APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0416 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☒ New ☐ Renewal

Manufacturer Information

Manufacturer: Huntair - CES Group LLC

Manufacturer's Technical Representative: Preston Harris

Mailing Address: 19855 SW 124th Ave, Tualatin, OR 97062

Telephone: (503) 639-0113 Email: pharris@huntair.com

Product Information

Product Name: FANWALL Aluminum Extrusion Fan Cell

Product Type: FANWALL

Product Model Number: Various (See Attachment)
(List all unique product identification numbers and/or part numbers)

General Description: FANWALL TECHNOLOGY uses multiple, small diameter, high-efficiency airfoil plenum fans. Coplanar silencers provide reduction in fan sound power level and maintain fan efficiency. Seismic enhancements made to the test units and modifications required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: FANWALL sections rigidly mounted at base within CES air handling units using CES standard mounting details. CES air handling units certified independently and are rigid base mounted.

Applicant Information

Applicant Company Name: Tobolski Watkins Engineering, Inc.

Contact Person: Matthew J. Tobolski, Ph.D., S.E.

Mailing Address: 9246 Lightwave Avenue, San Diego, CA 92123

Telephone: (858) 381-5843 Email: mtobolski@tobolskiwatkins.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant:  Date: 12/01/2014

Title: President & CEO Company Name: Tobolski Watkins Engineering, Inc.

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: Tobolski Watkins Engineering, Inc.

Name: Matthew J. Tobolski, Ph.D., S.E. California License Number: S5648

Mailing Address: 9246 Lightwave Avenue, San Diego, CA 92123

Telephone: (858) 381-5843 Email: mtobolski@tobolskiwatkins.com

Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: Environmental Testing Laboratory, Inc.

Contact Name: Brady Richard

Mailing Address: 11034 Indian Trail, Dallas, TX 75229-3513

Telephone: (972) 247-9657 Email: brady@etldallas.com

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 1.5 *for* S_{DS}*=2.0g* ; 1.44 *for* S_{DS}*=3.2g*

S_{DS} (Design spectral response acceleration at short period, g) = 2.0g *for z/h=1.0* ; 3.2g *for z/h=0.0*

a_p (In-structure equipment or component amplification factor) = 2.5

R_p (Equipment or component response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.5

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0 ; 0.0

Equipment or Component Natural Frequencies (Hz) = See Attachment

Overall dimensions and weight (or range thereof) = See Attachment

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) =

S_{DS} (Design spectral response acceleration at short period, g) =

S_{D1} (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2010: ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☒ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☒ Other(s) (Please Specify): Attachments

OSHPD Approval (For Office Use Only) – **Approval Expires on December 31, 2019**

Signature: Date: March 3, 2015

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above z/h = See Above

Condition of Approval (if applicable):

Table 1

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0542-CO-002

Manufacturer: CES Group, LLC

Model Line: FANWALL Aluminum Extrusion Fan Cells

Certified Product Construction Summary:

Fan cells are constructed of 2x2 aluminum extruded members. Wheels are constructed of aluminum. Fan cell external and internal panels: 0.040" aluminum and stainless steel sheet – solid and perforated.

Certified Options Summary:

Fan cell external and internal panels made of aluminum or stainless steel – solid or perforated. With or without coplanar. With or without extended coplanar. With or without backdraft dampers and discharge guards. Motors per Table 3.

Building Code: CBC 2013 | ***Seismic Certification Limits:*** S_{DS} = 2.0,3.2g z/h = 1.0,0.0 I_P = 1.5

Model Line	Model	Dimension (in)			Weight (lb)	Max. Cells per Stack	Notes	UUT
		Depth	Width	Height				
CES Group Fan cells (Without extended coplanar)	10" Fan	16	22	24	54	6		
				…				
		28	22	27	84	5	*(10) Fan cells tested*	1
				…				
		28	30	30	104	5		
	12" Fan	16	25	24	57	6		
				…				
		28	32	32	110	4		
	14" Fan	17	25	24	57	6		
				…				
		28	34	34	115	4		
	16" Fan	18	28	28	66	5		
				…				
		32	38	38	130	3		
	18" Fan	21	31	28	74	5		
				…				
		32	40	40	136	3		
	20" Fan	21	31	28	74	5		
				…				
		33	42	42	142	3		
	22" Fan	22	34	34	83	4		
				…				
		34	34	34	135	4	*(4) Fan cells tested*	1
				…				
		34	44	44	171	3		

