Development Services

From Concept to Construction

Phone: 503-823-7300 Email: bds@portlandoregon.gov 1900 SW 4th Ave, Portland, OR 97201
More Contact Info (http://www.portlandoregon.gov//bds/article/519984)

APPEAL SUMMARY

Status: Decision Rendered

Appeal ID: 16156	**Project Address:** 2946 NE Columbia Blvd
Hearing Date: 11/22/17	**Appellant Name:** Paul Hettervig
Case No.: M-001	**Appellant Phone:** 503-804-6569
Appeal Type: Mechanical	**Plans Examiner/Inspector:**
Project Type: commercial	**Stories:** 1 **Occupancy:** Not given **Construction Type:** Not given
Building/Business Name:	**Fire Sprinklers:** Yes - Location not given
Appeal Involves: Alteration of an existing structure	**LUR or Permit Application No.:** 17-263360-MT
Plan Submitted Option: pdf [File 1]	**Proposed use:** industrial manufacturing

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	Energy Code Section 101.4.3
Requires	Energy code section 101.4.3 Requires the thermal envelope of a non- conditioned space be brought up to current requirements when heating capacity is increased
Proposed Design	Proposed design intent is not for heating of the space. The proposed equipment raises the air discharge temperature to dry air for the removal of moisture from the space. The proposed system uses discharge temperature control and not space/room sensor temperature control
Reason for alternative	Adding insulation to the walls and roof will not lower energy consumption as we are controlling air temperature for drying purposes and not space temperature

APPEAL DECISION

Omission of current energy code requirements for building envelope insulation: Denied. Proposal does not provide equivalent energy efficiency.
Appellant may contact Thomas Ng (503 823-7434) with questions.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 180 calendar days of the date this decision is published. For information on the appeals process and costs, including forms, appeal fee, payment methods and fee waivers, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.

COM*check* Software Version 4.0.7.0

Mechanical Compliance Certificate

Section 1: Project Information

Energy Code: **2014 Oregon Energy Efficiency Specialty Code**
Project Title: Production Room Ventilation Upgrade
Project Type: Alteration

Construction Site:
Tarr, LLC
2946 NE Columbia Blvd
Portland, OR 97211

Owner/Agent:

Designer/Contractor:
Clifford Hood
Hood-McNees, Inc.
1923 SE Stark St
Portland, OR 97214
(503) 231-7825

Section 2: General Information

Building Location (for weather data): Portland, Oregon
Climate Zone: 4c

Section 3: Mechanical Systems List

Quantity	System Type & Description
2	MAU-1 (Single Zone) : Heating: 1 each - Duct Furnace, Gas, Capacity = 350 kBtu/h Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec Fan System: MAU-1 -- Compliance (Motor nameplate HP method) : Passes Fans: FAN 1 Supply, Constant Volume, 7000 CFM, 7.5 motor nameplate hp

Section 4: Requirements Checklist

In the following requirements, blank checkboxes identify requirements that the applicant has not acknowledged as being met. Checkmarks identify requirements that the applicant acknowledges are met or excepted from compliance. 'Plans reference page/section' identifies where in the plans/specs the requirement can be verified as being satisfied.

Requirements Specific To: MAU-1 :

✔ 1. Equipment meets minimum efficiency: Duct Furnace (Gas): 80.00 % Ec

✔ 2. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

✓ **Exception applies:** Systems exhausting toxic, flammable, paint exhaust, corrosive fumes, or dust.

Plans reference page/section: _____

Generic Requirements: Must be met by all systems to which the requirement is applicable:

✔ 1. Calculation of heating and cooling loads. Design loads are determined in accordance with the procedures described in the ASHRAE/ACCA Standard 183. Alternatively, design loads have been determined by an approved equivalent computation procedure.

✔ 2. Packaged Electric Equipment. Specified packaged electrical equipment has a heat pump as the primary heating source.

Requirement is not applicable.

Plans reference page/section: _____

✔ 3. Cooling equipment economizers: The total capacity of all cooling equipment without economizers must be less than 240 kBtu/h. This project lists 1999137872016199900000000000000000 kBtu/h capacity without economizers. That portion of the equipment serving dwelling units and guest rooms is not included in determining the total capacity of units without economizers.

Plans reference page/section: *N/A - No Cooling*

✔ 4. Equipment and system sizing. Heating and cooling equipment and systems capacity do not exceed the loads calculated in accordance with Section 503.2.1.

Plans reference page/section:

✔ 5. HVAC Equipment Performance Requirements. Reported efficiencies have been tested and rated in accordance with the applicable test procedure. The efficiency has been verified through certification under an approved certification program or, if no certification program exists, the equipment efficiency ratings are supported by data furnished by the manufacturer.

✔ 6. Thermostatic Controls. The supply of heating and cooling energy to each zone is controlled by individual thermostatic controls that respond to temperature within the zone.

Plans reference page/section: *M1*

✔ 7. Set point overlap restriction. Where used to control both heating and cooling, zone thermostatic controls provide a temperature range or deadband of at least 5°F (2.8°C) within which the supply of heating and cooling energy to the zone is capable of being shut off or reduced to a minimum.

Plans reference page/section: *N/A - No Cooling*

✔ 8. Optimum Start Controls. Each HVAC system has controls that vary the start-up time of the system to just meet the temperature set point at time of occupancy.

Plans reference page/section: *M1*

✔ 9. Off-hour controls. Each zone is provided with thermostatic setback controls that are controlled by either an automatic time clock or programmable control system.

Plans reference page/section: *M1*

✔ 10.Shutoff damper controls. Both outdoor air supply and exhaust are equipped with not less than Class I motorized dampers.

Plans reference page/section: *M1*

✔ 11.Freeze Protection and Snow melt system controls. Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, include automatic controls capable of shutting off the systems when outdoor air temperatures meet code criteria.

Plans reference page/section: *N/A - No Freeze Protection*

✔ 12.Zone Isolation Controls. A system serving multiple occupancies or floors in the same building is independently zoned and equipped with isolation devices.

Plans reference page/section: *N/A - Single Occupancy*

✔ 13.Separate air distribution systems. Zones with special process temperature requirements and/or humidity requirements are served by separate air distribution systems from those serving zones requiring only comfort conditions; or shall include supplementary control provisions so that the primary systems may be specifically controlled for comfort purposes only.

Plans reference page/section: *N/A - Single Zone*

✔ 14.Humidity control. If a system is equipped with a means to add or remove moisture to maintain specific humidity levels in a zone or zones, a humidity control device is provided.

Plans reference page/section: *N/A - No Humidity Control*

✔ 15.Humidity control. Where a humidity control device exists it is set to prevent the use of fossil fuel or electricity to produce relative humidity in excess of 30 percent. Where a humidity control device is used for dehumidification, it is set to prevent the use of fossil fuel or electricity to reduce relative humidity below 60 percent.

Plans reference page/section: *N/A - No Humidity Control*

✔ 16.Humidity control. Where a humidity control device exists it is set to maintain a deadband of at least 10% relative humidity where no active humidification or dehumidification takes place.

Plans reference page/section: *N/A - No Humidity Control*

✔ 17.Ventilation. Ventilation, either natural or mechanical, is provided in accordance with Chapter 4 of the International Mechanical Code. Where mechanical ventilation is provided, the system has the capability to reduce the outdoor air supply to the minimum required by Chapter 4 of the International Mechanical Code.

Plans reference page/section: *N/A - 100Outside Air*

✔ 18.Demand controlled ventilation (DCV). DCV is required for spaces larger than 500 ft2 for simple systems and spaces larger than 150 ft2 for multiple zone systems.

Plans reference page/section: *N/A - 100Outside Air*

✔ 19.Kitchen hoods. Kitchen makeup is provided as required by the Oregon Mechanical Specialty Code.

Plans reference page/section: *N/A - No Kitchen Hoods*

✔ 20.Enclosed parking garage ventilation controls. In Group S-2, enclosed parking garages used for storing or handling automobiles employs automatic carbon monoxide sensing devices.

Plans reference page/section: *N/A - No Parking Garages*

✔ 21.Duct and plenum insulation and sealing. All supply and return air ducts and plenums are insulated with the specified insulation. When located within a building envelope assembly, the duct or plenum is separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation. All ducts, air handlers and filter boxes are sealed. Joints and seams comply with Section 603.9 of the International Mechanical Code.

✔ 22.Low-pressure duct systems. All longitudinal and transverse joints, seams and connections of low-pressure supply and return ducts are securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes installed in accordance with the manufacturer's installation instructions.

Plans reference page/section: *M1*

✔ 23.Medium-pressure duct systems. All ducts and plenums designed to operate medium-pressure are insulated and sealed in accordance with Section 503.2.7. Pressure classifications specific to the duct system are clearly indicated on the construction documents.

Plans reference page/section: *N/A - No Medium Pressure Duct*

✔ 24.High-pressure duct systems. Ducts designed to operate at high-pressure are insulated and sealed in accordance with Section 503.2.7. In addition, ducts and plenums are leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual.

Plans reference page/section: *N/A - No High Pressure Duct*

✔ 25.Air system balancing. Each supply air outlet and zone terminal device is equipped with means for air balancing in accordance with the requirements of IMC 603.17. Discharge dampers intended to modulate airflow are prohibited on constant volume fans and variable volume fans with motors 10 horsepower.

Plans reference page/section: *M1*

✔ 26.Manuals. The construction documents require that an operating and maintenance manual be provided to the building owner by the mechanical contractor. See long description for specifications.

Plans reference page/section: *M1*

✔ 27.Air System Design and Control. Each HVAC system having a total fan system motor nameplate hp exceeding 5 hp meets the provisions of Sections 503.2.10.1 through 503.2.10.2.

Plans reference page/section: *M1*

✔ 28.Allowable fan floor horsepower. Each HVAC system at fan system design conditions does not exceed the allowable fan system motor nameplate hp (Option 1) or fan system bhp (Option 2) as shown and calulated in requirement details.

Plans reference page/section: *M1*

✔ 29.Motor nameplate horsepower. For each fan, the selected fan motor is no larger than the first available motor size greater than the brake horsepower (bhp).

Plans reference page/section: *M1*

✔ 30.Large Volume Fan Systems. Fan systems over 8,000 (7 m3/s) cfm without direct expansion cooling coils that serve single zones reduce airflow based on space thermostat heating and cooling demand. A two-speed motor or variable frequency drive reduces airflow to a maximum 60 percent of peak airflow or minimum ventilation air requirement as required by Chapter 4 of the International Mechanical Code, whichever is greater.

Plans reference page/section: *N/A - No Fans above 8000 CFM*

✔ 31.All air-conditioning equipment and air-handling units with direct expansion cooling and a cooling capacity at ARI conditions greater than or equal to 110,000 Btu/h that serve single zones have their supply fan operation controlled according to code specific requirements.

