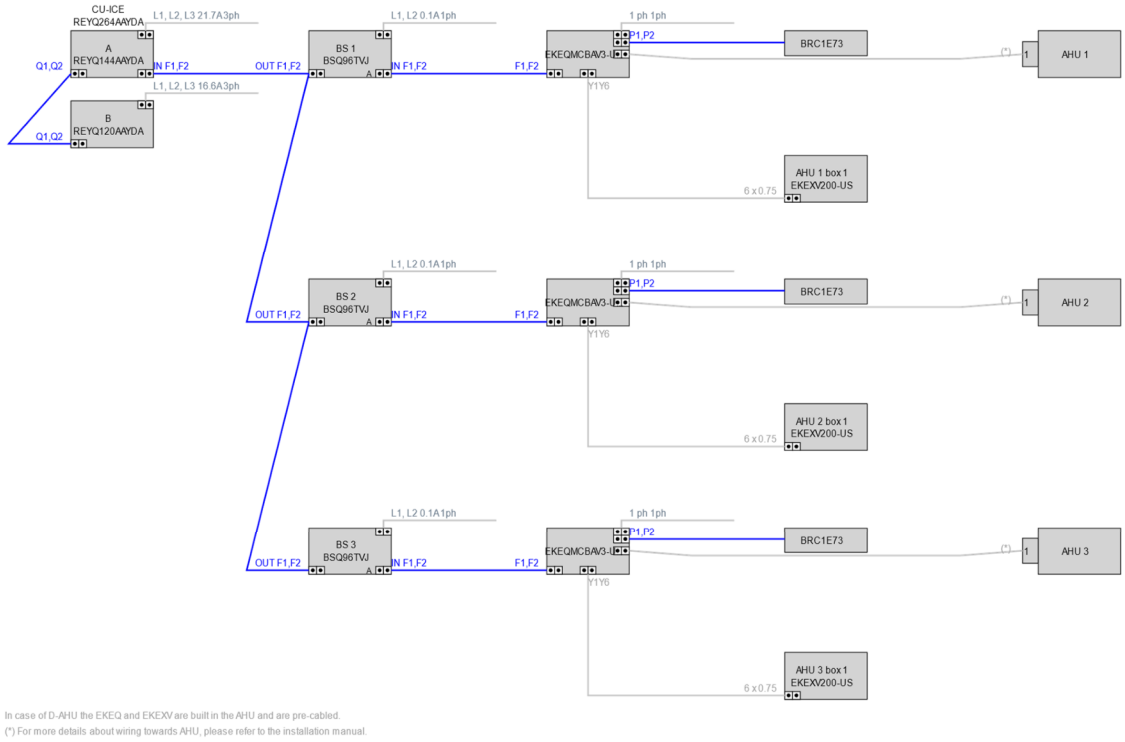


Piping

Warning: The pipe diameter values are purely indicative. Depending on the required pipe lengths, a different pipe diameter might be required.

Wiring diagrams

Wiring CU-ICE



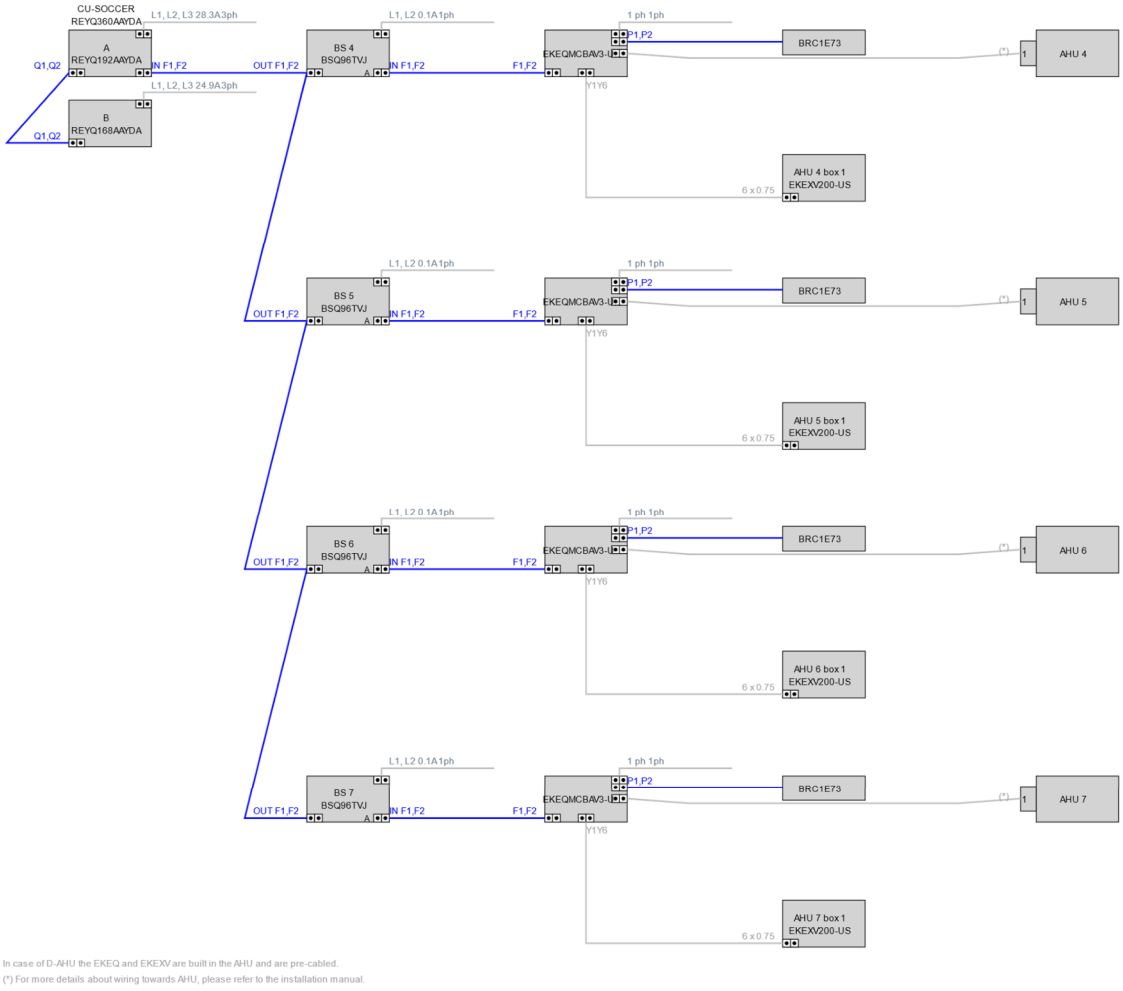
Remarks

P1P2 = AWG 18-2 is required - however always refer to local code for further information.

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

Wiring CU-SOCCER



Remarks

P1P2 = AWG 18-2 is required - however always refer to local code for further information.

F1F2 IN/OUT = AWG 18-2 is required - however always refer to local code for further information

Note:

SPORTSPLEX BELLINGHAM

Revision #: 1

Created Date: 2022-03-08

Revised Date: 2022-03-09

Company Name: Air Reps Washington

Contact Name: Ryan Brown

Performance

Unit Tag: ERV-1

Summary

Unit Details

Unit Tag:	ERV-1	Orientation:	Vertical
Model:	C70IN-BP - (5500 - 8100 CFM)	ESP SA / RA (inH2O):	1 / 1
Qty:	2	Filters OA / RA:	2" 85% MERV-13 / 2" 30% MERV-8
Location:	Indoor	Controls Preference:	Constant Volume
Altitude (ft):	138	Dampers & Actuator:	No Casing - Field Mounted and Wired
Bypass:	Yes		

Electrical Requirements

Total Number of Connections Required: 2

Unit	
Voltage:	460V/3ph/60Hz
Range:	380 - 480V
FLA:	34.94
MCA:	39.29
RFS:	50A

Heating Electric Heater	
Std. Coil:	1
Controls:	SCR
Voltage:	460V/3ph/60Hz
Range:	414.0 - 483.0V
FLA:	47.88
MCA:	60
RFS:	60A
Max KW:	38

Heat Exchanger

Design Condtions	Outdoor Air	Return Air
SCFM:	7150	7150
Summer DB (F) / WB (F) / RH (%):	82.2 / 66 / 42.6	75 / 63 / 51.2
Winter DB (F) / WB (F) / RH (%):	20.7 / 20.6 / 98.5	70 / 52.9 / 30

Performance Leaving Air	Supply Air	Exhaust Air
SCFM:	7150	7150
Summer DB (F) / WB (F) / RH (%):	77.5 / 64.2 / 48.7	79.7 / 64.9 / 45
Winter DB (F) / WB (F) / RH (%):	53 / 42.4 / 38.9	37.7 / 34.7 / 74.5

Performance	Summer	Winter
Supply Air PD (inH2O):	0.85	0.85
Exhaust Air PD (inH2O):	1.6	1.6
Sensible Effectiveness %:	65.6	65.6
Latent Effectiveness %:	45.3	45.3
Total Effectiveness %:	61.4	61.9
EATR %:	0.5	0.5
OACF:	1.00	1.00
Net Supply Airflow (SCFM):	7150	7150
Energy Recover Ratio %:	61.4	61.77
BTU/H Saved	43776	289363

Summer performance: Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Winter performance: Application rating is outside the scope of the AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.

Heating Electric Heater

Electric Heater	
Outdoor Air (CFM):	7150
Voltage:	460V/3ph/60Hz
kW:	27.1
Entering Temp (F):	53
Leaving Temp (F):	65
Installation:	In Casing – Field Mounted and Wired

*Separate electrical connection required for heater

Supply Fan

Fan

Model:	GR35C-ZID.DG.CR

Nominal values for single fan

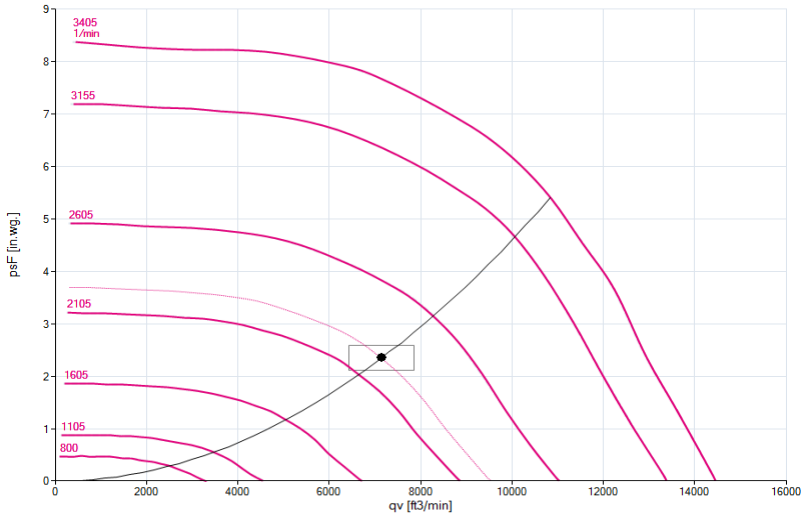
Power Input (KW):	3.70
FLA (A):	5.80

Operating point for three fans

Power Input (KW):	3.23
Current (A):	4.42
RPM:	2264
SFP (W/CFM):	0.45

Filter Pressure Drop:

Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.50
Dirty filter (in w.g.):	1.00



Exhaust Fan

Fan

Model:	GR35C-ZID.DG.CR

Nominal values for single fan

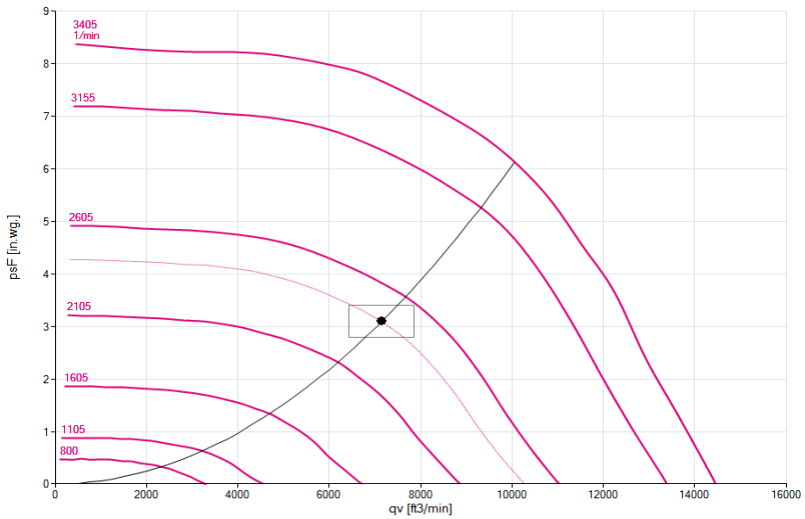
Power Input (KW):	3.70
FLA (A):	5.80

Operating point for three fans

Power Input (KW):	4.11
Current (A):	5.52
RPM:	2431
SFP (W/CFM):	0.57

Filter Pressure Drop:

Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.14
Dirty filter (in w.g.):	1.00



