TRANSMITTAL

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

August 13, 2015

PO Number: **4169943**
Sales Order#: **21538021**
Attention to: **Rob Smith - Munters Corporation**

Equipment Description: **(1) ICA-1300-040**

Attached please find:

Submittal Data **FOR APPROVAL – Mechanical Data Only.**.

A full Submittal package will be sent out to ryan.maclean@jci.com on Tuesday 8/18.

Please do not submit approval or comments until the full package is received and reviewed.

If you have any questions, please feel free to contact the undersigned.

Sincerely,

Robin Veniga

Robin Veniga
Document Control
Submittal Coordinator
Munters Corporation

Cc:

Munters Corporation
79 Monroe Street, P.O. Box 640, Amesbury, MA 01913 U.S.A. • TEL: 978-241-1100 or 1-800-843-5360
Web Address: www.munters.us Email: dhinfo@munters.com

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

SUBMITTAL DATA FOR APPROVAL

MECHANICAL DATA ONLY

MODEL: ICA-1500-050-PP

PREPARED FOR:
JOHNSON CONTROLS

END USER:
SHIPYARD BREWERY

Customer Purchase Order Number:
4169943

Munters Sales Order Number:
21538021

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Table of Contents:

Section 1 Scope

a) Scope and Responsibility

Section 2 Technical Data

a) Equipment Schedule Data
b) General Arrangement 21538021-01
c) Process Flow and Instrumentation Diagram G25691

Section 3 Wiring (Not Included in this Submittal)

a) Standard Wiring Diagram Legend & Symbols 22602
b) Wiring Diagram G51068

Section 4 Electrical Controls (Not Included in this Submittal)

a) Sequence of Operations

Section 5 Filters

a) 30% Efficiency Data – Farr 30/30 Selection 26983
b) Research Products EZ Kleen I26244

Section 6 Blowers

a) Supply Blower Curve
b) Reactivation Blower Curve
c) Greenheck 21 & 41 Series Catalog Selection

Section 7 Cooling Coils

a) Pre Cool Coil Data Sheet
b) Post Cool Coil Data Sheet
c) Heatcraft Fluid Coils Catalog 26612
d) P Trap Installation Guide 74759
e) Recommended Chilled Water/Glycol Piping Diagram 55576

Section 8 Dampers

a) Greenheck Dampers VCD-23 ..... I26272

Section 9 Rigging, Assembly

a) Rigging Instructions G20173
b) ICA Re-Assembly Instructions (applies only to skid split units) G25102

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

SCOPE & RESPONSIBILITY
21538021-01 JOHNSON CONTROLS

DESCRIPTION	RESPONSIBILITY	
	MUNTERS	JOHNSON CONTROLS
FACE & BYPASS DAMPERS		
CONTROL OF ACTUATORS	X	
CW COILS		
PIPING OF WATER COILS		X
WATER CONTROL VALVES		X
WEATHERHOODS FOR CONTROL VALVES		X
GAS		
GAS PIPING		X
ELECTRICS		
NEMA 4 CONTROLLER	X	
REACTIVATION ENERGY MODULATION	X	
460/3/60 POWER SUPPLY		X
DISCONNECT		X
SYSTEM IP ADDRESS INCLUDING SUBNET AND NODE ADDRESSES, FOR THIS UNIT ASSIGNED BY CONTROLS CONTRACTOR. THIS INFORMATION IS REQUIRED AT TIME OF SUBMITTAL RETURN		X

Equipment Schedule

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

PREPARED FOR:

JOHNSON- CONTROLS INC.
477 CONGRESS ST
PORTLAND, ME 04101
USA

END USER: SHIPYARD BREWERY

DATE: 8/4/2015
CUSTOMER P.O.: 4169943
JOB NUMBER: 21538021-01

REVISION: 0
REVISION DATE: 8/7/15
REV. DESC.: SUBMITTAL FOR APPROVAL
SUBMITTED BY: DPR, DSL

SYSTEM MODEL NO.: ICA-1500-050
DEHUMIDIFIER SIZE: 1500
ALTITUDE: 0 FT.
OUTDOOR INSTALLATION: YES

PROCESS AIR MANOMETER: 1.97" W.C.
REACTIVATION AIR MANOMETER: 2.74" W.C.
PURGE AIR MANOMETER: 1.16" W.C.
DESICCANT TYPE: TIGEL
WHEEL SPEED: 8 RPH
DEHUMIDIFICATION TYPE: POWER PURGE

Damper

Location	BYPASS	BYPASS	FACE	FACE	PROCESS MAKE-UP	PROCESS RETURN	PROCESS RETURN
Type	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE
Size	36 X 12	24 X 12	36 X 36	24 X 36	18 X 24	18 X 24	18 X 24
Qty	1	1	1	1	16	16	16
PN	94273-36 X 12	94273-24 X 12	94273-36 X 36	94273-24 X 36	94273-18 X 24	94273-18 X 24	94273-18 X 24
Model	VCD-23	VCD-23	VCD-23	VCD-23	VCD-23	VCD-23	VCD-23
Material	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL
Manufacturer	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK

Filter

Location	PROCESS MAKE-UP	REACTIVATION IN
Type	30%	Metal Mesh Filter
Size	24 X 24 X 2	16 X 20 X 2
Qty	6	2
PN	90118-02	95007-16
Model	Farr 30/30 MERV 8	MV EZ
Manufacturer	CAMFIL / FARR	RESEARCH
High Set Point	.5	.5
Low Set Point	.2	.2

Fan

Location	PROCESS SUPPLY	REACTIVATION OUT
Volume (SCFM)	10952	2175
System Loss (IN WC)	6.75	6.04
External Static Pressure (IN WC)	1.65	1.01
Blower Size	18-AFDW-41	13-1/2
Blower Type	AFDW	SISW
Blower RPM	3050	3450
Blower BHP	22.39	-
Motor RPM	3450	3450

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Motor HP	25	
Motor Type	TEFC	
Motor Frame	284T	
Fan Rotation	CW	
Discharge	TH	
Class	II	
Inlet Vane Control	No	
VFD Controlled	No	No
PN	TBD	TBD

Water Coil

Location	PROCESS MAKE-UP	PROCESS SUPPLY
Type	PROPYLENE GLYCOL	PROPYLENE GLYCOL
Capacity (BTUH)	383,600	523300
Flow Rate (GPM)	87.35	116.4
Water Inlet Temp (F)	40	40
Water Outlet Temp (F)	49.30	49.5
Rows	10	10
Fins	10	12
Tube Material	.035 COPPER	.035 COPPER
Fin Material	.0075 ALUMINUM	.0075 ALUMINUM
Circuit Configuration	3/4	1 1/3
Fluid Pressure Drop (FT HEAD)	33.24	26.56
Pipe Size (IN)	2.625	3.125
Airside Pressure Drop (IN WC)	1.50	1.48
PN	TBD	TBD

Gas Heater

Location	REACTIVATION IN
Type	DF NAT. GAS
ETL	No
Gas	NATURAL GAS
Max Capacity Input (BTUH)	750,000
Size	DF-750
PN	G45593-01

Direct Gas, Munters standard gas train 0.5 psig,

Utility

Supply Voltage (VOLTS)	460
Phase	3
Frequency (HZ)	60
Control Voltage (VOLTS)	24
Circuit Breaker	NONE
Enclosure NEMA Rating	4

Component FLA

Location	CONTROL TRANSFORMER	DEHUMIDIFIER MOTOR	PROCESS SUPPLY FAN	PURGE FAN	REACTIVATION FAN
Current (AMPS)	2.5	0.7	29	1.44	5.9
Separate Feed	No	No	No	No	No
Separate Feed Detail					

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

SIONS	DWN BY	DWN DATE	APRVD BY	APRVD DATE

DETAIL "A"

ESTIMATED WEIGHT: 10,375 LB.

ALL REACTIVATION DUCTS TO BE INSULATED AND INSTALLED WITH A PITCH TO AVOID CONDENSATION LEAKAGE INTO THE SYSTEM

SYSTEM IS NOT DESIGNED FOR OPEN ROOF CURB MOUNTING

SYSTEM LOCATION: OUTDOOR
INTERNAL MATERIAL: STAINLESS STEEL
EXTERNAL MATERIAL: GALVALUME
CONSTRUCTION TYPE: 2.5 INCH WALL THICKNESS
VOLTAGE/PHASE/FREQUENCY: 460 / 3 / 60
SUPPORT ALONG THE LENGTH OF EACH SIDE OF THE UNIT IS REQUIRED
CONTROL ENCLOSURE LOCATION SHOWN FOR REFERENCE ONLY
ALL PIPING AND DUCT CONNECTION DIMENSIONS +/- 12 INCHES
SELECTION FILE: \\USBOSA04\TABLEEDIT\ENGINEERING.MDB
COMPONENT RULES REVISION: 1

NOTES:

1. ANY ELECTRICAL AND/OR MECHANICAL REASSEMBLY IS THE RESPONSIBILITY OF OTHERS UNLESS PRIOR ARRANGEMENTS HAVE BEEN MADE WITH MUNTERS. THIS INCLUDES DISASSEMBLY THAT WAS NECESSARY TO FACILITATE SHIPPING.
2. REFER TO SECTION 110.26 IN THE NEC CODE BOOK FOR CLEARANCES AND REQUIREMENTS TO ELECTRICAL PANELS. THESE REQUIREMENTS MAY IMPACT THE LOCATION OF THE SUPPLIED EQUIPMENT. IT IS THE CUSTOMERS RESPONSIBILITY TO PLAN THE LOCATION OF THIS EQUIPMENT USING THE REQUIREMENTS SET FORTH IN NEC AND OTHER LOCAL CODES

CONFIDENTIALITY STATEMENT

THE TECHNICAL INFORMATION AND DESIGN DATA DISCLOSED HEREIN CONSTITUTE PROPIETARY INFORMATION OF MUNTERS CORPORATION AND ARE TO BE MAINTAINED IN STRICT CONFIDENCE, THIS INFORMATION IS FOR THE SOLE USE OF OUR CUSTOMERS AND END USERS OF OUR EQUIPMENT

CUSTOMER: JOHNSON CONTROLS			JOB NO. 21538021-01
Description: GENERAL ARRANGEMENT ICA-1500-050-PP			
Tolerances, if not indicated, according to: See MUNTERS DocNo. 160-018266-001		Sheet 1/1	Revision 0
Munters	Design by RAW DATE 8/12/15 / Proj Eng ckd DPR DATE 8/13/15 / Electrical ckd – DATE –	Drawing / Part No	21538021-01

Revision
–

Rev by	Rev date
–	–

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

NOTES:

1. DASHED LINES INDICATE CONTROLS/EQUIPMENT BY OTHERS.
2. SOLID LINES INDICATE CONTROLS/EQUIPMENT BY MUNTERS.
3. SEE DRAWING 22602 FOR SYMBOLS & IDENTIFICATION.
4. SEE EQUIPMENT SCHEDULE/TECH DATA SHEET FOR UTILITY CONNECTION SIZES, RATINGS & SET POINTS.

Description	PROCESS FLOW & INSTRUMENTATION DIAGRAM ICA–1500–050–PP		
CUSTOMER JOHNSON CONTROLS		JOB NO. 21538021–01	
Tolerances, if not indicated, according to: See MUNTERS Doc.No. 160–010266–001		Sheet 1 / 2	Revision 0
Munters	Design by DPR DATE 8/4/15	Drawing / Part No G25691	
	PM. ckd DPR DATE 8/4/15	EE. ckd DL DATE 8/7/15	

This document contains proprietary information and its contents are the exclusive property of Munters AB and its assignees and subsidiaries and its receipt or possession does not convey any rights to reproduce or disclose its contents, or to manufacture, use or sell anything that it may describe. Reproduction, disclosure or use of without specific written permission of Munters is strictly forbidden. This document does not constitute a contractual obligation unless otherwise expressly agreed upon in writing.

SUMMER DESIGN

–		A	B	C	D	E	F	G	H	I	J	K	L	M	N
OPERATING CONDITIONS	AIRFLOW (SCFM)	4000	4000	3476	3476	10952	10560	392	10560	10952	10952	10952	2175	2175	2175
	TEMPERATURE (°F)	91	47	55	55	52	52	52	83	82	86	42	91	285	133
	HUMIDITY RATIO (GRAINS/lbs)	115.0	47.4	35.0	35.0	39.5	39.5	39.5	3.2	4.5	4.5	4.5	115.0	148.0	326.3

* DUE TO LOW BYPASS VOLUME, CONTROL OF THE BYPASS DAMPER WILL BE DIFFICULT TO ACHIEVE, THEREFORE THE OUTPUT CONDITIONS ARE AN ESTIMATE.

WINTER DESIGN

–		A	B	C	D	E	F	G	H	I	J	K	L	M	N
OPERATING CONDITIONS	AIRFLOW (SCFM)	4000	4000	3476	3476	10952	9250	1702	9250	10952	10952	10952	2175	2175	2175
	TEMPERATURE (°F)	−5	−5	55	55	33	33	33	55	52	56	56	−5	229	133
	HUMIDITY RATIO (GRAINS/lbs)	3.0	3.0	35.0	35.0	23.3	23.3	23.3	1.0	4.5	4.5	4.5	3.0	42.8	145.6

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Inlet Weatherhood	0.20
Mixing Box Dampers	0.20
30% Filter	0.50
Pre-Cool Coil	1.50
Face & By Pass Dampers	0.20
DH Manometer	1.97
Diffuser	0.50
Post-Cool Coil	1.48
Outlet Damper	0.20
Total Pressure Loss	6.75
External Pressure	1.65
Total Static Pressure	8.40

Reactivation	
Inlet Weatherhood	0.20
Metal Mesh Filter	0.50
Direct Gas Fire Heater	1.90
DH Manometer	2.74
Outlet Damper	0.20
Outlet Weatherhood	0.50
Total Pressure Loss	6.04
External Pressure	1.01
Total Static Pressure	7.05

Please Note Filters are considered Dirty

Description PROCESS FLOW & INSTRUMENTATION DIAGRAM ICA−1500−050−PP

CUSTOMER JOHNSON CONTROLS

JOB NO. 21538021−01

Tolerances, if not indicated, according to: See MUNTERS Doc.No. 160−010266−001

Sheet 2 / 2

Revision 0

Munters

Design by DPR DATE 8/4/15

PM. ckd DPR DATE 8/14/15

EE. ckd DL DATE 8/7/15

Drawing / Part No G25691

This document contains proprietary information and its contents are the exclusive property of Munters AB and its assignees and subsidiaries and its receipt or possession does not convey any rights to reproduce or disclose its contents, or to manufacture, use or sell anything that it may describe. Reproduction, disclosure or use of without specific written permission of Munters is strictly forbidden. This document does not constitute a contractual obligation unless otherwise expressly agreed upon in writing.

