Dyna-Tech Sales Corporation

55 Columbia Ave.
Branchburg, NJ 08876

Attention: David V. Russo
Prepared for: Air Group, LLC – Commercial Division
One Prince Road
Whippany, NJ 07981

Date Prepared: 6/05/2012

Dyna-Tech Project No P11612

Project: Zeus Industrial New Building
Number of Systems: 1 **Fans Per System:** 2 **Total Fans Ordered:** 2

Attached are the following items:

- Fan Schedule – page 2
- Fan System Sound Evaluation – page 3
- Fan System Data Summary – page 4
- Limited Manufacturer's Warranty – page 6
- Fan Selection – page 7
- AMCA Statement – page 8
- Fan Performance Curve – page 9
- Fan/Plenum Drawing – page 10
- Wiring Diagrams – page 11
- System Rigging Diagram – page 13
- Component Submittal Sheets – page 14
- Coating Specifications – page 20

Purpose: These documents are being transmitted for approval. After review, please return one set with comments or marked 'Approved'.

Project Notes:

1. Fan performance data is based on constant primary air.

SUBMISSION: #
____ REVIEWED FOR INFORMATION ONLY
____ MAKE CORRECTIONS AS NOTED
__X_ NO EXCEPTIONS TAKEN
____ REJECTED
____ REVISE AND RESUBMIT
____ RESUBMIT FOR RECORD ONLY
____ NO FUTHER SUBMISSION REQUIRED

Review is only for the general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: dimensions, which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of work with that of all other trades; and the satisfactory performance of work.

ENVIRONETICS
PROJECT No. 12-010
TRACKING No.
REVIEWER:
ARCH/INTER
STRUCTURAL
M/E/P Jeff Ohlinger
DATE 9-12-12

HIGH PERFORMANCE INDUCTION EXHAUST FAN SCHEDULE

FAN SYSTEM TAG No.	PRIMARY EXHAUST VOLUME *1		MODEL NO.	MOTOR (ARR. IV)			SYSTEM OPERATING PERFORMANCE *2			NOZZLE PERFORMANCE			EQUIVALENT STACK HEIGHT (FT) *4		SOUND AT 10 FEET (dB "A")	SOUND AT 50 FEET (dB "A")
	CFM	E.S.P. ("WC)		NOMINAL RPM	HP	V/PH/HZ	CFM	T.S.P. ("WC)	BHP *3	TOTAL CFM	INDUCTION RATIO (%)	NOZZLE VELOCITY (FPM)	11 MPH WIND VELOCITY	15 MPH WIND VELOCITY		
EF-4A	8,970	2.95	HPE-035-015-A18S	1800	15	460/3/60	11,700	4.15	10.94	21,060	234	4200	50	40	60	46
EF-4B	8,970	2.95	HPE-035-015-A18S	1800	15	460/3/60	11,700	4.15	10.94	21,060	234	4200	50	40	60	46

NOTES:

A. FAN SHALL INCLUDE AS STANDARD: CHEMICAL RESISTANT GASKET, 316 S/S HARDWARE, ENTRAINMENT WINDBAND, INTERNAL DRAIN SYSTEM
B. FAN SHALL INCLUDE THE FOLLOWING OPTIONS: EXTERNAL LIFTING LUGS, SILENCER NOZZLE, DISCONNECT W/NEMA 3R ENCLOSURE
C. FAN MEETS QUALIFICATIONS FOR AMCA 210 STANDARD CERTIFICATION
C. SINGLE WALL PLENUM SHALL INCLUDE ACCESS DOORS, BOTTOM INLET, MOTORIZED OPPOSED BLADE ISOLATION DAMPER
D. UNIT TO BE INSTALLED ON ROOF CURB

*1 - SPECIFIED OPERATING DESIGN FLOW AT 150 °F. AIR DENSITY AT OPERATING POINT IS .0674 LB/FT³
*2 - PERFORMANCE INCLUDES STATIC PRESSURE LOSSES THROUGH MIXING PLENUM AND DISCHARGE NOZZLE
*3 - BRAKE HORSEPOWER AT OPERATING DESIGN POINT. BHP FOR PRIMARY SYSTEM AIR AT STANDARD AIR CONDITIONS OF 70 °F IS 12.18 HP
*4 - EQUIVALENT STACK HEIGHT FROM ROOFLINE. 11 MPH WIND VELOCITY SELECTED IS AVERAGE FOR NEW JERSEY.

DYNA-TECH ASSEMBLY MODEL NUMBER

HPE - 035 - 015-A18S

- HPE — HIGH PERFORMANCE EXHAUST DISCHARGE
- 035 — FAN SIZE = QSL-245 (TWIN-CITY)
- 015 — 15 HP MOTOR
- A — IMPELLER: A = 100% WIDTH
- 18 — 1800 RPM MOTOR
- S — SILENCER NOZZLE

Dyna-Tech
HVAC Products Group
55 Columbia Road, Branchburg, NJ 08876
Phone: 908-541-1010
Fax: 908-541-1011
www.dynatechsales.net

NO.	DATE	DESCRIPTION	BY
1	06-05-12	FOR SUBMITTAL	RJS

ZEUS INDUSTRIAL

DRAWING TITLE: FAN SCHEDULE		P11612
Date 06-05-12	Scale: NTS	Drawing No.
Drawn by: RJS	Checked by: BJM	Drawing File No.

ZEUS INDUSTRIAL EXHAUST FAN SYSTEM SOUND EVALUATION (TEN FOOT DISTANCE)

MID BAND FREQUENCY (HZ)	63	125	250	500	1000	2000	4000	8000
FAN OUTLET SOUND POWER LEVEL (10^{-12} W)	94	92	88	89	87	82	77	71
"A" SCALE CORRECTION	-26	-16	-9	-3	0	+1	+1	-1
10 FT. DISTANCE CORRECTION	-17	-17	-17	-17	-17	-17	-17	-17
INTEGRAL SILENCER CORRECTION	-4	-7	-11	-14	-17	-15	-11	-8
dB"A" SPECTRUM	44	49	48	52	50	48	47	42
NET SOUND LEVEL (10 FT. DISTANCE)	60 dB"A"							

ZEUS INDUSTRIAL EXHAUST FAN SYSTEM SOUND EVALUATION (FIFTY FOOT DISTANCE)

MID BAND FREQUENCY (HZ)	63	125	250	500	1000	2000	4000	8000
FAN OUTLET SOUND POWER LEVEL (10^{-12} W)	94	92	88	89	87	82	77	71
"A" SCALE CORRECTION	-26	-16	-9	-3	0	+1	+1	-1
50 FT. DISTANCE CORRECTION	-31	-31	-31	-31	-31	-31	-31	-31
INTEGRAL SILENCER CORRECTION	-4	-7	-11	-14	-17	-15	-11	-8
dB"A" SPECTRUM	30	35	34	38	36	34	33	28
NET SOUND LEVEL (50 FT. DISTANCE)	46 dB"A"							

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1	06-05-12	FOR SUBMITTAL	RJS

ZEUS INDUSTRIAL

DRAWING TITLE: SOUND CALCULATION

P11612

Date	Scale:	Drawing No.
06-05-12	NTS	
Drawn by: RJS	Checked by: BJM	Drawing File No.

HPE FAN SYSTEM

EXHAUST FAN SYSTEM:

MANUFACTURER:	Dyna-Tech Sales Corporation
MODEL:	HPE-035-015-A18S
TYPE:	Mixed Flow
ARRANGEMENT:	Arr. IV, Direct Drive; Motor isolated from primary airstream, visually accessible through inspection port
CONSTRUCTION:	AMCA “C” construction; single wall sheet, metal plenum construction
INCLUDED OPTIONS:	Jib crane socket

COATINGS:

Interior/Exterior Base:	Dura-Plate 154 Epoxy Coating (see attached data sheets)
Exterior Topcoat:	Acrolon 218 HS topcoat (see attached data sheets)

MOTOR (each fan):

HP / RPM:	15 / 1800
ENCLOSURE:	TEFC, Mill and Chem Duty, Premium Efficiency
VOLTAGE:	460/3/60
F.L. AMPS:	30
WEIGHT:	395 Lbs.
INSULATION:	Class F, NEMA MG1, Part 31 (Inverter Duty)
SHAFT SEALS:	Labyrinth – Both Ends
LUBRICATION:	Extended Grease Leads
VIBRATION TEST:	Factory Vibration Test Provided for Each Motor
MANUFACTURER:	Baldor

MAKE-UP AIR INTAKE DAMPER:

MFR./MODEL:	United Enertech Model CD-150 (Opposed Blade Control)
QUANTITY:	Two (2)
NOMINAL SIZE:	24” x 24” Frame
FRAME:	Extruded Aluminum (6063-T5) 1.5” x 0.125” Flanged Frame
BLADES:	Extruded Aluminum (6063-T5) Hollow Airfoil 0.375” thick end nose
BEARINGS:	Bronze Oilite
DRIVE SHAFT:	Extended ½” Diameter
LINKAGE:	Concealed in frame
SEALS:	EPDM Blade & Stainless Steel Jamb
SAFETY SCREEN:	Factory provided & mounted at damper inlet
WEATHER HOOD:	Factory provided & mounted
ACTUATOR:	Manual Quadrant

FAN ISOLATION DAMPER:

MFR./MODEL:	United Enertech Model CD-150 (Opposed Blade Control)
QUANTITY:	Two (2)
NOMINAL SIZE:	44” x 44” Frame
FRAME:	Extruded Aluminum (6063-T5)
BLADES:	Extruded Aluminum (6063-T5) Hollow Airfoil 0.375” thick end nose
BEARINGS:	Bronze Oilite
DRIVE SHAFT:	Extended ½” Diameter
LINKAGE:	Concealed in frame
SEALS:	EPDM Blade & Stainless Steel Lamb
ACTUATOR:	Provided & Installed; mounted external to exhaust airstream; Belimo (see enclosed data sheets)

FAN ISOLATION DAMPER ACTUATOR & TRANSFORMER:

MFR./MODEL:	Belimo Model EFX120-S
QUANTITY:	Two (2)
POWER SUPPLY:	120/1/60
TORQUE CAPACITY:	270 Inch-Pounds
ENCLOSURE:	Weather tight
AUXILIARY CONTACTS:	Yes (available for BAS options as may be required by others; see enclosed data sheets)
TRANSFORMER:	Primary: 460 VAC Secondary: 120 VAC

ROOF CURB:

MOUNTING SURFACE:	18” high overall
MATERIAL:	14 Gauge Galvanized Steel, welded construction
INSULATED:	1½” rigid fiberglass lining with vapor barrier
NAILER:	2” x 2” PTW Nailer
OPTIONS:	½” Round Steel Security Bars
ASSEMBLY:	Factory Assembled
INSTALLATION:	Curb is designed for mechanically mounting to a flat (level) roof structure (by others)

ACOUSTIC ATTENUATION:

Each high plume exhaust nozzle includes an integral sound attenuator.