TOBOLSKI WATKINS ENGINEERING

Table 2

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0542-CO-002

Manufacturer: CES Group, LLC

Model Line: FANWALL Aluminum Extrusion Fan Cells

Certified Product Construction Summary:

Fan cells are constructed of 2x2 aluminum extruded members. Wheels are constructed of aluminum. Fan cell external and internal panels: 0.040" aluminum and stainless steel sheet – solid and perforated.

Certified Options Summary:

Fan cell external and internal panels made of aluminum or stainless steel – solid or perforated. With or without coplanar. With or without extended coplanar. With or without backdraft dampers and discharge guards. Motors per Table 3.

Building Code: CBC 2013 | ***Seismic Certification Limits:*** S_{DS} = 2.0,3.2g z/h = 1.0,0.0 I_P = 1.5

Model Line	Model	Dimension (in)			Weight (lb)	Max. Cells per Stack	Notes	UUT
		Depth	Width	Height				
CES Group Fan cells (With extended coplanar)	10" Fan	24	22	24	82	6		
		…						
		42	30	30	157	5		
	12" Fan	24	25	24	86	6		
		…						
		42	32	32	166	4		
	14" Fan	26	25	24	88	6		
		…						
		42	34	34	173	4		
	16" Fan	27	28	28	99	5		
		…						
		48	38	38	195	3		
	18" Fan	32	31	28	109	5		
		…						
		48	40	40	205	3		
	20" Fan	32	31	28	112	5		
		…						
		50	42	42	216	3		
	22" Fan	32	34	31	125	4		
		…						
		51	34	34	199	4	*(4) Fan cells tested*	1
		…						
		51	44	44	230	3		

Table 3

Special Seismic Certification
Certified Subcomponent Matrix

TWEI Project No.: 2012-0542-CO-002

Manufacturer: CES Group, LLC

Model Line: FANWALL Aluminum Extrusion Fan Cells | **FAN MOTOR DETAIL**

Certified Product Construction Summary:

Component construction specific to model number listed below.

Certified Options Summary:

480V

Building Code: CBC 2013 | ***Seismic Certification Limits:*** S_{DS} = 2.0,3.2g z/h = 1.0,0.0 I_P = 1.5

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Nove Torque	2HP				72		1(Qt.2)
	…						
	6HP				74		1(Qt.2)
Baldor	1HP				45		1(Qt.2)
	…						
	12HP				169		1(Qt.2)
Toshiba	1HP				63		1(Qt.4)
	…						
	12HP				202		1(Qt.2)
Siemens	1HP				47		1(Qt.2)
	…						
	10HP				144		1(Qt.2)

TOBOLSKI WATKINS ENGINEERING

Table 4

Special Seismic Certification Certified Subcomponent Matrix

TWEI Project No.: 2012-0542-CO-002

Manufacturer CES Group, LLC

Model Line: FANWALL Aluminum Extrusion Fan Cells | **VFD DETAIL**

Certified Product Construction Summary:

Component construction specific to model number listed below.

Certified Options Summary:

480V

CES Group VFD: with and without pressure transducer 10" and 25".

Building Code: CBC 2013 | ***Seismic Certification Limits:*** S_{DS} = 2.0,3.2g z/h = 1.0,0.0 I_P = 1.5