Pleated Filters

30/30

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Advantages

- **Water resistant cardboard frame**
- **Conception with girders/ crossbars**
- **Diagonal stiffner stuck to media to keep the spacing of folds, protect and maintain the filter**
- **Fully sup bonded c grid**
- **Rounded pleats for a maximum capacity of dust retention and facilitate airflow through the media**
- **Replaceable filter media**

Application: Primary filter for air conditioning systems.
Type: High performance disposable pleated panel filter.
Case: Rigid water resistant cardboard.
Media: Mixture of cotton and synthetic fibre.
EN779:2012 efficiency: G4.
Gravimetric efficiency: 92%.
Recommended final pressure drop: 250 Pa.
Temperature: 70ºC maximum in continuous service.
Holding frames: Front and side access housings and frames are available, Type 8, Type L, and FC Housings.

Model Name	Filter class	Width	Height	Depth	Airflow m3/h	Pressure drop Pa	Media area m2	Unit weight kg	Unit volume m3
24241	G4	594	594	23	2600	65	0,83	0,5	0,01
24242	G4	594	594	48	3420	70	1,64	0,78	0,02
24244	G4	594	594	98	4140	90	2,56	1,45	0,04
12242	G4	289	594	48	1710	70	0,79	0,4	0,01
16202	G4	394	495	48	1890	70	0,94	0,44	0,01
16252	G4	495	622	48	2340	70	1,18	0,55	0,02
20202	G4	495	495	48	2340	70	1,12	0,55	0,02
20242	G4	495	594	48	2880	70	1,36	0,66	0,02
20252	G4	495	622	48	2970	70	1,42	0,7	0,02
12244	G4	289	592	98	2070	90	1,28	0,75	0,02
16204	G4	394	495	98	2250	90	1,45	0,85	0,02
20204	G4	495	495	98	2880	90	1,73	1,05	0,04

Other dimensions are available on request - All dimensions are nominal.

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice. 2015-03-21

ALWAYS ORDER BY STOCK NUMBER	Stock Size (Nominal) H x W x D	Stock No.	Performance		
E Z KLEEN® AIR FILTERS UL CLASS 2 FILTER RATED VELOCITY 150-650 FPM (0.76-3.31 m/s) OPTIMUM VELOCITY 350-520 FPM (1.78-2.64 m/s)			1" EZ Kleen Filters		
	20" x 25" x 1"	9801	1" (25 mm) & 3/32" (2.4 mm)	At 350 fpm (1.78 m/s)	
	20" x 20" x 1"	9802			
	16" x 25" x 1"	9803	Average Arrestance	54%	
	16" x 20" x 1"	9804	Clean Resistance	.045" w.c. 0.011 kPa	
	15" x 20" x 1"	9805			
	10" x 20" x 1"	9806	Dust-Holding Capacity	95 gms/ft² (1023 gms/m²)	67 gms/ft² (721 gms/m²)
MV E Z KLEEN® AIR FILTERS UL CLASS 2 FILTER RATED VELOCITY 150-650 FPM (0.76-4.58 m/s) OPTIMUM VELOCITY 350-520 FPM (1.78-2.64 m/s)			2" MV EZ Kleen Filters		
	20" x 25" x 2"	9151		At 350 fpm (1.78 m/s)	At 520 fpm (2.64 m/s)
	20" x 20" x 2"	9152			
	16" x 25" x 2"	9153	Average Arrestance	72%	68%
	16" x 20" x 2"	9154	Clean Resistance	.07" w.c. 0.018 kPa	.14" w.c. 0.035 kPa
	15" x 20" x 2"	9155			
	10" x 20" x 2"	9156	Dust-Holding Capacity	130 gms/ft² (1399 gms/m²)	91 gms/ft² (980 gms/m²)
	24" x 24" x 2"	9157			
INDUSTRIAL E Z KLEEN® AIR FILTERS UL CLASS 2 FILTER RATED VELOCITY 150-900 FPM (0.76-4.58 m/s) OPTIMUM VELOCITY 350-520 FPM (1.78-2.64 m/s)			2" Industrial Filters		
	20" x 25" x 2"	901		At 350 fpm (1.78 m/s)	At 520 fpm (2.64 m/s)
	20" x 20" x 2"	902			
	16" x 25" x 2"	903	Average Arrestance	67%	64%
	16" x 20" x 2"	904	Clean Resistance	.05" w.c. 0.013 kPa	.10" w.c. 0.025 kPa
	15" x 20" x 2"	905			
	10" x 20" x 2"	906	Dust-Holding Capacity	143 gms/ft² (1539 gms/m²)	117 gms/ft² (1259 gms/m²)
TRIM-TO-SIZE® E Z KLEEN AIR FILTERS UL CLASS 2 FILTER				1/4" Trim-To-Size Filters	5/8" Trim-To-Size Filters*
	15" x 24" x 1/4"	9200		At 350 fpm (1.78 m/s)	At 350 fpm (1.78 m/s)
	40" x 64" x 1/4"	9250	Average Arrestance	61%	54%
	40" x 64" x 5/8"	9251	Clean Resistance	.07" w.c. 0.018 kPa	.045" w.c. 0.011 kPa
	40" x 50' x 1/4"	9260			
	40" x 50' x 5/8"	9261	Dust-Holding Capacity	100 gms/ft² (1075 gms/m²)	95 gms/ft² (1023 gms/m²)
			* Note: See 1" EZ Kleen performance for 520 fpm		
Made-To-Order E Z KLEEN® AIR FILTERS Minimum quantities may apply.			EZ Kleen Filters: 3/32", 3/8", 1/2"		
			3/32", 3/8" & 1/2" Nominal Frame Thickness Average Arrestance	At 350 fpm (1.78 m/s) 64%	
			Clean Resistance	.06" w.c. (.016 kPa)	
			Dust-Holding Capacity	44 gms/ft² (474 gms/m²)	

CITY OF PORTLAND, MAINE — RESURGAM

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

126244

GREENHECK
Building Value in Air.

Job: 21

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

AFDW Series 41 Airfoil Do

Tag Supply Fan

Date: 11/03/15

ENGINEERING DATA

Approx. Fan Weight (lb)	Class	Max. T Motor Frame Size	WR2 (lb-ft2)
303	II	286	17

**Weight does NOT include motor, drives, or accessories.

Motor Location
Z

Drive Type
Constant

CONFIGURATION

Arrangement	Rotation	Discharge Position	Material Type
3	CW	TH	Steel

INSTALLATION

Inlet Conditions	Outlet Conditions
Standard	Standard

MOTOR SPECS

Size (hp)	RPM	V/C/P	Enclosure	Frame Size
25	3600	460/60/3	TEFC	284

STANDARD CONSTRUCTION FEATURES

HOUSING: Series 41 class I, II and III fans feature continuously welded steel housing on all sizes · Punched outlet flange standard (except for downblast - DB) on class I and II sizes 33-73, and all class III fans · All structural parts phosphatized and coated with Permatector

BEARINGS, SHAFT, AND WHEEL: Heavy duty, self-aligning ball or roller pillow block bearings · Polished, solid steel shafts · Welded centrifugal wheel

Structural or Inertia Base, required for this arrangement.

SELECTED OPTIONS & ACCESSORIES

Access door - Bolted
Steel Base, Permatector, Housed Isolator w/ 1" Defl., Base Factory Mntd
Permatector Coating on Steel Components
Motor Slide Base
Housing is not sealed for outdoor use
Class B Motor Insulation or Greater
Drive Service Factor of 1.5 - Standard
Flange - Outlet, Punched
Damper, Outlet Volume, HCD-120, Galv. Blade, OB, Manual Quadrant
VFD Rated Motor, Meets NEMA MG-1 Standard, S.F. is 1.0
NEMA Premium Efficient Motor - meets NEMA Table 12-12
Drain Conn. - 1" Pipe Thread w/ Plug
Extended Lube Line Kit - Field Assembly
Guard - Belt, TE, Steel
Guard - Inlet

PERFORMANCE

(Elevation ft = 0, Airstream Temperature F = 82, Start Up Temperature F = 70) Drive Loss (%) 3

Qty	Model	Volume (CFM)	Total SP (in. wg)	TS (ft/min)	OV (ft/min)	FRPM (RPM)	Max Class FRPM	Operating Power (hp)	SE%	FEG
1	18-AFDW-41	11,229	8.4	14,572	3,255	3050	3,068	22.39	68	80

SOUND

Inlet / Outlet Sound Power by Octave Band								---	dBA
63	125	250	500	1000	2000	4000	8000		
94 / 106	96 / 101	96 / 97	99 / 99	95 / 96	91 / 91	88 / 86	85 / 82	99 / 100	88 / 89

LwA - A weighted sound power level, based on ANSI S1.4.
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft.

dBA levels are not licensed by AMCA International.

——— Fan curve
– · · – System curve
– – – Brake horsepower curve

amca WORLDWIDE CERTIFIED RATINGS SOUND AND AIR PERFORMANCE AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. www.amca.org

GREENHECK
Building Value in Air.

Job: 21

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Size: 18
Arrangement: 3
Class: II

AFDW Series 41 Ai Double Widt

NOTES: All dimensions shown are in units of inches.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or desig

Date: 11/03/15

SIDE VIEW

END VIEW

OUTLET

ATTENTION:
Accessories such as bases, isolators, motors, drives, and belt guards may ship unmounted and require field installation.

FOOTPRINT

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

13 1/2 Blower Curves

Centrifugal Fans - Series 21 &

- Backward-Inclined and Airfoil Wheels
- Single and Double-Width
- Models BISW, AFSW, BIDW, AFDW

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Commercial & Industrial Applications

BUILDING VALUE IN AIR.

GREENHECK
Building Value in Air.

July 2010

Industrial Duty Centrifugal Fans

Greenheck's airfoil and backward-inclined centrifugal fans are designed to provide efficient a
operation for commercial and industrial applications. Our products are manufactured with st
forming, spinning and welding equipment, and endure our quality control testing to ensure tr
Greenheck centrifugal models include industry-leading design features to ensure your ventila
the latest technologies available.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Available with Greenheck Centrifugal Products:

- AMCA Licensed Sound and Air Performance
- All welded designs or Permalock™ construction
- Concentric mount bearings with industries highest cataloged bearing life
- Corrosion-resistant, electrostatically applied and baked powder coatings
- Both belt and direct drive configurations
- Three-plane, six-channel vibration analysis on all manufactured centrifugal models

Greenheck Fan Corporation certifies that the backward-inclined and airfoil centrifugal fans shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. AMCA Licensed Sound and Air Performance can be found in Greenheck Fan Corporation Supplements:

Single-Width Centrifugal Fan Supplement, Rev 2, October 2009

Double-Width Centrifugal Fan Supplement, Rev 2, July 2009

UL/cUL File #E40001
UL/cUL 705 Listed Power Ventilator

Industrial Duty Centrifugal Fans

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Greenheck's centrifugal products are specified to handle a variety of commercial and inc
applications include:

- General supply, return or exhaust systems
- Emergency smoke exhaust (buildings, car parks, etc.)
- Restaurant grease exhaust
- Stairwell pressurization
- Process heat exhaust
- Filter houses a
- Built-up or cus
- Spark-resistant
- Corrosive fume exhaust
- Grain drying

Our expertise in air movement technology can assist you in improving the operational efficiency of your system.

BISW Size 7-73
50 - 220,000 cfm *(85 - 373,780 m³/hr)*
up to 22 in. wg *(5.5 kPa)*

BIDW Size 7-73
1,000 - 360,000 cfm *(1,700 - 611,640 m³/hr)*
up to 14 in. wg *(3.49 kPa)*

AFSW 18-73
1,000 - 190,000 cfm *(1,700 - 322,810 m³/hr)*
up to 14 in. wg *(3.49 kPa)*

AFDW 18-73
2,000 - 380,000 cfm *(1,700 - 645,624 m³/hr)*
up to 13.5 in. wg *(3.38 kPa)*

Centrifugal Fan Model Number Code:

36 - BISW - 41 - 4 - CW - TH - IV - 80P - A 500

Fan Size
7 thru 73

BI - Backward Inclined
AF - Airfoil

SW - Single Width
DW - Double Width

Housing
Series 21 — Permalock™ housing
Series 41 — Welded housing

Arrangement
4, 8 - Direct
1, 3, 9, 10 - Belt

Rotation
CW, CCW

Discharge Position

TH = Top Horizontal	TAU = Top Angular Up
BH = Bottom Horizontal	BAU = Bottom Angular Up
UB = Upblast	TAD = Top Angular Down
DB = Downblast	BAD = Bottom Angular Down

Fan Class
I, II, III, IV

Percentage Wheel Width
(Direct Drive Only)

100 = 100%	70P = 70%
90P = 90%	60P = 60%
80P = 80%	50P = 50%

Motor RPM

A = 1770	F = 690	M = 3500
B = 1170	J = 1425	R = 2900
C = 870	K = 950	

Motor Horsepower

10 = 1	100 = 10	500 = 50
15 = 1½	150 = 15	600 = 60
20 = 2	200 = 20	750 = 75
30 = 3	250 = 25	1000 = 100
50 = 5	300 = 30	1250 = 125
75 = 7½	400 = 40	

Construction Features

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Series 21 Permalock™ Housings

Series 21 or Permalock™ housings use a mechanically fastened seam instead of welding. This airtight and watertight housing construction uses the same structural support as all welded Series 41 housings. Permalock construction is an excellent value engineering option for applications up to 8.5 inches wg (2.1 kPa).

Series 41 Welded Housings

Greenheck Series 41 centrifugal fans are manufactured with heavy gauge, edge-to-edge welded housing construction. All welded Series 41 construction is common for industrial applications and is suitable for pressures up to 22 inches wg (5.5 kPa). Alternative housing materials such as aluminum or stainless steel are only available with Series 41 construction.