Unit Sound Data

	63	125	250	500	1000	2000	4000	8000	dB (A)
Unit Radiated	76	77	78	71	67	65	57	52	74
Supply Fan Lw: 7150 CFM	81	78	88	85	87	83	77	74	90
Exhaust Fan Lw: 7150 CFM	82	78	89	86	88	84	78	75	91

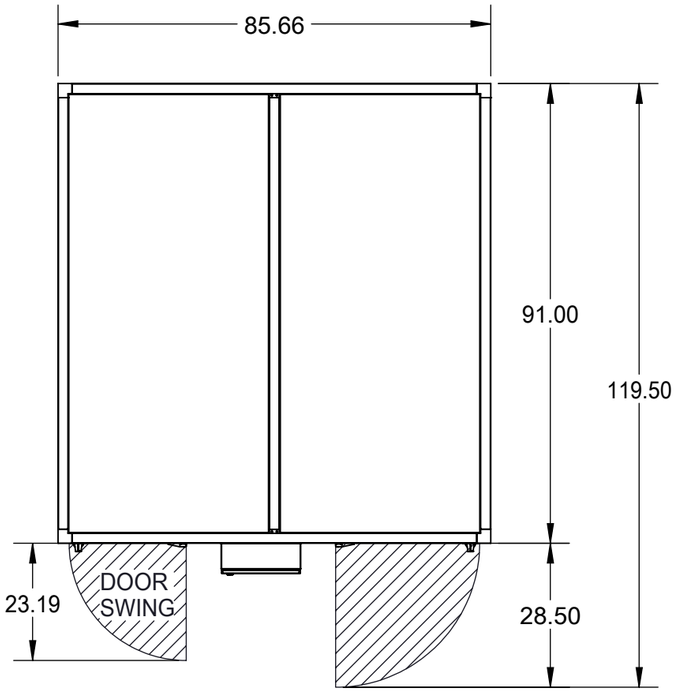
NOMENCLATURE:

SA - SUPPLY AIR
RA - RETURN AIR
OA - OUTDOOR AIR
EA - EXHAUST AIR

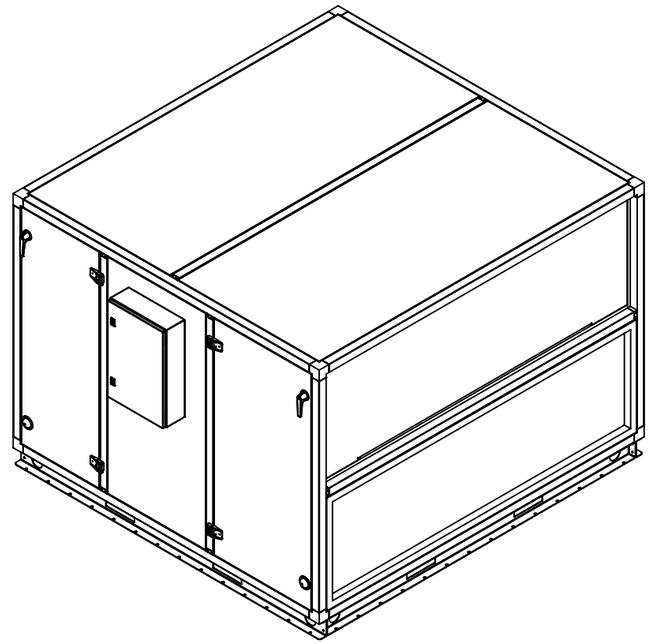
NOTES:

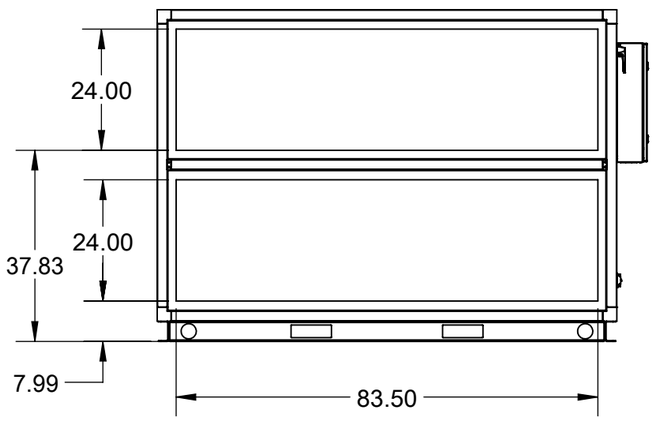
36" OF CLEARANCE MUST BE MAINTAINED PERPENDICULAR TO THE ELECTRICAL BOX AS PER THE NATIONAL ELECTRIC CODE (NEC).

OVERALL UNIT DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

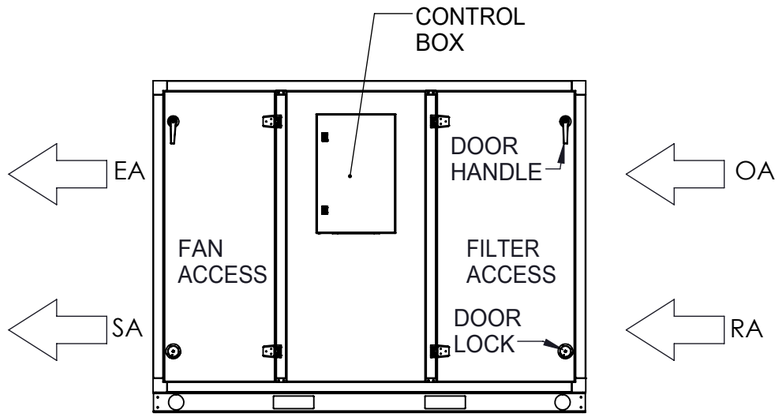


TOP VIEW

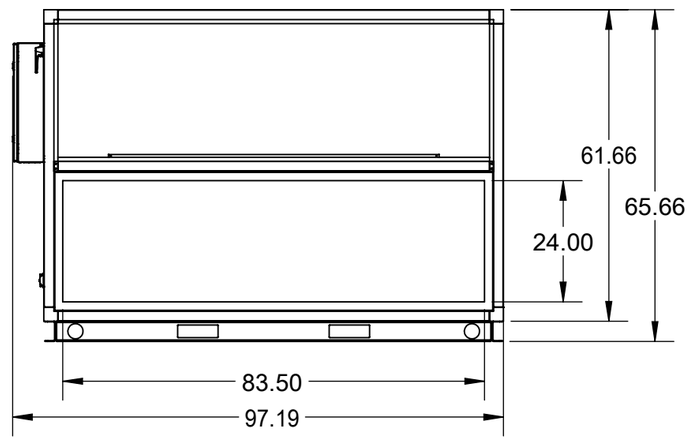




LEFT VIEW



FRONT VIEW



RIGHT VIEW

ALL DIMENSIONS ARE IN INCHES

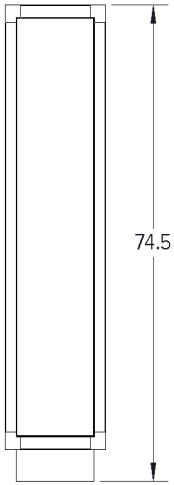
UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND BREAK ALL SHARP EDGES

OXYGEN 8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

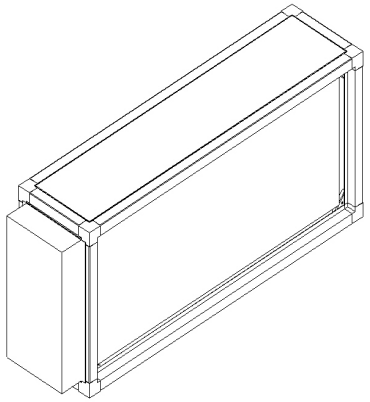
ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:30
Description: NOVA C70 ERV Bypass LH Vertical S2 01_02_3B_04			
Drawing №: NOVA_C70_ERV_B_I_L_V_S2_NP_01_02_3B_04		Weight: 2000 Lbs	
Drawn By: B. K.	Drawn Date: 2021-10-13	Installation: Floor Mounted	
Appd By: M. D.	Appd Date: 2021-10-13		Sheet 1 of 1

NOTES:

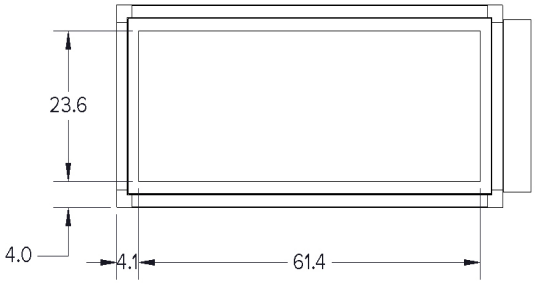
OVERALL UNIT DIMENSIONS ARE SUBJECT
TO CHANGE WITHOUT NOTICE.



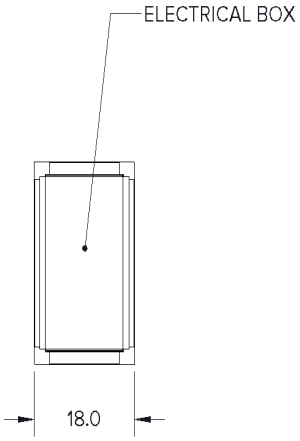
TOP VIEW



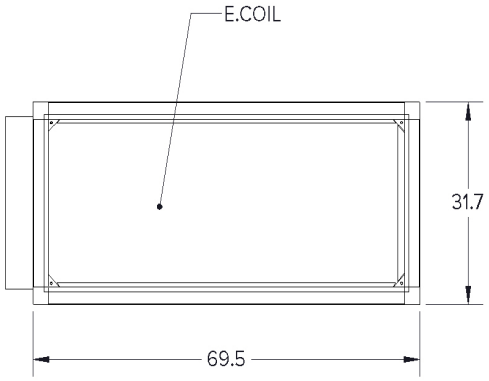
ISO VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW

ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:22
Description: ACCESSORY NOVA C70 INDOOR COUPLED VERTICAL LH 4603_38			
Drawing №: ACC_NOVA_C70_I_PV_L_EC_4603_38		Weight: 258 Lbs	
Drawn By: B. K.	Drawn Date: 2021-09-07	Application: FLOOR MOUNTED	
Appd By: M. D.	Appd Date: 2021-09-10		Sheet 1 of 1

ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND
BREAK ALL SHARP EDGES

OXYGEN 8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

Performance

Unit Tag: ERV-2

Summary

Unit Details

Unit Tag:	ERV-2	Orientation:	Vertical
Model:	C48IN-BP - (3500 - 5400 CFM)	ESP SA / RA (inH2O):	1 / 1
Qty:	2	Filters OA / RA:	2" 85% MERV-13 / 2" 30% MERV-8
Location:	Indoor	Controls Preference:	Constant Volume
Altitude (ft):	138	Dampers & Actuator:	No Casing - Field Mounted and Wired
Bypass:	Yes		

Electrical Requirements

Total Number of Connections Required: 2

Unit	
Voltage:	460V/3ph/60Hz
Range:	380 - 480V
FLA:	23.34
MCA:	26.24
RFS:	35A

Heating Electric Heater	
Std. Coil:	1
Controls:	SCR
Voltage:	460V/3ph/60Hz
Range:	414.0 - 483.0V
FLA:	32.76
MCA:	41
RFS:	50A
Max KW:	26

Heat Exchanger

Design Condtions	Outdoor Air	Return Air
SCFM:	5000	5000
Summer DB (F) / WB (F) / RH (%):	82.2 / 66 / 42.6	75 / 63 / 51.2
Winter DB (F) / WB (F) / RH (%):	20.7 / 20.6 / 98.5	70 / 52.9 / 30

Performance Leaving Air	Supply Air	Exhaust Air
SCFM:	5000	5000
Summer DB (F) / WB (F) / RH (%):	77.5 / 64.2 / 48.6	79.7 / 64.8 / 45.1
Winter DB (F) / WB (F) / RH (%):	52.7 / 42.2 / 39.1	38 / 34.9 / 74

Performance	Summer	Winter
Supply Air PD (inH2O):	0.91	0.91
Exhaust Air PD (inH2O):	1.7	1.7
Sensible Effectiveness %:	65.0	65.0
Latent Effectiveness %:	44.5	44.5
Total Effectiveness %:	60.8	61.3
EATR %:	0.5	0.5
OACF:	1.00	1.00
Net Supply Airflow (SCFM):	5000	5000
Energy Recover Ratio %:	60.77	61.14
BTU/H Saved	30296	200291

Summer performance: Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Winter performance: Application rating is outside the scope of the AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.