Plans reference page/section: *N/A - No Mechanical Cooling*

Section 5: Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed mechanical alteration project has been designed to meet the 2014 Oregon Energy Efficiency Specialty Code, Chapter 8, requirements in COM*check* Version 4.0.7.0 and to comply with the mandatory requirements in the Requirements Checklist.

Clifford Hood V.P. Clifford Hood 10-19-17

Name - Title Signature Date

Section 6: Post Construction Compliance Statement

- ❑ HVAC record drawings of the actual installation, system capacities, calibration information, and performance data for each equipment provided to the owner.
- ❑ HVAC O&M documents for all mechanical equipment and system provided to the owner by the mechanical contractor.
- ❑ Written HVAC balancing and operations report provided to the owner.

The above post construction requirements have been completed.

Principal Mechanical Designer-Name	Signature	Date

Mechanical Permit Application

City of Portland, Oregon - Bureau of Development Services

1900 SW 4th Avenue, Portland, Oregon 97201 • 503-823-7300 • TTY 503-823-6868 • www.portlandoregon.gov/bds

This permit application expires if a permit is not obtained within 180 days after it has been accepted as complete.

Type of work

❑ New construction ❑ Addition/alteration/replacement

❑ Demolition ❑ Other:

Category of construction

❑ 1 & 2 family dwelling ❑ Commercial/industrial ❑ Accessory building

❑ Multifamily ❑ Master builder ❑ Other:

Job site information and location

Job no.: | Job address: Tarr 2946 Ne Columbia Blvd

City/State/ZIP: Portland OR 97211

Suite/bldg./apt. no.: | Project name: Tarr Ventilation

Cross street/directions to job site: Columbia Blvd

Subdivision: | Lot no. | Tax map/parcel no.

Description of work (example: upstairs bath fan/dryer exhaust)

Install 2 MUA Gas fired 7000 CFM units

Provide RS permit no.

☐ Property owner

Name: Tarr | E-mail:

Address: 2946 NE Columbia Blvd

City/State/ZIP: Portland OR 97222

Phone: | FAX:

Owner installation: This installation is being made on property that I own, which is not intended for sale, lease, rent, or exchange.

Owner signature: Date:

☐ Contractor ☐ Subcontractor

Business name: Portland Mechanical | E-mail: paulh@pmc-g.com

Address: 2000 SE Hanna Harvester Dr

City/State/ZIP: Milwaukie OR 97222

Phone: 503-804-6569 | FAX:

Lic. no. 151807 | CCB lic. no.

Authorized signature: _____

Print name: Paul Hettervig Date:

☐ Applicant ☐ Contact Person

Business name: Portland Mechanical Contractors

Contact name: Paul Hettervig

Address: 2000 SE Hanna Harvester Dr

City/State/ZIP: Milwaukie OR 97222

Phone: 503-804-6569 | FAX:

E-mail: paulh@pmc-g.com

Commercial Fee Schedule - Use Checklist

Mechanical permit fees* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar of all mechanical materials, equipment, labor, overhead and profit.

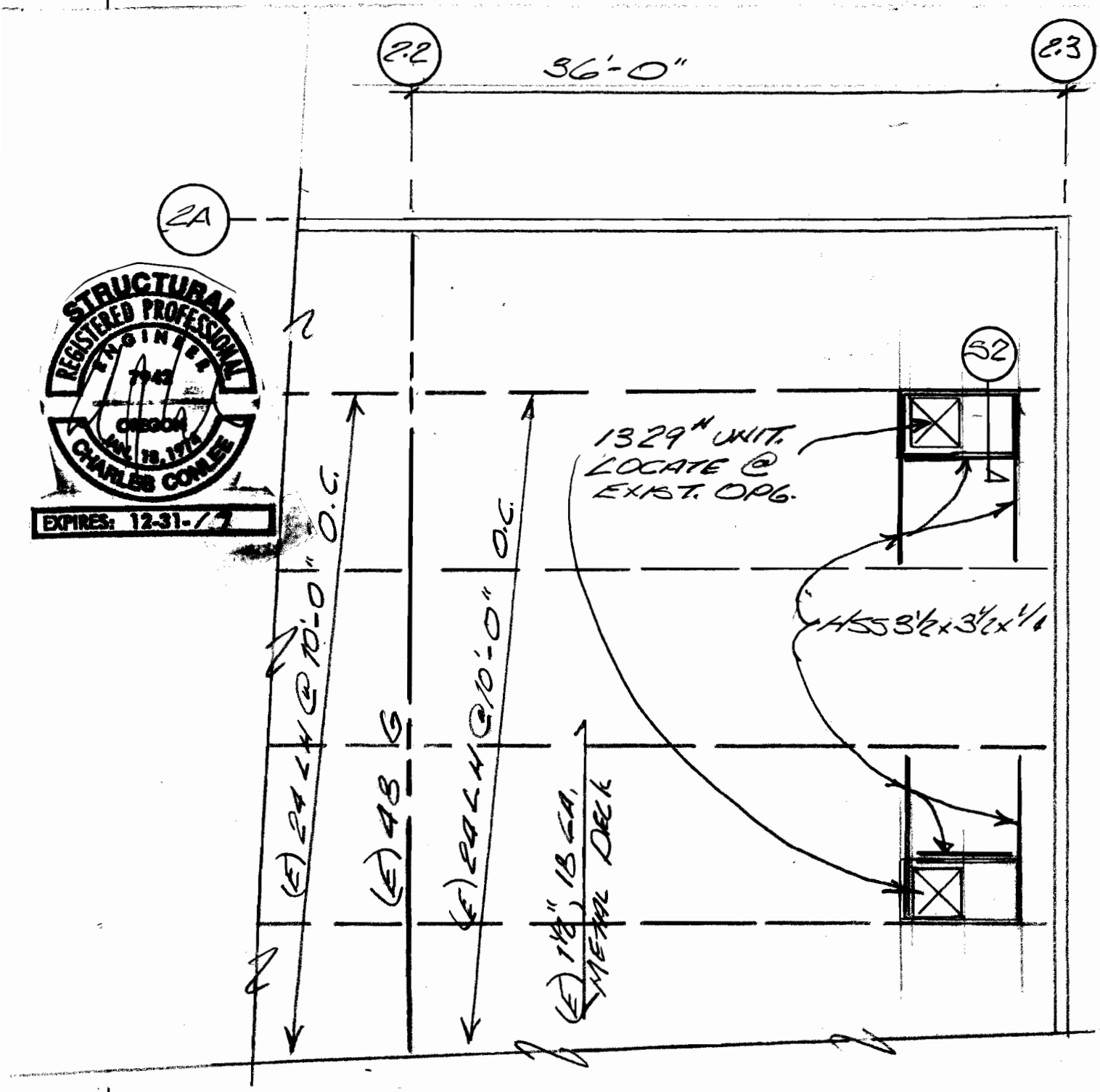
Value: $ 59,980.00

Residential Equipment / Systems Fees

For special information use checklist

Description	Qty.	Fee	Total
Heating / cooling			
Air conditioner (site plan required)		$26	
Furnace / burner including duct work / vent / liner		$55	
Heat pump (site plan required)		$51	
Air handling unit		$26	
Hydronic hot water system		$32	
Residential boiler (radiator or hydronic) includes piping		$32	
Unit heaters (fuel type, not electric) in-wall, in-duct, suspended, etc.		$26	
Vent for appliance other than furnace		$22	
Alteration of existing HVAC system		$32	
Other fuel appliances			
Decorative gas fireplace		$26	
Flue vent for water heater or gas fireplace		$22	
Wood / pellet stove		$57	
Gas or wood fireplace / insert		$57	
Chimney / liner / flue / vent		$22	
Other:		$32	
Environmental exhaust and ventilation			
Range hood / other kitchen equipment		$14	
Clothes dryer exhaust		$14	
Single-duct exhaust (bathrooms, toilet compartments, utility rooms)		$14	
Exhaust system apart from Heating or AC		$22	
Other:		$32	
Gas fuel piping			
$15 for the first four, $2.70 for each additional. Please indicate number of fuel gas piping outlets below:			
Furnace, etc.			
Gas heat pump			
Wall / suspended / unit heater			
Water heater / boiler			
Fireplace			
Range			
Barbecue			
Clothes dryer			
Other:			
Other appliances			
Including oil tanks, gas and diesel generators, gas and electric kilns, gas appliances / equipment not included above		$32	
Mechanical permit fees			
		Subtotal	
		Minimum permit fee ($95)	
		Commercial plan review (60% of permit fee)	
		State surcharge (12% of permit fee)	
		TOTAL PERMIT FEE	

CONLEE ENGINEERS, INC.	Client PMC	Sheet S1
	Project TARR VENT UPGRADE	Date 10.17.17
	Subject ROOF FRAMING PLAN	By CJC



STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 7143 OREGON JAN. 19, 1975 CHARLES CONLEE

EXPIRES: 12-31-17

S1 ROOF FRAMING PLAN

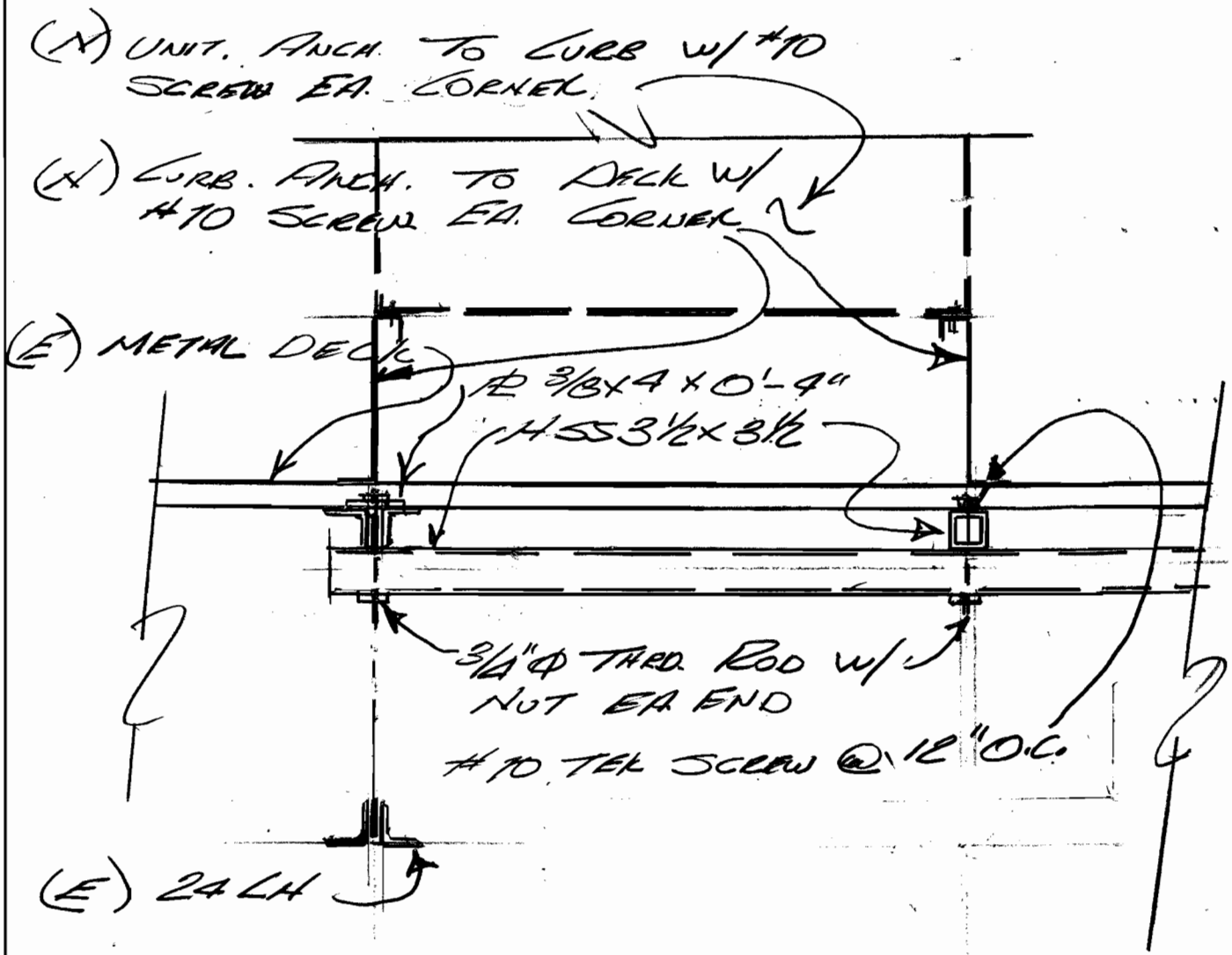
1/8" = 1'-0"