	Size	Class	Housing Material	Wheel Type	Housing Type	Arrangements
Series 21	7—49	I, II	Steel	Backward-Inclined or Airfoil	Single- or Double-width	1, 3, 9, or 10
Series 41	7—73	I, II, III, IV	Steel, Aluminum, Stainless Steel			1, 3, 4, 8, 9 or 10

Standard Construction Features

Housings are manufactured of laser cut and formed steel. Drive frames are manufactured with heavy-gauge, welded steel. Aluminum or stainless steel construction is optional. All steel surfaces are coated with industrial gray (040) Permatector™.

Fan shafts are turned and polished steel that is sized so the first critical speed is at least 25% over the maximum operating speed for each pressure class.

Steel housings and **wheels** are coated with Permatector™, an electrostatically applied and baked polyester urethane. Permatector™ is an excellent coating for interior or exterior applications. Greenheck offers a wide variety of additional protective coatings. Consult Greenheck's Product Application Guide, Performance Coatings for Ventilation Products for a complete listing of coatings and a relative resistance chart.

Example shown is
Model BISW-41
Arr. 9 Class III

Construction Features

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Wheels

Greenheck centrifugal fans have non-overloading backward-inclined blades. Both our Ba
and Airfoil (AF) designs operate efficiently and quietly in single-width or double-width con
are statically and dynamically balanced to grade G6.3 per ANSI S2.19.

	BISW	AFSW	BIDW	AFDW
Wheel Type				
Application	General purpose, clean air or severe environments	Clean air or fume exhaust	Clean air	
Temperature	Up to 1000°F (538°C)	Up to 500°F (260°C)	Up to 180°F (82°C)	
Construction	Steel Aluminum 316 Stainless Steel	Steel Aluminum 316 Stainless Steel	Steel Consult Factory for Alternative Materials	

Premium Bearings

The BI and AF series of centrifugal products are manufactured with "Air Handling Quality" self-aligning ball or roller pillow block bearings. Our standard bearings use concentric lock collars (no set screws) which ensure smooth operation and provide superior grip force between the bearing collar and fan shaft. All bearings are selected for a basic rating fatigue life of L_{10} in excess of 80,000 hours (L_{50} at 400,000 hrs.) at the maximum RPM for the selected pressure class. For more critical applications, Greenheck offers bearings with a minimum L_{10} life in excess of 200,000 hours (L_{50} at 1,000,000 hrs.). Our bearings include zerk fittings for relubrication.

	L_{10} Life	Equal to L_{50} or Average Life
Industry Standard	40,000 hrs.	200,000 hrs.
Greenheck Standard	***80,000 hrs.***	***400,000 hrs.***
Greenheck Upgrade	200,000 hrs.	1,000,000 hrs.

L_{10} life implies 90% reliability or 10% failure rate after the stated hours.
L_{50} life implies 50% reliability or 50% failure rate after the stated hours.

Vibration Analysis

All Greenheck centrifugal products endure a complete mechanical vibration test after assembly. Our custom data acquisition system uses tri-axial accelerometers to measure the vibration in three planes at the design operating speed. A permanent record for each fan's performance is kept on file and is available upon request.

The standard "filter-in" vibration levels attained meet the requirements of Fan Application BV-3 as defined in AMCA Standard 204-05 "Balance Quality and Vibration Levels for Fans". Consult factory if more stringent vibration levels are necessary.

Model	Drive Type	Filter-In Vibration Limit (Rigidly Mounted)
BISW, AFSW	Belt	0.15 in/sec-pk
BISW, AFSW	Direct	0.08 in/sec-pk
BIDW, AFDW	Belt	0.15 in/sec-pk

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Arrangement 10 — Belt Drive

Single-Width *Backward Inclined or Airfoil Wheel*

- Recommended as first choice configuration for belt drive applications.
- Bearings are mounted out of the airstream.
- Motor is mounted beneath the drive frame.
- Available with a weatherhood to cover motor, drives and bearings.
- Moderate dirt and heat tolerance.
- Compact design.
- Available with heat fan packages up to 500°F (260°C).

Class I, II

Arrangement 9 — Belt Drive

Single-Width *Backward Inc*

- Bearings are mounted out of the airstream.
- Easy access to large motors mounted on d
- Standard motor position is on the right side
- Optional motor position is on the left side c
- Weatherhood is not available on this arrangement. Recommend belt guard and shaft guard.
- Available heat fan packages to 500°F (260°C).

Class I, II, III

Arrangement 1 — Belt Drive

Single-Width *Backward Inclined or *Airfoil Wheel*

- Bearings are mounted out of the airstream.
- Unlimited motor size.
- Requires an isolation base (by factory) or structural pad to mount the fan and motor.
- Choice of motor positions W, X, Y or Z (see page 7).
- Weatherhood is not available on this arrangement. Recommend belt guard and shaft guard.
- Suitable for high temperatures or contaminated air.
- Available heat fan packages to 1000°F (538°C).

[*Airfoil wheel available to 500°F (260°C)].

Class I, II, III, IV

Arrangement 3 — Belt Drive

Single & Double-Width *Backward Inclined or Airfoil Wheel*

- Bearings are mounted in the airstream.
- Unlimited motor size.
- Requires an isolation base (by factory) or structural pad to mount the fan and motor.
- Choice of motor positions W, X, Y or Z (see page 7).
- Weatherhood is not available on this arrangement. Recommend belt guard and shaft guard.
- Recommended for clean air at ambient temperatures.

Class I, II, III

Arrangement 4 — Direct Drive

Single-Width *Backward Inclined or Airfoil Wheel*

- Available with partial width wheel and housing modifications for specific performance.
- Recommended for higher horsepower applications in lieu of belt drive.
- Limited to standard motor speeds, but are available with variable frequency drive compatible motors.
- Provides compact design with low maintenance.
- Suitable for clean or contaminated air applications.

Class I, II, III, IV

Arrangement 8 — Direct Drive

Single-Width *Backward Inclined or *Airfoil Wheel*

- Available with partial width wheel and housing modifications for specific performance.
- Recommended for higher horsepower applications in lieu of belt drive.
- Limited to standard motor speeds, but are available with variable frequency drive compatible motors.
- Bearings located out of the airstream.
- Suitable for high temperatures or contaminated air.
- Available heat fan packages to 750°F (400°C).

[*Airfoil wheel available to 500°F (260°C)].

Class I, II, III, IV

Configurations

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Discharge Positions and Rotatable Housings

All centrifugal fans are available with clockwise (CW) or counterclockwise (CCW) rotation discharge positions. **Rotation and discharge is always determined from the drive sic** Rotatable housings are standard on single-width fan sizes 30 and less; arrangements 1, 9 Class I and II.

Top Angular Down (TAD) and Bottom Angular Down (BAD) discharge positions are only available with special construction to prevent interference between the drive frame and fan discharge.

Motor Positions — Arrangements 1 and 3 Fans

Motor position and fan rotation are determined from drive side

Fan arrangements 1 and 3 require a structural steel base or structural platform to support the fan and motor. The motor can be located in any of four positions around the fan shaft to ensure proper alignment. Motor positions W and Z tend to make a longer footprint from end to end. Positions X and Y tend to make a shorter but wider footprint.

Class of Construction

Fan Class refers to a construction level designed to handle a given fan outlet velocity and pressure. As the fan performance requirements increase, the fan construction (material gauge, shaft diameter, motor size) must also increase to physically handle the new work load.

Centrifugal products are available in Class I, II, III, or IV, with Class I being the lightest construction and Class IV having the heaviest construction and performance capacity.

A typical fan curve is shown with shaded class limits. Visit www.greenheck.com for complete centrifugal fan performance.

Accessories

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Vibration Isolators and Structural Bases

Greenheck offers a complete package of structural steel isolation bases and vibration isolators to simplify field assembly and reduce transmitted vibrations. All structural isolation bases include a motor slide base for belt adjustments. Additionally, bases are available with height savings brackets to keep the base and fan center of gravity lower to the mounting surface.

Vibration isolator options include neoprene, free standing spring, housed spring and restrained spring isolators. Seismic isolators and calculations are available on request for all centrifugal configurations. Contact your Greenheck representative if seismic product certification is required.

Inlet Box Orientation Guide

Orientation is determined from the drive side of the fan. Positions start at 360° (see figure) and rotate clockwise in 45° increments.

135°, 180°, and 225° positions have special design considerations in regard to structural clearances, bases and dampers. Consult factory with your application requirements.

Accessories

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Weatherhoods for Arrangement 10*
Vented steel weatherhoods protect the motor and drive components from rain, moisture, dust, and dirt. Weatherhoods meet OSHA guidelines and are easily removed for service access.

Belt Guard*
Belt guards are designed to allow easy access to the belts and pulleys for service. All belt guards include tachometer openings to monitor the fan speed as well as an access panel for testing belt tension. Belt guards meet OSHA guidelines.

Shaft Guard*
Shaft guards are designed to cover shafts and bearings on arrangements 1, 8, 9, or 10 configurations. Extended lube lines are optional for bearing lubrication without removal of the guard. Shaft guards meet OSHA guidelines.

Inlet and Outlet Guards*
Removable inlet and outlet guards provide protection for personnel and equipment in non-ducted installations. Inlet and outlet guards meet OSHA guidelines.

Inlet and Outlet Flanges*
Optional inlet flanges on all single-width fans are pre-punched and welded to the inlet collar. Punched outlet flanges are available for fan sizes 7-73. Punched outlet flanges are standard on fan sizes 33-73, fans with downblast discharges, and all Class III fans.

Inlet Box*
An inlet box is used to minimize entry losses when a 90° turn is required at the fan inlet. Inlet boxes are available with dampers, access doors and drains.

Access Doors*
Bolted or hinged (quick-opening) access doors provide access for cleaning or inspection. Access doors are standard on downblast discharge fans. Raised bolted access doors are also available to allow up to 4 in. (102 mm) of field-applied insulation on the fan housing.

Companion Flanges*
Punched companion inlet flanges are available for all single-width fan sizes.

Drain Connection*
A one-inch (25 mm) threaded drain connection is located at the bottom of the fan housing to drain water that may accumulate.

Heat Slingers
The heat slinger is an aluminum cooling disc mounted on the fan shaft between the inboard bearing and the blower housing to dissipate heat conducted along the fan shaft. Heat slingers are not available for Arrangement 3 or 4 fans.

Stainless Steel Shafts
Stainless steel fan shafts are a
where standard carbon steel sl
excessive corrosion or heat str

Shaft Seals
A felt, neoprene, or ceramic shaft seal with an aluminum rub ring is available for operation at high temperatures or for exhausting contaminated air. Stuffing boxes are available upon request.

Extended Life Bearings
Extended life bearings are selected for a basic rating fatigue life L_{10} per ABMA Standards in excess of 200,000 hours at the maximum RPM for the selected pressure class. L_{10} is the life associated with 90% reliability of a bearing.

Extended Lubrication Lines
Single-width fans are available with flexible nylon tubing extending from the bearings to conveniently located grease fittings mounted on the fan drive frame (or on the fan housing if a weatherhood is supplied). Double-width fans can be provided with lube line kits containing 25 ft. (7.6 m) of nylon tubing and grease fittings for field installation.

Nested Inlet Vanes
Nested inlet vanes provide variable inlet volume at reduced horsepower. Nested inlet vanes are built into the inlet cone. Electric or pneumatic actuators are available for fan sizes 12-73. The maximum operating temperature for inlet vanes is 200°F (93°C)

External Inlet Vanes
Inlet vanes are mounted externally on the fan inlet flange and are available for fan sizes 12-60. External inlet vanes extend beyond the fan inlet. Electric or pneumatic actuators are available. The maximum operating temperature for inlet vanes is 200°F (93°C)

Disconnect Switches
Greenheck offers a wide selection of NEMA rated fusible or non-fusible disconnect switches. Switches can be factory mounted or shipped loose for field installation.

These accessories are also available in Aluminum or Stainless Steel construction.

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Protective Coatings

Greenheck offers a wide variety of protective coatings suitable for corrosive applications. All coatings are electrostatically-applied baked powders that offer a durable, long lasting finish. For more information on our complete offering of coatings, visit www.greenheck.com and navigate to Library/Application Articles. Search for Performance Coatings for Ventilation Products.

Zinc Advantage

For corrosive environments (outdoor, coastal, laboratory), discover Greenheck's zinc-rich basecoat technology. Our advanced two-coat powder application includes a basecoat of zinc-rich epoxy powder and a topcoat of Greenheck's Permatector™ or Hi-Pro Polyester.

The sacrificial protection offered by the zinc-rich basecoats in Perma-Z and Hi-Pro Z result in extraordinary corrosion resistance. Test data demonstrates our two-coat paint system offers three (Perma-Z) and four (Hi-Pro Z) times the corrosion resistance of other coatings commonly available within the fan industry.

For more information about the zinc advantage, see Greenheck's Coatings for Extreme Applications catalog, available on-line at www.greenheck.com.

Two Coat Process

Salt Spray ASTM B117 is a comparative test that indicates the corrosion resistance of powder paint coatings.

Sure-Aire™

The Sure-Aire airflow monitoring station measures fan flow within an accuracy of 3%. Unlike traditional flow probes mounted in the fan venturi that create a system effect hindering a fan's performance, Sure-Aire does not interfere with airflow and will not impact the fan's air or sound performance. This option is available on all BI and AF series products and ships completely assembled from our factory. An electronics package with pressure transmitter and digital read out is available with the Sure-Aire system. The electronic kits are available for 50 or 60 Hz power supplies and provide a 4-20 mA output that can be tied into the building's automation system.

Gravity and Volume Control Dampers

Gravity and volume control dampers are available for all centrifugal fan configurations. Backdraft dampers are available in galvanized, painted steel, or aluminum construction and include counterweights for tight closure when the fan is de-energized. Control dampers are available in painted steel, aluminum, or stainless steel. Options include manual quadrants (manual operation), electric actuators, or pneumatic actuators.

Industrial Control Dampers HCD

Industrial Backdraft Dampers HB

Construction Options

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Alternative Materials

Greenheck offers all centrifugal models in aluminum or stainless construction as an alter steel. Aluminum construction provides advantages for applications with high moisture ar Aluminum also reduces the weight of the fan if there are structural concerns. Stainless st is used for environments subject to continuous high heat up to 1,000ºF (538ºC) or severe aluminum or stainless steel construction can be applied to the entire fan (housing, wheel, inlet cone and drive frame) or the airstream components (housing, wheel and inlet cone) only.

Spark-Resistant Construction

Greenheck centrifugal fans are available with spark-resistant designs suitable for applications that involve flammable particles, fumes or vapors. Spark resistant construction options adhere to guidelines defined within AMCA Standard 99-0401-86.