Heating Electric Heater

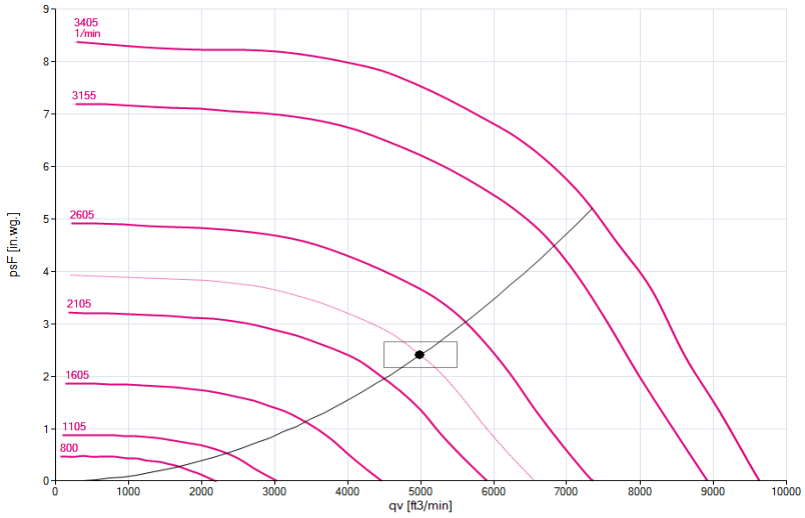
Electric Heater	
Outdoor Air (CFM):	5000
Voltage:	460V/3ph/60Hz
kW:	19.4
Entering Temp (F):	52.7
Leaving Temp (F):	65
Installation:	In Casing – Field Mounted and Wired

*Separate electrical connection required for heater

Supply Fan

Fan

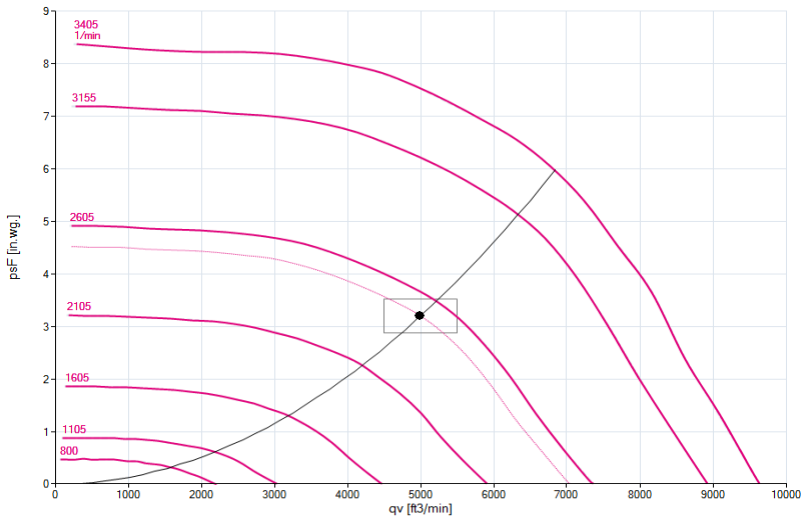
Model:	GR35C-ZID.DG.CR
Nominal values for single fan	
Power Input (KW):	3.70
FLA (A):	5.80
Operating point for two fans	
Power Input (KW):	2.33
Current (A):	3.16
RPM:	2333
SFP (W/CFM):	0.47
Filter Pressure Drop:	
Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.50
Dirty filter (in w.g.):	1.00



Exhaust Fan

Fan

Model:	GR35C-ZID.DG.CR
Nominal values for single fan	
Power Input (KW):	3.70
FLA (A):	5.80
Operating point for two fans	
Power Input (KW):	2.97
Current (A):	3.97
RPM:	2502
SFP (W/CFM):	0.59
Filter Pressure Drop:	
Included in TSP and fan curve (in w.g.):	0.50
Clean filter (in w.g.):	0.14
Dirty filter (in w.g.):	1.00



Unit Sound Data

	63	125	250	500	1000	2000	4000	8000	dB (A)
Unit Radiated	75	75	76	69	65	63	55	50	72
Supply Fan Lw: 5000 CFM	78	75	84	82	84	80	74	71	87
Exhaust Fan Lw: 5000 CFM	79	75	85	82	85	81	75	72	88

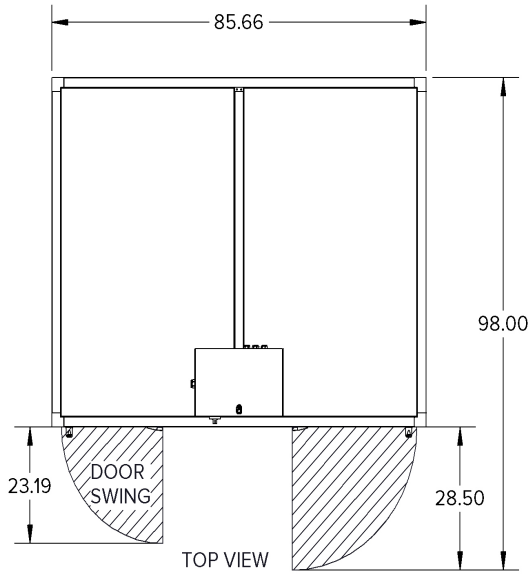
NOMENCLATURE:

SA - SUPPLY AIR
RA - RETURN AIR
OA - OUTDOOR AIR
EA - EXHAUST AIR

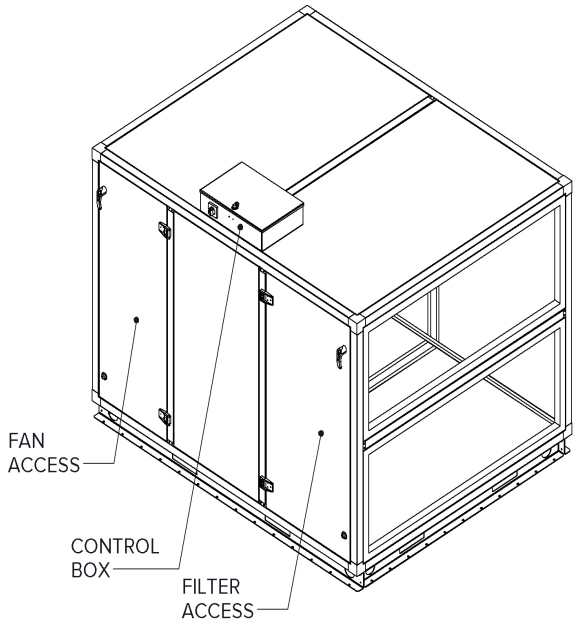
NOTES:

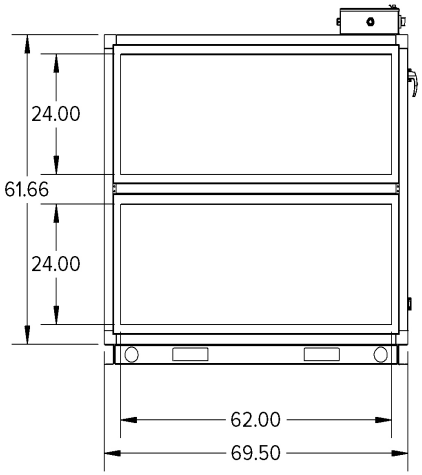
36" OF CLEARANCE MUST BE MAINTAINED PERPENDICULAR TO THE ELECTRICAL BOX AS PER THE NATIONAL ELECTRIC CODE (NEC).

OVERALL UNIT DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

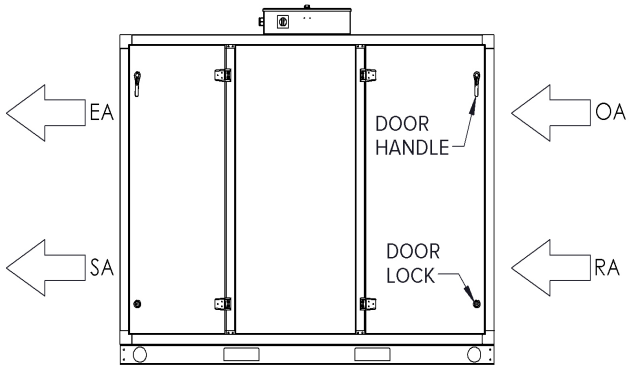


TOP VIEW

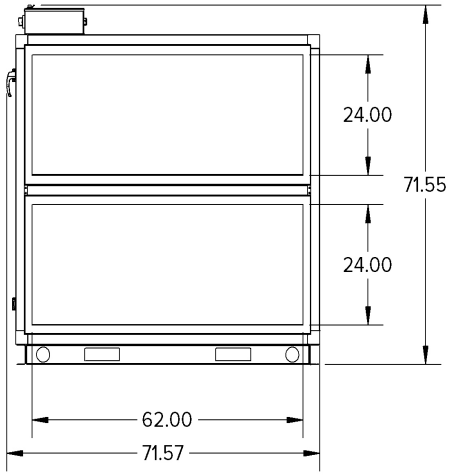




LEFT VIEW



FRONT VIEW



RIGHT VIEW

ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:28
Description: NOVA C48 ERV BYPASS LH VERTICAL S2 ND 01_02_03_04			
Drawing №: NOVA_C48_ERV_B_I_L_V_S2_ND_01_02_03_04		Weight: 1425.50 Lbs	
Drawn By: B. K.	Drawn Date: 2021-06-29	Installation: Floor Mounted	
Appd By: M. D.	Appd Date: 2021-06-29		Sheet 1 of 1

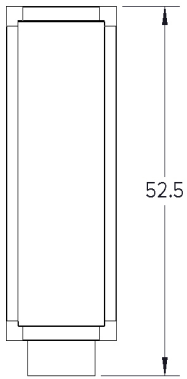
ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND BREAK ALL SHARP EDGES

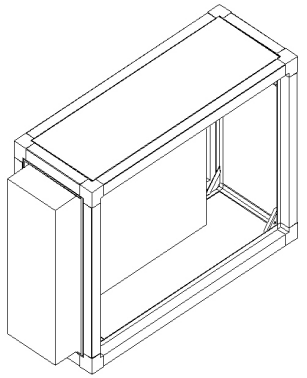
OXYGEN8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

NOTES:

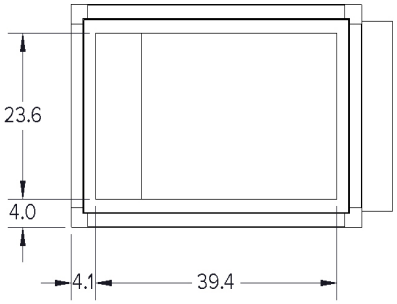
OVERALL UNIT DIMENSIONS ARE SUBJECT
TO CHANGE WITHOUT NOTICE.



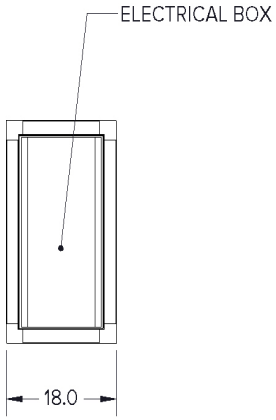
TOP VIEW



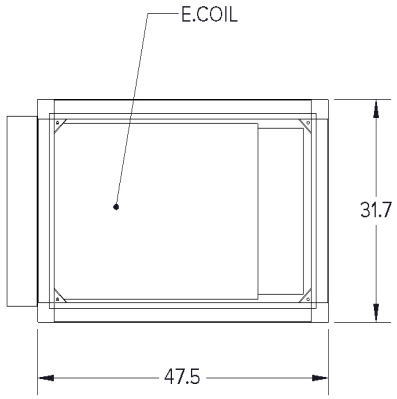
ISO VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW

ASSEMBLY DRAWING	Rev: A	Size: B	Scale: 1:20
Description: ACCESSORY NOVA C48 INDOOR COUPLED VERTICAL LH 4603_26			
Drawing №: ACC_NOVA_C48_I_CV_L_EC_4603_26		Weight: 160 Lbs	
Drawn By: B. K.	Drawn Date: 2021-09-07	Application: FLOOR MOUNTED	
Appd By: M. D.	Appd Date: 2021-09-10		Sheet 1 of 1

ALL DIMENSIONS ARE IN INCHES

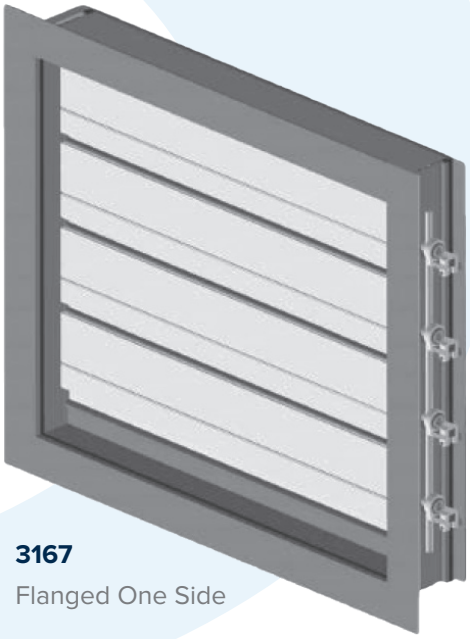
UNLESS OTHERWISE SPECIFIED
.0 ± 0.1
.00 ± 0.03
.000 ± 0.010
FINISH 125 µin
REMOVE ALL BURRS AND
BREAK ALL SHARP EDGES