N

CONLEE ENGINEERS, INC.

Client PMC
Project TARR VENT UPGRADE
Subject SECTION

Sheet S2
Date 10.17.17
By CLC



NOTE: FIELD VERIFY 'AS-BUILT' CONDITIONS BEFORE FABRICATION.

S2 SECTION
1" = 1'-0"

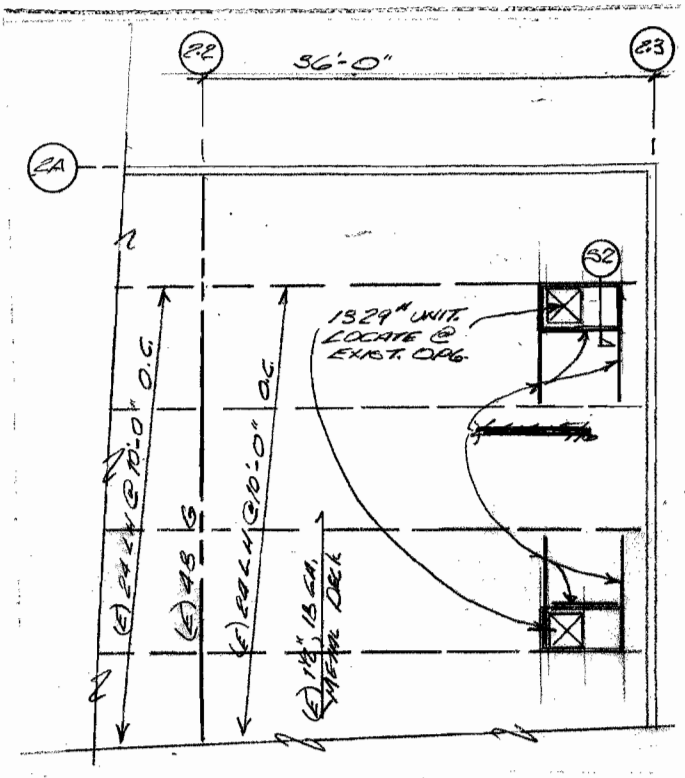
STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 7147 OREGON JULY 19, 1975 CHARLES CONLEE
EXPIRES: 12-31-17

CONLEE ENGINEERS, INC.

Client PMC
Project TARR VENT UPGRADE
Subject Ck. JOISTS

Sheet 1
Date 10.17.17
By CLC

CK (E) 24LH W/ UNIT



S7 ROOF FRAMING PLAN
1/8" = 1'-0"

N

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 7947 OREGON JAN. 19, 1979 CHARLES CONLEE
EXPIRES: 12-31-17

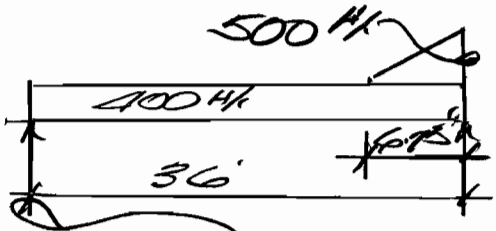
DESIGN LOAD

$w_D = 10'(15^{\#}/_{ft}) = 150$

$w_S = 10(25) = 250$

$w_l = 400^{\#}/_{ft}$

$w_D = 10'(50^{\#}/_{ft}) = 500^{\#}/_{ft}$



$R_L = 400(36/2) + \frac{6.75}{2}(500)\frac{6.75}{3} = 7305^{\#}$

$M_{MAX} = \frac{(7305)^2}{2(400)} = \frac{66,712}{36}$ 1-#

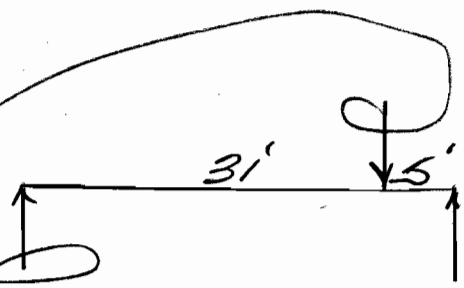
UNIT LOAD @ 1329#

$P = \frac{8}{10}(1329^{\#}) = 1063^{\#}$

$R_L = 1063(5/36) = 148^{\#}$

$M_u = 148(18) = 2658$ 1-#

$\Delta M = \frac{2658}{66,712} = 0.04 < 5\% \therefore$ O.K



Grilles/Registers/Diffusers Submittals

Job Name: Tarr - Production Room Ventilation Upgrade
Customer: PMC
Date Printed: 10/19/2017
Spec Section: 15 - HVAC

Contact: 2220 SE NINTH AVENUE
PORTLAND,, OR 97214

price®

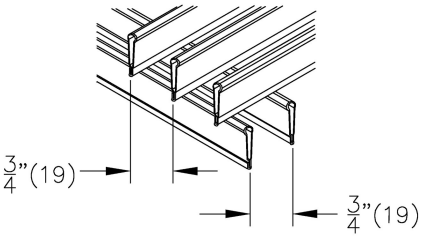
All-In-One
Detailed Submittal Schedule
Grilles/Registers/Diffusers

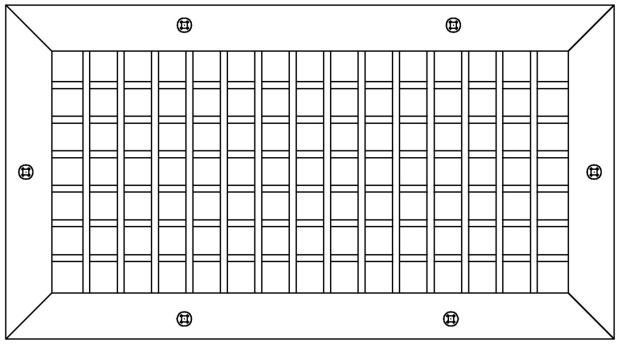
#	Qty	Model	Tag	Description	Unit Size	Border	Pattern	Finish	Accessories
1	2	520D	HS w/ OBD	Louvered Steel Dbl Deflec Reg W/Damp, 3/4" Spacing	20.000, 10.000	F	S	B15	SW
Desc: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B15 - Aluminum - Powder Coat									
2	2	520D	HS w/ OBD	Louvered Steel Dbl Deflec Reg W/Damp, 3/4" Spacing	22.000, 10.000	F	S	B15	SW
Desc: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B15 - Aluminum - Powder Coat									
3	5	520D	HS w/ OBD	Louvered Steel Dbl Deflec Reg W/Damp, 3/4" Spacing	22.000, 12.000	F	S	B15	SW
Desc: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B15 - Aluminum - Powder Coat									
4	2	520D	HS w/ OBD	Louvered Steel Dbl Deflec Reg W/Damp, 3/4" Spacing	26.000, 14.000	F	S	B15	SW
Desc: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B15 - Aluminum - Powder Coat									

520D Louvered Steel Supply Register – 3/4" Blade Spacing, Double Deflection

Core Style:

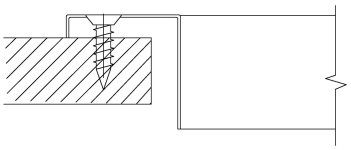
Double Deflection





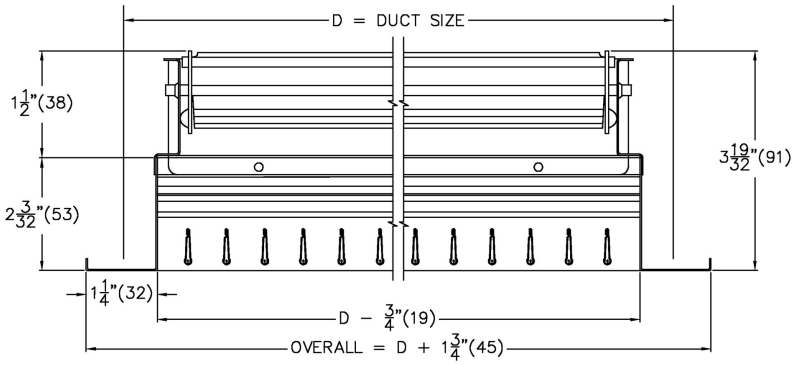
Fastening:

A: Countersunk Screwholes with Screw



Border: F

1 1/4" (32) Flat Frame



Material:

- Steel

Finish:

- B15 - Aluminum Powder Coat

Notes:

- Front blades parallel to Short dimension
- Individually adjustable roll formed blades on 3/4" (19) centers
- VCS3 opposed blade damper, coated steel
- Factory tolerance ± 1/32" (1)
- Standard Construction with a Mullion: A mullion is provided when nominal size grille dimension exceed 24" (610). For uneven nominal size grille dimensions. e.g 45x6, the mullion is positioned 1/2" (12) from the center of the grille

PROJECT: Tarr - Production Room Ventilation Upgrade **SUBMITTAL NO:** 258306 **SUBMITTAL DATE:** 10/19/2017
ENGINEER: **CUSTOMER:** PMC
DESCRIPTION: Louvered Steel Dbl Deflec Reg W/Damp, 3/4" Spacing
520D//I/20.000,22.000,26.000/10.000,12.000,14.000/F/S////A/SW/B15

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.
Information within this document is subject to change without notice.