Model Line	Model		Dimension (in)			Weight (lb)	Notes	UUT
			Depth	Width	Height			
CES Group	HD4005	0.5HP						
	HD4010	1.0HP					*UUT: Pressure transducer 10"*	1 (Qt.4)
	HD4015	1.5HP						
	HD4025	2.0HP						
	HD4025	2.5HP						
	HD4030	3.0HP						
	HD4035	3.5HP						
	HD4040	4.0HP						
	HD4045	4.5HP						
	HD4050	5.0HP						
	HD4055	5.5HP						
	HD4060	6.0HP						
	HD4065	6.5HP						
	HD4070	7.0HP						
	HD4075	7.5HP						
	HD4080	8.0HP						
	HD4085	8.5HP						
	HD4090	9.0HP						
	HD4095	9.5HP						
	HD4100	10.0HP					*UUT: Pressure transducer 25"*	1 (Qt.4)

TOBOLSKI WATKINS ENGINEERING

Table 4

Special Seismic Certification Certified Subcomponent Matrix

TWEI Project No.: 2012-0542-CO-002

Manufacturer CES Group, LLC

Model Line: FANWALL Aluminum Extrusion Fan Cells | **VFD DETAIL**

Certified Product Construction Summary:

Component construction specific to model number listed below.

Certified Options Summary:

480V

CES Group VFD: with and without pressure transducer 10" and 25".

Building Code: CBC 2013 | ***Seismic Certification Limits:*** S_{DS} = 2.0,3.2g z/h = 1.0,0.0 I_P = 1.5

Model Line	Model		Dimension (in)			Weight (lb)	Notes	UUT
			Depth	Width	Height			
ABB, Inc.	ACS355-03U-01A2-4	0.5HP						
	ACS355-03U-01A9-4	0.75HP						
	ACS355-03U-02A4-4	1.0HP						
	ACS355-03U-03A3-4	1.5HP						
	ACS355-03U-04A1-4	2.0HP						1 (Qt.2)
	ACS355-03U-05A6-4	3.0HP						
	ACS355-03U-07A3-4	4.0HP						
	ACS355-03U-08A8-4	5.0HP						
	ACS355-03U-12A5-4	7.5HP						
	ACS355-03U-15A6-4	10HP						
	ACS355-03U-23A1-4	15HP						1 (Qt.2)
Yaskawa, Inc. (Z1000)	CIMR-ZU4A0005FAA	3HP						1 (Qt.2)
	CIMR-ZU4A0008FAA	5HP						
	CIMR-ZU4A00011FAA	7.5HP						
	CIMR-ZU4A00014FAA	10HP						
	CIMR-ZU4A00021FAA	15HP						
	CIMR-ZU4A00027FAA	20HP						1 (Qt.1)
	CIMR-ZU4A00034FAA	25HP						1 (Qt.1)

TOBOLSKI WATKINS ENGINEERING

UUT - 1

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0542-CO-002

Manufacturer:	CES Group, LLC		
Model Line:	FANWALL Aluminum Extrusion Fan Cells		
Model Number:	N/A	***Serial Number:***	N/A

Product Construction Summary:

Fan cells are constructed of 2x2 aluminum extruded members. Wheels are constructed of aluminum. (10) 28Dx22Wx27H fan cells with 10" wheel (2W x 5H configuration) without extended coplanar. (4) 34Dx34Wx34H fan cells with 22" wheel without extended coplanar (1W x 4H configuration). (4) 51Dx34Wx34H fan cells with 22" wheel with extended coplanar (1W x 4H configuration). Coplanar and extended coplanar panel construction: 0.040" aluminum and stainless steel sheet – solid and perforated.

Options/Subcomponent Summary:

Motor – 480V: (2) Novatorque 2HP, (2) Novatorque 6HP, (2) Baldor 1HP, (2) Baldor 12HP, (4) Toshiba 1HP, (2)Toshiba 12 HP, (2) Siemens 1HP, (2) Siemens 10HP. VFD - 480V: CES Group (4) HD4010xx-1.0HP, (2) HD4100xx-10HP. ABB, Inc. (2) ACS355-03U-04A1-4/2.0HP, (2) ACS355-03U-23A1-4/15HP. Yaskawa, Inc. (2) CIMR-ZU4A0005FAA/3HP, (1) CIMR-ZU4A00027FAA/20HP, (1) CIMR-ZU4A00034FAA/25HP