MANUFACTURER’S STATEMENT

Manufacturer reserves the right to make changes, substitutions or improvements as necessary that do not negatively affect the performance.

LIMITED MANUFACTURER'S WARRANTY

Dyna-Tech Sales Corporation (the "Manufacturer") warrants that the equipment will perform under design conditions in accordance with the Manufacturer's specifications for a period of 7 years from the shipment date (the "Warranty Period"). During the Warranty Period, the Manufacturer will repair or replace defective materials and/or workmanship, provided that the Manufacturer will not be responsible for conditions resulting from normal wear and tear or resulting from improper operation and/or maintenance of the equipment.

THIS WARRANTY IS IN LIEU OF ALL OTHER GUARANTEES AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE MANUFACTURER SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND THE MANUFACTURER'S TOTAL LIABILITY ARISING FROM ANY AND ALL DEFECTS IN THE EQUIPMENT SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE EQUIPMENT.

Twin City Fan & Blower
A Twin City Fan Company
5959 Trenton Lane · Minneapolis, MN 55442-3238
Phone (763) 551-7600 · Fax (763) 551-7601 · www.tcf.com
ISO 9001 CERTIFIED

Customer: Air Group, LLC
Job Name: Zeus Industrial
Job ID: 11612

Fan Description

Tag	EF-4A & EF-4B
Quantity	2
Type	QSL
Size	245
Width	SWSI
Arrangement	9
Class	II
Rotation	CW
Discharge	VUI
Wheel diameter (in.)	30
Drive method	60 Hz belt drive
Percentage width	100%
Percentage diameter	100%

Fan Performance

CFM	11,700
Operating SP (in.wg)	4.15
Standard SP (in.wg)	4.62
RPM	1751
Tip Speed (fpm)	13,752
Oper. BHP	10.94
Standard BHP	12.18
Outlet area (sq. ft)	6.01
Outlet Velocity (fpm)	1,947
Temperature (°F)	130
Altitude (ft)	0
Density (lb/ft³)	0.067
Max RPM for Class	2132
Static Efficiency	69.78
Mechanical Efficiency	73.35

Sound

Sound Power Levels in dB re. 10^{-12} Watts:

Octave Bands	1	2	3	4	5	6	7	8	LwA
Level at Inlet	86	87	85	84	83	80	76	72	88
Level at Outlet	94	92	88	89	87	82	77	71	91

Estimated sound pressure level in dBA (re: 0.0002 microbar) based on a single* ducted installation:

Distance in ft	1	3	5
dBA at Inlet	88	78	74
dBA at Outlet	91	81	77

*To estimate dBA level for ducted inlet and ducted outlet (into and out of the room) type installation, deduct 20 from the LwA value shown.

Using a directivity factor of 1.

Estimated Sound Pressure based on free field, spherical (Q = 1) radiation at the stated distance.

Definitions:

LwA The overall (single value) fan sound power level, 'A' weighted.

dBA The environment for each fan installation influences its measured sound value, therefore dBA levels cannot be guaranteed. Consult AMCA Publication 303 for further details.
A fan's dBA is influenced by nearby reflective surfaces.

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Customer: Air Group, LLC
Job Name: Zeus Industrial
Job ID: 11612

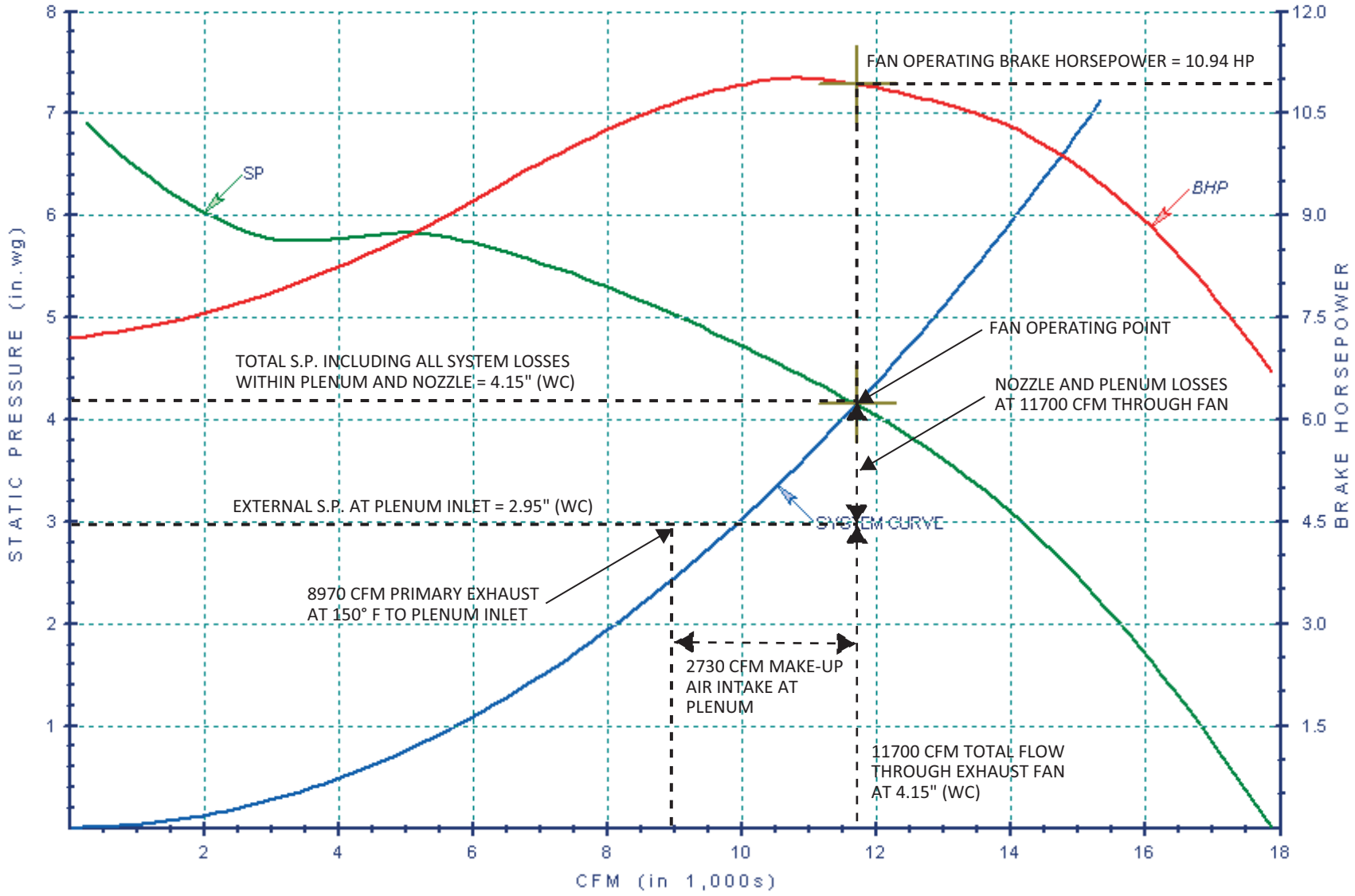
AMCA Statements

Tag : EF-4A & EF-4B

1. Twin City Fan and Blower certifies that the model QSL is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B: Free inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. Performance ratings do not include the effects of appurtenances (accessories).
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.
8. The AMCA Certified Ratings Seal applies to LwA, LwiA and LwoA ratings only.
9. dBA levels are not licensed by AMCA International.