SUBMITTAL

Job Title: **TARR LLC**

Contractor: PMC
Elevation: (ft) 203
Date: 10/18/2017
Submitted By: Aaron Cormack

JOHNSON AIR PRODUCTS
2220 SE 9TH AVENUE
PO BOX 15098
PORTLAND, OR 97293
US
Phone: (503)234-5071
Fax: (503)233-0451
Email Address: acormack@johnsonair.com

SUBMITTAL NOTES:
** 10/18/17 - MAU (ALT. Lower Temp. Rise) Final Order Submittal **

IGX-115-H22

CONSTRUCTION FEATURES AND ACCESSORIES

Unit Overview

Model	Airflow (CFM)	Heating	Cooling	Electrical V/C/P
IGX-115-H22	7,000	Indirect Gas	No Cooling	460/60/3

Features
- Exterior housing constructed of galvanized steel
- Removable access panels
- Painted or galvanized steel blower and bearing supports
- Forward curved steel blower and motor
- Fan assembly is mounted on neoprene vibration isolators
- Motor pulleys are adjustable through 15 hp and fixed for 20 hp and greater
- Fan shaft is mounted in permanently lubricated ball bearings (up through size 118) or ball bearing pillow blocks (size 120 and greater)
- Static free belts
- Corrosion resistant fasteners are standard
- Disconnect mounted by factory

Options and Accessories
- Air Flow Arrangement: Outdoor Air Only
- Furnace Control: 4 to 1 Electronic
- Weatherhood: Birdscreen
- Filter Section: MERV8, 20x20x2 - (6)
- Outdoor Air Intake Position: End
- Discharge Position: Downblast
- Coating: Galvanized
- Insulation: Duct Liner - Heat Source On
- Outlet Damper: Non-Insulated (ships loose)
- Access Side: Right-Hand
- Control Center
- Heat Inlet Air Sensor
- Remote Panel: Industrial (ships loose)
- Mounting: GPI-40.5/82.5-G12
- Curb Includes: 1 in. Insul.
- Unit Warranty: 1 Yr (Standard)

SPECIAL DESIGN
SDR: M1700208 - EXPLOSION PROOF MOTOR
Explosion proof motor in place of standard ODP motor.

Only the motor is explosion proof, all other items and wiring will not be explosion proof

NOTES:

Integral unit disconnect is supplied as a standard.

Birdscreen weatherhoods ship knocked down and require field installation.

Unit weight does NOT include skid/crating and may vary by 15% based on selected options.

PERFORMANCE AND SPECIFICATIONS

Description/Arrangement

Model	Qty	Unit Weight (lb)	Discharge Position	Air Flow Arrangement	Unit Arrangement
IGX-115-H22	2	1,329	Downblast	Outdoor Air Only	Horizontal

Design Conditions

Elevation (ft)	Summer DB (F)	Summer WB (F)	Winter DB (F)
203	91.8	70.5	21.8

Air Performance

Type	Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating hp (per motor)	Motor Quantity/HP (per motor)	Supply Fan Type/Quantity
Supply	7,000	0.5	0.948	933	4.54	Qty 1/7-1/2	

Unit Pressure Drop (in. wg)

Air Stream	Weatherhood	Damper Section	Filter Section	Cooling Section	Heating Section
Supply	0.033	0.05	0.242	0	0.123

Sound Performance in Accordance with AMCA

Fan	Sound Power by Octave Band								Lwa	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Supply	91	91	89	86	83	81	78	72	89	78	33

Electrical/Motor Specifications

V/C/P	Unit MCA (amps)	Unit MOP (amps)	Enclosure	Supply Motor RPM	Supply Efficiency
460/60/3	14.6	25	ODP	1725	Premium

Heating/Cooling Specifications

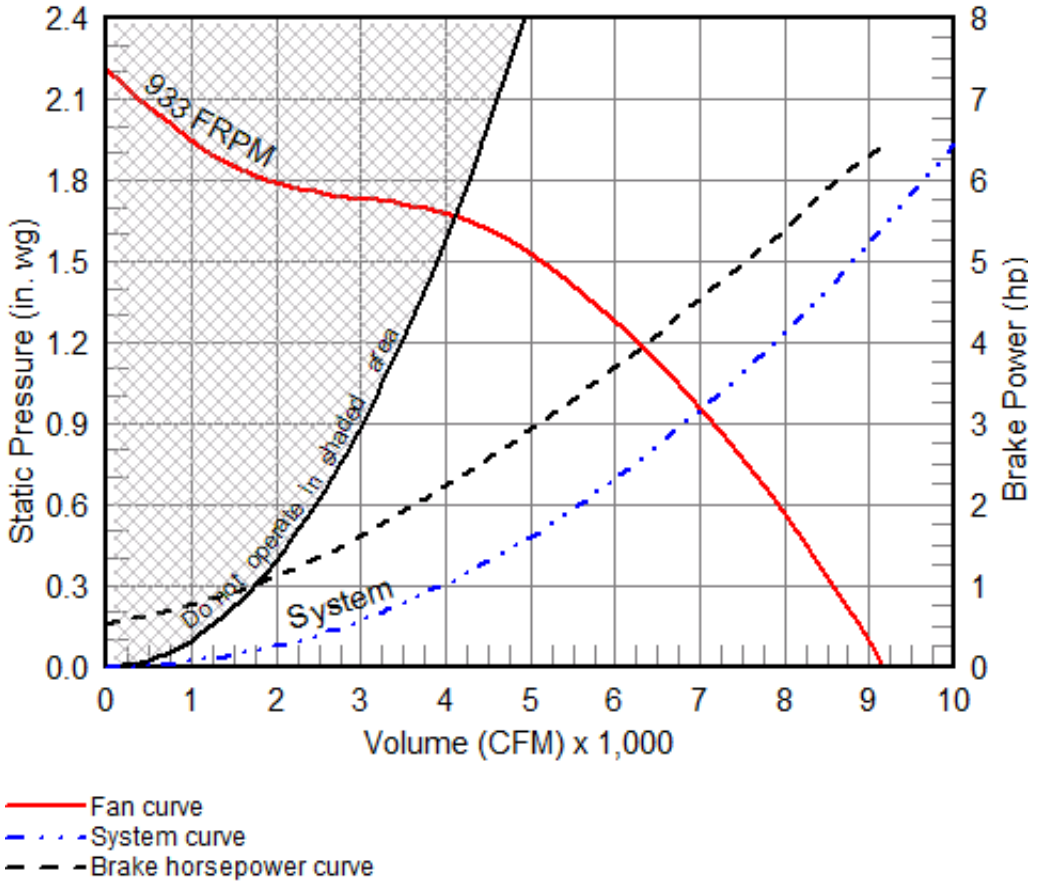
Heating Type	Gas Type	Input (MBH)	Output (MBH)	LAT (F)	Temp. Rise (F)	Furnace Size (MBH)	Furnace Control
Indirect Gas	Natural	350.0	280.0	58.8	36.8	350.0	4 to 1 Electronic

Note: Filter pressure drop is for clean filters.
Note: Weatherhood pressure drop is for clean filters.

FAN CURVES

Supply Fan Performance

Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating hp (per motor)	Motor hp (per motor)	Supply Fan Type	Supply Fan Quantity
7,000	0.5	0.948	933	4.54	7-1/2	Forward Curve	1



HEATING PERFORMANCE

Indirect Gas Heating

Heating Type	Gas Type	Input (MBH)	Output (MBH)	LAT (F)	Temp.Rise (F)	Furnace Control
Indirect Gas	Natural	350.0	280.0	58.8	36.8	4 to 1 Electronic

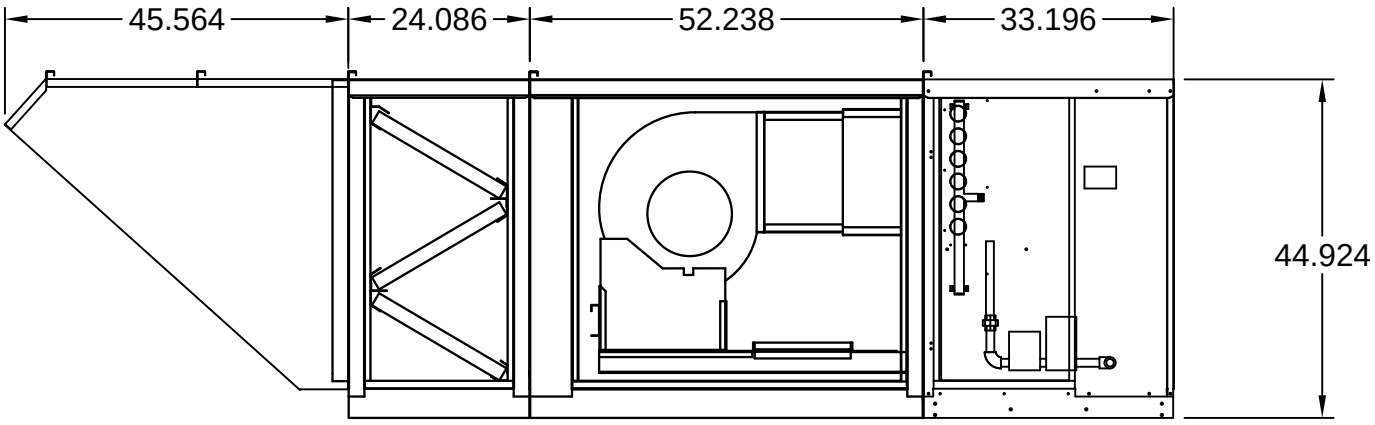
Indirect Gas Unit Details

This unit will come equipped with the following:

- ETL Listed to ANSI Standard Z83.8 and CSA 2.6
- High Thermal Efficiency
- Direct Spark Ignition
- Power Venting
- 24 Volt Control Power
- Aluminized Heat Exchanger Tubes
- At least 6 in. wg of natural gas pressure (14 in. wg for LP) is required at the units gas connection in order to achieve maximum performance