Spark A	All parts in contact with the airstream are constructed of nonferrous material (usually aluminum).
Spark B	The fan wheel is constructed of a nonferrous material (usually aluminum). A nonferrous (aluminum) rub ring surrounds the fan shaft where it passes through the fan housing.
Spark C	The inlet cone is constructed of nonferrous material (usually aluminum). A nonferrous (aluminum) rub ring surrounds the fan shaft where it passes through the fan housing.

Material Availability by Model and Configuration

Construction	Model	Construction	Size	Class	Arrangement
Steel	BISW/AFSW BIDW/AFDW	21/41	7 – 73	I, II, III, IV,	Any—1, 3, 4, 8, 9, 10
Aluminum, entire	BISW/AFSW	41	7 – 30	I, II	10
Aluminum, airstream	BISW/AFSW	41	7 – 49	I, II	1, 9, 10
316 Stainless, entire	BISW	41	7 – 49	I, II, III	1, 9, 10
316 Stainless, airstream	BISW	41	7 – 49	I, II, III	1, 9, 10
Spark A	BISW/AFSW	41	7 – 49	I, II, III	1, 8, 9, 10
Spark B	BISW/AFSW	21/41	7 – 49	I, II, III	1, 4, 8, 9, 10
Spark C	BISW/AFSW	21/41	7 – 73	I, II, III	1, 4, 8, 9, 10

*Consult factory for sizes and options beyond what is cataloged.

Split Housings

Split housings can solve many space limitation problems in both retrofit and new construction situations. The standard split is horizontal, through the centerline of the fan shaft. Split housings are available on single and double-width fans sizes 33 and larger. Vertical splits are available upon request.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Emergency Smoke Options (UL Listed)

Greenheck model BISW is available with the UL Power Ventilators for Smoke Control System indicates it is designed and tested to exhaust heat and smoke in an emergency situation. Th temperature option is suitable for the following temperatures:

Operating Temperature	Time Duration
500°F (260°C)	4 hours
572°F (300°C)	2 hours
750°F (400°C)	2 hours
1000°F (538°C)	15 minutes

Model BISW offers:

UL/cUL File #E40001
UL/cUL 705 Listed Power Ventilator

c UL US LISTED

UL/cUL 762 Power Ventilators for Restaurant Exhaust
UL/cUL Power Ventilator for Smoke Control Systems

High temperature options include a heat slinger and shaft seal.

High Temperature Process Construction

The BISW and AFSW models are available in a wide variety of configurations to meet continuous high temperature exhaust requirements. Our high temperature process packages include a heat slinger, high temperature fan bearing grease, and high temperature paint for steel housed fans.

Temperature Option	Model	Arrangement	Material
251–500°F (121–260°C)	BISW, AFSW	1, 8, 9, 10	Steel, 316 Stainless Steel*
501–750°F (261–400°C)	BISW	1, 8	316 Stainless Steel
751–1000°F (401–538°C)	BISW	1	316 Stainless Steel

Note: Aluminum construction is suitable up to 250° F (121°C)
* AFSW wheels are steel construction only.

UL Listed for Restaurant Grease Exhaust

The BISW centrifugal fan is designed for high pressure restaurant grease exhaust applications. Both the welded and Permalock™ versions of the BISW are available with the UL Listing of Power Ventilators for Restaurant Exhaust Appliances. The welded housing is suitable for indoor or outdoor mounting locations whereas the Permalock housing is suitable for only outdoor kitchen ventilation installations. UL 762 selections require a drain connection and access door.

Commercial Kitchen Installation Guide

Due to high temperatures and grease-laden airstreams in commercial kitchen ventilation, system designers must be aware of governing codes and guidelines. The National Fire Protection Association (NFPA) is the primary source for many local codes for commercial kitchen ventilation systems. Local code authorities should be consulted before proceeding with any kitchen ventilation project.

- Installation must include a means for inspecting, cleaning and servicing the exhaust fan.
- Fans selected for grease removal must include a weatherhood, bolted access door, and 1 in. (25 mm) drain connection. For grease applications where the fan is mounted indoors, the welded scroll option (Series 41) must be selected.
- An outlet guard is strongly recommended when the fan discharge is accessible.
- An upblast discharge is recommended.
- The fan must discharge a minimum of 40 in. (1016 mm) above the roof line and the exhaust duct must be fully welded to a minimum distance of 18 in. (457 mm) above the roof surface.
- No dampers are to be used in the system.

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Selection data for centrifugal products can be found at www.greenheck.com. BISW and AFSW models can be found in "Single-Width Centrifugal Fan Performance Supplement" and BIDW and AFDW data is available in "Double-Width Centrifugal Fan Performance Supplement.

Selection

The first consideration in any fan selection is the amount of air to be moved and the resistance to this air movement. Air volume requirements are established through specific codes or accepted industry standards. Once the air volume is known, system resistance can be determined by summing up the losses through the system components. Duct layout, duct size, coil, filters, dampers and fan accessories all affect system resistance. "ASHRAE Guide and Data Books" and manufacturer's data on individual system components are common sources of information available to the system designer.

In most applications, several fans may meet the required airflow and system resistance conditions. An optimum fan selection requires evaluation of alternative fan types and fan sizes, as they relate to initial cost, operating cost, available space and allowable sound levels. The relative importance of these facts varies with each system.

When deciding on a specific fan size, consider selections that allow for adjustments after installation. Avoid selecting fans that are within 10% of the maximum fan RPM or max motor horsepower capacity. If a selection is within 10% of capacity, upgrade to the next class of construction if possible. Avoid selections near the fan "stall" if there is potential variability in pressure. Operation in stall conditions will result in low fan performance and potential vibration issues. Watch for fan selections with excessive fan RPM's (above 2700 fan RPM) as these can generate higher sound levels. Select a slower running fan (typically a larger diameter wheel) if possible. Please contact your local Greenheck Representative if you need any assistance in reviewing fan selections.

Effects of Installation on Perform

Fan ratings presented in the performance ta
in accordance with AMCA Standard 210 "La
of Testing Fans for Aerodynamic Performan
AMCA test procedure utilizes an open inlet a
duct to assure maximum static regain.

Any installation with inlet or discharge configurations that deviate from this standard may result in reduced fan performance. Restricted or unstable flow at the fan inlet can cause pre-rotation of incoming air or uneven loading of the fan wheel yielding large system losses and increased sound levels. Free discharge or turbulent flow in the discharge ductwork will also result in system effect losses.

The examples below show system layouts and inlet and discharge configurations which can affect fan performance.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Series 21 — Class I

Fan Size	Scroll Gauge		Wheel Weight				Arr. 1, 9 & 10 (BISW, AFSW)					Arr. 3 (BISW, AFSW)				
							Shaft Dia.	Arr. 1, 9 Weight		Arr. 10 Weight		Shaft Dia.	Fan Weight			
	Side	Wrap	BISW	BIDW	AFSW	AFDW		BISW	AFSW	BISW	AFSW		BISW	AFSW		
7-10	14	16	9	NA	NA	NA	1	125	NA	107	NA	NA	NA	NA		
12	14	16	16	20	NA	NA	1	144	NA	145	NA	1	111	NA		
13	14	16	18	21	NA	NA	1	151	NA	151	NA	1	123	NA		
15	14	16	22	29	NA	NA	1	164	NA	165	NA	1	143	NA	1 1/16	188	NA
16	14	16	33	41	NA	NA	1 3/16	214	NA	221	NA	1 3/16	174	NA	1 7/16	222	NA
18	14	14	40	50	43	58	1 3/16	280	283	285	288	1 3/16	220	223	1 11/16	280	288
20	14	14	45	56	47	66	1 3/16	300	302	305	307	1 3/16	250	252	1 11/16	316	326
22	14	14	68	85	71	98	1 7/16	438	441	448	451	1 7/16	325	328	1 15/16	417	430
24	14	14	77	95	79	111	1 7/16	474	476	485	487	1 7/16	380	382	2 3/16	502	518
27	14	14	87	112	92	130	1 11/16	598	603	623	628	1 11/16	490	495	2 3/16	632	650
30	14	14	130	162	137	176	1 15/16	691	698	716	723	1 15/16	602	609	2 7/16	782	796
33	14	14	146	186	154	203	1 15/16	752	760	752	760	1 15/16	678	686	2 7/16	919	936
36	14	14	189	242	191	248	1 15/16	870	872	870	872	1 15/16	837	839	2 11/16	1094	1100
40	14	14	249	325	251	328	2 3/16	1059	1061	1058	1060	1 15/16	1032	1034	2 15/16	1328	1331
44	14	14	287	379	285	377	2 7/16	1344	1342	1344	1342	1 15/16	1198	1196	2 15/16	1657	1655
49	14	14	373	486	403	547	2 11/16	1594	1624	1593	1623	2 3/16	1471	1501	3 7/16	2028	2089
54	10	12	477	704	479	708	2 15/16	2241	2243	2239	2241	2 7/16	2116	2118	3 15/16	2923	2927
60	10	12	697	929	757	1020	2 15/16	2720	2780	2717	2777	2 15/16	2688	2748	3 15/16	3551	3642
66	10	12	858	1200	852	1190	3 7/16	3525	3519	3508	3502	2 15/16	3322	3316	4 7/16	4445	4435
73	10	10	1020	1470	1007	1450	3 7/16	4253	4240	4232	4219	3 7/16	4119	4106	4 15/16	5678	5658

Series 21 — Class II

Fan Size	Scroll Gauge		Wheel Weight				Arr. 1, 9 & 10 (BISW, AFSW)					Arr. 3 (BISW, AFSW)			Arr. 3 (BIDW, AFDW)		
							Shaft Dia.	Arr. 1, 9 Weight		Arr. 10 Weight		Shaft Dia.	Fan Weight		Shaft Dia.	Fan Weight	
	Side	Wrap	BISW	BIDW	AFSW	AFDW		BISW	AFSW	BISW	AFSW		BISW	AFSW		BIDW	AFDW
7-10	14	16	9	NA	NA	NA	1	125	NA	126	NA	NA	NA	NA	NA	NA	NA
12	14	16	18	23	NA	NA	1	146	NA	172	NA	1	113	NA	1 7/16	145	NA
13	14	16	20	34	NA	NA	1	153	NA	179	NA	1	125	NA	1 11/16	180	NA
15	14	16	23	38	NA	NA	1 3/16	167	NA	192	NA	1 3/16	148	NA	1 11/16	207	NA
16	14	16	37	45	NA	NA	1 3/16	219	NA	262	NA	1 3/16	179	NA	1 15/16	246	NA
18	14	14	44	54	47	62	1 7/16	291	294	296	299	1 7/16	231	234	1 15/16	295	303
20	14	14	50	61	52	72	1 7/16	312	314	317	319	1 7/16	263	265	2 3/16	347	358
22	14	14	68	85	71	98	1 7/16	440	443	450	453	1 7/16	328	331	2 7/16	454	467
24	14	14	81	103	79	111	1 11/16	490	488	501	499	1 11/16	399	397	2 7/16	533	541
27	14	14	92	153	92	161	1 11/16	606	606	631	631	1 11/16	498	498	2 11/16	725	733
30	14	14	146	194	148	197	1 15/16	710	712	735	737	1 15/16	621	623	2 11/16	843	846
33	14	14	165	224	180	254	2 3/16	785	800	785	800	2 3/16	706	721	2 15/16	985	1015
36	14	14	204	272	224	312	2 7/16	921	941	921	941	2 7/16	886	906	2 15/16	1127	1167
40	14	14	268	363	291	408	2 7/16	1101	1124	1100	1123	2 7/16	1087	1110	3 7/16	1404	1449
44	14	14	337	504	331	493	2 11/16	1429	1423	1429	1423	2 11/16	1318	1312	3 7/16	1815	1804
49	14	14	434	647	432	643	2 15/16	1677	1675	1676	1674	2 11/16	1591	1589	3 15/16	2254	2250
54	10	12	552	820	549	813	3 7/16	2374	2371	2372	2369	2 15/16	2245	2242	4 7/16	3174	3167
60	10	12	778	1050	744	977	3 7/16	2914	2880	2911	2877	3 7/16	2881	2847	4 15/16	3992	3919
66	10	12	895	1230	852	1140	3 15/16	3681	3638	3664	3621	3 15/16	3563	3520	5 1/4	4798	4708
73	10	10	1060	1560	1007	1450	3 15/16	4416	4363	4395	4342	3 15/16	4298	4245	5 3/4	6105	5995

Series 41 — Class I

Fan Size	Scroll Gauge		Wheel Weight				Arr. 1, 9 & 10 (BISW, AFSW)					Arr. 3 (BISW, AFSW)			Arr. 3 (BIDW, AFDW)		
							Shaft Dia.	Arr. 1, 9 Weight		Arr. 10 Weight		Shaft Dia.	Fan Weight		Shaft Dia.	Fan Weight	
	Side	Wrap	BISW	BIDW	AFSW	AFDW		BISW	AFSW	BISW	AFSW		BISW	AFSW		BIDW	AFDW
7-10	14	16	9	NA	NA	NA	1	125	NA	107	NA	NA	NA	NA	NA	NA	NA
12	14	14	16	20	NA	NA	1	144	NA	145	NA	1	111	NA	1 3/16	138	NA
13	14	14	18	23	NA	NA	1	151	NA	151	NA	1	123	NA	1 3/16	156	NA
15	14	14	22	29	NA	NA	1	164	NA	165	NA	1	143	NA	1 7/16	192	NA
16	14	14	33	41	NA	NA	1 3/16	214	NA	221	NA	1 3/16	174	NA	1 7/16	226	NA
18	14	14	40	50	43	58	1 3/16	280	283	285	288	1 3/16	220	223	1 11/16	280	288
20	14	14	45	56	47	66	1 3/16	300	302	305	307	1 3/16	250	252	1 11/16	316	326
22	12	14	68	85	71	98	1 7/16	449	452	459	462	1 7/16	336	339	1 15/16	424	437
24	12	14	77	95	79	111	1 7/16	488	490	499	501	1 7/16	394	396	2 3/16	512	528
27	12	14	87	112	92	130	1 11/16	615	620	640	645	1 11/16	507	512	2 3/16	644	662
30	10	12	130	162	137	176	1 15/16	777	784	802	809	1 15/16	688	695	2 7/16	879	893
33	10	12	146	186	154	203	1 15/16	856	864	856	864	1 15/16	782	790	2 7/16	1035	1052
36	10	12	189	242	191	248	1 15/16	997	999	997	999	1 15/16	964	966	2 11/16	1236	1242
40	10	12	249	325	251	328	2 3/16	1214	1216	1213	1215	1 15/16	1187	1189	2 15/16	1502	1505
44	10	12	287	379	285	377	2 7/16	1534	1532	1534	1532	1 15/16	1388	1386	2 15/16	1870	1868
49	10	12	373	486	403	547	2 11/16	1825	1855	1824	1854	2 3/16	1702	1732	3 7/16	2287	2348
54	10	12	477	704	479	708	2 15/16	2241	2243	2239	2241	2 7/16	2116	2118	3 15/16	2923	2927
60	10	12	697	929	757	1020	2 15/16	2720	2780	2717	2777	2 15/16	2688	2748	3 15/16	3551	3642
66	10	12	858	1200	852	1190	3 7/16	3525	3519	3508	3502	2 15/16	3322	3316	4 7/16	4445	4435
73	10	10	1020	1470	1007	1450	3 7/16	4253	4240	4232	4219	3 7/16	4119	4106	4 15/16	5678	5658

Weights, shown in pounds, are for steel fans and do not include motors, drives or accessories.
Fan weights include the wheel weight and may vary up to 5% based on the discharge position.