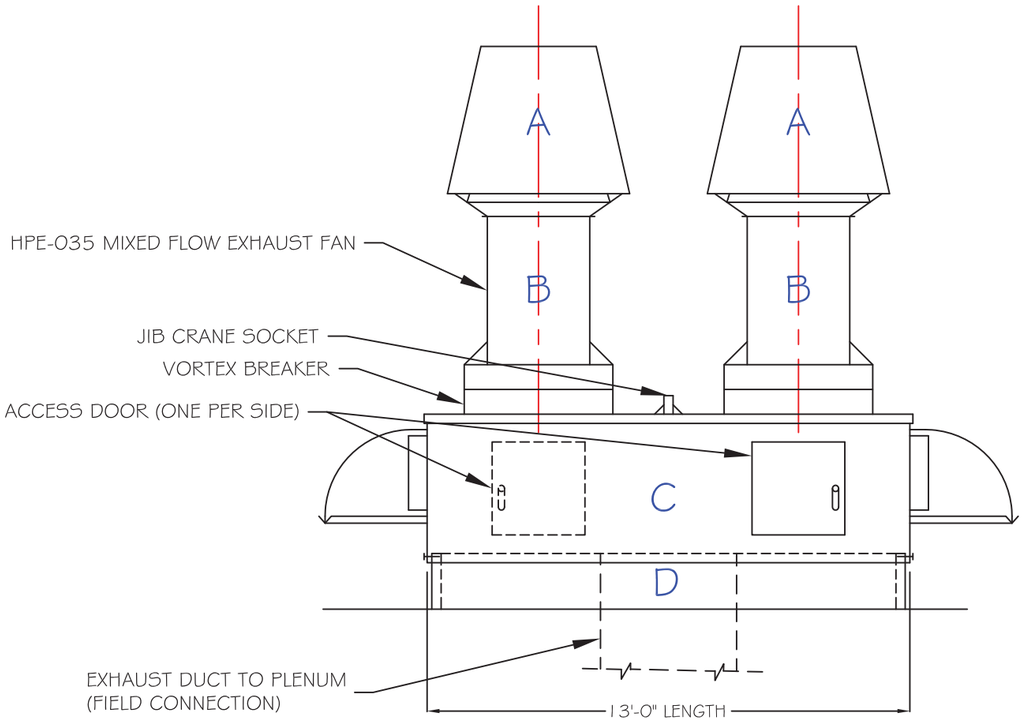
Customer: Zeus Industrial		Fan Tag: EF-4A & EF-4B	CFM: ------ 11,700
Job ID: 11612		Model: 245 QSL	SP: ---- 4.15 in.wg
			RPM: ------- 1751
			BHP: ------- 10.94
			Outlet Velocity: 1,947
			Density: ---- 0.067
			Corrected for: Temperature 130°F

TWIN CITY FAN AND BLOWER PERFORMANCE CURVE

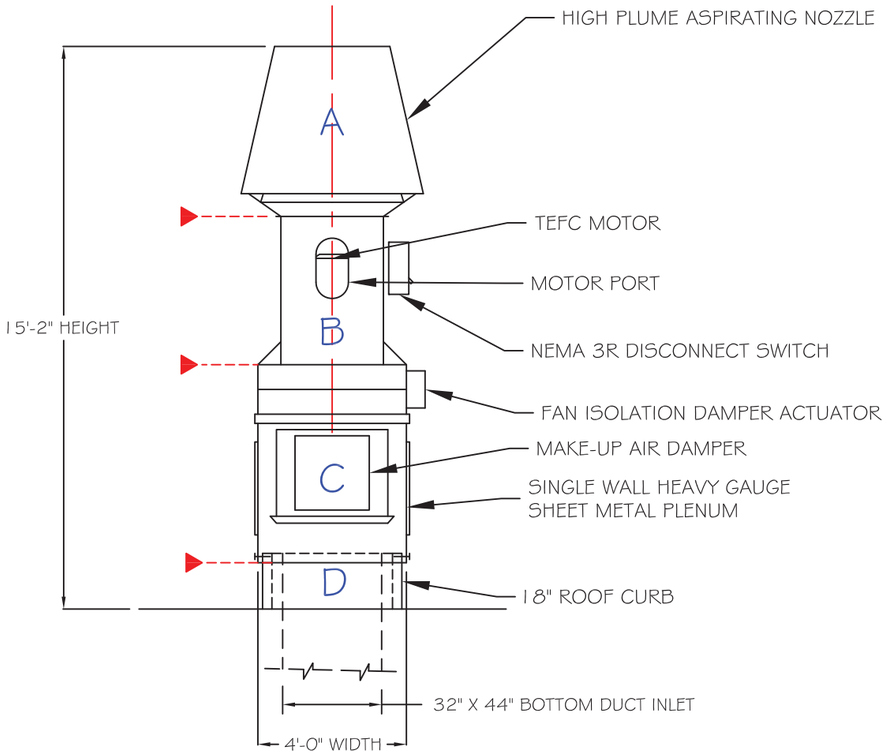


6/3/2012
Page: 1 of 1

Component Rigging Weights			
Component	Description	Quantity	Weight (lbs)
A	Nozzle	2	500
B	Exhaust Fan	2	1000
C	Plenum	1	3000
D	Roof Curb	1	400
Total System Weight			6400



SYSTEM FRONT ELEVATION



SYSTEM SIDE ELEVATION

▶ DENOTES SHIPPING SPLIT

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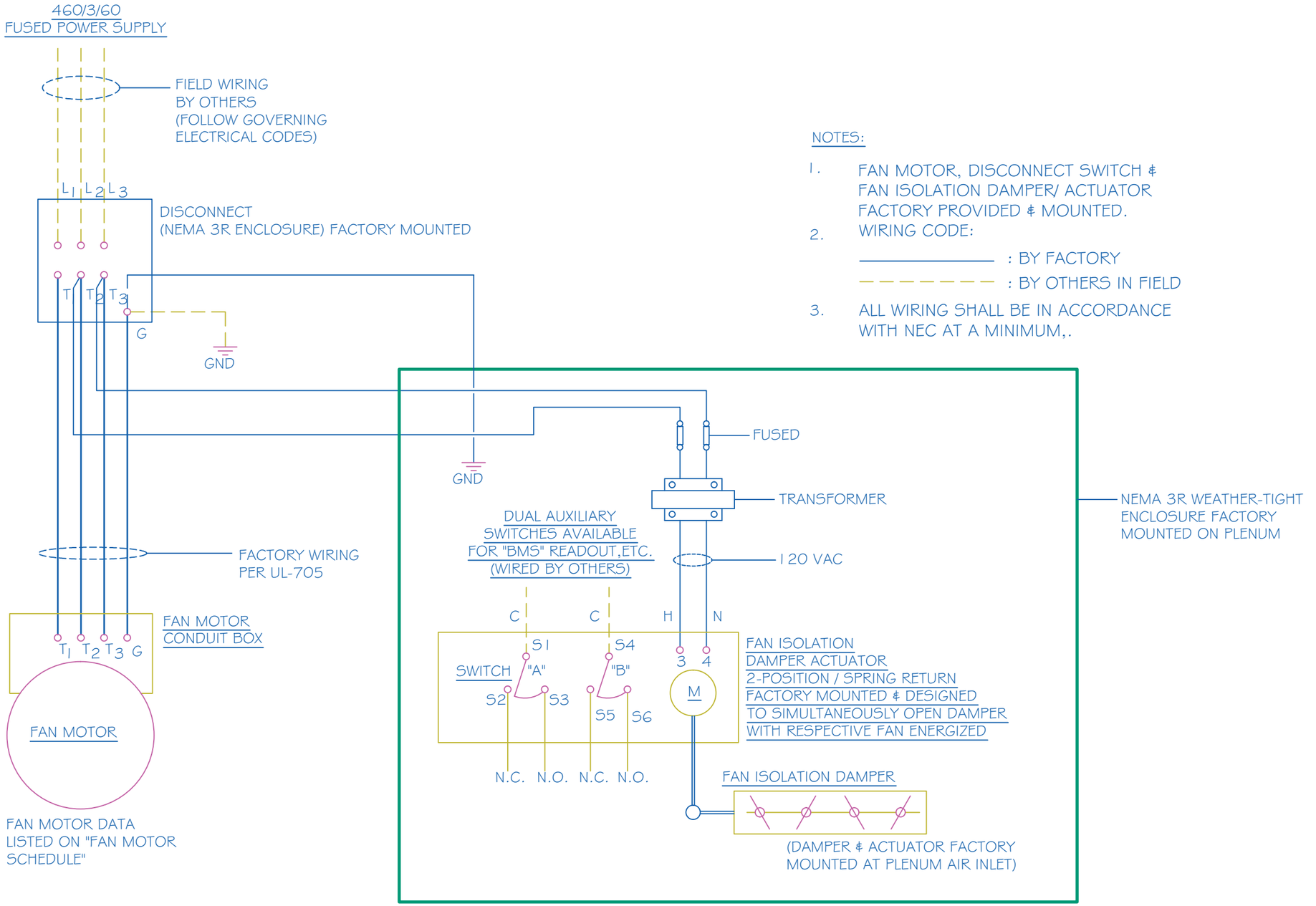
NO.	DATE	DESCRIPTION	BY
1	06-05-12	FOR SUBMITTAL	RJS

ZEUS INDUSTRIAL

DRAWING TITLE: EXHAUST FAN PLENUM ASSEMBLY		P11612
Date 06-05-12	Scale: 1/4" = 1'-0"	Drawing No.
Drawn by: RJS	Checked by: BJM	Drawing File No.



NOTES:

1. FAN MOTOR, DISCONNECT SWITCH & FAN ISOLATION DAMPER/ ACTUATOR FACTORY PROVIDED & MOUNTED.
2. WIRING CODE:
   - ——————— : BY FACTORY
   - — — — — — — — : BY OTHERS IN FIELD
3. ALL WIRING SHALL BE IN ACCORDANCE WITH NEC AT A MINIMUM,.