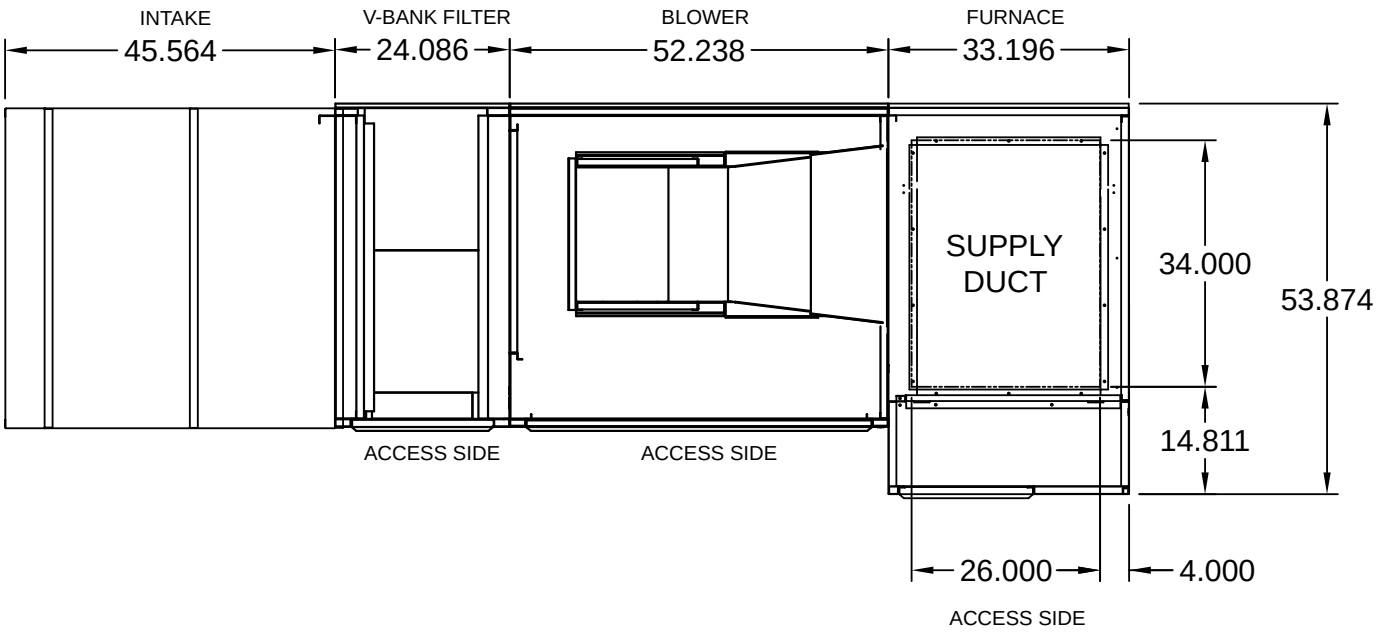
Heating Details

Heat Exch. Material	Aluminized Steel
Unit Installation	Outdoor
Outdoor Venting	Standard
Furnace Control	4 to 1 Electronic



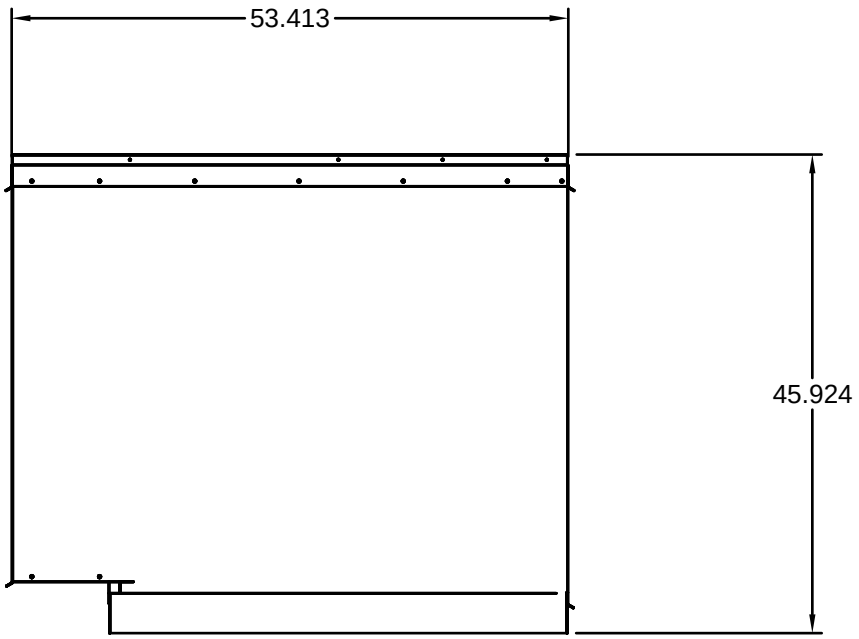
ELEVATION VIEW

*Standard configuration for unit access is on the right-hand side, when looking into the unit intake in the direction of airflow.
*Note: Order of unit sections is from intake of unit to discharge of unit.
*Sections included on this unit: Weatherhood Section, Filter Section, Blower Section, Furnace 1 Section
*Insulation: Duct Liner, from Furnace Section through end of unit.



PLAN VIEW

* Standard configuration for unit access is on the right-hand side, when looking into the unit intake in the direction of airflow.

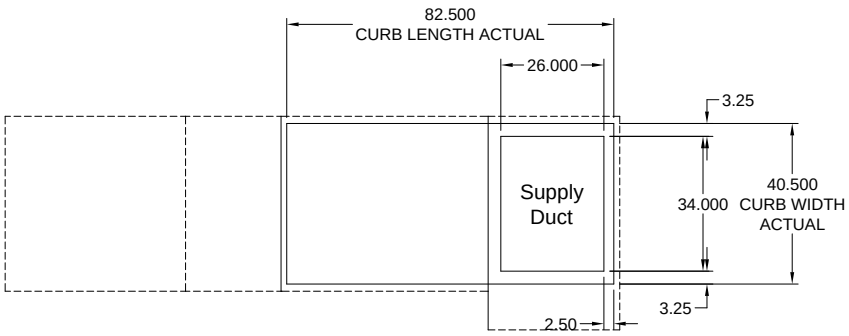


END VIEW

NOTE: Roof Opening Requirements:

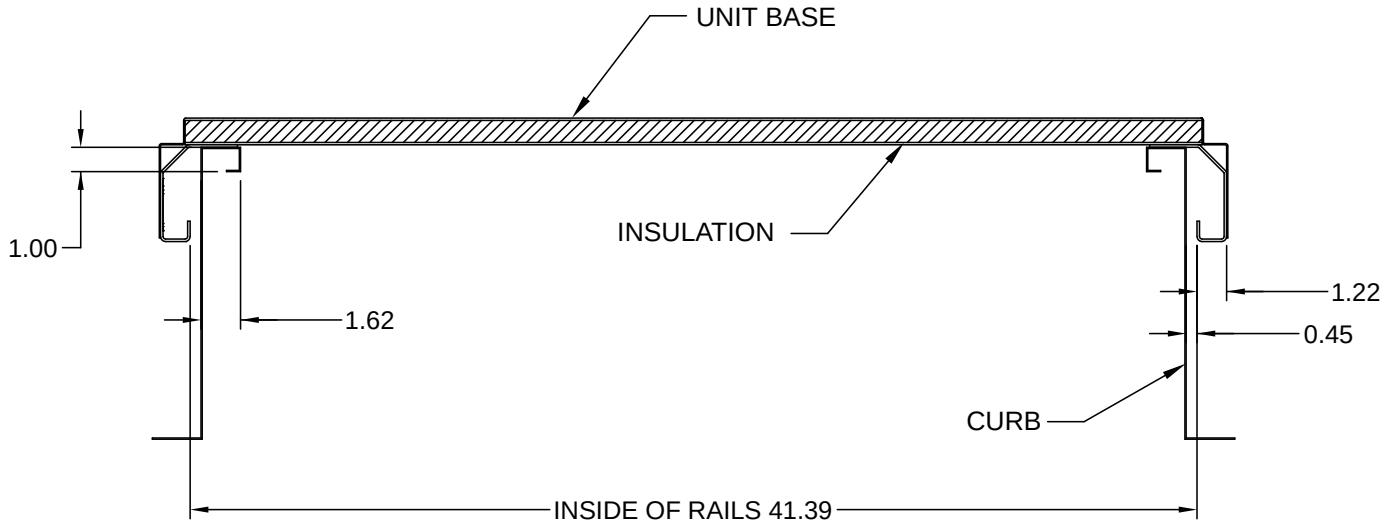
Minimum Roof Opening: The minimum roof opening size is the illustrated duct diameter plus 0.25 in. on all sides.
For example: If the duct size is 14 x 14 in. square, the minimum roof opening size is 14.5 x 14.5 in. square.

Maximum Roof Opening: There must be a minimum perimeter of 1.75 in. between the roof opening and the roof curb.
For example: If the roof curb is 75 x 30 in. square, the maximum roof opening is 71.5 x 26.5 in. inches square.



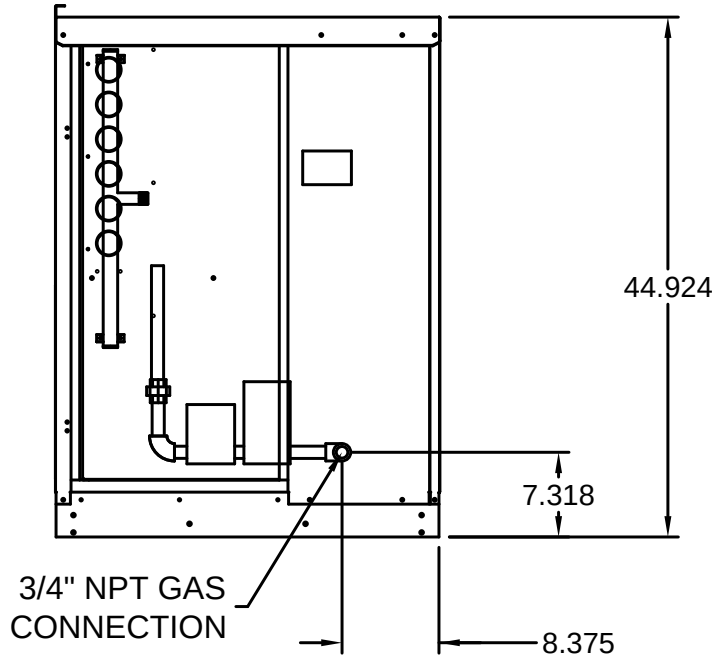
NOTE: The weatherhood and filter sections of the make-up air unit are not supported by the curb.
This is by design, in order to help alleviate water infiltration issues.