UUT Properties

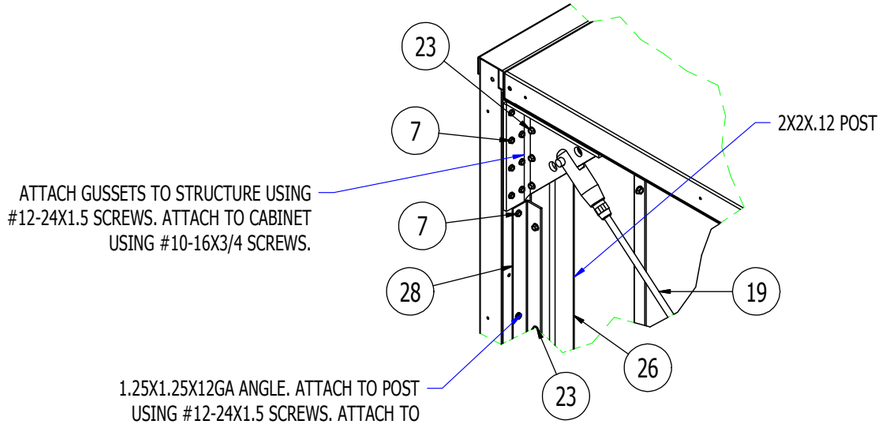
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
7155	130	60	150	3.6	3.9	22.9

UUT Highest Passed Seismic Run Information

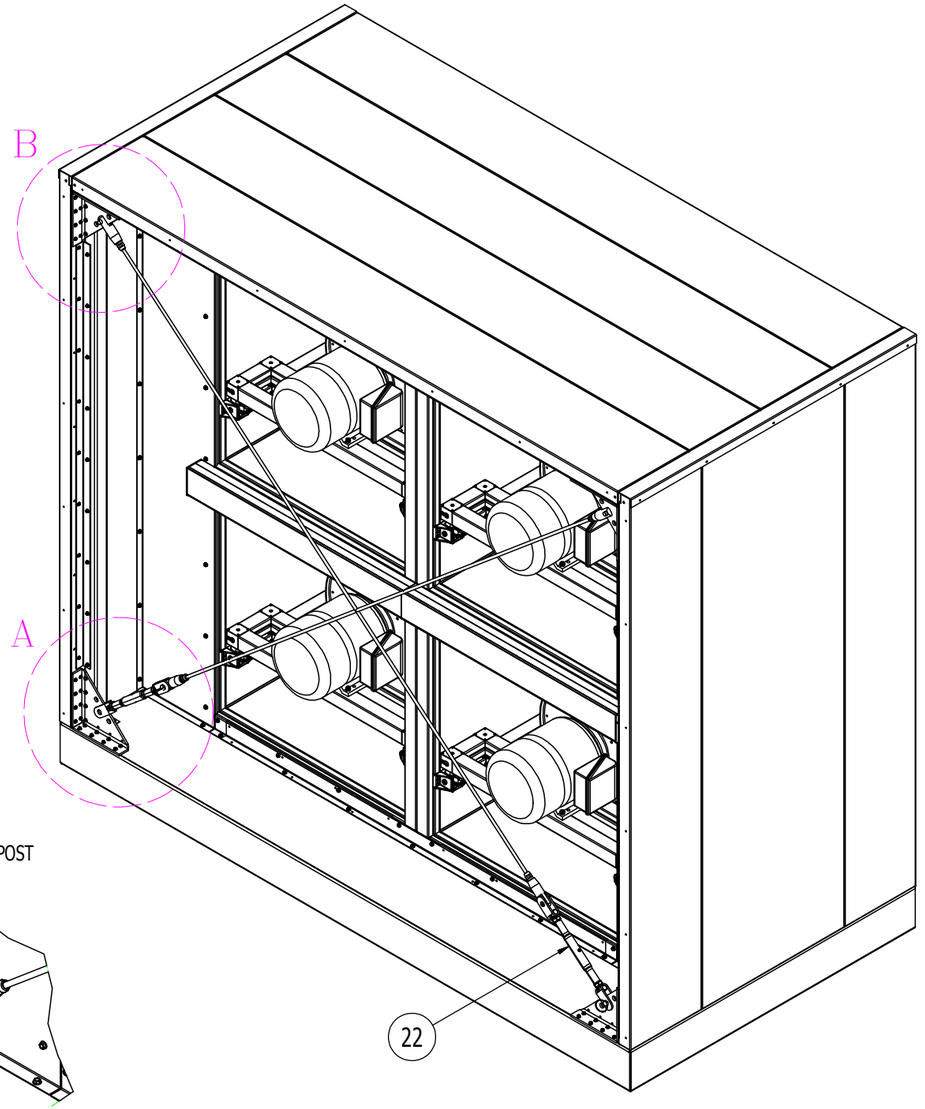
Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2013	ICC-ES AC 156	2.0g	1.0	1.5	3.20g	2.40g	1.33g	0.53g
		3.2g	0.0	1.5	3.20g	1.28g	2.13g	0.85g