TYPICAL WIRING DIAGRAM FOR ONE (1)
EXHAUST FAN OPERATION

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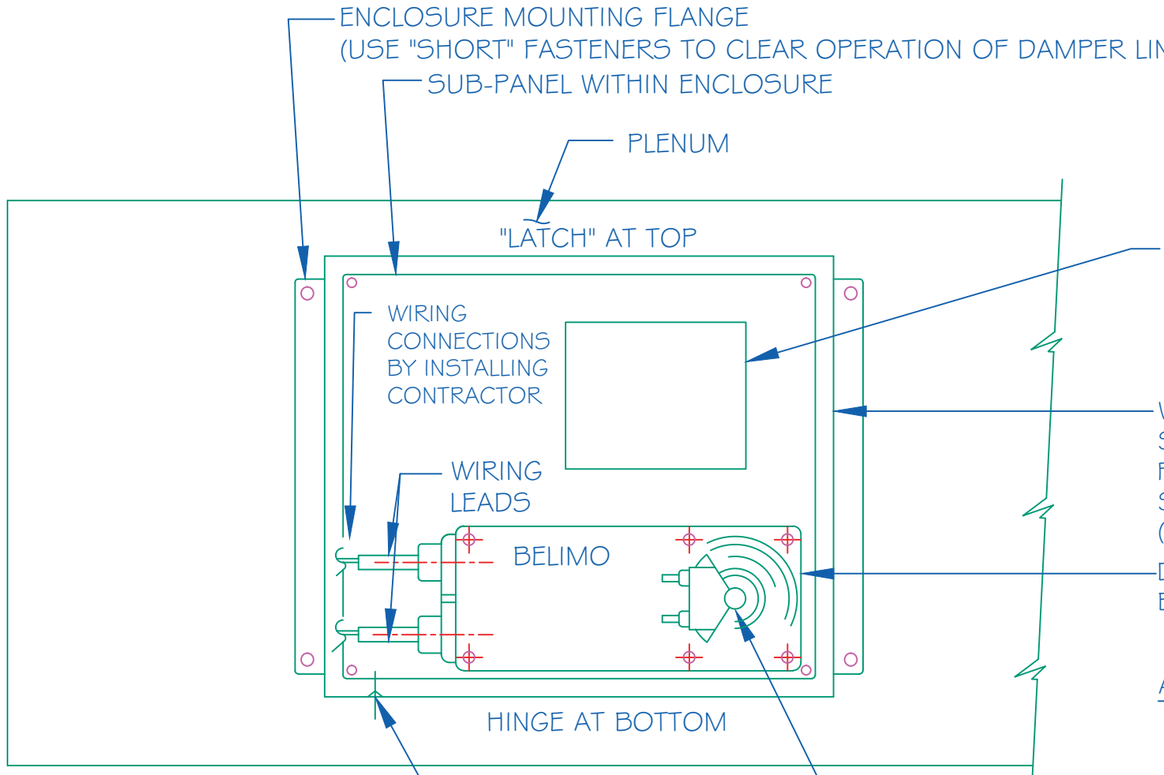
NO.	DATE	DESCRIPTION	BY
1	06-05-12	FOR SUBMITTAL	RJS

ZEUS INDUSTRIAL

DRAWING TITLE: ISOLATION DAMPER ACTUATOR WIRING DIAGRAM		P11612
Date 06-05-12	Scale: NTS	Drawing No.
Drawn by: RJS	Checked by: BJM	Drawing File No.



PRIMARY 120 V TRANSFORMER

WEATHERPROOF ENCLOSURE (ELECTRICAL BOX)
SIZE SHOWN: 14" x 12" x 6" DEEP
FIBERGLASS CONSTRUCTION
SIMILAR TO ALLIED MOULDED PRODUCTS, INC.
(MOUNT TO FACE OF COVER PLATE W/SCREWS)

"AWED" MOD. No.
AMU 1426 LF
WITH
SUB-PANEL

DAMPER ACTUATOR
BELIMO MODEL SHOWN: AFBUP-S (120 VAC)

ACTUATOR MOUNTING BRACKET IS REQUIRED (NOT SHOWN)

0.50" DIA. DAMPER SHAFT THROUGH REAR
SURFACE OF ENCLOSURE & SUB-PANEL

COORDINATE ACTUATOR WITH "NOTCH" AT END OF SHAFT:

- DAMPER "CLOSED" - ACTUATOR DE-ENERGIZED
- DAMPER "OPEN" - ACTUATOR ENERGIZED TO "OPEN"

FACTORY TEST EACH DAMPER/ACTUATOR

DRILL HOLE AT THIS END
OF ENCLOSURE BOTTOM SURFACE -
3/8" DIAM. DRILL BIT
(FOR DRAINING ANY POSSIBLE
WATER ENTRY INTO ENCLOSURE)

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NO.	DATE	DESCRIPTION	BY
1	06-05-12	FOR SUBMITTAL	RJS

ZEUS INDUSTRIAL

DRAWING TITLE: ISOLATION DAMPER ACTUATOR ENCLOSURE DETAIL		P11612
Date 06-05-12	Scale: NTS	Drawing No.
Drawn by: RJS	Checked by: BJM	Drawing File No.

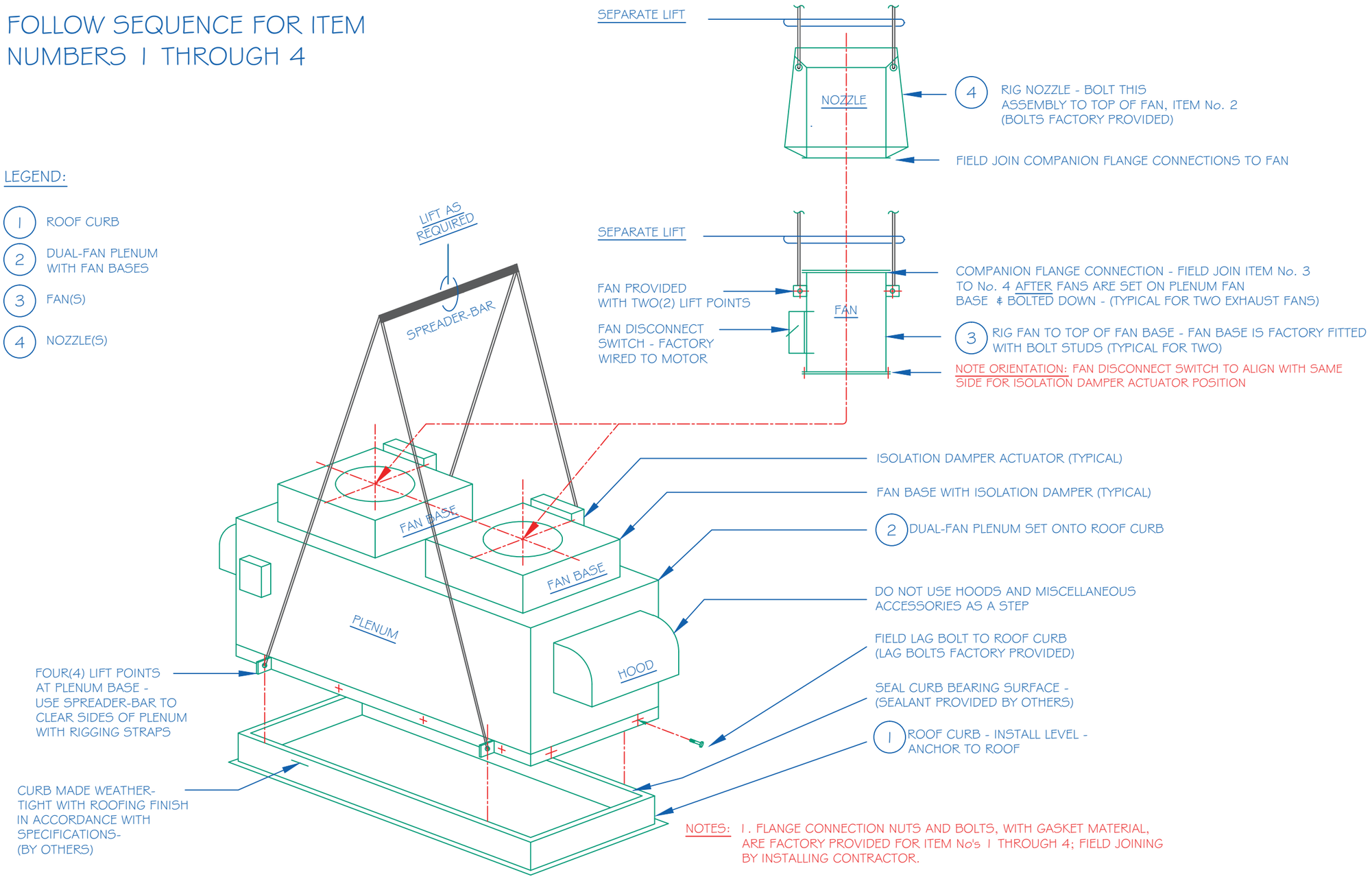
DUAL-FAN PLENUM ASSEMBLY

INSTALLATION/RIGGING SEQUENCE

FOLLOW SEQUENCE FOR ITEM NUMBERS 1 THROUGH 4

LEGEND:

1. ROOF CURB
2. DUAL-FAN PLENUM WITH FAN BASES
3. FAN(S)
4. NOZZLE(S)



NOTES: 1. FLANGE CONNECTION NUTS AND BOLTS, WITH GASKET MATERIAL, ARE FACTORY PROVIDED FOR ITEM No's 1 THROUGH 4; FIELD JOINING BY INSTALLING CONTRACTOR.

2. FOR COMPONENT WEIGHTS REFER TO PROJECT SUBMITTAL EXHAUST FAN PLENUM ASSEMBLY DRAWING

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NO.	DATE	DESCRIPTION	BY
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ZEUS INDUSTRIAL

DRAWING TITLE: FAN SYSTEM RIGGING DIAGRAM		P11612
Date 06-05-12	Scale: NTS	Drawing No.
Drawn by: RJS	Checked by: BJM	Drawing File No.

(ENGINEERS)

SUBMITTAL DATA

CONTROL DAMPERS

Airfoil Blade

Suggested Specifications:

Furnish and install at location shown on drawing or in accordance with schedules dampers meeting the following specifications: Rectangular damper shall have 3/8" thick nose hollow airfoil blade and .081 extruded aluminum top and bottom frames. Damper to have thrust bushings and meet the low pressure drop and low leakage equal to United Enertech **MODEL CD-150, 151.** Damper bears the AMCA seal for air performance and leakage. Manufacturer must have a series of six dampers certified.