FOOTPRINT VIEW

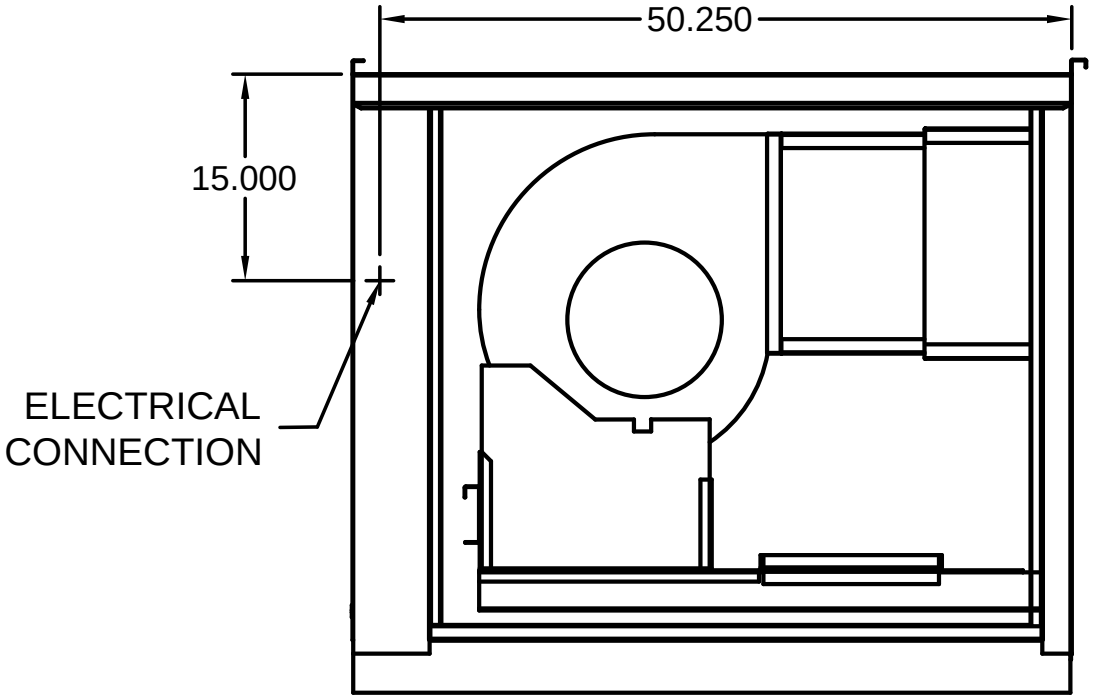


CURB VIEW

Notes: All dimensions shown are in in.'s.
Curb Dimenision: Length = 82.5 in. Width = 40.5 in. Height = 12 in.



Gas Connections



Electrical Connections

Recommended Minimum Combustible Clearances				
	Floor	**Top**	**Sides**	**Ends**
Indirect Fired Units*	0 in.	0 in.	0 in.	0 in.

Clearance to combustibles is defined as the minimum distance required between the heating source and the adjacent combustible surfaces to ensure the adjacent surface's temperature does not exceed 90 F above the ambient temperature.

***Reference venting guidelines for combustion blower clearances.**

Recommended Minimum Service Clearances	
Housing 32 and less	**42 in. on the controls side of the unit**

To ensure ample space for component removal (evaporative cooling media, coils, filters, etc.), service clearances should be 6 in. wider than the width of the module itself.

EQUIPMENT SCHEDULE

Tempered Make-Up Air Unit

Mark: MAU (Lower Temp Rise)

Qty	Greenheck Model	Volume	External SP	Total SP	FRPM	Operating Power	Weight
2	IGX-115-H22	7,000 CFM	0.5 in. wg	0.948 in. wg	933	4.54 hp	1,329 lb

Motor Information					MCA	MOP
Size	V/C/P	Enclosure	Motor RPM	Windings		
7 1/2 hp	460/60/3	ODP	1725	1	14.6	25

Heating

Type	Gas Type	Temperature			Energy			Connection Gas	Building Gas Pressure	Control Access
		Winter DB	Max Δ	Max LAT	Input	Output	Efficiency			
Indirect Gas	Natural	21.8 F	36.8 F	58.8 F	350.0 MBH	280.0 MBH	80%	3/4"	1/2PSI	Right Hand

Outlet Sound Power By Octave Band								LwA	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
90.6	*91.2*	*88.6*	*86*	*83.4*	*81.4*	*78.2*	*71.6*	*89.2*	*78.2*	*32.5*

- *LwA - A weighted sound power level based on ANSI S1.4*
- *dBA - A weighted sound pressure level base on 11.f dB attenuation per octabe band at 5.0 ft.*
- *Noise Criteria (NC) based on an average attenuation of 11.5 dB per octabe band at 5.0 ft.*

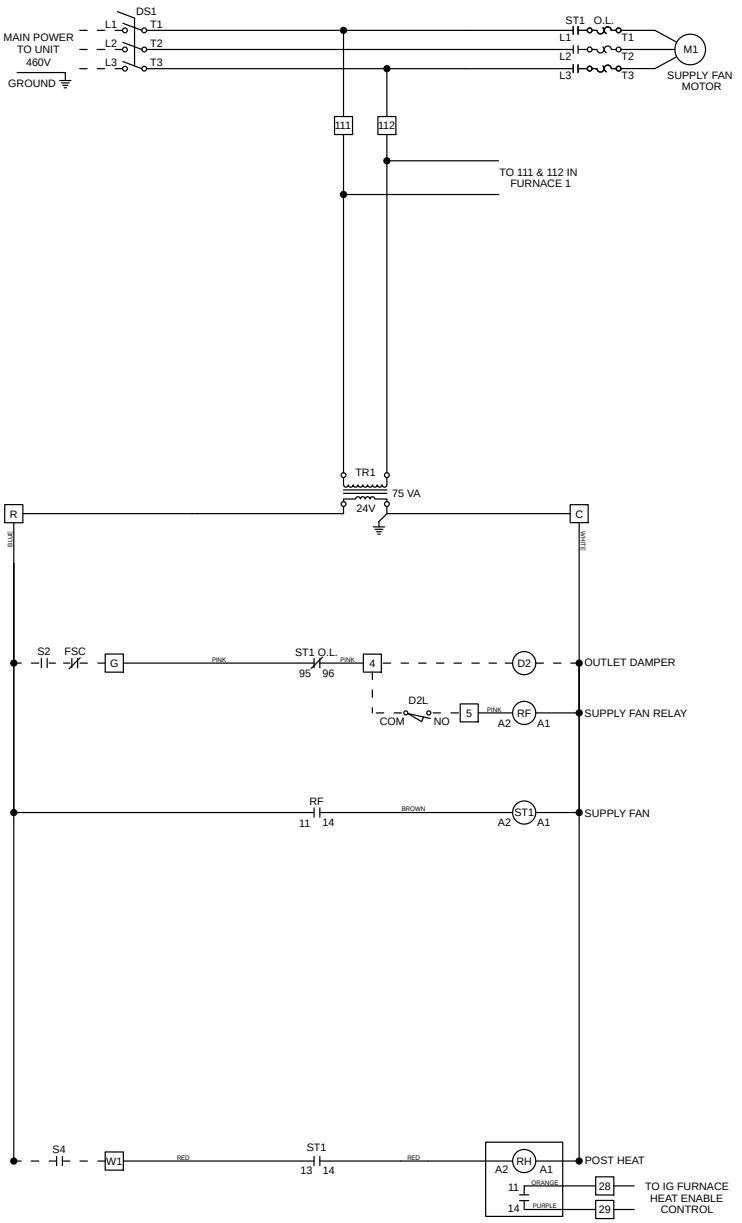
OPTIONS AND ACCESSORIES

Air Flow Arrangement: Outdoor Air Only
Weatherhood: Birdscreen
Filter Section: MERV8, 20x20x2 - (6)
Outdoor Air Intake Position: End
Discharge Position: Downblast
Coating: Galvanized
Insulation: Duct Liner - Heat Source On
Outlet Damper: Non-Insulated (ships loose)
Access Side: Right-Hand
Control Center
Heat Inlet Air Sensor
Remote Panel: Industrial (ships loose)
Indirect Gas Options/Accessories
Outdoor Install.-Standard Vent.
Heat Exchanger: Aluminized Steel
Furnace Control: 4 to 1 Electronic
Temperature Control: Discharge
Mounting: GPI-40.5/82.5-G12
Curb Includes: 1 in. Insul.
Special Design Request(s)
SDR: M1700208 - EXPLOSION PROOF MOTOR

SPECIAL DESIGN REQUESTS

SDR: M1700208 - EXPLOSION PROOF MOTOR

Wiring Diagram



GREENHECK
Building Value in Air.

Wiring Diagram Code:

GI14N602A040N10AU06

CAUTION

UNIT SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C.
POWER MUST BE OFF WHILE SERVICING.

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.

FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.

FIELD WIRED – – – – –
FACTORY SUPPLIED AND WIRED ————

WIRE COLOR CODE

BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

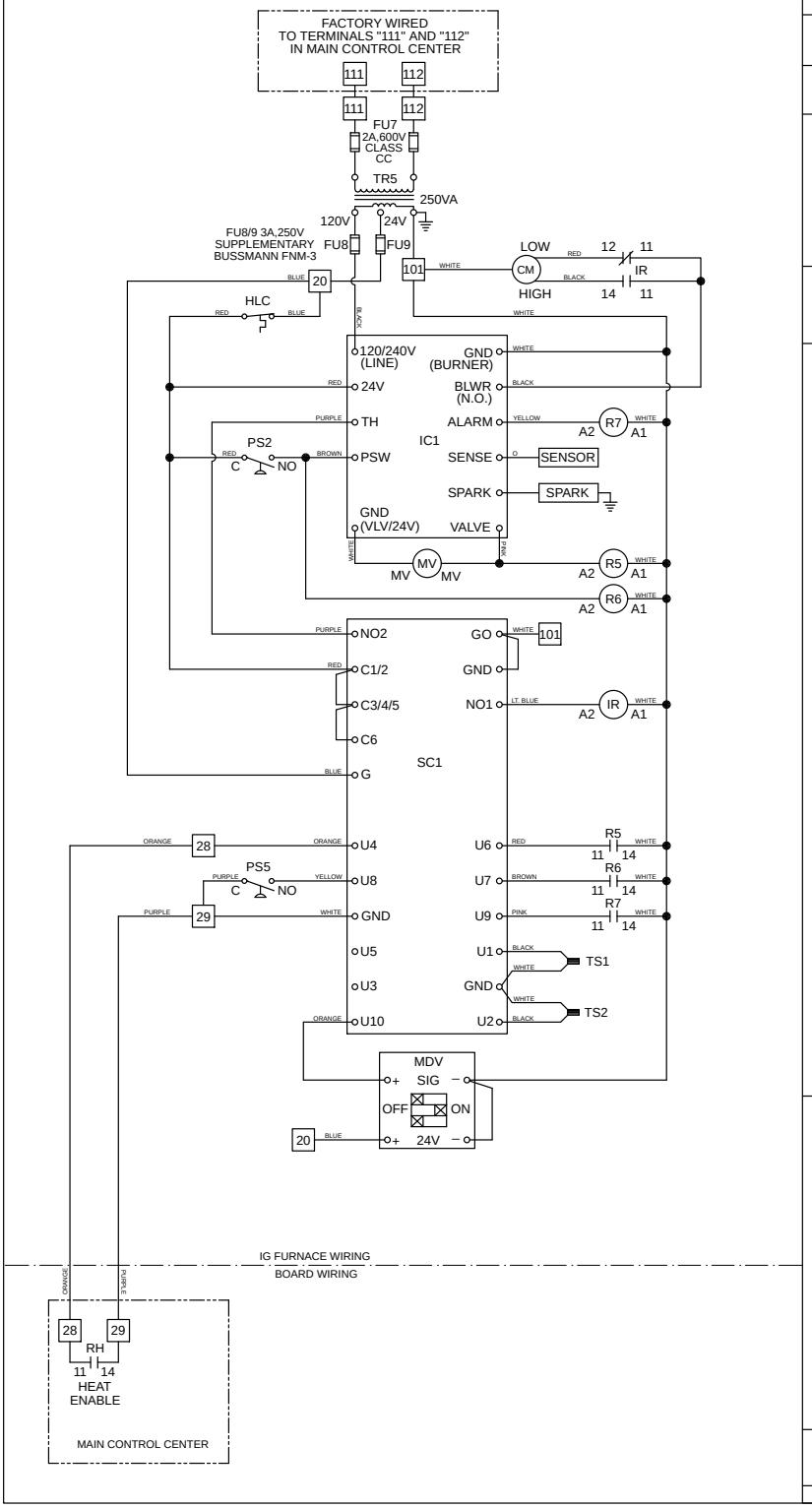
LEGEND

D2	OUTLET DAMPER
D2L	OUTLET DAMPER LIMIT
DS1	MAIN DISCONNECT SWITCH
FSC	FIRE SYSTEM CONTACT
FU#	FUSE
M#	MOTOR
OL#	MOTOR OVERLOAD
RF	SUPPLY FAN RELAY
RH	HEAT RELAY
S2	FAN SWITCH
S4	HEAT AND COOL SWITCH
ST#	MOTOR STARTER
TR#	TRANSFORMER
TS4	INLET AIR SENSOR - HEAT

Template Drawing: U06 DOC NUMBER: ---- REV: ----

Manufacturer reserves right to change, alter, or improve this product at any time.