OXYGEN 8
300-638 Smithe Street, Vancouver, British Columbia, V6B 1E3, Canada

Airfoil Blade Control Dampers

Model: 3167

OXYGEN8



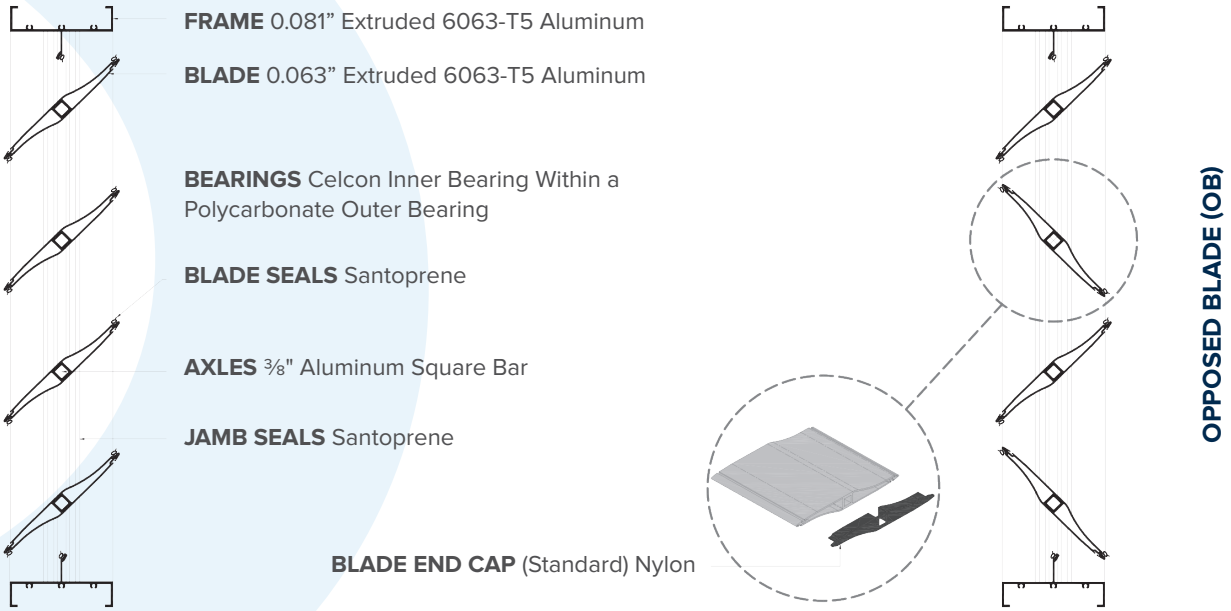
3167
Flanged One Side

STANDARD CONSTRUCTION

Depth	4” (101 mm) - 3167
Depth with Blades Open	6.125” (156 mm)
Minimum Height	8” (203 mm) - Single Blade 15” (381 mm) - Multiple Blade
Maximum Panel Width	48” (1219 mm)
Maximum Panel Height	60” (1524 mm)
Maximum Panel Size	20 sq. ft.
Maximum System Pressure	See chart on page 2.
Operating Temperature Range	-40° to +180°F
Standard Finish	Mill
Standard Motor Installation	6” Side Shaft Direct Drive
Linkage	Outside of Frame
Blade End Cap	Nylon

AVAILABLE ACCESSORIES

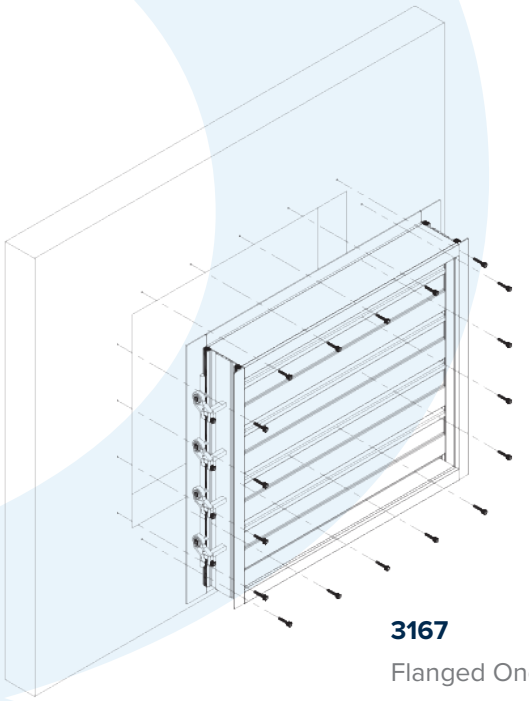
Factory supplied actuators
End switch for signaling peripheral devices
Jack shaft
Hand quadrants
Chain operation for manual operation spring closed
Silicone blade and jamb seals
4” blade construction



Oxygen8 Solutions Inc.
300-638 Smithe St., Vancouver, BC V6B 1E3

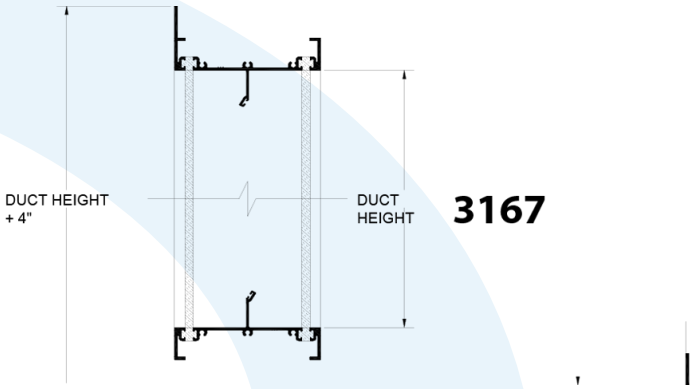
Airfoil Blade Control Dampers

Model: 3167



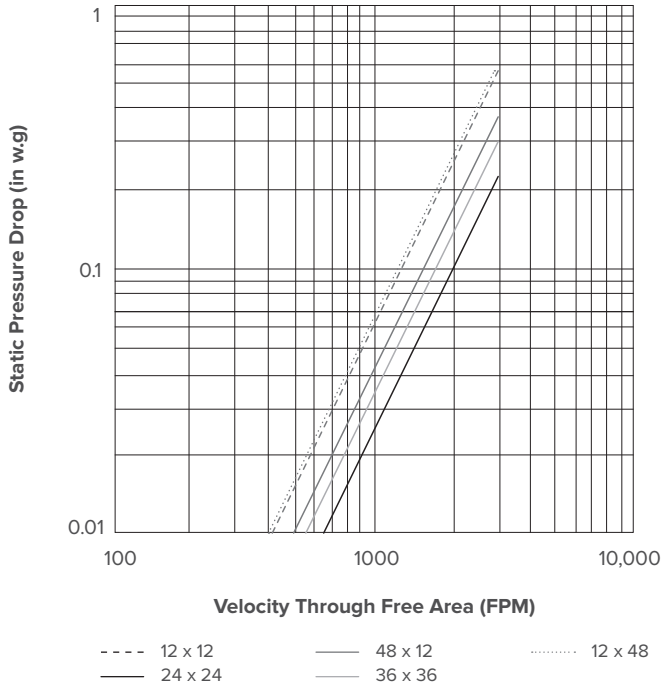
3167

Flanged One Side

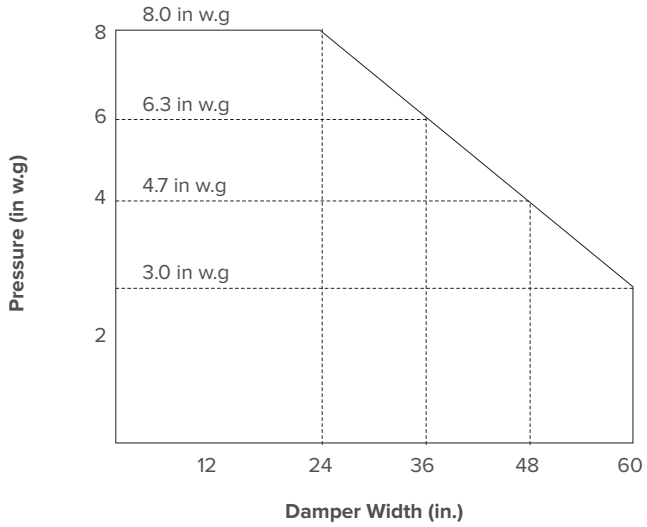


Clearance = ¼" Overall for Single Panel Construction
Clearance = ½" Overall for Multiple Panel Construction

PRESSURE DROP



PRESSURE LIMITATIONS



RECOMMENDED SPECIFICATION

Furnish and install control damper models 3167 as manufactured by Alumavent, Bolton Ontario. Dampers shall be 4” (101 mm) deep. Blades shall be 0.063” (1.60 mm) thick, hollow airfoil shape. Frames shall be 0.081” (2.06 mm) thick. Axles shall be 0.375” (9.53 mm) thick, Aluminum square bar. Blade and Jamb seals shall be Santoprene. Linkage is concealed outside of frame for model 3167. Air leakage through a 48”x ” damper shall not exceed 8 CFM/ ft2 (40.6 L/s/m2) against 4” w.g (1 kPa) static pressure at standard air. Operating temperature range shall be -40° to +180°F.

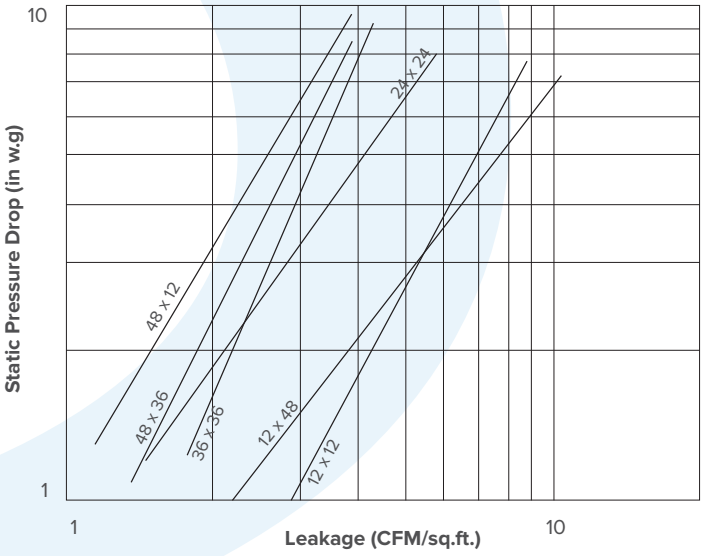
Oxygen8 Solutions Inc.
300-638 Smithe St., Vancouver, BC V6B 1E3

Airfoil Blade Control Dampers

Model: 3167

OXYGEN8

LEAKAGE



Leakage test was conducted in accordance with AMCA Standard 500-D-98. Holding torque applied was 6 in - lbs/sq.ft on parallel blade dampers. Air leakage is based on operation between 0°C - 49°C (32°F - 120°F).

DAMPER LEAKAGE RATING

Damper Size	Pressure in w.g (kPa)		
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)
12" x 12" (305 x 305 mm)	1A	1	1
24" x 24" (610 x 610 mm)	1A	1	1
36" x 36" (914 x 914 mm)	1A	1	1
12" x 48" (305 x 1219 mm)	1A	1	1
48" x 12" (1219 x 305 mm)	1A	1	1
48" x 36" (1219 x 914 mm)	1A	1	1

DEFINITION OF LEAKAGE CLASSIFICATION

Class	Leakage $ft^2/min/ft^2$ ($L/s/m^2$)		
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)
1A	3 (15.2)	N/A	N/A
1	4 (20.3)	8 (40.6)	14 (71.1)
2	10 (50.8)	20 (102)	35 (178)
3	40 (203)	80 (406)	140 (711)

Oxygen8 Solutions Inc.
300-638 Smithe St., Vancouver, BC V6B 1E3

Rotary actuator fail-safe for adjusting dampers in technical building installations

- **Air damper size up to approx. 0.5 m²**
- **Torque motor 2.5 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control Open/close**

Technical data

Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	2.5 W
	Power consumption in rest position	1.5 W
	Power consumption for wire sizing	5 VA
	Connection supply / control	Cable 1 m, 2 x 0.75 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	2.5 Nm
	Torque fail-safe	2.5 Nm
	Direction of motion motor	selectable by mounting L/R
	Direction of motion fail-safe	selectable by mounting L/R
	Manual override	No
	Angle of rotation	Max. 95°
	Angle of rotation note	adjustable starting at 37% in 2.5% steps (with mechanical end stop)
	Running time motor	75 s / 90°
	Running time fail-safe	<25 s / 90°
	Sound power level, motor	50 dB(A)
	Mechanical interface	Universal shaft clamp 6...12.7 mm
	Position indication	Mechanical
	Service life	Min. 60'000 fail-safe positions
Safety	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Degree of protection IEC/EN	IP42
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1.AA
	Overvoltage category	III
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Storage temperature	-40...80°C
	Ambient humidity	Max. 95% r.H., non-condensing
	Servicing	maintenance-free
Weight	Weight	1.5 kg

Safety notes

- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Outdoor application: only possible in case that no (sea) water, snow, ice, insolation or aggressive gases interfere directly with the actuator and that is ensured that the ambient conditions remain at any time within the thresholds according to the data sheet.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- Cables must not be removed from the device.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Mode of operation
The actuator moves the damper to the operating position at the same time as tensioning the return spring. The damper is turned back to the safety position by spring energy when the supply voltage is interrupted.