Standard Construction:

Frame: .081 Extruded Aluminum (6063-T5)

Blade: Hollow Airfoil with .375" thick end nose (6063-T5) Extruded Aluminum

Extended shaft: 1/2" diameter

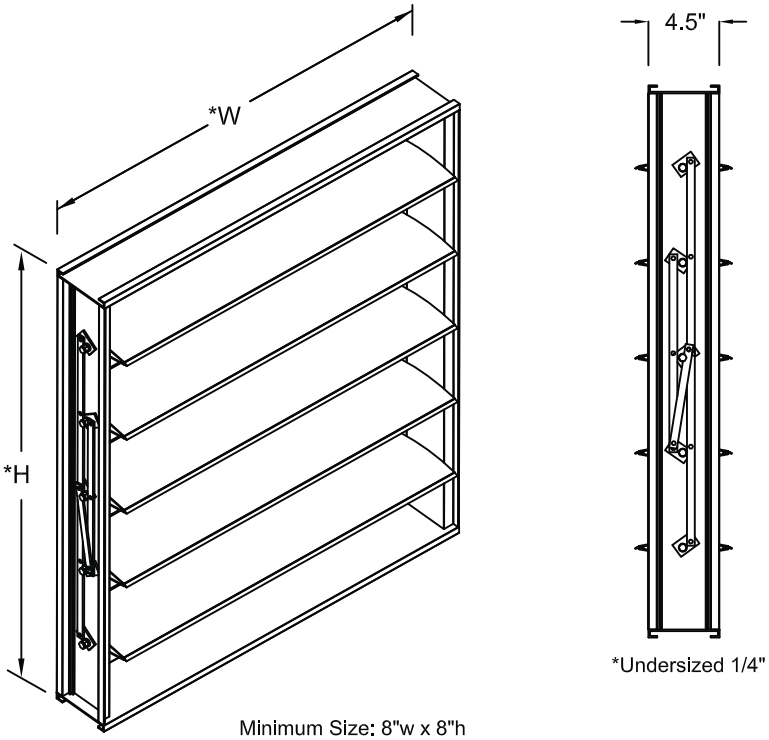
Bearing: Bronze Oilite

Linkage: Concealed in frame

Pivot axels: Zinc with Thrust Bushings

Blade seals: Removable EPDM (250° F)

Jamb seals: Stainless steel (compression)



*Undersized 1/4"

Options:

.125" Extruded Aluminum Flanged Frame
Hand Quadrant (Make-up Air Dampers Only)
Powder Coated - Epoxy

Minimum Size: 8"w x 8"h
Maximum Size: 60"w x 72"h (single section)
Maximum multi-section: Unlimited

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

Job Name: Zeus Industrial	☒ MODEL CD-150 (Opposed)		
Location:	☐ MODEL CD-151 (Parallel)		
Architect:	DRAWN BY: CLJ	DATE: June 2003	REV. DATE: CD-150 February 2011
Engineer:	REV. NO. 21	APPROVED BY: BGT	DWG. NO.: **A-9**
Contractor:			

MODEL CD-150, CD-151 PERFORMANCE DATA

Imperial Units (CD-150 Opposed Blade, Forward Flow)

Damper Width X Height	1 in. w.g.	4 in. w.g.	8 in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1A	Class 1	Class 1	10 lbs-in
12" X 48"	Class 1	Class 1	Class 1	17.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	10 lbs-in
60" X 36"	Class 1A	Class 2		10 lbs-in

*Torque applied to close and seat damper in during the test.

Imperial Units (CD-150 Opposed Blade, Reverse Flow)

Damper Width X Height	1 in. w.g.	4 in. w.g.	8 in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1A	Class 1	Class 1	10 lbs-in
12" X 48"	Class 1A	Class 1	Class 1	17.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	10 lbs-in
60" X 36"	Class 1A	Class 1		10 lbs-in

*Torque applied to close and seat damper in during the test.

Imperial Units (CD-151 Parallel Blade, Forward Flow)

Damper Width X Height	1 in. w.g.	4 in. w.g.	8 in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1	Class 1	Class 1	32.5 lbs-in
12" X 48"	Class 1	Class 1	Class 1	32.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	32.5 lbs-in
60" X 36"	Class 1A	Class 2		16 lbs-in

*Torque applied to close and seat damper in during the test.

Imperial Units (CD-151 Parallel Blade, Reverse Flow)

Damper Width X Height	1 in. w.g.	4 in. w.g.	8 in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1A	Class 1	Class 1	32.5 lbs-in
12" X 48"	Class 1	Class 1	Class 1	32.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	32.5 lbs-in
60" X 36"	Class 2	Class 2		16 lbs-in

*Torque applied to close and seat damper in during the test.

United Enertech certifies that the CD-150 and CD-151 are 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 Program. The AMCA Certified Rating Seal applies to Air Performance and Air Leakage ratings.

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs/ft³.

	Leakage, ft³/min /ft²			
	Required Rating		Extended Ranges (optional)	
Pressure / Class	1"	4"	8"	12"
1A	3	n/a	n/a	n/a
1	4	8	11	14
2	10	20	28	35
3	40	80	112	140

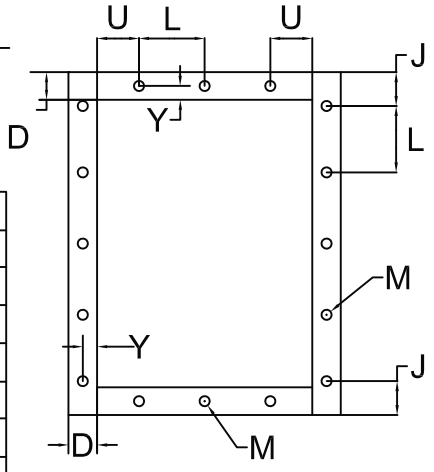
All data corrected to represent standard air at a density of 0.075 lbs/ft³

FRAME CONSTRUCTION OPTIONS

Flange (D Dim): Standard- 2"
Optional- 1-1/2"- 4"
Web (C Dim): Standard- 8"
Optional- 8" - 12"

Bolt holes: (Standard does not include bolt holes)
Optional- United Enertech recommended standard pattern.
7/16" dia. holes (M dimension) - Spaced 6" C-C (L dimension)
Optional- Customer may specify within limits shown in table below.

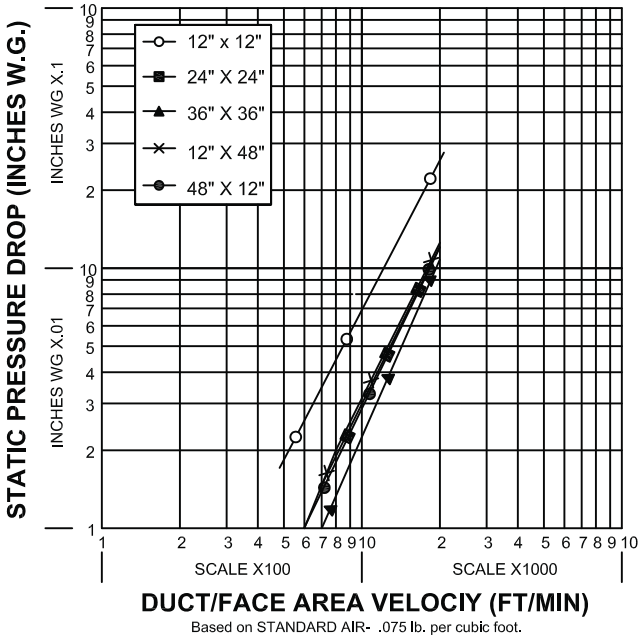
Dim.	Standard (Min./Max)	Description
J	(D/2 min.)	First/Last Space in Jamb
F	(1 min.)	No. of holes in Jamb
L	6" (2"/12")	Hole Spacing
M	7/16" (1/4"/11/16")	Mounting hole Diameter
U	(3/4" min.)	First/Last Space in Head/Sill
V	(1 min.)	No. of holes in Head/Sill
Y	D/2M (3/4"/D-3/4")	Centerline of bolt hole from inside edge of frame



A-10

MODEL CD-150, 151 PERFORMANCE DATA

PRESSURE DROP



Based on STANDARD AIR- .075 lb. per cubic foot.

CD-150,151 sizes: 12" x 12", 24" x 24", 48" x 12", 12" x 48", 36" x 36"
(305 x 305mm, 610 x 610mm, 1219 x 305mm, 305 x 1219mm, 914 x 914mm)

Pressure drop test per AMCA Standard 500-D, Figure 5.3.

United Enertech certifies that the CD-150 and CD-151 are 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 Program. The AMCA Certified Rating Seal applies to Air Performance and Air Leakage ratings.