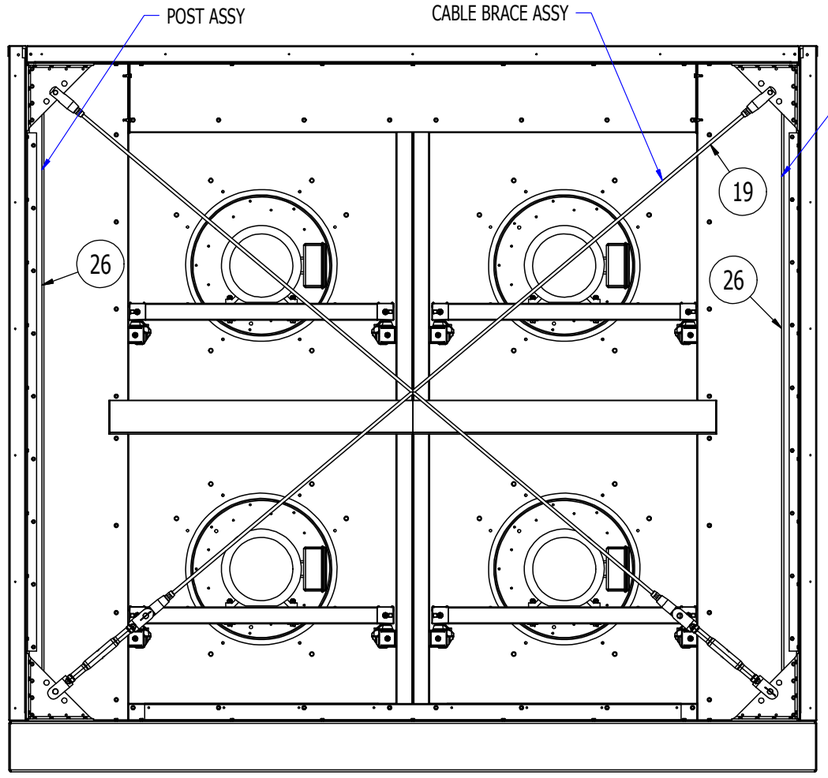
Test Mounting Details:

FANWALL sections mounted within air handling section constructed of 2" galvanized steel panels with 6" tube sections. FANWALL sections mounted at base using floor rigid CES Group stantard mounting details with gage metal blank off panels to air handling walls. Air handling section mounted to shake table with (4) 5/8" diameter grade 8 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.
Contents were included in testing per operating conditions.

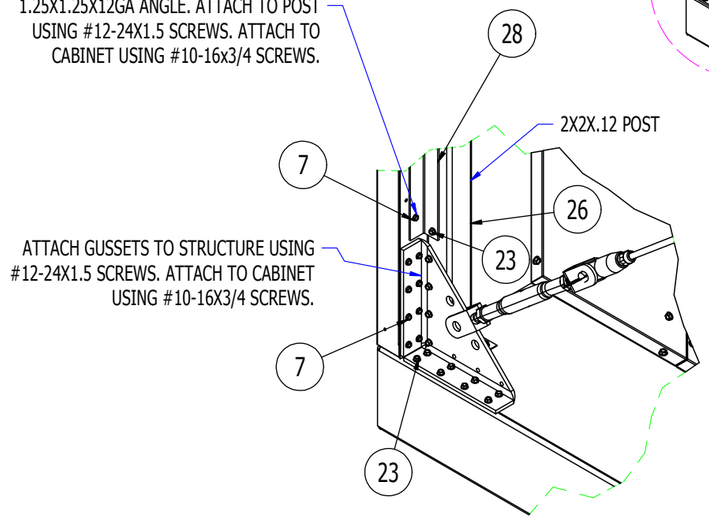


DETAIL B
(UPPER CROSS BRACE ATTACHMENT)