INDIRECT GAS WIRING DIAGRAM
FURNACE 1 - 4:1 MODULATING



GREENHECK
Building Value in Air.

Wiring Diagram Code:

G6KX1X1MX00000S07

CAUTION

UNIT SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C.
POWER MUST BE OFF WHILE SERVICING.

NOTES

USE COPPER CONDUTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.

FIELD CONTROL WIRING RESISTANCE SHOULD
NOT EXCEED 0.75 OHM.

FIELD WIRED – – – – –
FACTORY SUPPLIED AND WIRED ————

WIRE COLOR CODE

BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

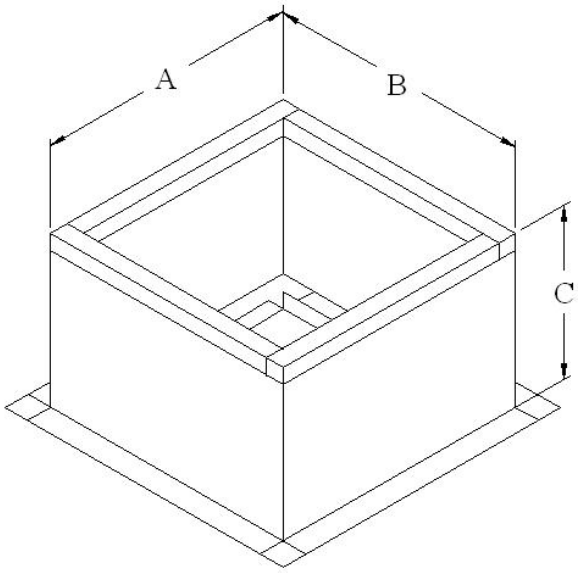
CM	COMBUSTION BLOWER MOTOR
FU#	FUSE(S)
HLC	HIGH TEMPERATURE LIMIT CONTROL
IC1	IGNITION CONTROL
IR	INDUCTION RELAY
MDV	MODULATING VALVE
MV	MAIN GAS VALVE
PS2	COMBUSTION AIR PROVING SWITCH
PS5	HIGH SPEED PRESSURE SWITCH
R5	MAIN GAS VALVE MONITORING
R6	LOW SPEED PRESSURE SWITCH
R7	IGNITION CONTROLLER ALARM MONITORING
SC1	STAGE CONTROLLER
TR#	TRANSFORMER(S)
TS1	OUTDOOR AIR TEMP SENSOR
TS2	DISCHARGE AIR TEMP SENSOR

DDC Code: Version - IGFv1.01

GSFXXX

Wiring Template: S07

Manufacturer reserves right to change, alter, or improve this product at any time.



Roof Curb - GPI

CONSTRUCTION FEATURES

• Welded aluminum (0.064 in.) or galvanized steel (18 ga.) • Straight sided • 2 in. mounting flange • 1 in., 3 lb. density insulation • Wood nailer

Dimension	Description	Value (in.)
A	Length	82.5
B	Width	40.5
C	Height	12

*** All dimensions are actual**

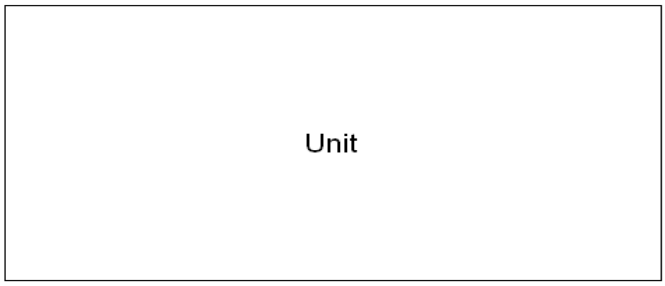
GPI Curb Weight: 51 lb

ADDITIONAL NOTES

• The Roof Opening Dimension may NOT match the Structural Roof Support Dimension.
▪ Curbs with length > 143.5 will ship knocked-down
▪ Curbs with length > 119.5 may ship knocked-down, dependent on manufacturing location

Corner Weights

271 lb 318 lb



340 lb 400 lb

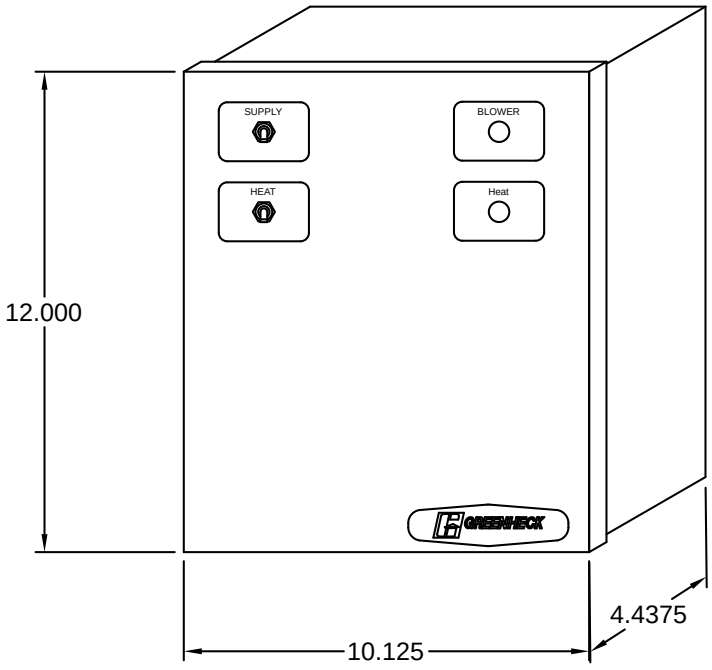
Note: Estimated corner weights are shown looking down on unit and airflow from left to right. Weights are applied at the base of the unit. Images not drawn to scale.

TSCP

REMOTE CONTROL PANEL

STANDARD CONSTRUCTION FEATURES

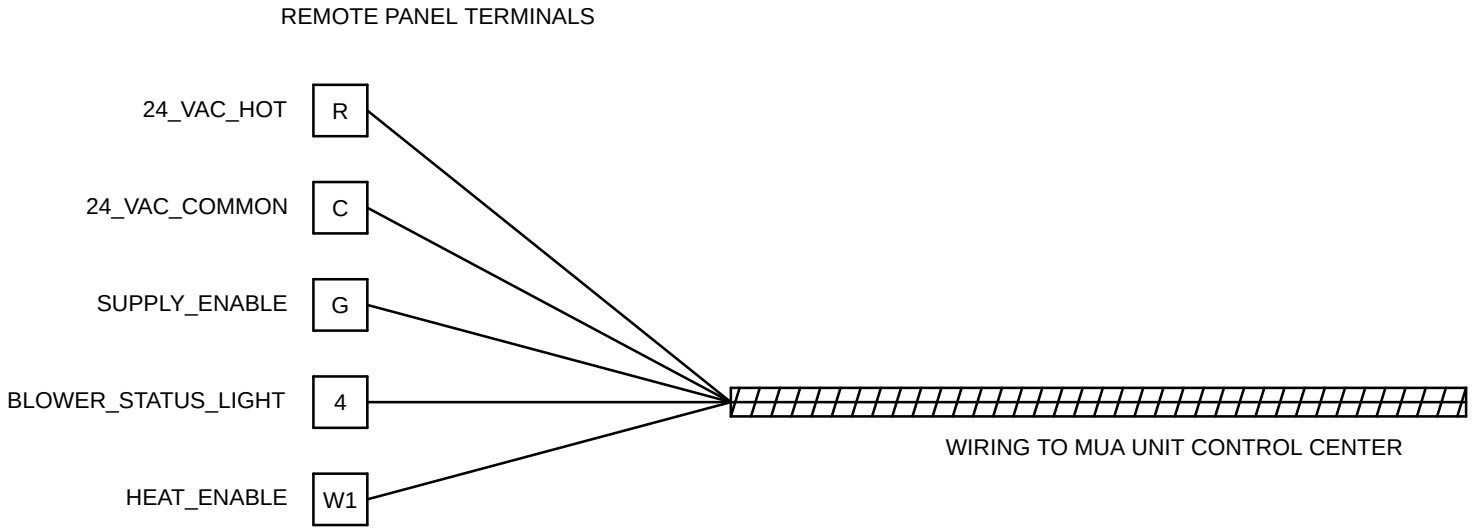
- Galvaneal Steel with Baked Enamel Finish.
- Numbered terminal strip to match unit wiring.



*** Location of switches, lights and controls may vary.**

NOTES: All dimensions shown are in units of inches

Remote Panel Wiring Requirements



The wiring drawings details the number of the wires and the type of wire that needs to be run from the unit control center to the panel. A detailed wiring schematic will be provided with the panel when the unit ships.

Warranty Information

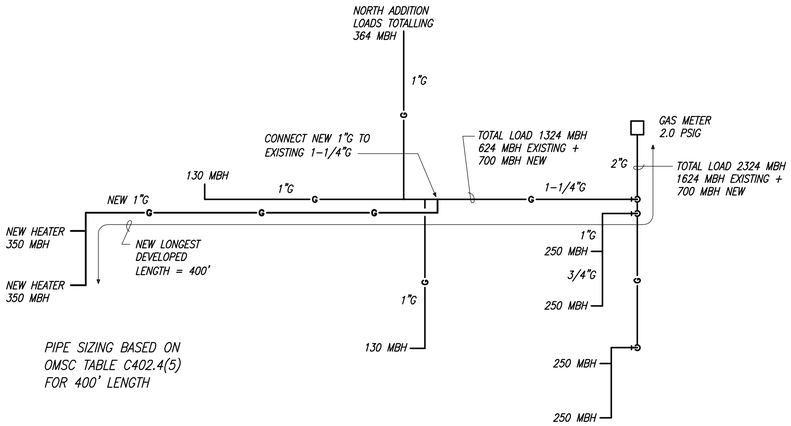
Limited Warranty - Unit

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of 1 year(s) from the purchase date. Any component which proves defective during the warranty period will be repaired, or replaced, at Greenheck's sole option when returned to our factory, transportation prepaid.