12" x 12" (305mm x 305mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.07 (17)
1500 (7.62)	0.16 (39)
2000 (10.16)	0.28 (69)

24" x 24" (610mm x 610mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (8)
1500 (7.62)	0.07 (18)
2000 (10.16)	0.13 (32)

48" x 12" (1219mm x 305mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (8)
1500 (7.62)	0.07 (17)
2000 (10.16)	0.12 (31)

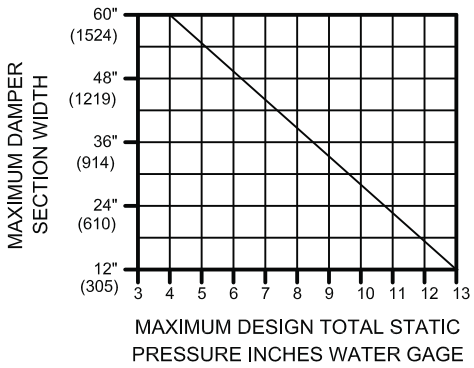
12" x 48" (305mm x 1219mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (8)
1500 (7.62)	0.07 (18)
2000 (10.16)	0.13 (32)

36" x 36" (914mm x 914mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (7)
1500 (7.62)	0.06 (15)
2000 (10.16)	0.11 (27)

CD-150/151 PRESSURE LIMITATIONS



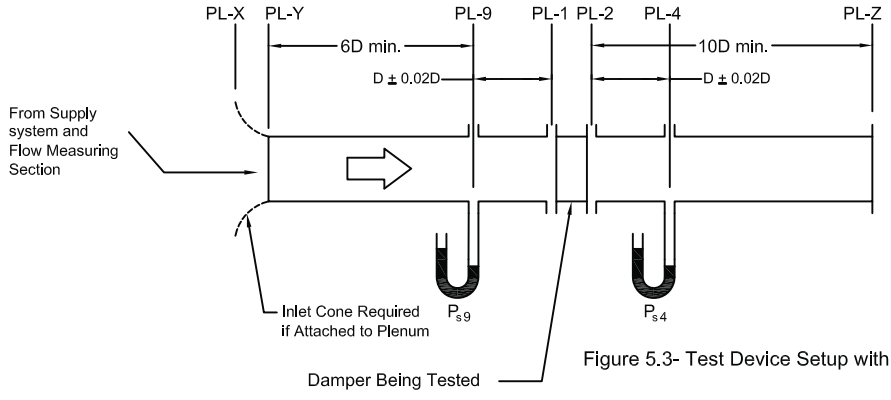


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

A-12

EFB120, EFB120-S, EFX120, EFX120-S

On/Off, Spring Return, 100 to 240 VAC

Torque min. 270 in-lb, for control of air dampers

Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact, or a manual switch.

The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

Operation

The EFB and EFX series actuators provide true spring return operation for reliable fail-safe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator.

The EFB and EFX series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°.

The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches.

The EFB120-S and EFX120-S versions are provided with two built-in auxiliary switches. These SPDT switches provide safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at +10°, the other switch function is adjustable between +10° to +85°. The EFB120, EFB120-S, EFX120 and EFX120-S actuator is shipped at +5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

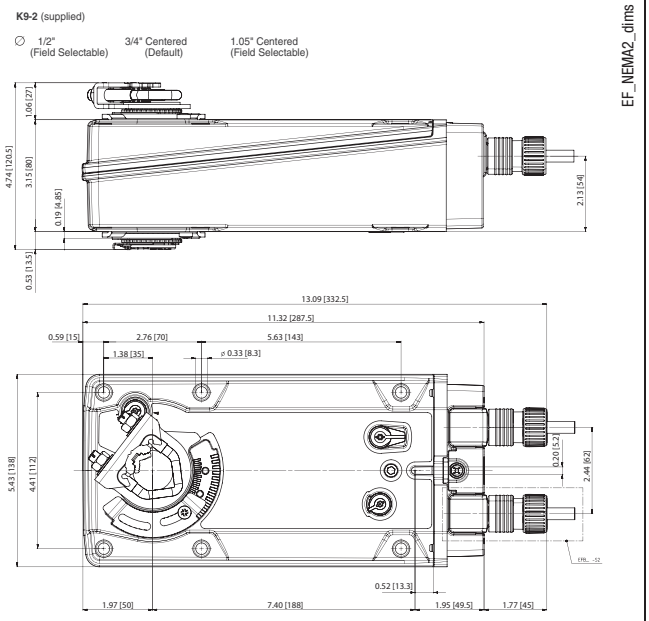
Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuators input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.

Technical Data		EFB120, EFB120-S, EFX120, EFX120-S
Power supply		100...240 VAC +10% / -20%, 50/60 Hz 100...125 VDC ±10%
Power consumption	running	9.5 W
	holding	4.5 W
VA rating		21 VA @ 100 VAC 29 VA @ 240 VAC
Electrical connection		
EFB120...		3 ft, 18 GA appliance cable, 1/2" conduit connector **-S models:** Two 3 ft, 18 gauge appliance cables with 1/2" conduit connectors
EFX120...		3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cable, with or without 1/2" conduit connector **-S models:** Two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors
Overload protection		electronic throughout 0 to 95° rotation
Control		on/off
Torque		270 in-lb [30 Nm] minimum
Direction of rotation	spring	reversible with CW/CCW mounting
Mechanical angle of rotation		max. 95° (adjustable with mechanical end stop, 35° to 95°)
Running time	motor	75 sec
	spring	< 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C]
Position indication		visual indicator, 0° to 95° (0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Humidity		max. 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		Nema 2, IP54, Enclosure Type2
Housing material		aluminum diecast and plastic casing
Agency listings †		cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC
Noise level		≤56.5dB(A) motor @ 75 seconds ≤71.4dB(A) spring return
Servicing		maintenance free
Quality standard		ISO 9001
Weight		9.82 lbs [4.45 kg], 10.14 lbs [4.6 kg] with switches

† Rated Impulse Voltage 2.5kV, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

EFB120-S, EFX120-S	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL Approved one set at +10°, one adjustable 10° to 85°

Dimensions (Inches [mm])



Accessories

IND-EFB	Damper position indicator
KH-EFB	Crank arm
K9-2	Universal clamp for up to 1.05” diameter jackshafts
TF-CC US	Conduit fitting
Tool-07	13 mm wrench
ZG-EFB	Crank arm adaptor kit

Note: When using EFB120, EFB120-S, EFX120, EFX120-S actuators, only use accessories listed on this page.

For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05” diameter. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 ***CAUTION** Equipment Damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

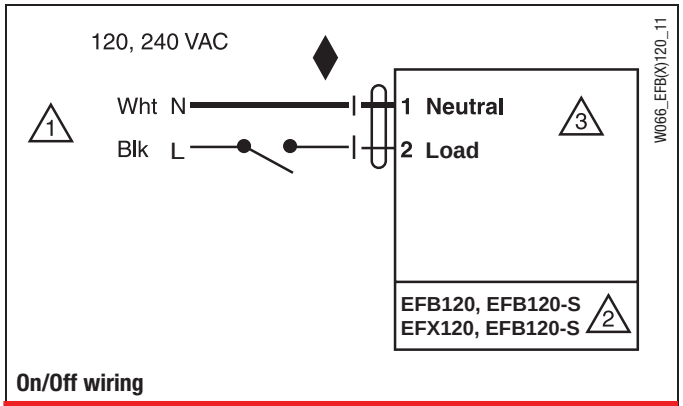
3 No ground connection is required.

4 For end position indication, interlock control, fan startup, etc., EFB120-S and EFX120-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 85°.

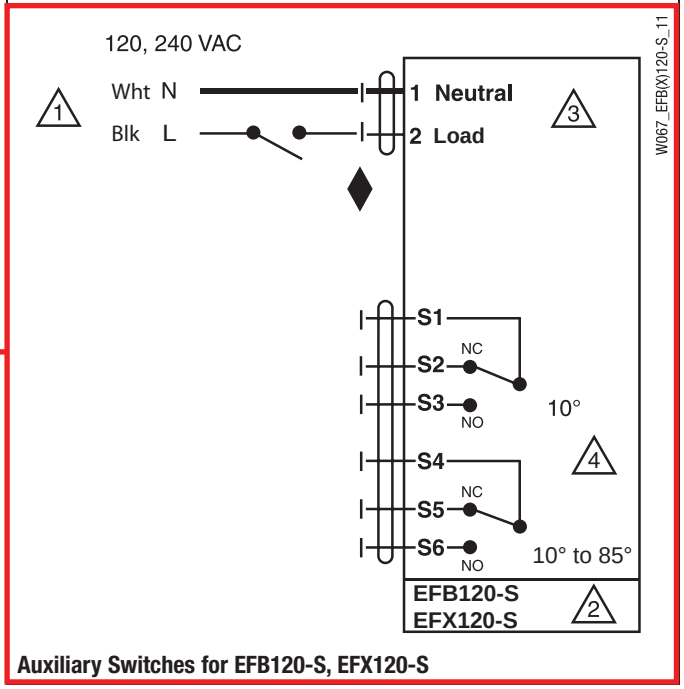
APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