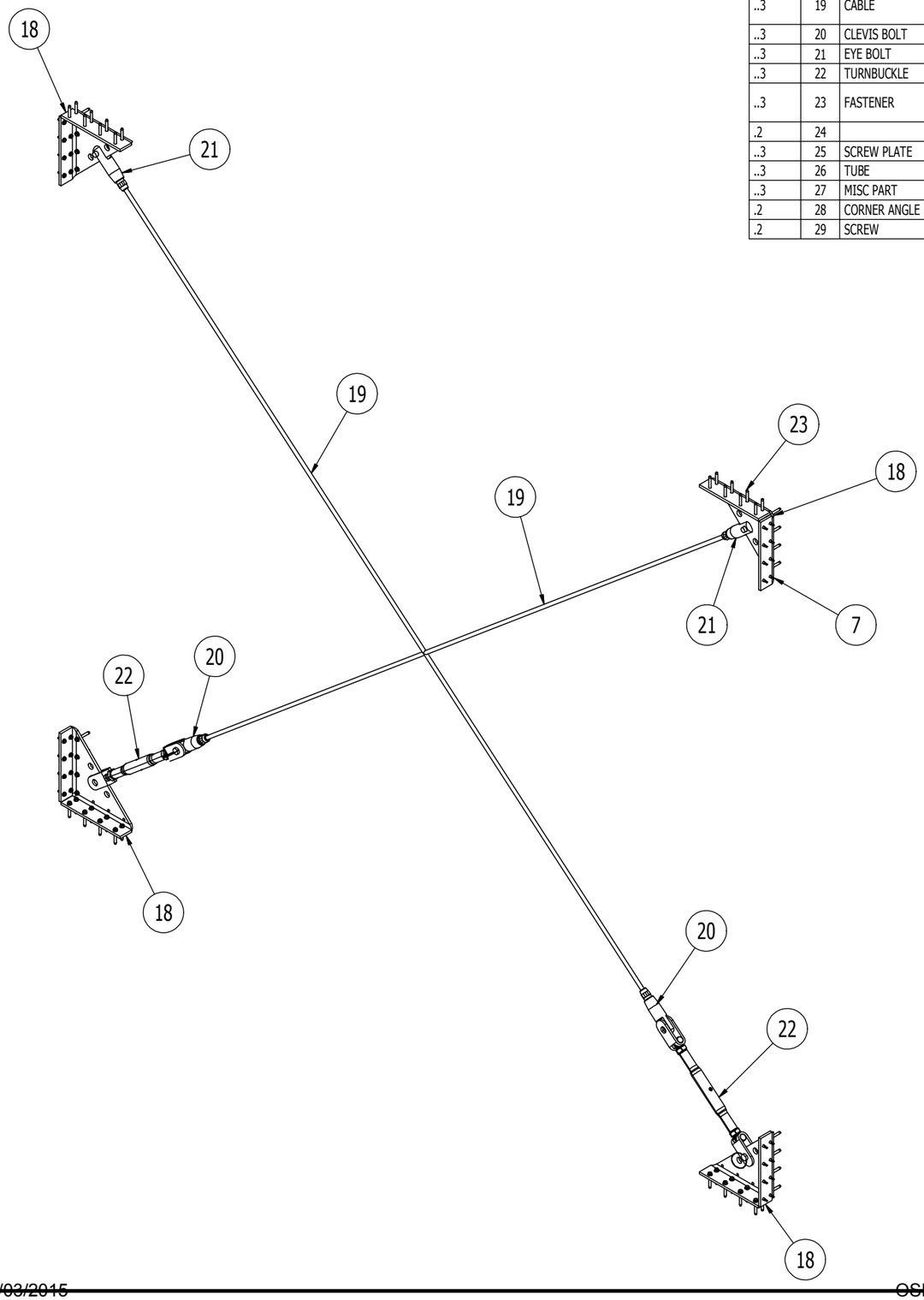
DISCHARGE VIEW

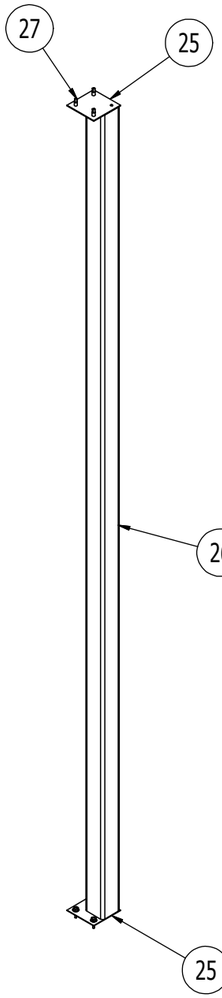


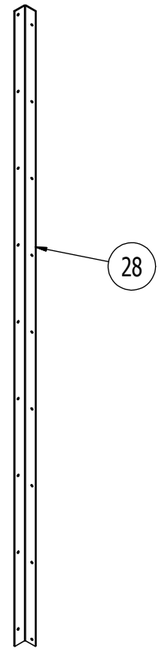
DETAIL A
(LOWER CROSS BRACE ATTACHMENT)

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS: ±1/32 0.0: ±0.1 0.00: ±0.03 0.000: ±0.010 ANGLES: ±0.5° OTHER: SEE DOC. OMS000.01A	THIS DRAWING, SPECIFICATIONS, AND CONCEPTS CONTAINED HEREIN ARE THE SOLE PROPERTY OF CES GROUP, LLC, AND MAY NOT BE REPRODUCED OR USED IN ANY FASHION WITHOUT THE PRIOR WRITTEN PERMISSION OF CES GROUP, LLC.	DRAWN BY: JJOHNSTON ISSUED ON: 01-23-2015 CHECKED BY: PART NO.:	3rd ANGLE PROJECTION JOB NO.: 00000-000 FILE NAME: CROSS BRACE DETAILS	HUNTAIR a CES Group Brand 19855 SW 124th AVE. TUALATIN, OR 97062 Phone (503) 639-0113 Fax (503) 692-0958 GEN II FANWALL CABLE BRACE DETAILS SINGLE TUNNEL REV: SHEET 1 OF 2