Material Specifications

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Series 41 — Class II

Fan Size	Scroll Gauge		Wheel Weight				Arr. 1, 9 & 10 (BISW, AFSW)					Arr. 3 (BISW, AFS				
							Shaft Dia.	Arr. 1, 9 Weight		Arr. 10 Weight		Shaft Dia.	Fan Wei			
	Side	Wrap	BISW	BIDW	AFSW	AFDW		BISW	AFSW	BISW	AFSW		BISW	A		
7-10	14	16	9	NA	NA	NA	1	125	NA	126	NA	NA	NA			
12	14	14	18	23	NA	NA	1	146	NA	172	NA	1	113			
13	14	14	20	34	NA	NA	1	153	NA	179	NA	1	125			
15	14	14	23	38	NA	NA	1 3/16	167	NA	193	NA	1 3/16	148	NA	1 11/16	211	NA
16	14	14	37	45	NA	NA	1 3/16	219	NA	262	NA	1 3/16	179	NA	1 15/16	250	NA
18	14	14	45	54	47	62	1 7/16	292	294	297	299	1 7/16	232	234	1 15/16	295	303
20	14	14	50	61	52	71	1 7/16	312	314	311	313	1 7/16	263	265	2 3/16	348	358
22	12	14	68	85	71	98	1 7/16	451	454	461	464	1 7/16	339	342	2 7/16	461	474
24	12	14	81	103	79	111	1 11/16	504	502	515	513	1 11/16	413	411	2 7/16	543	551
27	12	14	92	153	92	161	1 11/16	623	623	648	648	1 11/16	515	515	2 11/16	737	745
30	10	12	146	194	148	197	1 15/16	796	798	821	823	1 15/16	707	709	2 11/16	940	943
33	10	12	165	224	180	254	2 3/16	889	904	889	904	2 3/16	810	825	2 15/16	1101	1131
36	10	12	204	272	224	312	2 7/16	1048	1068	1048	1068	2 7/16	1013	1033	2 15/16	1269	1309
40	10	12	268	363	291	408	2 7/16	1256	1279	1255	1278	2 7/16	1242	1265	3 7/16	1578	1623
44	10	12	337	504	331	493	2 11/16	1619	1613	1619	1613	2 11/16	1508	1502	3 7/16	2028	2017
49	10	12	434	647	432	643	2 15/16	1908	1906	1907	1905	2 11/16	1822	1820	3 15/16	2513	2509
54	10	12	552	820	549	813	3 7/16	2374	2371	2372	2369	2 15/16	2245	2242	4 7/16	3174	3167
60	10	12	778	1050	744	977	3 7/16	2914	2880	2911	2877	3 7/16	2881	2847	4 15/16	3992	3919
66	10	12	895	1230	852	1140	3 15/16	3681	3638	3664	3621	3 15/16	3563	3520	5 1/4	4798	4708
73	10	10	1060	1560	1007	1450	3 15/16	4416	4363	4395	4342	3 15/16	4298	4245	5 3/4	6105	5995

Series 41 — Class III

Fan Size	Scroll Gauge		Wheel Weight				Arr. 1, 9 & 10 (BISW, AFSW)					Arr. 3 (BISW, AFSW)			Arr. 3 (BIDW, AFDW)	
							Shaft Dia.	Arr. 1, 9 Weight		Arr. 10 Weight		Shaft Dia.	Fan Weight		Shaft Dia.	Fan Weight	
	Side	Wrap	BISW	BIDW	AFSW	AFDW		BISW	AFSW	BISW	AFSW		BISW	AFSW		BIDW	AFDW
12	10	10	21	34	NA	NA	1 7/16	186	NA	NA	NA	1 7/16	155	NA	1 15/16	208	NA
13	10	10	24	40	NA	NA	1 7/16	209	NA	NA	NA	1 7/16	178	NA	1 15/16	237	NA
15	10	10	36	45	NA	NA	1 11/16	260	NA	NA	NA	1 11/16	222	NA	1 15/16	291	NA
16	10	10	39	50	NA	NA	1 11/16	294	NA	NA	NA	1 11/16	253	NA	1 15/16	330	NA
18	10	10	52	76	57	90	1 11/16	342	347	NA	NA	1 11/16	314	319	2 7/16	432	446
20	10	3/16	64	126	64	133	1 11/16	416	416	NA	NA	1 11/16	384	384	2 11/16	589	596
22	10	3/16	86	145	86	154	1 15/16	524	524	NA	NA	1 15/16	528	528	2 15/16	742	751
24	3/16	3/16	99	161	97	172	2 3/16	684	682	NA	NA	1 15/16	641	639	3 7/16	907	918
27	3/16	3/16	109	176	123	218	2 3/16	814	828	NA	NA	1 15/16	728	742	3 7/16	1069	1111
30	3/16	3/16	156	202	175	238	2 7/16	995	1014	NA	NA	2 3/16	894	913	3 7/16	1276	1312
33	3/16	3/16	178	234	200	279	2 11/16	1184	1206	NA	NA	2 7/16	1128	1150	3 15/16	1468	1513
36	3/16	3/16	244	353	255	376	2 11/16	1404	1415	NA	NA	2 7/16	1339	1350	3 15/16	1772	1795
40	3/16	3/16	308	444	321	470	2 11/16	1757	1770	NA	NA	2 11/16	1648	1661	4 7/16	2293	2319
44	3/16	3/16	359	523	368	540	3 7/16	2185	2194	NA	NA	2 15/16	1933	1942	4 7/16	2625	2642
49	3/16	3/16	460	642	477	676	3 7/16	2557	2574	NA	NA	2 15/16	2368	2385	4 15/16	3394	3428
54	3/16	3/16	603	831	647	919	3 15/16	3168	3212	NA	NA	3 7/16	2958	3002	5 1/4	4283	4371
60	3/16	3/16	817	1100	814	1100	4 15/16	4502	4499	NA	NA	3 15/16	3673	3670	5 3/4	5256	5256
66	3/16	3/16	945	1400	939	1390	4 15/16	5019	5013	NA	NA	3 15/16	4411	4405	5 15/16	6758	6748
73	3/16	3/16	1120	1660	1110	1640	4 15/16	5795	5785	NA	NA	4 7/16	5344	5334	6 7/16	7943	7923

Series 41 — Class IV

Fan Size	Scroll Gauge		Wheel Weight				Arr. 1, 9 & 10 (BISW)					Arr. 4 (BISW)			Arr. 8 (BISW)	
							Shaft Dia.	Arr. 1, 9 Weight		Arr. 10 Weight		Shaft Dia.	Fan Weight		Shaft Dia.	Fan Weight	
	Side	Wrap	BISW	BIDW	AFSW	AFDW		BISW	AFSW	BISW	AFSW		BISW	AFSW		BISW	AFSW
18	3/16	3/16	60	NA	NA	NA	1 11/16	540	NA	NA	NA	NA	CF	CF	CF	CF	CF
20	3/16	3/16	67	NA	NA	NA	2 3/16	550	NA	NA	NA	NA	CF	CF	CF	CF	CF
22	3/16	3/16	93	NA	NA	NA	2 3/16	700	NA	NA	NA	NA	CF	CF	CF	CF	CF
24	3/16	3/16	119	NA	NA	NA	2 3/16	840	NA	NA	NA	NA	CF	CF	CF	CF	CF
27	3/16	3/16	138	NA	NA	NA	2 11/16	1030	NA	NA	NA	NA	CF	CF	CF	CF	CF
30	3/16	3/16	195	NA	NA	NA	2 15/16	1275	NA	NA	NA	NA	1120	CF	2 15/16	1465	CF
33	1/4	1/4	222	NA	NA	NA	3 7/16	1825	NA	NA	NA	NA	1600	CF	3 7/16	2100	CF
36	1/4	1/4	298	NA	NA	NA	3 7/16	2125	NA	NA	NA	NA	1870	CF	3 7/16	2444	CF
40	1/4	1/4	371	NA	NA	NA	3 15/16	2640	NA	NA	NA	NA	2320	CF	3 15/16	3030	CF
44	1/4	1/4	442	NA	NA	NA	3 15/16	3300	NA	NA	NA	NA	2900	CF	3 15/16	3800	CF
49	1/4	1/4	580	NA	NA	NA	3 15/16	3900	NA	NA	NA	NA	3430	CF	3 15/16	4480	CF
54	1/4	1/4	685	NA	NA	NA	4 7/16	4700	NA	NA	NA	NA	NA	NA	4 7/16	5410	CF
60	1/4	1/4	1100	NA	NA	NA	4 15/16	6930	NA	NA	NA	NA	NA	NA	4 15/16	7970	CF
66	1/4	1/4	1270	NA	NA	NA	5 7/16	7740	NA	NA	NA	NA	NA	NA	5 7/16	8900	CF
73	1/4	1/4	1500	NA	NA	NA	5 7/16	8910	NA	NA	NA	NA	NA	NA	5 7/16	10250	CF

Weights, shown in pounds, are for steel fans and do not include motors, drives or accessories.
Fan weights include the wheel weight and may vary up to 5% based on the discharge position.
Arrangement 8 fan weights will vary with motor frame size.
CF – Consult Factory

Design and Selection Support

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Computer Aided Product Selection — CAPS

All Greenheck products are supported by the industry's best product literature, electronic media, and Computer Aided Product Selection program, CAPS. Online, you can also find electronic copies of our product literature as well as storage, installation and maintenance information in our Installation and Operation Manuals.

And, of course, you can always count on the personal service and expertise of our national and international representative organization. To locate your nearest Greenheck representative call 715-359-6171 or visit our website at www.greenheck.com

To-Scale Drawings and Fan Specifications

To-scale CAD drawings and Revit models along with detailed centrifugal specifications can be found online at www.greenheck.com or within our Computer Aided Product Selection program (CAPS).

Building Value in Air

Greenheck delivers value to mechanical engineers by helping them solve virtually any air quality challenges their clients face with a comprehensive selection of top quality, innovative air-related equipment. We offer extra value to contractors by providing easy-to-install, competitively priced, reliable products that arrive on time. And building owners and occupants value the energy efficiency, low maintenance and quiet dependable operation they experience long after the construction project ends.

Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

U.S. GREEN BUILDING COUNCIL MEMBER

Prepared to Support Green Building Efforts

GREENHECK
Building Value in Air.

P.O. Box 410 • Schofield, WI 54476-0410 • Phone (715) 359-6171 • greenheck.com

00.CVI.1000 R2 7-2010 SN
Copyright © 2010 Greenheck Fan Corp.

LUVATA

HEATCRAFT FLUID SELECTION

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Customer:		Date:	8/7/2015
Contact:		From:	
Telephone:		Company:	
Cell:		Return Tel:	
Fax:		Return Fax:	
Job:			
Quote #:			

Construction

Item:	21538021-01 PRE COOL
Coils Per Bank:	1
Allow Opp. End:	No
Tube OD IN:	5/8
Coil Duty:	Cool-Standard
Fins Per Inch:	10
Rows:	10
Fin Surface:	Optimize ABC
Fin Height (IN):	36.00
Finned Length (IN):	36.00
Tubing Mat. (IN):	0.035 Copper
TurboSpirals:	No
Fin Mat. (IN):	0.0075 Aluminum
Conn Qty/Size (IN):	1 / Optimize
Circuiting:	Three Quarter
Face Area (SQ FT):	9.00

Air Side

Air Flow (Sft^3/min)	4000.0
Altitude FT:	0.00
Ent. Air DB/WB °F:	91.00 / 76.52
Lvg. Air DB/WB °F:	47.00 / 46.87
Total / Sensible MBH:	0.00 / 0.00
Max Air PD "H2O:	0.00
Fin Fouling Factor ft^2-°F-hr/BTU:	0

Fluid Side

Fluid Type:	Propylene
Percent Glycol:	30
Ent. Fluid :	40.00
Lvg. Fluid :	49.30
Fluid Flow gal/min:	0.00
Max FPD FT H2O:	0.00
Fouling Factor ft^2-°F-hr/BTU:	0

OUTPUT DATA				OPTIONS	
Model Number:		5WL1010C		Casing Material:	Galvanized
Air Velocity:	(Sft/min)	444.4		Casing Type:	Flanged
Total Capacity:	MBH	383.6		Hand:	Right
Sens. Capacity:	MBH	192.7		Connection Material:	Copper
Lvg. Air DB:	°F	46.94		Connection Type:	Sweat
Lvg. Air WB:	°F	46.91		Vent/Drain:	.50 FPT on Face
Standard APD	"H2O	1.50		Label Kit:	Yes
Lvg. Fluid:	°F	49.29		Coating: Electrofin	
Fluid Flow:	gal/min	87.35		Mounting Holes:	Yes
Fluid PD:	FT H2O	33.24		Drain Headers:	No
Fluid Vel.:	ft/s	5.84		Boxed Headers:	No
Conn Size:	IN	(1) 2.625			
Internal Volume:	in^3	2999.3			
Weight (Dry):	lbm	378.0			
Weight (w/Fluid):	lbm	492.7			
Notes:		AGL			

Notes:

A) Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.
G) Rated performance is below the capacity or temperature requested.
L) Coil rating valid for Heatcraft coils only.