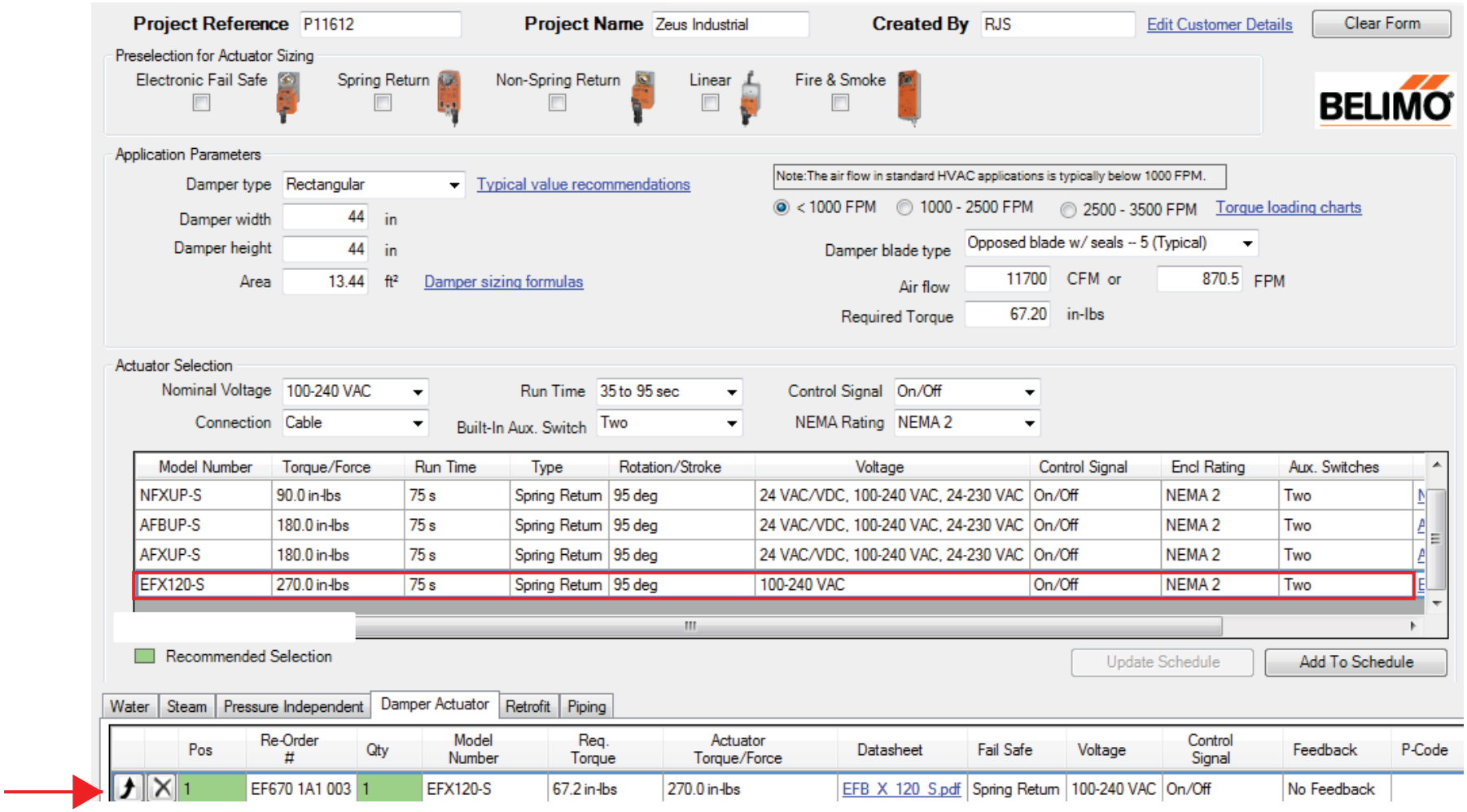


On/Off wiring



Auxiliary Switches for EFB120-S, EFX120-S

Fan Isolation Damper Actuator Selection



Protective & Marine Coatings

DURA-PLATE® 154
EPOXY SPLASH ZONE COATING

PART A	B62A320	GRAY
PART B	B62V320	HARDENER

Revised 10/09

PRODUCT INFORMATION

9.01

PRODUCT DESCRIPTION

DURA-PLATE 154 EPOXY SPLASH ZONE COATING is a high solids, high build amine epoxy coating that will withstand extreme conditions of abrasion and corrosion. It can be applied from 10-40 mils (250-1000 microns) dry in one coat and over prepared, damp substrates while providing adequate adhesion and a protective film.

- Easy to apply
- Low VOC
- Low odor
- Chemical resistant
- Corrosion resistant

RECOMMENDED USES

For use over prepared steel and concrete surfaces in industrial exposures such as:

- Offshore platforms (splash zones)
- Pulp and paper mills
- Water treatment plants
- Chemical plants
- Refineries

PRODUCT CHARACTERISTICS

Finish:	Semi-Gloss
Color:	Gray
Volume Solids:	85% ± 2%, mixed
Weight Solids:	92% ± 2%, mixed
VOC calculated: mixed	Unreduced:<150 g/L; 1.28 lb/gal Reduced 10%: <200 g/L; 1.67 lb/gal
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum		Maximum	
Wet mils (microns)	**12.0**	300	**46.0**	1150
Dry mils (microns)	**10.0**	250	**40.0**	1000
~Coverage sq ft/gal (m^2/L)	**34**	0.83	**136**	3.3
Theoretical coverage sq ft/gal (m^2/L) @ 1 mil / 25 microns dft	**1360**	33.3		

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 15.0 mils wet (375 microns):

	@ 77°F/25°C ***50% RH***
To touch:	4 hours
To handle:	18 hours
To recoat:	
minimum:	16 hours
maximum:	7 days
To service:	4-6 hours
To cure:	7 days

If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.

Pot Life:	45 minutes
Sweat-in-Time:	None required

Shelf Life:	12 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C)
Flash Point:	101°F (39°C), Seta flash, mixed
Reducer/Clean Up:	Xylene, R2K4

PERFORMANCE CHARACTERISTICS

Substrate*: Steel
Surface Preparation*: SSPC-SP10/NACE 2
System Tested*:
2 cts. Dura-Plate 154 @ 12.0 mils (300 microns) dft/ct
*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	123 mg loss
Adhesion	ASTM D4541	750 psi
Direct Impact Resistance	ASTM G14	26 in. lb.
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Pencil Hardness	ASTM D3363	4H

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Protective & Marine Coatings

DURA-PLATE® 154
EPOXY SPLASH ZONE COATING

PART A	B62A320	GRAY
PART B	B62V320	HARDENER

PRODUCT INFORMATION

9.01

RECOMMENDED SYSTEMS

		Dry Film Thickness / ct. Mils	(Microns)
Steel:			
1-2 cts.	Dura-Plate 154 Epoxy Splash Zone Coating	10.0-40.0	(250-1000)
Concrete/Masonry:			
1-2 cts.	Dura-Plate 154 Epoxy Splash Zone Coating	10.0-40.0	(250-1000)

The systems listed above are representative of the product's use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:
- Atmospheric: SSPC-SP6/NACE 3, 2 mil (50 micron) profile
- Splash Zone/Immersion: SSPC-SP10/NACE 2, 2 mil (50 micron) profile

Concrete & Masonry:
- Atmospheric: Cured, clean, dry, sound
- Splash Zone/Immersion: Brush Blast

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

TINTING

Do not tint.

APPLICATION CONDITIONS

Temperature:	55°F (13°C) minimum, 100°F (38°C) maximum (air, surface, and material) At least 5°F (2.8°C) above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:
- Part A: 5 gallon (18.9L) container
- Part B: 5 gallon (18.9L) container

Weight: 12.9 ± 0.2 lb/gal ; 1.55 Kg/L

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

Protective & Marine Coatings

DURA-PLATE® 154
EPOXY SPLASH ZONE COATING

PART A	B62A320	GRAY
PART B	B62V320	HARDENER

Revised 10/09

APPLICATION BULLETIN

9.01

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel
Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3. For Splash Zone areas, the minimum surface preparation is Near White Metal Blast per SSPC-SP10/ NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Concrete and Masonry
For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI 03732, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910. Primer required.

Always follow the standard methods listed below:
ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
ICRI 03732 Concrete Surface Preparation.

Concrete, Immersion Service:
For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI 03732, CSP 2-3.

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature:	55°F (13°C) minimum, 100°F (38°C) maximum (air, surface, and material) At least 5°F (2.8°C) above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean Up ..... Xylene, R2K4

Airless Spray
Unit.....30:1 Pump
Pressure.....2800-3000 psi
Hose.....3/8" ID
Tip .....033" - .037"
Filter.....30 mesh
Reduction.....As needed up to 10% by volume

Conventional Spray
Oil and moisture separators recommended
Gun .....DeVilbiss MBC-510
Fluid Tip .....D
Air Cap.....64
Hose.....3/8"
Reduction.....As needed up to 10% by volume

Brush
Brush.....Nylon/Polyester or Natural Bristle
Reduction.....Not recommended

Roller
Cover .....3/8" woven with solvent resistant core
Reduction.....Not recommended

If specific application equipment is not listed above, equivalent equipment may be substituted.

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Protective & Marine Coatings

DURA-PLATE® 154
EPOXY SPLASH ZONE COATING

PART A	B62A320	GRAY
PART B	B62V320	HARDENER

APPLICATION BULLETIN

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APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly using low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine one part by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	**12.0** 300	**46.0** 1150
Dry mils (microns)	**10.0** 250	**40.0** 1000
~Coverage sq ft/gal (m^2/L)	**34** 0.83	**136** 3.3
Theoretical coverage sq ft/gal (m^2/L) @ 1 mil / 25 microns dft	**1360** 33.3	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 15.0 mils wet (375 microns):

	@ 77°F/25°C *50% RH*
To touch:	4 hours
To handle:	18 hours
To recoat:	
minimum:	16 hours
maximum:	7 days
To service:	4-6 hours
To cure:	7 days

If maximum recoat time is exceeded, abrade surface before recoating.

Drying time is temperature, humidity, and film thickness dependent.

Pot Life:	45 minutes
Sweat-in-Time:	None required

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Xylene, R2K4. Clean tools immediately after use with Xylene, R2K4. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

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PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Xylene, R2K4.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

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Protective & Marine Coatings

ACROLON™ 218 HS
ACRYLIC POLYURETHANE

PART A	B65-600	GLOSS SERIES
PART A	B65-650	SEMI-GLOSS SERIES
PART B	B65V600	HARDENER

Revised 5/11

PRODUCT INFORMATION

5.22

PRODUCT DESCRIPTION

ACROLON 218 HS is a low VOC, polyester modified, aliphatic, acrylic polyurethane formulated specifically for in-shop applications. Also suitable for industrial applications. A fast drying, urethane that provides color and gloss retention for exterior exposure.