Simple direct mounting
Simple direct mounting on the damper shaft with a universal shaft clamp, supplied with an anti-rotation device to prevent the actuator from rotating.

Adjustable angle of rotation
Adjustable angle of rotation with mechanical end stops.

High functional reliability
The actuator is overload protected and automatically stops when the end stop is reached.

Accessories

Mechanical accessories

Description	Type
Actuator arm	AH-TF
Shaft extension 170 mm Ø10 mm for damper shaft Ø 6...16 mm	AV6-20
Ball joint suitable for damper crank arm KH8 / KH10	KG10A
Ball joint suitable for damper crank arm KH8	KG8
Damper crank arm Slot width 8.2 mm, clamping range Ø10...18 mm	KH8
Screw fastening kit	SB-TF
Angle of rotation limiter, with end stop	ZDB-TF
Form fit adapter 8x8 mm	ZF8-TF
Mounting kit for linkage operation for flat and side installation	ZG-TF1
Anti-rotation mechanism 180 mm, Multipack 20 pcs.	Z-ARS180

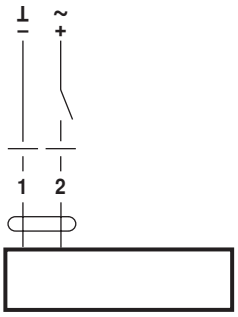
Electrical installation

Notes
- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.

Electrical installation

Wiring diagrams

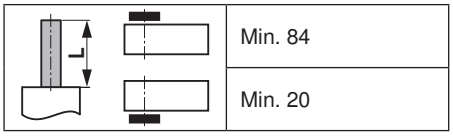
AC/DC 24 V, open/close



Cable colours:
1 = black
2 = red

Dimensions [mm]

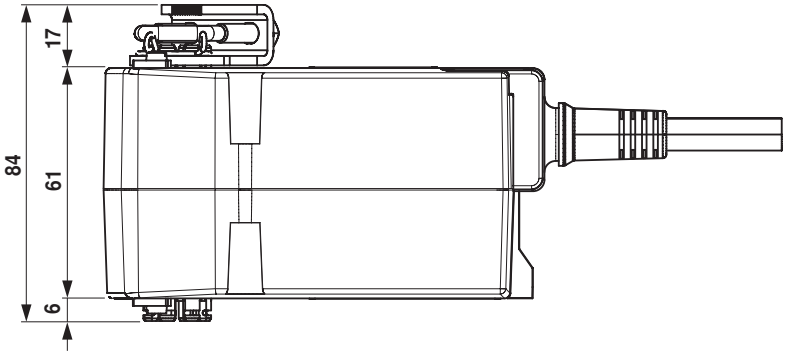
Spindle length

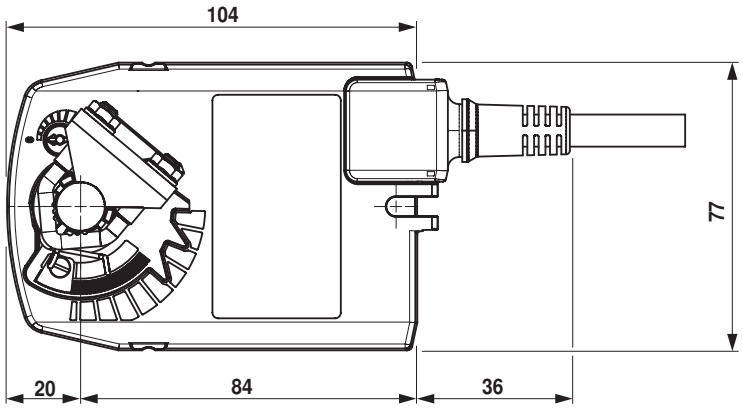


Clamping range

6...12.7	6...12.7

Dimensional drawings

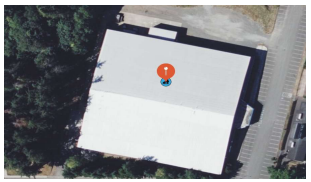




Appendix F – Cost Estimate

Civic Sportsplex Improvements, Bellingham, WA- *Budgetary Cost Estimate*

This is Opinion of Probable Cost

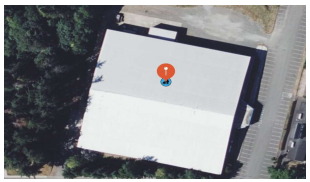


DATE:	April 12, 2022
A/ E:	**Coffman Engineers/ RMC Architects**
ESTIMATE:	Design/ Development Estimate
BY:	Coffman Engineers, Rory Woolsey
PROJECT:	**Civic Sportsplex improvements; envelope, mechanical and electrical improvements. Floor Area = 77,100 SF.**

Item #	Work Breakdown		Cost Totals	% of Total Cost
1.0	General Requirements		$145,635	*3.1%*
2.0	Building Envelope Clean & Repair Improvements		$50,960	*1.1%*
3.0	Roof Replacement		$1,392,990	*29.9%*
4.0	Mechanical Improvements- ***Base Option***		$1,391,593	*29.9%*
5.0	Electrical Improvements- ***Base Option***		$462,700	*9.9%*
6.0	Fire Alarm Improvements		$31,870	*0.7%*
7.0	**Subtotal**		**$3,475,747**	***74.6%***
	Estimate Contingency	15%	$521,362	
8.0	**Subtotal w/ Contingency**		**$3,997,110**	***85.8%***
	Contractor Performance and Payment Bond	1.5%	$59,957	
	General Contractor Overhead and Profit	15%	$599,566	
9.0	**TOTAL Year 2022 Estimated Cost,** *No Sales Taxes*		**$4,656,633**	***Current $***
10.0	**TOTAL Year 2024 Estimated Cost,** *No Sales Taxes*	27%	**$5,913,923**	***Mid 2024 $***
Alternate #1	R3 Roof Assembly, TPO Membrane Over New Metal Deck		$(450,000)	***Deduct from TOTAL in Current $***
Alternate #2	R4 Roof Assembly, TPO Membrane Over Existing Metal Decl		$(730,000)	***Deduct from TOTAL in Current $***
Permits	Allow for Building Permit		$120,000	***Add to TOTAL in Current $***
AE Design	Allow for AE Design Fees		$400,000	***Add to TOTAL in Current $***
VE Mechanical	Mechanical/ Electrical Improvements- with ***VE Configuration***		$(696,500)	***Deduct from TOTAL in Current $***

Civic Sportsplex Improvements, Bellingham, WA- *Budgetary Cost Estimate*

This is Opinion of Probable Cost



DATE:	April 12, 2022
A/ E:	**Coffman Engineers/ RMC Architects**
ESTIMATE:	Design/ Development Estimate
BY:	Coffman Engineers, Rory Woolsey
PROJECT:	**Civic Sportsplex improvements; envelope, mechanical and electrical improvements. Floor Area = 77,100 SF.**

Basis of Estimate

Documents Used:

1. Design/ devlopment scope of work in the Coffman preliminary evaluation report dated March 23, 2022.
2. RMC architectural drawings A201, A202, A210, A301, A302. Dated 3.30.2022.
3. RMC mechainical drawings M003, M101, M102, M202, M203. Dated 3.2.2022.

Prevailing Wages Whatcom County:

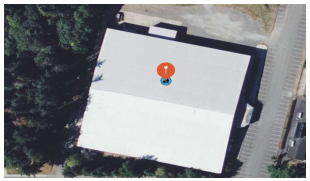
4. This estimate is based on Whatcom, County, WA prevailing wages 2022
   - ***a.*** Laborer wages w/ fringes = $55 + 30% burden = $70 per hr. **Sub rate w/ OHP = $85 / hr**.
   - ***b.*** Skilled Worker wages w/ fringes = $85 + 30% burden = $110 / hr. **Sub rate w/ OHP = $135 / hr**.
   - ***c*** Electrician wages w/ fringes = $78 + 30% burden = $100 / hr. **Sub rate w/ OHP = $125 / hr**.
   - ***d*** HVAC/ Plumbing wages w/ fringes = $85 + 30% burden = $110 / hr. **Sub rate w/ OHP = $135 / hr**.

General Requirements Scope:

5. Facility will be fully operational during construction improvements- assumed.
6. Staging area will be in the parking lot outside the building. Fencing required.
7. Dumpster will be located on site for the duration.
8. This estimate is based on a 16 week construction schedule. Subs will be working concurrently.
9. A full time GC superintendent will be required during all construction on site.
10. This job will be competitively bid in the current market by General Contractors.
11. The contractor will have portable toilets on site with hand washing facilities.
12. The general contractor will subcontract all work for this project.

Civic Sportsplex Improvements, Bellingham, WA- *Budgetary Cost Estimate*

This is Opinion of Probable Cost



DATE:	April 12, 2022
A/ E:	**Coffman Engineers/ RMC Architects**
ESTIMATE:	Design/ Development Estimate
BY:	Coffman Engineers, Rory Woolsey
PROJECT:	**Civic Sportsplex improvements; envelope, mechanical and electrical improvements. Floor Area = 77,100 SF.**

Improvements Scope of Work:

13 **Architectural:** Repair damaged vapor barrier at interior walls. Select areas ADD a protective coverboard or mesh.

14 Replace metal roof with standing seam roof assembly. New insulation between purlins.

15 Replace built up roof system at covered entry canopy.

16 New flashing, gutters and downspouts at roof.

17 Clean metal siding, concrete and CMU foundation walls. Staining, patching and reseal with protective seal.

18 Replace select exterior trim at openings, repair overhead door, Caulk and seal.

19 **Mechanical:** Install two new AHU (mezzanine) and Condensing Units (ground level). With ductwork.

20 Install four new ERV at the mezzanine level with associated ductwork.

21 Install four new DH duct heaters. Install eight new intake and exhaust hoods at the roof elevation.

22 **Electrical:** Upgrade due to mechanical loads. New 480V 1200 Amp 3 phse 4 wire service distribution.

23 Two new 225 amp panelboards to feed mechanical loads.

24 Replcae 42 each, 20 amp 1 pole breakers

25 Replace all lighting with LED lights.

26 Replace the emergency generator.

27 Fire alarm system replace with a new addressable system.

Design Fees, Permits and Sales Taxes:

28 Building permits and fees are included in this estimate.

29 This estimate ***excludes sales taxes.***

30 This estimate includes and allowance for Architect and Engineer Fees.

Estimate Contingency

31 This estimate includes a 15% estimate contingency which is reasonable for a design/ development estimate.

32 This estimate does not include an adjustment for time or construction contingency.

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Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
1.0	**General Requirements**					
	Construction duration duration during on-going ops- 16 Weeks for estimating purposes. Assume new roof completed initially (5 Weeks) all other work will then occur concurrently (11 Weeks).					
	Mobilize and Staging Area					
1	GC mobilization, site layout	**1**	LS	3,500.00	**$3,500**	
2	Fence at portion of North side parking area for staging	**500**	LF	5.55	**$2,775**	400' x 50' at from of building
3	Temp toilet at site; 2 unit	**16**	Weeks	190.00	**$3,040**	
4	Construction signage	**1**	LS	500.00	**$500**	
5	Protection at parking lot staging area- plywood	**400**	SF	2.85	**$1,140**	Protect pavement
	Site Management					
6	GC Superintendent- full time required	**640**	Superintendent Hrs	110.00	**$70,400**	
7	GC Laborer for daily clean up- due to building remain in operation	**640**	Labor hours	70.00	**$44,800**	8 hours clean up per day due to building in full operation during work
8	Dumpster on site for duration- general debris	**16**	Weeks	400.00	**$6,400**	Includes bi monthly pick up
	GC Insurance					
9	Allowance for this job specific liability insurance	**1**	LS	5,000.00	**$5,000**	
	Project Close Out					
10	Record drawings at complettion	**16**	Engineer hours	130.00	**$2,080**	
11	Test all systems and turnover to owner	**1**	LS	6,000.00	**$6,000**	includes punchlist work
	GC Contractor Pricing TOTAL				**$145,635**	
2.0	**Building Envelope Clean & Repair Improvements**					
	Clean Metal Siding					
1	Gently clean siding; 18 Crew hours per side; 26,000 SF siding	**72**	Crew hours	190.00	**$13,680**	Crew = 2 laborer + equipment = $190/ Hr
	Clean Exposed Concrete and CMU Foundation Walls					
2	Gently clean concrete	**840**	SF	4.20	**$3,528**	
3	Gently clean CMU	**1,250**	SF	4.20	**$5,250**	
4	Reseal CMU and Concrete add anti-graffiti coat	**2,090**	SF	2.80	**$5,852**	
	Replace Damage Garage Door					
5	Remove OH door 10' x 14'	**4**	Crew hours	190.00	**$760**	
6	Haul to dump	**2**	Truck hours	185.00	**$370**	
7	Dump fee	**1**	LS	150.00	**$150**	
8	New garage door 10' x 14'	**1**	Door	4,500.00	**$4,500**	Includes installation
	Caulking/ Sealants and Flashing					
9	Flash and seal pipe penetrations	**1**	LS	500.00	**$500**	
10	Replace metal transition at CMU - remove existing w/ care	**6**	Crew hours	190.00	**$1,140**	
11	Replace metal transition at CMU - new flashing	**200**	LF	5.00	**$1,000**	
12	Replace metal trim with new head flashing	**40**	LF	8.00	**$320**	