The warranty does not include labor costs associated with troubleshooting, removal, or installation. Greenheck will not be liable for any consequential, punitive, or incidental damages resulting from use, repair, or operation of any Greenheck product.

This warranty is exclusive, and is in lieu of all other warranties, whether written, oral or implied, including the warranty of merchantability and the warranty of fitness for a particular purpose.

HOOD–MCNEES INC
1923 Southeast Stark Street
Portland, OR 97214–1549
Tel: (503) 231–7825
Fax: (503) 231–8309

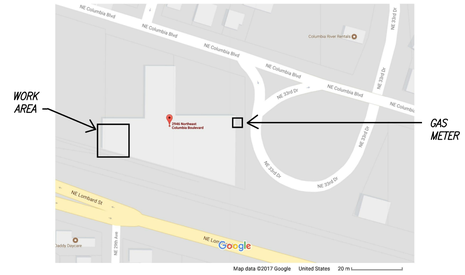


2 M1 Gas Piping Diagram

Scale: None

MECHANICAL EQUIPMENT SCHEDULE

DESIG	DESCRIPTION	BASIS OF DESIGN
MAU–1 QTY=2	MAKE–UP AIR UNIT, INDIRECT FIRED GAS 7000 CFM @ 0.5" ESP, 4.54 BHP, 7.5 MHP 350 MBH INPUT, 80% EFFICIENCY PROVCIDE WITH SHUTOFF DAMPER, MERVE 8 FILTERS, REMOTE CONTROL PANEL, DISCHARGE TEMPERATURE CONTROL, AND EXPLOSION PROOF MOTOR.	GREENHECK IGX–115–H22 480V–3ø 15.6 MCA 25 MOCP



0 M1 Site Plan

Scale: None

ENERGY CODE COMPLIANCE STATEMENTS

503.2.4.1: Provide each zone with individual thermostat controls that respond to the temperature within the zone.

503.2.4.2: Set each thermostat with automatic heating/cooling change over control for a 5 degree dead band within which the supply of heating and cooling energy to the zone is capable of being shut off or reduced to a minimum.

503.2.4.3: Provide each HVAC system with optimum start control to vary start–up time of the system to just meet the temperature set point at time of occupancy.

503.2.4.4: Provide each zone with programmed or automatic time clock setback controls.

503.2.4.5: Provide Class I motorized dampers with maximum leakage rate of 4 CFM per SF at 1.0 inch water gauge (w.g.) when tested per AMCA 500D, that will automatically shut when system or spaces served are not in use.

503.2.5: Provide ventilation controls capable of reducing outdoor air supply to minimum levels required by Chapter 4 of the Mechanical Code.

503.2.5.1: Provide demand controlled ventilation for high density spaces (more than 25 people per 1000 SF) larger than 500 SF for simple systems and 150 SF for multiple zone systems.

503.2.7: Provide R–5 duct insulation for all ducts located in unconditioned space. Provide R–8 duct insulation for all ducts located outside the building. Seal all joints and seams per 603.9 of the Mechanical Code.

503.2.7.1.1: Securely fasten and seal all supply and return duct longitudinal and transverse joints, seams, and connections with welds, gaskets, mastics (adhesives), mastic–plus–embedded–fabric systems or tapes (installed in accordance with the manufacturer's installation instructions.)

503.2.9.1: Provide means of balancing air volume at each outlet.

503.2.9.3: Provide building owner with operating and maintenance manuals with the following: Equipment capacities (input & output), Equipment operation & maintenance manuals, HVAC system control maintenance & calibration information, wiring diagrams, schematics, & control sequence descriptions, setpoints permanently recorded on controls drawings, at control devices or in programming comments.

GRILLE & DIFFUSER SCHEDULE

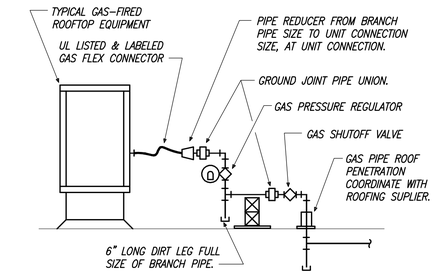
TYPE	FACE	FINISH	MODEL (Price)	NOTES
CEILING DIFFUSER	LOUVER	WHITE	SMD	T–BAR: TYPE 3P SURFACE: TYPE 6 (Bevelled)
SIDEWALL GRILLE, SUPPLY	DOUBLE DEFLECTION	WHITE	520	3/4" SPACING, VERTICAL FRONT BLADE
SIDEWALL GRILLE, RETURN & EXHAUST	LOUVERED	WHITE	530D	FIXED 45° DEFLECTION, 3/4" SPACING, HORIZONTAL BLADE, WITH DAMPER
CEILING GRILLE, RETURN & EXHAUST	EGGCRATE	WHITE	80DAL	1/2x1/2x1/2, WITH ALUMINUM DAMPER
CEILING DIFFUSER, ROUND	3–CONE	WHITE	RCD	RADIAL DAMPER
–	–	–	–	–

GRILLE/DIFFUSER DESIGNATION

NECK SIZE — THROW PATTERN OR TYPE — 8x8–4W 150–FLD — CFM — ACCESSORY

ABBREVIATIONS

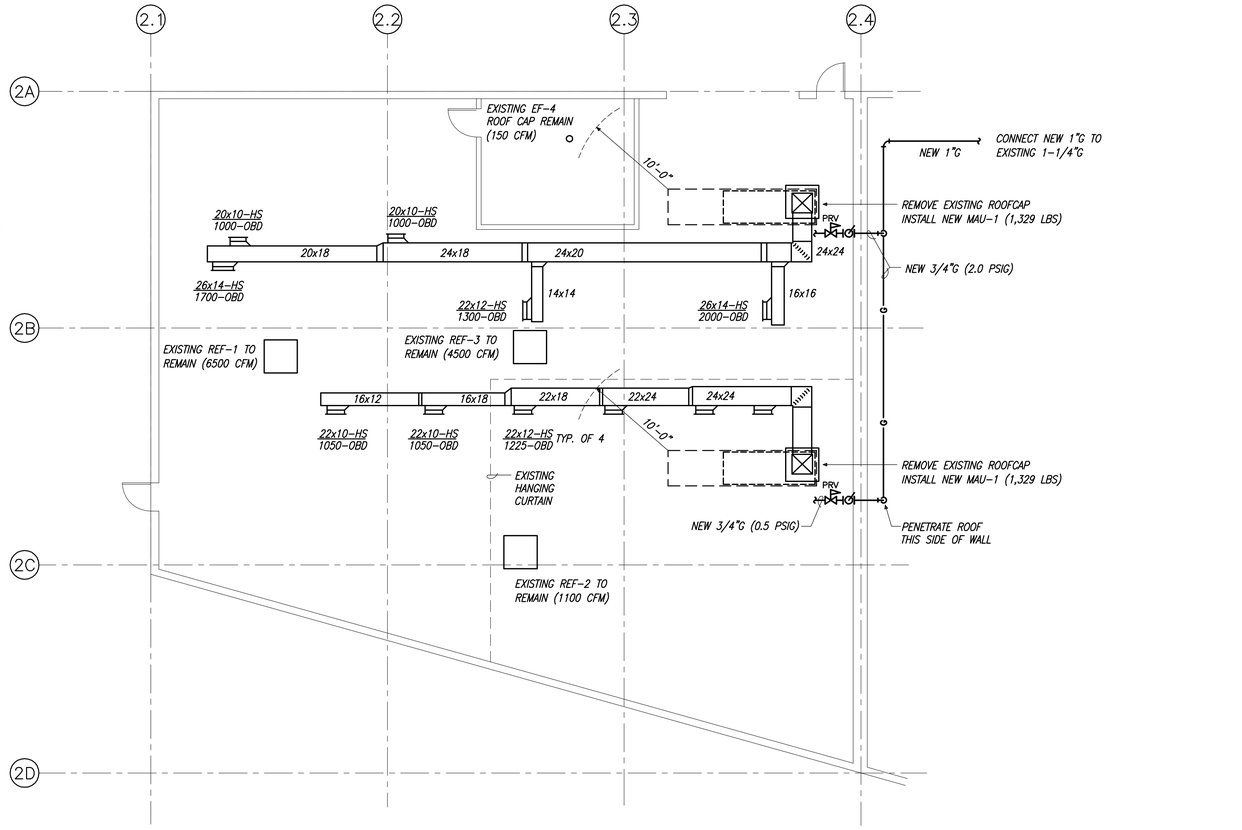
1W	ONE WAY THROW
2WC	TWO WAY CORNER
2WO	TWO WAY OPPOSITE
3W	THREE WAY
4W	FOUR WAY
CE, CR	CEILING EXHAUST, RETURN
FLD	FUSIBLE LINK DAMPER
FLR	FLOOR
HE	HIGH SIDE WALL EXHAUST
HR	HIGH SIDE WALL RETURN
HS	HIGH SIDE WALL SUPPLY
LE	LOW SIDE WALL EXHAUST
LR	LOW SIDE WALL RETURN
LS	LOW SIDE WALL SUPPLY
OBD	OPPOSED BLADE DAMPER
RD	ROUND
S/FLD	COMBINATION SMOKE FIRE DMPR
TF	THERMALLY POWERED DIFFUSER (THERMA–FUSER)
TG	TRANSFER GRILLE



PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST AS REQUIRED.

3 M1 Gas Appliance Connection

NO SCALE



1 M1 Partial Floor Plan

Scale: 1/8"=1'–0"

5 4 3 2 1 0 10 20
Scale in meters | Scale in Feet

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 15, 1983
CLIFFORD M. HOOD
EXPIRES 6/30/19

PMC
PORTLAND MECHANICAL CONTRACTORS
2000 SE HANNA HARVESTER DR (503) 656-7400
MILWAUKIE, OR 97222 Fax (503) 656-6374

These drawings have been producted exclusively for the use by PORTLAND MECHANICAL CONTRACTORS. The information contained herein does not represent a complete set of contract documents required to perform the mechanical for this project.

Production Room Ventilation Upgrade
TARR LLC
2946 NE Columbia Blvd.
PORTLAND, OREGON 97211

PERMIT SET

PROJ NO. - HMI.2152
10.19.17

M1