- Can be used directly over organic zinc rich primers (epoxy zinc primer and moisture cure urethane zinc primer)
- Color and gloss retention for exterior exposure
- Fast dry
- Outstanding application properties

PRODUCT CHARACTERISTICS

Finish:	Gloss or Semi-Gloss
Color:	Gray
Volume Solids:	65% ± 2%, mixed
Weight Solids:	78% ± 2%, mixed
VOC (EPA Method 24):	Unreduced: <300 g/L; 2.5 lb/gal
mixed	Reduced 10% with R7K15: <340 g/L; 2.8 lb/gal
mixed	Reduced 9% with MEK, R6K10: <340 g/L; 2.8 lb/gal
Mix Ratio:	6:1 by volume, 1 gallon or 5 gallon mixes premeasured components

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	**4.5** (112.5)	**9.0** (225)
Dry mils (microns)	**3.0** (75)	**6.0** (150)
~Coverage sq ft/gal (m^2/L)	**175** (4.3)	**346** (8.5)
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil / 25 microns dft	**1040** (25.5)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 6.0 mils wet (150 microns):

	@ 35°F/1.7°C	@ 77°F/25°C *50% RH*	@ 120°F/49°C
To touch:	4 hours	30 minutes	20 minutes
To handle:	18 hours	6 hours	4 hours
To recoat:			
minimum:	18 hours	8 hours	6 hours
maximum:	3 months	3 months	3 months
To cure:	14 days	7 days	5 days
Pot Life: (reduced 5% with Reducer R7K15)	4 hours	2 hours	45 minutes
Sweat-in-Time:		None	

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.
Paint temperature must be at least 40°F (4.5°C) minimum.

Shelf Life:	Part A - 36 months, unopened Part B - 24 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	55°F (13°C), Seta, mixed
Reducer/Clean Up:	
Spray:	Reducer R7K15, MEK R6K10, or R7K111
Brush / Roll:	Reducer #132, R7K132 or R7K111

RECOMMENDED USES

Specifically formulated for in-shop applications.
For use over prepared metal and masonry surfaces in industrial environments such as:

- Structural steel
- Rail cars and locomotives
- Conveyors
- Bridges
- Tank exteriors
- Pipelines
- Ships
- Wind Towers - onshore and offshore
- Offshore platforms - exploration and production
- Suitable for use in USDA inspected facilities
- Conforms to AWWA D102 Outside Coating Systems #4 (OCS-4), #5 (OCS-5) & #6 (OCS-6)
- Acceptable for use in high performance architectural applications

PERFORMANCE CHARACTERISTICS

Substrate*: Steel
Surface Preparation*: SSPC-SP10/NACE 2
System Tested*:
1 ct. Macropoxy 646 @ 6.0 mils (150 microns) dft
1 ct. Acrolon 218 HS Gloss @ 4.0 mils (100 microns) dft
*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance[1]	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	43 mg loss
Adhesion	ASTM D4541	975 psi
Corrosion Weathering[2]	ASTM D5894, 9 cycles, 3024 hours	Rating 10 per ASTM D610, for rusting; Rating 10 per ASTM D714, for blistering
Direct Impact Resistance[1]	ASTM D2794	50 in. lb.
Dry Heat Resistance[1]	ASTM D2485, Method A	200°F (93°C)
Flexibility[1]	ASTM D522, 180° bend, 1/8" mandrel	Passes
Humidity Resistance[2]	ASTM D4585, 100°F (38°C), 1500 hours	Rating 10 per ASTM D610, for rusting; Rating 10 per ASTM D714, for blistering
Pencil Hardness	ASTM D3363	3H
Salt Fog Resistance[2]	ASTM B117, 7000 hours	Rating 10 per ASTM D610, for rusting; Rating 9 per ASTM D714, for blistering

Meets the requirements of SSPC Paint No. 36, Level 3.

Complies with ISO 12944-5 C5I and C5M requirements.

Footnotes:
[1] Finish coat only tested
[2] Primer — Zinc-Clad II Plus
Intermediate — Macropoxy 646
Finish — Acrolon 218 HS

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Protective & Marine Coatings

ACROLON™ 218 HS
ACRYLIC POLYURETHANE

PART A	B65-600	GLOSS SERIES
PART A	B65-650	SEMI-GLOSS SERIES
PART B	B65V600	HARDENER

PRODUCT INFORMATION

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RECOMMENDED SYSTEMS

		Dry Film Thickness / ct. Mils	(Microns)
Steel:			
1 ct.	Macropoxy 646	5.0-10.0	(125-250)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Steel:			
1 ct.	Zinc Clad II Plus	3.0-5.0	(75-125)
1 ct.	Macropoxy 646	5.0-10.0	(125-250)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Steel:			
1 ct.	Zinc Clad IV	3.0-5.0	(75-125)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Steel:			
1 ct.	Corothane I-GalvaPac Zinc Primer	3.0-4.0	(75-100)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Steel:			
1 ct.	Epoxy Mastic Aluminum II	6.0	(150)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Steel:			
1 ct.	Recoatable Epoxy Primer	4.0-6.0	(100-150)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Concrete/Masonry:			
1 ct.	Kem Cati-Coat HS Epoxy Filler/Sealer	10.0-20.0	(250-500)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
Aluminum/Galvanizing:			
1 ct.	DTM Wash Primer	0.7-1.3	(18-32)
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)
ISO 12944 C5M System:			
1 ct.	Zinc Clad III HS	3.0-5.0	(75-125)
1 ct.	Tower Guard Epoxy	5.0-11.5	(125-287.5)
1 ct.	Acrolon 218 HS	3.0-6.0	(75-150)

The systems listed above are representative of the product's use, other systems may be appropriate.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

* Iron & Steel: SSPC-SP6/NACE 3, 1-2 mil (25-50 micron) profile
* Galvanizing: SSPC-SP1
* Concrete & Masonry: SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3

* Primer required

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

TINTING

Tint Part A with Maxitoner Colorants.

- Extra white tints at 100% tint strength
- Ultradeep base tints at 150% tint strength

Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

APPLICATION CONDITIONS

Temperature:	35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface) 40°F (4.5°C) minimum, 120°F (49°C) maximum (material) At least 5°F (2.8°C) above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	1 gallon (3.78L) mix:	5 gallon (18.9L) mix:
Part A:	.86 gal (3.25L)	4.29 gal (16.2L)
Part B:	.14 gal (0.53L)	0.71 gal (2.7L)
(premeasured components)		

Weight: 11.2 ± 0.2 lb/gal ; 1.3 Kg/L mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Protective & Marine Coatings

ACROLON™ 218 HS
ACRYLIC POLYURETHANE

PART A	B65-600	GLOSS SERIES
PART A	B65-650	SEMI-GLOSS SERIES
PART B	B65V600	HARDENER

Revised 5/11

APPLICATION BULLETIN

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SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel
Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (1-2 mils / 25-50 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Aluminum
Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1. Primer required.

Galvanized Steel
Allow to weather a minimum of six months prior to coating. Solvent Clean per SSPC-SP1. When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned or before flash rusting occurs. Primer required.

Concrete and Masonry
For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910. Primer required.

Follow the standard methods listed below when applicable:
ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
ICRI No. 310.2 Concrete Surface Preparation.

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature:	35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface) 40°F (4.5°C) minimum, 120°F (49°C) maximum (material) At least 5°F (2.8°C) above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean Up:
Spray.....Reducer R7K15, MEK R6K10, or R7K111
Brush/Roll .....Reducer #132, R7K132, or R7K111
If reducer is used, reduce at time of catalyzation.

Airless Spray
Pressure.....2500 - 2800 psi
Hose.....3/8" ID
Tip .....013" - .017"
Filter.....60 mesh
Reduction.....As needed up to 10% by volume with R7K15 or R7K111, or up to 9% with MEK, R6K10*

Conventional Spray
Gun .....Binks 95
Cap 63P
Atomization Pressure.....50 - 70 psi
Fluid Pressure.....20 - 25 psi
Reduction.....As needed up to 10% by volume with R7K15 or R7K111, or up to 9% with MEK, R6K10*

Brush
Brush.....Natural Bristle
Reduction.....As needed up to 10% by volume*

Roller
Cover .....3/8" woven with solvent resistant core
Reduction.....As needed up to 10% by volume*

If specific application equipment is not listed above, equivalent equipment may be substituted.

* Note: Reducing more than maximum recommended level will result in exceed VOC exceeding 340g/L

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Protective & Marine Coatings

ACROLON™ 218 HS
ACRYLIC POLYURETHANE

PART A	B65-600	GLOSS SERIES
PART A	B65-650	SEMI-GLOSS SERIES
PART B	B65V600	HARDENER

APPLICATION BULLETIN

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APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine six parts by volume of Part A with one part by volume of Part B (premeasured components). Thoroughly agitate the mixture with power agitation. Re-stir before using.

If reducer is used, add only after both components have been thoroughly mixed.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	**4.5** (112.5)	**9.0** (225)
Dry mils (microns)	**3.0** (75)	**6.0** (150)
~Coverage sq ft/gal (m^2/L)	**175** (4.3)	**346** (8.5)
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil / 25 microns dft	**1040** (25.5)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 6.0 mils wet (150 microns):

	@ 35°F/1.7°C	@ 77°F/25°C *50% RH*	@ 120°F/49°C
To touch:	4 hours	30 minutes	20 minutes
To handle:	18 hours	6 hours	4 hours
To recoat:			
minimum:	18 hours	8 hours	6 hours
maximum:	3 months	3 months	3 months
To cure:	14 days	7 days	5 days
Pot Life: (reduced 5% with Reducer R7K15)	4 hours	2 hours	45 minutes
Sweat-in-Time:		None	

If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.
Paint temperature must be at least 40°F (4.5°C) minimum.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer #132, R7K132. Clean tools immediately after use with Reducer #132, R7K132. Follow manufacturer's safety recommendations when using any solvent.

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PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer #15, R7K15 or MEK, R6K10.

Mixed coating is sensitive to water. Use water traps in all air lines. Moisture contact can reduce pot life and affect gloss and color.

Quick-Thane Urethane Accelerator is acceptable for use. See data page 5.97 for details.

E-Z Roll Urethane Defoamer is acceptable for use. See data page 5.99 for details.

Refer to Product Information sheet for additional performance characteristics and properties.

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