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
13	Caulking/ Sealants at various locations- all sides	1	Allow	1,500.00	$1,500	
	Interior of Building					
14	Tape damaged vapor barrier at all sides	7,500	SF	0.50	$3,750	
15	Install protective coverboard at select walls	2,800	SF	2.20	$6,160	At select walls at ice rink
16	Tape damage vapor barrier at interior higher elevations	1,000	SF	1.00	$1,000	
17	Caulking/ Sealants at select interior openings	1	Allow	1,500.00	$1,500	
	Installing Contractor Pricing TOTAL				$50,960	
3.0	**Roof Replacement**					
	Demo the Roof Assembly					
1	Tape damaged vapor barrier at walls	640	LF	2.45	$1,568	
2	Downspouts	280	LF	1.70	$476	
3	Ridge vent	281	LF	1.90	$534	
4	Galvanized ribbed sheet steel roofing removal	77,500	SF	1.38	$106,950	
5	Load in truck all demo metal roofing	40	Crew hours	255.00	$10,200	Three laborer crew = $255/ crew hour
6	Haul roof materials to recycle	64	Truck hours	185.00	$11,840	Truck and driver- use two trucks for 1 day
7	Recycle fees (1 Lb per SF sheet steel)	40	Tons	90.00	$3,600	
	Demo Insulation at Purlins					
8	Insulation in between purlins	77,500	SF	0.45	$34,875	assume insulation at 12" depth
9	Load insulation for hauling	20	Crew hours	255.00	$5,100	Three laborer crew = $255/ crew hour
11	Haul insulation to dump	64	Truck hours	185.00	$11,840	Truck and driver- use two trucks for 1 day
12	Dump fees (12" batt insulation with VB = .48 Lbs/ SF)	20	Tons	120.00	$2,400	
	New Insulation Between Purlins					
13	R-25 Metal building insulation unfaced	77,500	SF	2.00	$155,000	
14	R-11 metal building insulation between purlins	77,500	SF	1.05	$81,375	
15	Polyethylene vapor barrier (white)	77,500	SF	0.15	$11,625	
16	20 ga wire mesh scrim above the ice area	26,000	SF	0.60	$15,600	
	New Metal Roofing					
17	Metal roof 2" standing seam, 20 ga.	77,500	SF	11.50	$891,250	
18	New boots at roof penetrations	1	LS	500.00	$500	
19	Continuous ridge, galvanized	281	LF	11.00	$3,091	
20	Rake flashing	540	LF	12.35	$6,669	
21	Gutters, 9" x 7" South side	280	LF	19.50	$5,460	
22	Gutters, 6" North side	280	LF	14.50	$4,060	
23	Downspouts 4" x 6" prefinished metal	170	LF	14.00	$2,380	
24	Downspouts 3 3/4" x 5" prefinished metal	130	LF	12.00	$1,560	
25	Downspouts 3" x 4" prefinished metal	55	LF	10.40	$572	

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
	Demo Built-up Roof at Entry Canopy					
26	Remove built up roof	**1,410**	SF	2.00	**$2,820**	
27	Trucking demo material to dump	**2**	Truck hours	185.00	**$370**	
28	Recycle fee	**1**	LS	200.00	**$200**	
	New Modified Bituminous Roof Assembly- Entry Canopy					
29	Vapor barrier/ roof membrane	**1,410**	SF	2.80	**$3,948**	
30	R38 polyiso, mechanical fastened	**1,410**	SF	3.10	**$4,371**	Tapered to drain
31	1/4" glass fiberinforced gypsum coverboard	**1,410**	SF	1.50	**$2,115**	
32	Torch applied modified bituminous and cap sheet with 2 ply flashin	**1,410**	SF	5.10	**$7,191**	
33	Flashing	**1**	LS	750.00	**$750**	
	Additional Repairs at Entry Canopy					
34	Repair loose metal panel at north end entry soffit	**1**	LS	1,500.00	**$1,500**	
35	Replace missing plexiglass panel	**1**	LS	1,200.00	**$1,200**	Material & labor
	Installing Contractor Pricing TOTAL				**$1,392,990**	
4.0	**Mechanical Improvements- Base Option**					
	Seal Select Openings at Exhaust & Intake					
1	Abandoned exhaust fans - Seal openings	**4**	Each	560.00	**$2,240**	Seal opening: material = $150 each plus 3 labor hours each
2	Abandoned intake/ damper - Seal openings	**2**	Each	560.00	**$1,120**	
	EQUIPMENT- Includes delivery to site					
3	***AHU-1:*** 20 Tons AC, 620 MBH Heat; Serving Ice Rink	**1**	Unit	135,000.00	**$135,000**	8,000 CFM
4	***AHU-2:*** 10 Tons AC, 150 MBH Heat Serving Ice Rink Deck	**1**	Unit	95,000.00	**$95,000**	4,000 CFM
5	***AHU-3:*** 20 Tons AC, 570 MBH Heat; Serving NE Scoccer	**1**	Unit	135,000.00	**$135,000**	8,000 CFM
6	***AHU-4:*** 8.5 Tons AC, 240 MBH Heat; Serving NW Soccer	**1**	Unit	87,500.00	**$87,500**	3,400 CFM
7	***AHU-5:*** 10 Tons AC, 385 MBH Heat; Serving Soccer Deck	**1**	Unit	87,500.00	**$87,500**	4,000 CFM
8	***CU-1:*** 20 Tons (installed at exterior, on grade)	**1**	Unit	42,000.00	**$42,000**	
9	***CU-2:*** 10 Tons	**1**	Unit	36,000.00	**$36,000**	
10	***CU-3:*** 20 Tons	**1**	Unit	42,000.00	**$42,000**	
11	***CU-4:*** 8.5 Tons	**1**	Unit	18,000.00	**$18,000**	
12	***CU-5:*** 10 Tons	**1**	Unit	36,000.00	**$36,000**	
13	Allow for regeration piping/ materials	**1**	LS	15,000.00	**$15,000**	
14	***ERV-1:*** Soccer area 7,150 CFM	**1**	Unit	46,000.00	**$46,000**	Energy recovery ventilation
15	***ERV-2:*** Soccer area 7,150 CFM	**1**	Unit	46,000.00	**$46,000**	
16	***ERV-3:*** Ice rink area 5,000 CFM	**1**	Unit	42,000.00	**$42,000**	
17	***ERV-4:*** Ice rink area 5,000 CFM	**1**	Unit	42,000.00	**$42,000**	
18	***DH-1:*** service to ERV1 38KW	**1**	Unit	4,800.00	**$4,800**	Duct heaters
19	***DH-2:*** service to ERV2 38KW	**1**	Unit	4,800.00	**$4,800**	

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
20	***DH-3:*** service to ERV 3 26KW	**1**	Unit	3,600.00	**$3,600**	
21	***DH-4:*** service to ERV 4 26 KW	**1**	Unit	3,600.00	**$3,600**	
	Controls					
22	Allowance for mechanical controls	**1**	LS	20,000.00	**$20,000**	
	INSTALL Mechanical Equipment:					
23	AHU Installation	**80**	Crew hours	540.00	**$43,200**	Crew = 3 HVAC techs, 1 laborer and equipment = $540/ crew hour
24	CU Units - includes refrigeration tubing installation	**120**	Crew hours	540.00	**$64,800**	
25	ERV Units Installation	**48**	Crew hours	540.00	**$25,920**	
26	DH Installation	**12**	Crew hours	540.00	**$6,480**	
	Roof Hood at ERV					
27	Intake hood at ERV 67"x 72"	**2**	Each	6,450.00	**$12,900**	
28	Intake hood at ERV 58" x 60"	**2**	Each	4,900.00	**$9,800**	
29	Exhaust hood at ERV 67" x 72"	**2**	Each	6,450.00	**$12,900**	
30	Exhaust hood at ERV 58" x 60"	**2**	Each	4,900.00	**$9,800**	
	Ductwork, Insulation, Diffusers					
31	AHU ductwork 1,000 LF	**12,000**	Lbs	9.30	**$111,600**	
32	ERV ductwork 1,200 LF	**14,400**	Lbs	9.30	**$133,920**	
33	Diffusers at AHU	**30**	Each	210.00	**$6,300**	
34	Diffusers at ERV	**20**	Each	210.00	**$4,200**	
35	Insulation at ERV ductwork, 30' x 4 Units	**1,025**	SF	4.50	**$4,613**	At select ERV Ductwork
	Installing Contractor Pricing TOTAL				**$1,391,593**	
5.0	**Electrical Improvements- Base Option**					
	Disconnect and Reconnect Building Power					
1	Disconnect and reconnect power PSE	**1**	Allowance	1,500.00	**$1,500**	
	Selective Demolition					
2	Remove existing 800amp swtchboard	**5**	Crew hours	385.00	**$1,925**	Crew = 2 electricians, 1 laborer, equipment = $335 plus $50 = 385/ crew hour
3	Haul electrical demo materials to recycle	**2**	Truck hours	185.00	**$370**	
4	Dump fees for switchboard demo	**1**	LS	685.00	**$685**	
	Electrical Service Upgrade- Switchboard					
5	***New:*** Switchboard 480volt, 1600amp 3phase, 4wire- material	**1**	Each	29,900.00	**$29,900**	With Ground Fault
6	***Labor:*** Install new switchboard	**16**	Crew hours	385.00	**$6,160**	
7	New feeder lines (4 Each) from PSE Transformer at 100' Each	**400**	LF	250.00	**$100,000**	Assume 100 ' for each feeder
	New Panelboards					
8	***New:*** Panelboards 400amp, 480volt, 3phase, 4wire- material	**2**	Each	11,300.00	**$22,600**	Required to feed new mechanical loads
9	***Labor:*** Install new panelboards	**24**	Crew hours	385.00	**$9,240**	
	Circuit Breakers					

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
10	Remove circuit breakers	**8**	Crew hours	250.00	**$2,000**	
11	***New:*** 20amp, 1pole breakers- material	**42**	Each	35.00	**$1,470**	
12	***Labor:*** Install new circuit breakers	**16**	Crew hours	250.00	**$4,000**	
	Electrical Service to new Mechanical Equipment					
13	Non-fused disconnect 30Amp/ 3pole	**7**	Each	350.00	**$2,450**	
14	Non-fused disconnect 60Amp/ 3pole	**7**	Each	450.00	**$3,150**	
15	Non-fused disconnect 100Amp/ 3pole	**7**	Each	650.00	**$4,550**	
16	NEMA 1 Enclosure for controls at AHU-1, 2, 3, 4 and 5	**5**	Each	850.00	**$4,250**	
17	Feeder from panel to AHU Units 20A/ 3P	**1,250**	LF	12.00	**$15,000**	
18	Feeder from panel to ERV and DH Units 35Amp, 50Amp and 60Ar	**2,000**	LF	20.00	**$40,000**	
19	Feeder from panel to CU, 60Amp through 100Amp	**200**	LF	25.00	**$5,000**	
	Lighting Upgrades					
20	Exit signs remove, 10 Each	**4**	Labor hours	125.00	**$500**	
21	Remove fluorescent light fixtures, 180 Each	**36**	Crew hours	260.00	**$9,360**	Crew with scissor lift = $260/ crew hours = Electrician, laborer and scissor lift
22	Haul fixtures to recycle	**8**	Truck hours	185.00	**$1,480**	
23	Recycle fee for fixtures	**1**	LS	1,000.00	**$1,000**	
24	**New:** exit signs, LED- material	**10**	Each	75.00	**$750**	
25	**New:** LED Light fixtures- material	**180**	Each	250.00	**$45,000**	
26	**Labor:** install LED light fixtures	**120**	Crew hours	260.00	**$31,200**	Crew with scissor lift = $260/ crew hours = Electrician, laborer and scissor lift
27	Automated lighting control- offices, restrooms, lockers	**11,200**	SF	1.05	**$11,760**	At office, restrooms, locker, rooms, storage =11,200 SF
28	Automated lighting control system at ice rink & field	**61,000**	SF	0.65	**$39,650**	Field and ice rink = 61,000 SF
29	Secure electric room door to close proper	**1**	LS	450.00	**$450**	Door does not close proper
	Generator Set Replacement					
30	Remove generator set	**12**	Crew hours	385.00	**$4,620**	Crew = 2 electricians, 1 laborer, forklift = $335 plus $50 = 385/ crew hour
31	Haul to recycle	**4**	Truck hours	185.00	**$740**	
32	Recycle fees	**1**	LS	500.00	**$500**	
33	**New:** 100KW diesel fired generator set- material delivered	**1**	Gen Set	45,000.00	**$45,000**	In a self contained, sound attenuated enclosure. Includes transfer switch.
34	**Labor:** to install new generator set - 3 days to install	**24**	Crew hours	385.00	**$9,240**	
35	**New:** Panelboard 480volt, 200amp, 3phase - material	**1**	Each	4,200.00	**$4,200**	Feed new egress lighting and existing 208volt equipment that feeds genset loads
36	**Labor:** install new panelboard	**12**	Crew hours	250.00	**$3,000**	
	Installing Contractor Pricing TOTAL				**$462,700**	