Copyright 2003 Luvata Grenada LLC Confidential and Proprietary. This design is for the exclusive and confidential use of Luvata Grenada LLC and its client. Any duplication made for the purpose of disclosing this design or any part of the design to a competitor of Luvata Grenada LLC is in direct violation of this confidentiality. Any duplication must be approved in writing by Luvata Grenada LLC.

LUVATA

HEATCRAFT FLUID SELECTION

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Customer:		Date:	8/4/2015
Contact:		From:	
Telephone:		Company:	
Cell:		Return Tel:	
Fax:		Return Fax:	
Job:			
Quote #:			

Construction

Item:	21538021-01 PST COOL
Coils Per Bank:	1
Allow Opp. End:	No
Tube OD IN:	5/8
Coil Duty:	Cool-Standard
Fins Per Inch:	12
Rows:	10
Fin Surface:	Optimize ABC
Fin Height (IN):	48.00
Finned Length (IN):	72.00
Tubing Mat. (IN):	0.035 Copper
TurboSpirals:	Yes
Fin Mat. (IN):	0.0075 Aluminum
Conn Qty/Size (IN):	1 / Optimize
Circuiting:	One & One Third
Face Area (SQ FT):	24.00

Air Side

Air Flow (Sft^3/min)	10952.0
Altitude FT:	0.00
Ent. Air DB/WB °F:	86.00 / 0.00
Lvg. Air DB/WB °F:	42.00 / 0.00
Total / Sensible MBH:	0.00 / 0.00
Max Air PD "H2O:	0.00
Fin Fouling Factor ft^2-°F-hr/BTU:	0

Fluid Side

Fluid Type:	Propylene
Percent Glycol:	30
Ent. Fluid :	40.00
Lvg. Fluid :	49.50
Fluid Flow gal/min:	0.00
Max FPD FT H2O:	0.00
Fouling Factor ft^2-°F-hr/BTU:	0

OUTPUT DATA				OPTIONS	
Model Number:		5WP1210C		Casing Material:	Galvanized
Air Velocity:	(Sft/min)	456.3		Casing Type:	Flanged
Total Capacity:	MBH	523.3		Hand:	Right
Sens. Capacity:	MBH	523.3		Connection Material:	Copper
Lvg. Air DB:	°F	41.94		Connection Type:	Sweat
Lvg. Air WB:	°F	0.00		Vent/Drain:	.50 FPT on Face
Standard APD	"H2O	1.48		Label Kit:	Yes
Lvg. Fluid:	°F	49.51		Coating: Electrofin	
Fluid Flow:	gal/min	116.4		Mounting Holes:	Yes
Fluid PD:	FT H2O	26.56		Drain Headers:	No
Fluid Vel.:	ft/s	3.25		Boxed Headers:	No
Conn Size:	IN	(1) 3.125			
Internal Volume:	in^3	7199.8			
Weight (Dry):	lbm	980.0			
Weight (w/Fluid):	lbm	1263.0			
Notes:		BCL			

Notes:

B) Coil is Outside of the scope of AHRI Standard 410. Coils are rated using a prediction model that is verified by the manufacturer and independent testing facilities. The rating model methodology used for the coil selections is consistent with AHRI certified coils offered by the manufacturer.
C) Coil is NOT certified by AHRI.

L) Coil rating valid for Heatcraft coils only.

Copyright 2003 Luvata Grenada LLC Confidential and Proprietary. This design is for the exclusive and confidential use of Luvata Grenada LLC and its client. Any duplication made for the purpose of disclosing this design or any part of the design to a competitor of Luvata Grenada LLC is in direct violation of this confidentiality. Any duplication must be approved in writing by Luvata Grenada LLC.

RESURGAM
CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

HEATCRAFT™

Fluid Coil Installation, Operation and Maintenance

LUVATA
Partnerships beyond metals

26612

FLUID IOM

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Guidelines for the installation, operation and maintenance of Heatcraft cooling and heating coi to help insure the proper performance of the coils. These are general guidelines that may meet the specific requirements of any one job. As always, the installation and maintenance of any coil should be performed by a qualified party or individual. Protective equipment such as safety glasses, steel toe boots, and gloves are recommended during the installation and routine maintenance of the coil.

Receiving Instructions

1. All Heatcraft coils are factory tested, inspected and carefully packaged.
2. Damage to the coils can occur in transit. Therefore, the coils should be inspected for shipping damage upon receipt. The freight bill should also be checked against items received for complete delivery.
3. Damaged and/or missing items should be noted on the carrier's freight bill and signed by the driver.
4. For additional assistance, contact your local Luvata coil representative.

Nomenclature

5 W S 14 06 C 24.00 x 144.00

Tube O.D.
3 = 0.375
4 = 0.500
5 = 0.625

Coil Type
W Standard Water
M Splayed Headers
B Booster
K Cleanable Both Ends
P Cleanable Supply End
Q Cleanable Opp. Supply End

Circuiting
Q - 1/4 serp M - 1 1/2 serp
H - 1/2 serp D - 2 serp
L - 3/4 serp T - 3 serp
S - 1 serp B - skip tube

Booster
S - 1 circuit B - skip tube
D - 2 circuits

Fin Design
A - flat (Al, Cu)
B - corrugated (Al, Cu)
C - sine wave (Al, Cu)
D - raised lance (Al) 3/8 only
F - flat (SS, CS)
G - corrugated (SS, CS)
H - sine wave (SS, CS, Al, Cu)

Rows Deep

Fins Per Inch

Finned Length (inches)

Fin Height (inches)

26612

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Mounting

	Horizontal Air Flow Horizontal Tubes	Level with the Y-axis & X-axis
	Vertical Air Flow[2] Horizontal Tubes	Level with the Z-axis & X-axis
	Horizontal Air Flow Vertical Tubes	Level with the Y-axis & X-axis

1. All water and glycol coils are designed to be fully drainable when properly mounted.
2. Vertical air-flow is not recommended for dehumidifying coils.

Coil Types

Standard Fluid Coils

Our fluid coils are specifically designed for your particular application. Flexibility is built into our manufacturing processes, offering variations in fin type, fin density, circuitry arrangement, coil casing and materials of construction. Standard fluid type "W" coils utilize a collection header for one and two row applications and return bends for applications that require three or more rows. Type "M" coils are used for one and two row applications that require same end connections. For type "M" coils the supply and return headers are offset or "splayed." This orientation allows for the supply and return headers to be placed side by side. Booster coils, type "B," are also available for one and two row applications.

Cleanable Fluid Coils

We offer cleanable fluid coils for applications where mechanical cleaning of the internal surface of the tubes is needed. Our cleanable coils utilize a box-style head in lieu of cylindrical headers. The head contains baffles for circuiting and is removable for easy access to coil tubes. Type "P" coils are cleanable from the supply end of the coil. Type "Q" coils are cleanable from the end opposite the supply. Type "K" coils are cleanable from both ends of the coil.

K Removable Heads (Both Ends) | P Removable Head (Connection End) | Q Removable Heads (Opposite Connection End)

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Installation

1. Carefully remove the coil from the shipping package to avoid damage to the finned surface area. Damaged fins can be straightened using an appropriate fin comb. If a mist eliminator was purchased, remove it before installation.
2. For coils with removable heads, check the torque on the nuts before installing. Refer to Maintenance on Page 5 for recommended torque values.
3. Luvata recommends cleaning the coil with a commercially available coil cleaner prior to installation. Refer to Maintenance on Page 5 for cleaning recommendations.
4. Check the coil hand designation to insure that it matches the system. Water and glycol coils are generally plumbed with the supply connection located on the bottom of the leaving air-side of the coil and the return connection at the top of the entering air-side of the coil (Figure 2 - Connection Diagram). This arrangement provides counter flow heat exchange and positive coil drainage. If a universal coil is supplied, cap off the two unused connections.
5. Standard coils must be mounted level to insure drainability. Refer to Mounting on page 2 for leveling requirements. Coils with intermediate headers and coils with removable box style headers can be pitched 0.125" per foot of coil finned length towards the coil's header/connection end.
6. Proper clearance should be maintained between the coil and other structures such as the fan, filter racks, transition areas, etc..
7. Once installed, the coil should be pressurized to 100 psig with dry nitrogen or other suitable gas. The coil should be left pressurized for a minimum of 10 minutes. If the coil holds the pressure, the hook-up can be considered leak free. If the pressure drops by 5 psig or less re-pressurize the coil and wait another 10 minutes. If the pressure drops again, there is more than likely one or more small leaks which should be located and repaired. Pressure losses greater than 5 psig would indicate a larger leak that should be isolated and repaired. If the coil itself is found to be leaking, contact your local Luvata coil representative.
8. All field brazing and welding should be performed using high quality materials and an inert gas purge (such as nitrogen) to reduce oxidation of the internal surface of the coil.
9. All field piping must be self supporting. System piping should be flexible enough to allow for thermal expansion and contraction of the coil.
10. General piping diagrams can be found in Figure 1 - Horizontal Airflow and Figure 3 - Vertical Airflow.
11. If a mist eliminator was purchased with the coil installed, place the mist eliminator into its brackets. M Make sure the mesh is aligned with the coil face area (finned area).

Figure 1 - Horizontal Airflow Diagram

26612

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Figure 2 - Connection Diagram

Figure 3 - Vertical Airflow Diagram

Figure 4 - Mist Eliminator Installation

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Operation

Initial Start-Up

1. Open all air vents so that air is eliminated from within the coil circuitry and headers. Verify that all vents and drains are not obstructed and do discharge a stream of water.
2. Fill the coil with water then close all vents.
3. Perform an initial hydrostatic leak test of all brazed, threaded or flanged joints, valves and interconnecting piping. Recheck the coil level and correct if necessary. When the setup is found to be leak free, discharge and discard initial water charge. It is important that all grease, oil, flux and sealing compounds present from the installation be removed.

General

1. Proper air distribution is vital to coil performance. Air flow anywhere on the coil face should not vary by more than 20%.
2. The drain pan and associated piping (drain line and trap) should be installed so that there is no standing water in the drain pan and that no blow-through occurs.
3. Fluid and air velocities should be maintained within our recommended values.

Table 2a

Fluid Velocity	
Water	1 to 8 fps
Glycol	1 to 6 fp

Table 2b

Air Velocity		
Cooling Coils	Dry Surface: 200-800 fpm Wet Surface: 200-550 fpm	With eliminator Dry Surface: 200-800 fpm Wet Surface: 200-750 fpm
Heating Coils	200-1500 fpm	

Maintenance

General

1. Filters and mist eliminators should be inspected on a regular basis and changed as needed. Maintaining clean filters and mist eliminators is a cost effective way to help maintain maximum coil performance and service life.
2. Periodic inspection of the coil for signs of corrosion and/or leaks is recommended. Repair and replacement of the coil and the connection of piping, valves, etc., should be performed as needed by a qualified technician.
3. Should the coil surface need cleaning, caution must be exercised in selecting the cleaning solution as well as the cleaning equipment. Improper selection can result in damage to the coil and/or health hazards. Clean the coil from the leaving air-side so that foreign material will be washed out of the coil rather than pushed further in. Be sure to carefully read and follow the manufacturer's recommendations before using any cleaning fluid.
4. The circulated fluid must be free of sediment, corrosive products and biological contaminants. Periodic testing of the fluid followed by any necessary corrective measures along with maintaining proper fluid velocities and filtering of the fluid will help to satisfy this goal.
5. If automatic air vents are not utilized, periodic venting of the coil is recommended to remove accumulated air. Caution should be exercised to avoid injury. High pressure and/or high temperature fluids can cause serious personal injury.

26612

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

6. Heatcraft cleanable coils with removable box headers should be cleaned using a s equivalent. Dislodged debris should be flushed from the coil and drain pan. Be su not clog the drain. After the coil has been cleaned, the old gaskets should be discarded and replaced with new ones (contact your local Heatcraft coil representative for replacement gaskets). The box header should then be reinstalled. The recommended installation procedure is as follows.
   a. Nuts and weld studs should be coated with thread lubricant.
   b. Tighten all nuts per Figure 5 - Torque Pattern, to 35 ft-lb torque. After the initial torque has been applied retorque them to 50 ft-lb, again using the pattern shown in Figure 5. The permissible range of final torque values are as follows:

maximum torque:	53 ft-lb
design torque:	50 ft-lb
minimum torque:	47 ft-lb

   c. Pressure test coils per the installation instructions.
   d. After the coil has been leak tested and found to be free from leaks, let it sit for 24 hours. Retorque to 50 ft-lb per Figure 5 - Torque Pattern.
   e. Refill the coil per the operation instructions.

Figure 5 - Torque Pattern

Freeze Protection

During the winter, chilled water coils need to be protected against freezing. The two predominant protective measures are covered below.

Blowing- Out Coils

1. Isolate the coil from the rest of the system by closing the valves on both the supply and return lines (gate valves in Figure 1 - Horizontal Airflow and Figure 3 - Vertical Airflow).
2. Drain the coil by opening all drain valves and/or the drain plug. Remove the vent plug to aid the draining process.
3. Once the coil has been fully drained, the blower can be hooked-up. Caps installed in the piping on straight runs going to the supply and return connections are ideal points to hook-up the blower. The air vent and drain plug are not suitable locations for hooking-up the blower. Caution should be exercised when installing the blower. The blower operator must take precautions to insure that water does not come into contact with any of the electrical components of the blower. Failure to do so may result in damage to the equipment and serious injury.

26612

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

4. Close the vent or drain plug on the header which the blower is connected and op cap on the other header.
5. Operate the blower for 45 minutes and then check the coil to see if it is dry. A mirror placed in the discharge will become fogged if moisture is present. Repeat this procedure until the coil is dry.
6. Let the coil stand for several minutes then blow it out again. If water comes out, repeat the blowing operation.
7. Leave all plugs out and drains open until the threat of freezing has passed.

Flushing Coils

1. We recommend the use of inhibited glycol designed for HVAC applications for corrosion protection. The use of uninhibited glycol has produced formicary corrosion in copper tubing. The complete filling of water coils with an inhibited glycol solution for freeze protection can be expensive. In some instances, it is more cost effective to flush the coils with an appropriate concentration of inhibited glycol solution. Residual fluid can be left in the coil without the threat of freeze damage provided the correct concentration of inhibited glycol was used. The recovered fluid can then be used to flush other coils. Select an inhibited glycol solution that will protect the coil from the lowest possible temperatures that can occur at the particular coil's locality. The following tables have been provided for your convenience.

% Ethylene GlycolBy Volume	Freeze point[1]
0	32°F
10	25°F
20	16°F
30	3°F
40	-13°F
50	-34°F
60	-55°F

[1]Freeze points may vary from product to product.

% Ethylene GlycolBy Volume	Freeze point[1]
0	32°F
10	26°F
20	19°F
30	8°F
40	-7°F
50	-28°F
60	-60°F

2. Estimate the volume of the coil in gallons.
   For 0.625" tubes (1.5" face tube spacing)
   (finned height in inches)x(finned length in inches)x(# of rows)x 0.0011 = gallons
   For 0.5" tubes (1.25" face tube spacing)
   (finned height in inches)x(finned length in inches)x(# of rows)x 0.00083 = gallons
3. Isolate the coil from the rest of the system by closing the valves on both the supply and return lines (gate valves in Figure 1 - Horizontal Airflow and Figure 3 - Vertical Airflow).
4. Drain the coil by opening all drain valves and/or the drain plug. Remove the vent plug to aid the draining process.
5. Close the drain valve(s) and drain plug.
6. Connect the flushing system to the coil. A typical system is shown in Figure 6 - Flushing System Diagram.
7. With the throttling valve closed, start the pump and operate until the air is vented from the coil. Next, close the air vent.
8. Open the throttling valve about half-way and circulate the fluid through the coil for 15 minutes. Check the strength of the fluid. A hydrometer or test kit from the fluid manufacturer is suitable for this application.
9. Adjust the solution strength as needed and circulate the fluid for another 15 minutes.
10. Repeat steps 8 and 9 until the desired concentration is reached.
11. Shut the pump down and drain the inhibited glycol from the coil.
12. The recaptured fluid can be used to flush other coils.

Note: Be sure to follow the manufactures' recommendations before utilizing any glycol based antifreeze solution. Additional fluid will be required for the pump, connected piping and fluid reservoir. Formulae are for estimation purposes only.

26612

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Figure 6 - Flushing System Diagram

26612

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Luvata Grenada LLC
Commercial Products
PO Box 1457 / 1000 Heatcraft Drive
Grenada, MS 38902-1457
Tel: 800-225-4328 / Fax: 662-229-4212
Emails: coils@luvata.com
Web: www.luvata.com/heatcraft

Printed in the USA
June 2009

26612

LU

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

FLUID COIL SPECIFICATION

1.0 CERTIFICATION

Acceptable coils are to have ARI Standard 410 certification and bear the ARI symbol. Coils exceedi manufacturer's certification and/or the range of ARI's standard rating conditions will be consid manufacturer is a current member of the ARI Air-Cooling and Air-Heating Coils certification program and the coils have been rated in accordance to ARI Standard 410. Manufacturer must be ISO 9002 certified.

1.1 FLUID COIL DESIGN PRESSURES AND TEMPERATURES

Coils shall be designed to withstand 250 psi maximum operating pressures and a maximum fluid temperature of 300°F for standard duty copper tube coils. Optional high pressure construction will include cupronickel tubes and headers to increase maximum operating pressure to 350 psi and maximum operating temperature to 450°F. For cleanable coils with removable heads, coils shall be designed to withstand 100 psi maximum operating pressures and a maximum fluid temperature of 150°F. Higher limits are available, depending on coil construction and/or materials used.

1.2 FACTORY TESTING REQUIREMENTS

Coils shall be submerged in water and tested with a minimum of 315 psi air pressure for standard copper tube coils and 125 psi for cleanable coils with removable heads. A 500 psig hydrostatic and shock test is required for high pressure cupronickel construction. Coils must display a tag with the inspector's identification as proof of testing.

1.3 FINS

Coils shall be of plate fin type construction providing uniform support for all coil tubes. Stainless steel fins shall be constructed of 304 & 316 stainless. Carbon steel fins shall be constructed of ASTM A109-83. Coils are to be manufactured with die-formed aluminum, copper, stainless steel or carbon steel fins with self-spacing collars which completely cover the entire tube surface. The fin thickness shall be 0.0075 +/- 5% unless otherwise specified. Manufacturer must be capable of providing self-spacing die-formed fins 4 through 14 fins/inch with a tolerance of +/- 4%.

1.4 TUBING

Tubing and return bends shall be constructed from UNS 12200 seamless copper conforming to ASTM B75 and ASTM B251 for standard pressure applications. High pressure construction shall use seamless 90/10 Cupronickel alloy C70600 per ASTM B111. Stainless steel tubes shall be ASTM A249. Carbon steel tubes shall be W&D / ASTM A214 & seamless A179. Copper tube temper shall be light annealed with a maximum grain size of 0.040 mm and a maximum hardness of Rockwell 65 on the 15T scale.

Design permits in-tube water velocities up to 6 ft/s for the standard seamless copper tubing, and up to 8 ft/s for optional seamless alloy C70600 cupronickel tubing.

Tubes are to be mechanically expanded to form an interference fit with the fin collars. Coil tube size and wall thickness' are 5/8"x0.020 and 1/2"x0.016 and 1"x.035 standard for copper, with other options available. Steel tubes are offered as 5/8"x0.035 or 0.049.

1.5 HEADERS

Headers shall be constructed from UNS 12200 seamless copper conforming to ASTM B75 and ASTM B251 for standard pressure applications. High-pressure construction is to incorporate seamless 90/10 Cupronickel alloy C70600 per ASTM B111. Stainless steel will be constructed of 304L & 316L (ASTM-A240) Sch-5 or Sch-10. Carbon steel headers shall be constructed of Sch-10 (ASTM-A135A) or Sch-40 (ASTM A53A) pipe.

Coil return headers are to be equipped with factory-installed 1/2” fpt air vent connection placed at the highest point available on face of the header.

Tube-to-header holes are to be intruded inward such that the landed surface area is three times the core tube thickness to provide enhanced header to tube joint integrity. all core tubes shall evenly extend within the inside diameter of the header no more than 0.12 inch.

End caps shall be die-formed and installed on the inside diameter of the header such that the landed surface area is three times the header wall thickness.

1.6 CONNECTIONS

Standard construction fluid connections are male pipe thread (MPT) and constructed from red brass conforming to ASTM B43 or Schedule 40 steel pipe as a minimum. Stainless steel will be304L or 316L (ASTM-A240) Sch-40 or Sch 80. Carbon steel will be A53A Sch-40, A106A Sch-40 or Sch-80 or A53B Sch-80 pipe.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

1.7 CLEANING
All residual manufacturing oils and solid contaminants are removed internally and externally by com the coil in an environmentally and safety approved type degreasing solution, which is also chemica the coil material. This may vary for steel tube coils, depending on the application and/or customer spe

1.8 BRAZING
Oxyfuel gas brazing, using fillet rod material of minimum 5% silver, is used for all non-ferrous tube j and connections. Depending on the application, ferrous to non-ferrous brazing material may contain upwards of 35% silver, or may be Tobin bronze.

1.8.1 WELDING
Gas shielded arc welding is used for welded vessels constructed of stainless steel. Gas welding is used for welded vessels constructed of carbon steel.

1.9 CASING
Coil casing and endplate shall be fabricated from Galvanized steel, as a standard construction, meeting ASTM and UL G90U requirements, Aluminum, 0.080" thick, optional, Copper, 0.063 " thick, optional,16- or 14-gauge carbon steel or stainless steel, optional. double-flange casing shall be provided when coils are specified as vertical stacking.

Standard coil intermediate tube sheets (center tube supports) shall be fabricated from the same gauge sheet stock and material as the end plates, and to the following schedule:

Finned Length (inches)	Number of Tube Sheets
6.00 – 48.00	0
48.01 – 96.00	1
96.01 – 144.00	2
144.01 and greater	4

1.10 CERTIFICATION
Performance certified coils that are ARI Standard 410 listed bear the ARI symbol. Coils exceeding the scope of the certification and/or the range of standard rating conditions are also rated to the extent possible by the ARI Std. 410 method. Luvata continues as a current and active member of the ARI Air-Cooling and Air-Heating Coils certification program, with original coil line certification and computerized selections dating back to 1969.

1.11 AGENCY APPROVAL
Luvata Grenada LLC was facility registered by UL in 1994 to ISO 9002 (ANSI/ASQC Q92). Applicable commercial coil models are UL Standard 207 registered as Refrigerant Containing Components and Accessories; non-electrical. CRN, category H.
Note: Luvata Grenada LLC can provide ASME code stamped vessels.

1.13 INSTALLATION
Coils to be installed in accordance with manufacturer's instructions and any applicable piping codes.

1.14 LEAD TIME
Standard lead-time for custom made retrofit fluid coils of standard construction with OEM circuiting shall be 11-15 working days, with reduced lead-time emergency shipment options of 10 working days and 5 working days from order placement date and based upon production approval.

Standard lead-time for custom made fluid coils of manufacturer's own standard design and circuiting shall be 10 working days, with reduced lead-time emergency shipment options for 5 working days, 48-hours and 24-hours from order placement date.

All coils shall be quoted and offered as FOB Factory, Full Freight Allowed to any and all destinations within the Continental United States.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

NEGATIVE PRESSURE SUPPLY PLENUM TRAP

C = MINIMUM STATIC PRESSURE PLUS 3
D = C DIVIDED BY 2

C = (Sp/2)+3
D = C/2

POSITIVE PRESSURE SUPPLY PLE

B = 2 INCH MINIMUM
A = MAXIMUM STATIC PRESSURE PLUS 3
A = Sp + 3

Sp = MAX STATIC PRESSURE
FOR PURPOSES OF CALCULATION, REMOVE THE NEGATIVE SIGN IF THE PRESSURE IS NEGATIVE

Static Pressure (positive or negative)	C	D
1	4	2
1.5	4.5	2.25
2	5	2.5
2.5	5.5	2.75
3	6	3
3.5	6.5	3.25
4	7	3.5
4.5	7.5	3.75
5	8	4
5.5	8.5	4.25
6	9	4.5
6.5	9.5	4.75
7	10	5
7.5	10.5	5.25
8	11	5.5
8.5	11.5	5.75
9	12	6
9.5	12.5	6.25
10	13	6.5

1. The drain outlets of the P-traps should not be hard piped together into a common drain. This procedure can prevent properly determining status of a p-trap's prime and flow.
2. Periodically inspect the P-trap to ensure the water has not evaporated.
3. Use a minimum of 1 inch corrosion resistant pipe.

REV	DESCRIPTION	DFT	DATE	APP
2	REVISED DIMENSIONS TO ENHANCE PERFORMANCE	JDR	9/22/09	JDR
1	REDRAWN AND REVISED TO INDUSTRY STANDARDS	RHG	6/20/07	RG

REVISIONS

Munters Corporation **79 Monroe Street** **Amesbury, MA 01913**	DFT JDR	DATE 9/22/09	REF SPEC #	DWG NO. **N/A**
	CHK RG	9/22/09	PART NUMBER 74759	
P-TRAP DESIGN	APP JDR	9/22/09	PAGE 1 OF 1	CODE IDENT # 82974 / REV 2

Rev	Ecr	
1		REDRAW
2		REMOVE
3		REVISE
4		RELOCA
5		REDRAW
6		ADDED
7	866	ADDED
8		UPDATE

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

	Date	Dft	Chk	App
	11/87	CS	HWA	HWA
	05/88		LJR	LJR
	10/90	JS	TPW	TPW
	06/92	EL	KY	KY
	04/95	JEM	KY	KY
	05/97	JEM	RG	RG
	05/97	CJT		
	6/24/14	DPR	RG	RG

NOTES:
1. SEE APPROPRIATE COOLING COIL SECTION WITHIN EQUIPMENT SCHEDULE FOR PIPING CONNECTION SIZES, REQUIRED FLOW RATES AND PRESSURE DROP.
2. UNIONS ARE LOCATED AT THE COIL FOR COIL REMOVAL.

LEGEND

1. WATER COIL
2. TEMPERATURE GAUGE
3. PRESSURE GAGE
4. 3 WAY VALVE AND ACTUATOR
5. AUTOMATIC AIR VENT
6. BALANCING VALVE
7. STRAINER
8. CHECK VALVE
9. BALANCING VALVE/FLOW METER
10. CONDENSATE DRAIN (1" COPPER SWEAT CONN.)
11. DRAIN VALVE
12. GATE VALVE

PART NO. 55576-01

Job No. STD	Date	Munters Cargocaire 79 Monroe St. Amesbury, Ma 01913
Customer		
Dr.By. J. MONTMINY	04/11/95	TYPICAL (RECOMMENDED) 3 WAY WATER/GLYCOL PIPING
Ck.By RG	04/95	
Aprv.By. RG	04/95	

SCALE	SHEET	SIZE		REV
NTS	1 of 1	B	55576	8

GREENHECK Low Leakage CONTRO

N

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Application and Design

The VCD-23 series is a ruggedly built low leakage control damper intended for application in low to medium pressure and velocity systems.

Ratings (See page 4 for specific limitations)

Pressure: 2.5 - 5.0 in. wg (.63 kPa - 1.2 kPa) - pressure differential.

Velocity: 2000 to 3000 fpm (10.2 m/s - 15.2 m/s)

Leakage: 6 cfm/ft^2 @ 4 in. wg (110 cmh/m^2 @ 1 kPa)
3 cfm/ft^2 @ 1 in. wg (55cmh/m^2 @ .25 kPa)

Temperature: 180°F (82ºC)

Construction	Standard	Optional
Frame Material	Galvanized Steel	Aluminum or 304SS
Frame Thickness	16 ga.	12 ga. or 14 ga.
Frame Type	5 in. x 1 in. Channel	-
Blade Material	Galvanized steel	-
Blade Thickness	16 ga.	-
Blade Type	3V	-
Blade Seals	TPE	Silicone
Axle	1/2 in. dia. Plated Steel	304SS
Axle Bearings	Synthetic	Bronze, 304SS
Linkage Material	Plated Steel	304SS
Jamb Seal	304SS	-

Size Limitations

W x H	Minimum Size	Maximum Size	
		Single Section	Multiple Section
Inches	6 x 6	48 x 74	Unlimited
mm	152 x 152	1219 x 1880	Unlimited

Features & Options

- Blade seals - pressure activated to produce tighter sealing.
- Linkage concealed in the frame
- Low profile head and sill are used on sizes less than 17 in. (432mm)
- Wide range of electric (120V, 24V, 240V) actuators, manual quadrant and pneumatic actuators available. Factory installation available.
- Sleeves available
- 5/8 in. - 2 in. (16mm - 51mm) flange available
- Retaining angles
- Transitions
  - R, C and O
- Security bars
- Paint finishes
  - Baked Enamel
  - Epoxy
  - Hi Pro Polyester
  - Industrial Epoxy
  - Permatector

* W&H dimension furnished approximately ¼ in. (6mm) undersize.

amca CERTIFIED RATINGS AIR PERFORMANCE AIR MOVEMENT AND CONTROL ASSOCIATION, INC.