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
6.0	**Fire Alarm Improvements**					
	Install new System					
1	Remove exiting FA system	**12**	Crew hours	335.00	**$4,020**	Demo existing system
2	Haul and recycle fee of FA system	**1**	LS	650.00	**$650**	
3	**New:** addressable system w/ current tech - material	**1**	Each	12,700.00	**$12,700**	Addressable with voice 12 stations
4	**Labor:** install new system	**1**	Each	14,500.00	**$14,500**	
	Installing Contractor Pricing TOTAL				**$31,870**	
VE	**Mechanical VE Option**					
	Seal Select Openings at Exhaust & Intake					
1	Abandoned exhaust fans - Seal openings	**4**	Each	560.00	**$2,240**	Seal opening: material = $150 each plus 3 labor hours each
2	Abandoned intake/ damper - Seal openings	**2**	Each	560.00	**$1,120**	
	EQUIPMENT- Includes delivery to site					
3	***AHU-1:*** at Soccer area 20 Ton AC	**1**	Unit	130,000.00	**$130,000**	
4	***AHU-2:*** at Ice rink area 30 Ton	**1**	Unit	195,000.00	**$195,000**	
5	***CU-1:*** 30 Tons	**1**	Unit	55,000.00	**$55,000**	
6	***CU-2:*** 22 Tons	**1**	Unit	45,000.00	**$45,000**	
7	Allow for regeration piping/ materials	**1**	LS	15,000.00	**$15,000**	
8	***ERV-1:*** Soccer area 7,150 CFM w/ stand-alone controls	**1**	Unit	46,000.00	**$46,000**	Energy recovery ventilation
9	***ERV-2:*** Soccer area 7,150 CFM	**1**	Unit	46,000.00	**$46,000**	
10	***ERV-3:*** Ice rink area 5,000 CFM	**1**	Unit	42,000.00	**$42,000**	
11	***ERV-4:*** Ice rink area 5,000 CFM	**1**	Unit	42,000.00	**$42,000**	
12	***DH-1:*** service to ERV1 38KW	**1**	Unit	4,800.00	**$4,800**	
13	***DH-2:*** service to ERV2 38KW	**1**	Unit	4,800.00	**$4,800**	
14	***DH-3:*** service to ERV 3 26KW	**1**	Unit	3,600.00	**$3,600**	
15	***DH-4:*** service to ERV 4 26 KW	**1**	Unit	3,600.00	**$3,600**	
	Controls					
16	Allowance for mechanical controls	**1**	LS	20,000.00	**$20,000**	
	INSTALL Equipment:					
17	AHU Installation	**32**	Crew hours	540.00	**$17,280**	Crew = 3 HVAC techs, 1 laborer and equipment = $540/ crew hour
18	CU Units - includes refrigeration tubing installation	**45**	Crew hours	540.00	**$24,300**	
19	ERV Installation	**48**	Crew hours	540.00	**$25,920**	
20	DH Installation	**12**	Crew hours	540.00	**$6,480**	
	Roof Hood at ERV					
22	Intake hood at ERV 67"x 72"	**2**	Each	6,450.00	**$12,900**	
23	Intake hood at ERV 58" x 60"	**2**	Each	4,900.00	**$9,800**	
24	Exhaust hood at ERV 67" x 72"	**2**	Each	6,450.00	**$12,900**	

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
25	Exhaust hood at ERV 58" x 60"	**2**	Each	4,900.00	**$9,800**	
	Ductwork, Insulation, Diffusers					
26	AHU ductwork 500 LF	**6,000**	Lbs	9.30	**$55,800**	
27	ERV ductwork 600 LF	**7,200**	Lbs	9.30	**$66,960**	
28	Diffusers at AHU	**19**	Each	210.00	**$3,990**	
29	Diffusers at ERV	**23**	Each	210.00	**$4,830**	
30	Insulation at ERV ductwork, 30' x 4 Units	**1,025**	SF	4.50	**$4,613**	
	Subtotal Mechanical VE				**$911,733**	***VE Mechanical***
VE	**Electrical VE Due to Mechanical VE**					
	Disconnect and Reconnect Building Power					
1	Disconnect and reconnect power PSE	**1**	Allowance	1,500.00	**$1,500**	
	Selective Demolition					
2	Remove existing 800amp swtchboard	**5**	Crew hours	385.00	**$1,925**	Crew = 2 electricians, 1 laborer, equipment = $335 plus $50 = 385/ crew hour
3	Haul electrical demo materials to recycle	**2**	Truck hours	185.00	**$370**	
4	Dump fees for switchboard demo	**1**	LS	685.00	**$685**	
	Electrical Service Upgrade- Switchboard					
5	***New:*** Switchboard 480volt, 1200amp 3phase, 4wire- material	**1**	Each	15,000.00	**$15,000**	With Ground Fault
6	***Labor:*** Install new switchboard	**16**	Crew hours	385.00	**$6,160**	
7	New feeder lines (4 Each) from PSE Transformer at 100' Each	**400**	LF	250.00	**$100,000**	Assume 100 ' for each feeder
	New Panelboards					
8	***New:*** Panelboards 225amp, 480volt, 3phase, 4wire- material	**2**	Each	5,500.00	**$11,000**	Required to feed new mechanical loads
9	***Labor:*** Install new panelboards	**24**	Crew hours	385.00	**$9,240**	
	Circuit Breakers					
10	Remove circuit breakers	**8**	Crew hours	250.00	**$2,000**	
11	***New:*** 20amp, 1pole breakers- material	**42**	Each	35.00	**$1,470**	
12	***Labor:*** Install new circuit breakers	**16**	Crew hours	250.00	**$4,000**	
	Electrical Service to new Mechanical Equipment					
13	Non-fused disconnect 30Amp/ 3pole	**3**	Each	350.00	**$1,050**	
14	Non-fused disconnect 60Amp/ 3pole	**5**	Each	450.00	**$2,250**	
15	Non-fused disconnect 100Amp/ 3pole	**5**	Each	650.00	**$3,250**	
16	NEMA 1 Enclosure for controls at AHU-1, 2	**2**	Each	850.00	**$1,700**	
17	Feeder from panel to AHU Units 20A/ 3P	**750**	LF	12.00	**$9,000**	
18	Feeder from panel to ERV and DH Units 35Amp, 50Amp and 60Ar	**2,000**	LF	20.00	**$40,000**	
19	Feeder from panel to CU, 60Amp through 100Amp	**150**	LF	25.00	**$3,750**	
	Lighting Upgrades					
20	Exit signs remove, 10 Each	**4**	Labor hours	125.00	**$500**	

COFFMAN ENGINEERS

Civic Sportsplex Improvements, Bellingham, WA- Budgetary Cost Estimate

This is Opinion of Probable Cost

Item #	Description	Quantity	Units	Unit Cost	Extended	Estimate Notes
21	Remove fluorescent light fixtures, 180 Each	**36**	Crew hours	260.00	**$9,360**	Crew with scissor lift = $260/ crew hours = Electrician, laborer and scissor lift
22	Haul fixtures to recycle	**8**	Truck hours	185.00	**$1,480**	
23	Recycle fee for fixtures	**1**	LS	1,000.00	**$1,000**	
24	**New:** exit signs, LED- material	**10**	Each	75.00	**$750**	
25	**New:** LED Light fixtures- material	**180**	Each	250.00	**$45,000**	
26	**Labor:** install LED light fixtures	**120**	Crew hours	260.00	**$31,200**	Crew with scissor lift = $260/ crew hours = Electrician, laborer and scissor lift
27	Automated lighting control- offices, restrooms, lockers	**11,200**	SF	1.05	**$11,760**	At office, restrooms, locker, rooms, storage =11,200 SF
28	Automated lighting control system at ice rink & field	**61,000**	SF	0.65	**$39,650**	Field and ice rink = 61,000 SF
29	Secure electric room door to close proper	**1**	LS	450.00	**$450**	Door does not close proper
	Generator Set Replacement					
30	Remove generator set	**12**	Crew hours	385.00	**$4,620**	Crew = 2 electricians, 1 laborer, forklift = $335 plus $50 = 385/ crew hour
31	Haul to recycle	**4**	Truck hours	185.00	**$740**	
32	Recycle fees	**1**	LS	500.00	**$500**	
33	**New:** 100KW diesel fired generator set- material delivered	**1**	Gen Set	45,000.00	**$45,000**	In a self contained, sound attenuated enclosure. Includes transfer switch.
34	**Labor:** to install new generator set - 3 days to install	**24**	Crew hours	385.00	**$9,240**	
35	**New:** Panelboard 480volt, 200amp, 3phase - material	**1**	Each	4,200.00	**$4,200**	Feed new egress lighting and existing 208volt equipment that feeds genset loads
36	**Labor:** install new panelboard	**12**	Crew hours	250.00	**$3,000**	
	Installing Contractor Pricing TOTAL				**$422,800**	***VE Electrical due to VE Mechanical***

Appendix G – Heating and Ventilation Calculations

System Checksums

By Coffman Engineers, Inc.

Ice Rink **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 77 / 65 / 73

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	43,145	43,145	19
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	12,476	2,638	15,113	7
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	27,096		27,096	12
Sub Total ==>	39,572	45,783	85,355	38
Internal Loads				
Lights	63,902	15,976	79,878	36
People	20,250	0	20,250	9
Misc	34,758	0	34,758	16
Sub Total ==>	118,910	15,976	134,886	61
Ceiling Load	28,261	-28,261	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			2,122	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	186,743	33,498	222,363	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	12,476	8
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	8,824	5
Sub Total ==>	21,300	13
Internal Loads		
Lights	63,902	40
People	11,250	7
Misc	34,758	22
Sub Total ==>	109,910	68
Ceiling Load	29,399	18
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	160,609	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 15

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-30,799	22.92
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-14,412	-17,601	13.10
Partition/Door	0	0	0.00
Floor	-196	-196	0.15
Adjacent Floor	0.00	0.00	0.00
Infiltration	-85,771	-85,771	63.83
Sub Total ==>	-100,379	-134,366	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-15,555	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-115,933	-134,366	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	71.7
Ra Plenum	75.4	58.1
Return	75.4	58.1
Ret/OA	75.4	58.1
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.1	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	8,952	8,952
Terminal	8,952	8,952
Main Fan	8,952	8,952
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	1,719	1,719
MinStop/Rh	0	0
Return	8,952	8,952
Exhaust	0	0
Rm Exh	1,719	1,719
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.34	0.34
cfm/ton	460.08	
ft²/ton	1,358.91	
Btu/hr·ft²	8.83	-6.72
No. People	45	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	19.5	233.5	205.6	8,952	75.6	61.3	58.8	55.0	52.2	54.1
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	19.5	233.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	26,440		
Part	0		
Int Door	1		
ExFlr	44		
Roof	26,440	0	0
Wall	7,300	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-177.7	8,952	56.1	71.7
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-177.7			

System Checksums

By Coffman Engineers, Inc.

Soccer Fields **Fan Coil**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 76 / 64 / 69

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	60,856	60,856	19
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	16,567	3,346	19,913	6
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	25,188		25,188	8
Sub Total ==>	41,755	64,201	105,957	32
Internal Loads				
Lights	87,604	21,901	109,504	33
People	57,600	0	57,600	18
Misc	52,072	0	52,072	16
Sub Total ==>	197,276	21,901	219,177	67
Ceiling Load	35,076	-35,076	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			3,315	1
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	274,107	51,027	328,448	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	20,917	9
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	9,124	4
Sub Total ==>	30,041	13
Internal Loads		
Lights	87,604	37
People	32,000	14
Misc	52,072	22
Sub Total ==>	171,676	73
Ceiling Load	34,491	15
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	236,207	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 15

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-49,782	21.32
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-36,935	-45,127	19.33
Partition/Door	0	0	0.00
Floor	-248	-248	0.11
Adjacent Floor	0.00	0.00	0.00
Infiltration	-138,289	-138,289	59.24
Sub Total ==>	-175,472	-233,447	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-23,621	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-199,094	-233,447	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.0	84.8
Ra Plenum	75.3	69.8
Return	75.3	69.8
Ret/OA	75.3	69.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.1	0.0
Fn Frict	0.1	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	13,984	13,984
Terminal	13,984	13,984
Main Fan	13,984	13,984
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	2,188	2,188
MinStop/Rh	0	0
Return	13,984	13,984
Exhaust	0	0
Rm Exh	2,188	2,188
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.42	0.42
cfm/ton	486.57	
ft²/ton	1,171.05	
Btu/hr·ft²	10.25	-9.17
No. People	128	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	28.7	344.9	302.8	13,984	75.5	61.5	59.8	56.0	53.0	55.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	28.7	344.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	33,655		
Part	0		
Int Door	1		
ExFlr	44		
Roof	33,655	0	0
Wall	14,769	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-308.7	13,984	67.5	84.8
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-308.7			

BASED ON 2018 INTERNATIONAL MECHANICAL CODE WITH WASHINGTON AMENDMENTS

						V(bz) = R(p)P(z) + R(a)A(z) Breathing Zone Outdoor Air Flow							Exhaust		Zone Outdoor Airflow			
PROGRAM	**QTY**	**SQFT**	**TOTAL SQFT**	**Main Category**	**Sub Category**	**A(z)**	**P(z) ASHRAE**	**P(z) Occupancy**	**R(p)**	**R(a)**	**V(bz) ASHRAE**	**V(bz) Occupancy**	**EX (CFM/SF)**	**TOT EX**	**System Type**	**E(z)**	**V(oz)**	**Total OSA**
Northeast Soccer Field	1	16330	16330	Sports	Gym, stadium, arena (play area) (j)	16330	0.00	12	0	0.3	4899	4899	0	0	Ceiling supply of warm air and ceiling return	0.8	6124	6124
Northeast Viewing Area	1	2470	2470	Sports	Spectator areas	2470	370.50	100	7.5	0.06	2927	898	0	0	Ceiling supply of warm air and ceiling return	0.8	3659	3659
Northwest Soccer Field	1	6860	6860	Sports	Ice arenas w/o combustion engines (j)	6860	0.00	23	0	0.3	2058	2058	1	3430	Ceiling supply of warm air and ceiling return	0.8	2573	3430
South Players Bench	1	1120	1120	Sports	Spectator areas	1120	168.00	20	7.5	0.06	1327	217	0	0	Ceiling supply of warm air and ceiling return	0.8	272	272
Soccer Deck Area	1	10490	10490	Public	Corridors	10490	0.00	0	0	0.06	629	629	0	0	Ceiling supply of warm air and ceiling return	0.8	787	14
Men's Bath	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	450	Ceiling supply of warm air and ceiling return	0.8	0	450
Women's Bath	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	450	Ceiling supply of warm air and ceiling return	0.8	0	450
Skate Rental	1	590	590	Retail	Sales (except as below)	590	8.85	9	7.5	0.12	137	138	0	0	Ceiling supply of warm air and ceiling return	0.8	173	173
Office	1	170	170	Offices	Offices spaces	170	0.85	1	5	0.06	14	15	0	0	Ceiling supply of warm air and ceiling return	0.8	19	19
Ticket Office	1	260	260	Offices	Offices spaces	260	1.30	2	5	0.06	22	26	0	0	Ceiling supply of warm air and ceiling return	0.8	32	32
Ticket Office	1	160	160	Offices	Offices spaces	160	0.80	1	5	0.06	14	15	0	0	Ceiling supply of warm air and ceiling return	0.8	18	18
Asst Mgr Office	1	160	160	Offices	Offices spaces	160	0.80	1	5	0.06	14	15	0	0	Ceiling supply of warm air and ceiling return	0.8	18	18
Mgr Office	1	160	160	Offices	Offices spaces	160	0.80	1	5	0.06	14	15	0	0	Ceiling supply of warm air and ceiling return	0.8	18	18
Men's Bath	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	450	Ceiling supply of warm air and ceiling return	0.8	0	450
Women's Bath	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	450	Ceiling supply of warm air and ceiling return	0.8	0	450
Dressing Room 1	1	390	390	Public	Shower room (per shower head) (g)	390	0.00	10	5	0.06	23	73	50/20 (f)	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 2	1	390	390	Public	Shower room (per shower head) (g)	390	0.00	10	5	0.06	23	73	50/20 (f)	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 3	1	390	390	Public	Shower room (per shower head) (g)	390	0.00	10	5	0.06	23	73	50/20 (f)	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 4	1	390	390	Offices	Offices spaces	390	1.95	10	5	0.06	33	73	0	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 5	1	390	390	Offices	Offices spaces	390	1.95	10	5	0.06	33	73	0	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 6	1	390	390	Offices	Offices spaces	390	1.95	10	5	0.06	33	73	0	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 7	1	390	390	Offices	Offices spaces	390	1.95	10	5	0.06	33	73	0	150	Ceiling supply of warm air and ceiling return	0.8	92	150
Dressing Room 8	1	640	640	Offices	Offices spaces	640	3.20	15	5	0.06	54	113	0	150	Ceiling supply of warm air and ceiling return	0.8	142	150
Dressing Room 9	1	290	290	Offices	Offices spaces	290	1.45	5	5	0.06	25	42	0	150	Ceiling supply of warm air and ceiling return	0.8	53	150
Dressing Room 10	1	290	290	Offices	Offices spaces	290	1.45	5	5	0.06	25	42	0	150	Ceiling supply of warm air and ceiling return	0.8	53	150
Bath 1	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	100	Ceiling supply of warm air and ceiling return	0.8	0	100
Bath 2	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	100	Ceiling supply of warm air and ceiling return	0.8	0	100
Bath 3	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	100	Ceiling supply of warm air and ceiling return	0.8	0	100
Bath 4	1	315	315	Public	Toilet rooms - public (g)	315	0.00	0	0	0	0	0	50/70 (f)	100	Ceiling supply of warm air and ceiling return	0.8	0	100
Ice Rink Seating Area	1	1400	1400	Sports	Spectator areas	1400	210.00	40	7.5	0.06	384	384	0	0	Ceiling supply of warm air and ceiling return	0.8	480	480
Ice Rink	1	16320	16320	Sports	Ice arenas w/o combustion engines (j)	16320	0.00	25	0	0.3	4896	4896	1	8160	Ceiling supply of warm air and ceiling return	0.8	6120	8160
Storage Room	1	550	550	Retail	Storage rooms	550	0.00	0	0	0.12	66	66	0	0	Ceiling supply of warm air and ceiling return	0.8	83	83
Storage Room	1	460	460	Retail	Storage rooms	460	0.00	0	0	0.12	55	55	0	0	Ceiling supply of warm air and ceiling return	0.8	69	69
Storage Room	1	1450	1450	Retail	Storage rooms	1450	0.00	0	0	0.12	174	174	0	0	Ceiling supply of warm air and ceiling return	0.8	218	218
Ice Rink Deck Area	1	10120	10120	Public	Corridors	10120	0.00	0	0	0.06	607	607	0	0	Ceiling supply of warm air and ceiling return	0.8	759	759
			0	Blank	Blank													
TOTAL			**75540**			**75540**	**776**	**330**			**18544**	**15819**		**15290**			**22310**	**27245**

Appendix H – Electrical Demand Worksheet

DEMAND LOAD CALCULATION

FACILITY: SPORTSPLEX, BELLINGHAM, WA

PROJECT: CIVIC SPORTSPLEX BUILDING EVALUATION

SYSTEM: (E) MAIN DISTRIBUTION SWITCHBOARD (MDS)

VOLTAGE: 480 **PHASE:** 3

PSE CONSUMPTION, EXISTING CONDITION LOAD EVALUATION:

1	**(E) CALCULATED DEMAND**	**3/16/2022**	=	605.00 A
	WATTS			447.66 kW
2	**POWER FACTOR**		÷	0.89 (P.F.)
	APPARENT PEAK DEMAND		=	502.99 kVA
3	**NEC ADJUSTMENT FACTOR**		x	1.25
	ADJUSTED PEAK DEMAND			628.73 kVA
4	**OCCUPANCY ADJUSTED FACTOR**		x	1.00
	OCCUPANCY ADJUSTED PEAK DEMAND		=	628.73 kVA
5	**SEASONAL ADJUSTMENT FACTOR**		x	1.00
	SEASONALLY ADJUSTED PEAK DEMAND		=	628.73 kVA
6	**OTHER ADJUSTMENT FACTOR(S)**		x	1.00
	ANNUAL PEAK DEMAND		=	628.73 kVA

ADJUSTED DEMAND BASED CALCULATED DEMAND	**628.73 kVA**
	756.25 AMPS

1	**CALCULATED DEMAND - EXISTING LOAD**	**3/16/2022**	=	756.25 A
	WATTS			559.57 kW
2	**POWER FACTOR**		÷	0.89 (P.F.)
	APPARENT PEAK DEMAND		=	628.73 kVA
3	**(N) CALCULATED MECH LOAD ADDED**		+	637.00 kVA
	ADJUSTED DEMAND BASED CALCULATED DEMAND		=	**1,265.73 kVA**
				1,522.44 AMPS

Appendix I – Mechanical Equipment Schedule; Electrical Connections

MECHANICAL EQUIPMENT SCHEDULE

NOTES:

1 COMBINATION STARTER
2 MANUAL STARTER
3 FUSED DISCONNECT SWITCH
4 NON-FUSED DISCONNECT SWITCH
5 DIRECT CONNECTION
6 CORD AND PLUG
7 NEMA 5-15P
8 NEMA 6-15P
9 INTEGRAL INPUT POWER TERM. BOARD
10 PROVIDE HACR BREAKER PER MFR.
11 VARIABLE FREQUENCY DRIVE

A. FURNISHED AND INSTALLED BY OTHERS
B. FURNISHED BY MANUFACTURER, INSTALLED BY CONTRACTOR.
C. FURNISHED AND INSTALLED BY CONTRACTOR.

MOCPD - MAXIMUM OVERCURRENT PROTECTIVE DEVICE
MCA - MINIMUM CIRCUIT AMPACITY
FLA - FULL LOAD AMPS
W - WATTS
KW - KILOWATTS
N - NORMAL
E - EMERGENCY

UNIT	DESCRIPTION	EQUIPMENT LOAD				MOCPD	POWER			CONDUIT	WIRES (CU)			STARTER	DISC.	NOTE	
NO.		HP	kW	FLA	MCA	(A/POLE)	TYPE	VOLTS	PHASE	SIZE	NO.	SIZE	GND	SIZE	SWITCH	NO.	REMARKS
AHU-1	AIR HANDLING UNIT				18.50	20A/3P	N	480	3	3/4"	3	10	10		30/3P	4C	
AHU-2	AIR HANDLING UNIT				18.50	25A/3P	N	480	3	3/4"	3	10	10		30/3P	4C	
AHU-3	AIR HANDLING UNIT				10.30	15A/3P	N	480	3	3/4"	3	12	12		30/3P	4C	
AHU-4	AIR HANDLING UNIT				10.30	15A/3P	N	480	3	3/4"	3	12	12		30/3P	4C	
AHU-5	AIR HANDLING UNIT				10.30	15A/3P	N	480	3	3/4"	3	12	12		30/3P	4C	
CU-1A	CONDENSING UNIT				67.10	100A/3P	N	480	3	1-1/4"	3	2	8		100A/3P	4C	
CU-1B	CONDENSING UNIT				67.10	100A/3P	N	480	3	1-1/4"	3	2	8		100A/3P	4C	
CU-2	CONDENSING UNIT				39.20	60A/3P	N	480	3	1"	3	6	10		60A/3P	4C	
CU-3A	CONDENSING UNIT				51.80	80A/3P	N	480	3	1"	3	4	8		100A/3P	4C	
CU-3B	CONDENSING UNIT				67.10	100A/3P	N	480	3	1-1/4"	3	2	8		100A/3P	4C	
CU-4	CONDENSING UNIT				51.80	80A/3P	N	480	3	1"	3	4	8		100A/3P	4C	
CU-5A	CONDENSING UNIT				46.50	70A/3P	N	480	3	1"	3	4	8		100A/3P	4C	
CU-5B	CONDENSING UNIT				46.50	70A/3P	N	480	3	1"	3	4	8		100A/3P	4C	
ERV-1	ENERGY RECOVERY UNIT				39.30	50A/3P	N	480	3	1"	3	6	10		60A/3P	4C	
ERV-2	ENERGY RECOVERY UNIT				39.30	50A/3P	N	480	3	1"	3	6	10		60A/3P	4C	
ERV-3	ENERGY RECOVERY UNIT				26.30	35A/3P	N	480	3	1"	3	8	10		30/3P	4C	
ERV-4	ENERGY RECOVERY UNIT				26.30	35A/3P	N	480	3	1"	3	8	10		30/3P	4C	
DH-1	DUCT HEATER		38.00	50.8		60A/3P	N	480	3	1"	3	6	10		60A/3P	4C	
DH-2	DUCT HEATER		38.00	50.8		60A/3P	N	480	3	1"	3	6	10		60A/3P	4C	
DH-3	DUCT HEATER		26.00	34.8		50A/3P	N	480	3	1"	3	8	10		60A/3P	4C	
DH-4	DUCT HEATER		26.00	34.8		50A/3P	N	480	3	1"	3	8	10		60A/3P	4C	