Greenheck Fan Corporation certifies that the model VCD-23 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs.The AMCA Certified Ratings Seal applies to air performance ratings only.

Flange Options

Single Flange | Single Reversed Flange | Double Flange

Blade Operation

Parallel Blades | Opposed Blades

Installation instructions available at www. greenheck.com.

I26272

Pressure Drop Data

This pressure drop testing was conducted in accordance with AMCA Standard 500-D using th configurations shown. All data has been corrected to represent standard air at a density of .0

Actual pressure drop found in any HVAC system is a combination of many factors. This pressu along with an analysis of other system influences should be used to estimate actual pressure installed in a given HVAC system.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

AMCA Test Figures

Figure 5.3 Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

Figure 5.2 Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

Figure 5.5 Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

$$D \quad \sqrt{\frac{4\,(W)\,(H)}{3.14}}$$

I26272

AMCA 5.2 Pressure Drop

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Figure 5.2

VELOCITY VS. PRESSURE DROP

FACE VELOCITY - FEET/MINUTE
AMCA FIG. 5.2

12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.14
1500	0.31
2000	0.55
2500	0.86
3000	1.24
3500	1.69
4000	2.20

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.07
1500	0.16
2000	0.29
2500	0.45
3000	0.65
3500	0.89
4000	1.16

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.36
3500	0.49
4000	0.64

12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.13
2000	0.23
2500	0.36
3000	0.52
3500	0.70
4000	0.92

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.10
1500	0.23
2000	0.41
2500	0.63
3000	0.91
3500	1.24
4000	1.62

Greenheck Fan Corporation certifies that the model VCD-23 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.

I26272

AMCA 5.3 Pressure Drop

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Figure 5.3

AMCA FIG. 5.3

12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.09
1500	0.20
2000	0.36
2500	0.56
3000	0.81
3500	1.10
4000	1.44

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.35
3500	0.48
4000	0.63

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.11
2500	0.17
3000	0.24
3500	0.33
4000	0.42

12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.10
2000	0.17
2500	0.27
3000	0.39
3500	0.53
4000	0.70

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.07
1500	0.16
2000	0.29
2500	0.45
3000	0.64
3500	0.88
4000	1.14

Greenheck Fan Corporation certifies that the model VCD-23 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.

I26272

AMCA 5.5 Pressure Drop

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

VELOCITY VS. PRESSURE DROP

FACE VELOCITY - FEET/MINUTE
AMCA FIG. 5.5

12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.06
1000	0.22
1500	0.50
2000	0.89
2500	1.39
3000	2.00
3500	2.72
4000	3.55

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.14
1500	0.31
2000	0.54
2500	0.85
3000	1.22
3500	1.66
4000	2.17

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.26
2000	0.46
2500	0.73
3000	1.05
3500	1.42
4000	1.86

12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.13
1500	0.30
2000	0.53
2500	0.83
3000	1.19
3500	1.62
4000	2.11

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.17
1500	0.38
2000	0.67
2500	1.04
3000	1.50
3500	2.05
4000	2.67

Greenheck Fan Corporation certifies that the model VCD-23 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.

I26272

ASSEMBLY/SELECTION SPECI

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Multi-Section Assembly

Dampers larger than the maximum single section size, will be made up of a multiple of equal size sections. Multiple section dampers can be jackshafted together so that all sections operate together as shown below.

NOTE: Dampers larger than 48 in. x74 in. (1219mm x 1880mm) are not intended to be structurally self supporting. Additional horizontal bracing is recommended to support the weight of the damper and vertical bracing should be installed as required to hold against system pressure.

Selection Criteria

Pressure Limitations

Velocity Limitations

NOTE: VCD-23 will withstand higher pressures and velocities. Displayed ratings are conservative to prevent misapplication. Consult Greenheck if you have an application outside these limitations.

Temperatures in excess of 180°F (82°C) require special consideration.

Specifications

Control dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules.

Damper blades shall be 16 ga. (1.5mm) galvanized steel 3 Vee type with three longitudinal grooves for reinforcement. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow and operation in either direction through the damper (blades that are non-symmetrical relative to their axle pivot point or utilize blade stops larger than ½ in. [13mm] are unacceptable). Blade seals shall be TPE. Linkage shall be blade-to-blade concealed in jamb (out of the airstream) to protect linkage and reduce pressure drop and noise.

Damper frame shall be 16 ga. (1.5mm) galvanized steel formed into a structural hat channel shape with reinforced corners to meet 11 ga. (3.1mm) criteria. Bearings shall be corrosion resistant, permanently lubricated, synthetic (acetal) sleeve type rotating in extruded holes in the damper frame for maximum service. Axles shall be square and positively locked into the damper blade. Jamb seals shall be flexible stainless steel compression type to prevent leakage between blade end and damper frame.

The Damper Manufacturer's submittal data shall certify all air performance pressure drop data is licensed in accordance with the AMCA Certified Ratings Program for Test Figures 5.2, 5.3 and 5.5. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D.

Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 5 in. wg (1245Pa), velocities to 3000 fpm (15.2 m/s) and temperatures to 180°F (82°C). Testing and ratings to be in accordance with AMCA Standard 500-D.

Damper manufacturer's printed performance data showing standard air leakage less than 10 cfm/ft^2 @ 4 in. wg (.005 m^3/s @ 996 Pa) shall be submitted for approval.Testing and ratings shall be per AMCA Standard 500-D.

Basis of design is Greenheek's model VCD-23.

GREENHECK
P.O. Box 410 • Schofield, WI 54476-0410 • 715.359.6171 • greenheck.com

Copyright © 2010 Greenheck Fan Corporation

I26272

REV.		DATE	APPROVED
1	D NOTES	4/5/13	M.R.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

NOTES:

1. RECEIVING:

A. WHEN EQUIPMENT IS RECEIVED, Al ECKED AGAINST THE BILL OF LADING, TO BE SURE THAT 'E BEEN RECEIVED. ANY DAMAGE OR IRREGULARITIES SHOULD BE NOTED TO THE CARRIER.

2. HANDLING AND RIGGING:

A. WHEN LIFTING AN ICA SYSTEM WITH A HOOK AT A SINGLE POINT, A LIFTING/SPREADING DEVICE SIMILAR TO WHAT IS SHOWN IS REQUIRED.

B. THE LIFTING/SPREADING DEVICE & LIFTING BARS MUST BE FURNISHED BY THE RIGGING CONTRACTOR AND MUNTERS ASSUMES NO RESPONSIBILITY OR LIABILITY FOR METHODS OR MATERIALS USED. LIFTING/SPREADING DEVICE - REFER TO GENERAL ARRANGEMENT FOR APPROXIMATE WEIGHT.

C. A LIFTING/SPREADING DEVICE IS ESSENTIAL TO PREVENT CRUSHING SYSTEM SIDES AND DAMAGE TO SENSITIVE CONTROL COMPONENTS.

D. RIGGING MUST BE DESIGNED SO THAT LOAD REMAINS LEVEL AT ALL TIME.

3. LIFTING:

A: RECOMMENDED LIFTING/SPREADING DEVICE SHOULD HAVE A LENGTH AT LEAST 12 INCHES WIDER THAN THE SYSTEM AT ITS WIDEST POINT. RIGGER MUST UTILIZE THE 2 INCH DIAMETER HOLES PROVIDED IN THE REMOVABLE LIFTING LUGS. CABLES MUST BE LONG ENOUGH TO PERMIT A MINIMUM DISTANCE OF 15 FEET BETWEEN CABLES, CENTER RING AND HIGHEST POINT OF SYSTEMS.

B. SAFETY LINES SHOULD BE ATTACHED TO SKID AT NOT LESS THAN 2 POINTS TO PREVENT SWINGING OR TWISTING DURING LIFTING.

C. PRIOR TO LIFTING, CHECK THAT ALL ACCESS PANELS ARE IN PLACE, THAT CORNERS ALONG TOP SURFACES ARE PROTECTED FROM POSSIBLE DAMAGE BY SLINGS AND THAT ALL EXPOSED COMPONENTS ARE FULLY PROTECTED.

D. LIFTING SHOULD BE ACCOMPLISHED USING SAFEST SPEED OF LIFT BASED ON CONDITIONS AT TIME OF OPERATION.

E. WHEN A SYSTEM IS SPLIT INTO TWO OR MORE SECTIONS, EACH SECTION IS TO BE LIFTED AS SHOWN. DO NOT LIFT A "SPLIT SYSTEM" AS A COMPLETE UNIT.

4. PLACEMENT:

A. THE ICA SYSTEM IS DESIGNED TO BE PLACED AS A SINGLE STRUCTURE ON A CONCRETE PAD OR OTHER TYPE OF BASE DESIGNED FOR SUPPORTING THE WEIGHT OF THE SYSTEM.

B. THE SYSTEM SHOULD BE SO PLACED AS TO ALLOW ACCESS TO ALL COMPONENTS AND EQUIPMENT. CARE SHOULD BE TAKEN SO THAT AIR INLETS AND OUTLETS ARE NOT BLOCKED BY OTHER STRUCTURES OR PIECES OF EQUIPMENT THAT DO NOT INTERFACE WITH THE SYSTEM.

C. THE SYSTEM MUST BE LOWERED GENTLY ONTO THE BASE OR SUPPORT STRUCTURE WITHOUT BOUNCING OR DROPPING.

D. CARE MUST BE TAKEN DURING PLACEMENT OF UNIT WITH REGARD TO AVAILABILITY OF UTILITIES.

CABLING:

.TENSION SHOULD BE RELATIVELY EQUAL ON ALL CABLES.

.VISUAL INSPECTION OF SKID FLATNESS.
(SHOULD NOT BE GREATER THAN 1/4" ALONG TOTAL UNIT LENGTH)

.ADJUST CABLES UNTIL LIFT IS FLAT.

CONFIDENTIALITY STATEMENT

THE TECHNICAL INFORMATION AND DESIGN DATA DISCLOSED HEREIN CONSTITUTE PROPIETARY INFORMATION OF MUNTERS CORPORATION - CARGOCAIRE DIVISION AND ARE TO BE MAINTAINED IN STRICT CONFIDENCE, THIS INFORMATION IS FOR THE SOLE USE OF OUR CUSTOMERS AND END USERS OF OUR EQUIPMENT

All Dimensions Are In Inches
Unless Otherwise Specified
TOLERANCES:

MACHINED	OTHER
.XXX ± .005	.XXX ± .03
.XX ± .012	.XX ± .05
.X ± .03	.X ± .10
± 1/2 Deg	± 1 Deg

--

FINISH: SEE NOTES

DO NOT SCALE DRAWING

Munters

Job No	STD	
Designed By	AUTO	Date 11/13/2000
Dr. By	CJT	3/7/2001
Ck. By	GNG	3/7/2001
Appr. By	GNG	3/7/2001

Munters
79 Monroe St. Amesbury, Ma. 01913
Tel. 978-241-1100 FAX 978-241-1214

STANDARD ICA LIFTING INSTRUCTIONS

SHEET 1 OF 1 | SCALE 1:96 | SIZE B | G20173-01 | REV. 1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Instructions for Joining an ICA Unit

Follow recommended lifting, rigging and safety instructio found in the unit operating and maintenance manual.

Date: 11/03/15

1. Lift units and place in final resting location. Typically it will be best to lift the heaviest section first so that the other, lighter sections may be drawn up to it.

2. The Unit foundation should be flat and level within ¼" over the entire unit length and width. Unit sections may be shimmed, but the mating unit surfaces MUST remain plumb and parallel to one another to ensure seam tightness, and prevent damage to the unit.

3. Draw sections together using pipe clamps, a come along or heavy equipment, using care to prevent damage to unit base or unit casing.

4. When sections are close together, approximately 6-12" apart, apply a 3/8" bead of silicone sealant to both the inner panel and outer panel, approximately ¼" in from the edge of the panel. Apply a third bead of silicone to the foam in the middle of the thermal break. See Figure 1 and Picture 1.

5. Remove lifting lug plates at split, reinstall bolting hardware and tighten to pull the unit base together. See Picture 2.

6. Your specific unit may involve one or both of the following joining methods:

Figure 1 : Same Size Joining

Figure 2 : Mismatched Plenum Joining

Munters Corporation	DFT MSB	DATE 5/07	DWG NO. **G25102**		
79 Monroe Street **Amesbury, MA 01913**	CHK RHG	5/07	**Instructions for Joining an ICA Unit**		
	APP MSB	5/07	PAGE 1 of 6	CODE IDENT # 82974	REV 2

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Same Size Interface

1. The unit walls will be pulled together using the latching receptacles mounted inside structure. These are identified by the 5/8" diameter holes in the panels set approxi feet. ***Note: Panel latches are not designed to pull the panels parallel or clo The intent is to snug panels tight once sections have been properly aligned a
2. Place a 5/16" diameter Allen wrench inside the 5/8" diameter holes and into the latch. See Picture 3.
3. Turn clockwise approximately 180 to 190 degrees. **Do Not Overtighten.**
4. Repeat this process for every receptacle.

Mismatched Unit Sizes (ie. a small to large air handler interface)

1. During installation be sure the plenum-joining collars located inside the unit, male and female slide over one another.
2. Silicone last ¼" of the duct, applying a neat fillet bead to finish. See Figure 2.
3. Install self-tapping screws (provided) to hold plenum-joining collars together.

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Picture #1

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Picture #2

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 11/03/15

Picture #3

2	Updated Photos and Reformatted	RGV
1	Title Change	RHG
REV.	**DESCRIPTION**	**DFT**

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 11/03/15

Munters Corporation **79 Monroe Street** **Amesbury, MA 01913**	DFT MSB	DATE 5/07	DWG NO. **G25102**		
	CHK RHG	5/07	**Instructions for Joining an ICA Unit**		
	APP MSB	5/07	PAGE 6 of 6	CODE IDENT # 82974	REV 2