LEVEL	ITEM	NOMENCLATURE	DESCRIPTION	MATERIAL	QTY	TOTA	DIMENSION	TOTAL DIM	DAX ITEM NO	WELD	PAINT	SOURCE	NOTE	RV	SHIP	BOX
.2	17	OSHPD BRACING	X-BRACING ASSEMBLY		1	1	-	-			NONE	STDASSY				
..3	18	CORNER BRACE	CORNER BRACKET	STL 0.250	4	4	9.549 x 9.549	-		W	GRY STD	HAM P2				
..3	19	CABLE	WIRE ROPE NYLON-COATED 7X19 STRAND 3/8-15/32	STL	2	2	89.52 in	179.04 in	038.0067		NONE	STOCK				
..3	20	CLEVIS BOLT	EYE BOLT FOR 3/8 ROPE ZNC	STL	2	2	-	-	034.0404		NONE	STOCK				
..3	21	EYE BOLT	EYE BOLT FOR 3/8 ROPE ZNC	STL	2	2	-	-	034.0405		NONE	STOCK				
..3	22	TURNBUCKLE	TURNBUCKLE 5/8-11X6 JAW-JAW GALV	STL	2	2	-	-	175-72-160		NONE	STOCK				
..3	23	FASTENER	SCREW #12-24X1.5 UNSLTD HWH TEK CLIMASEAL	Generic	48	48	-	-	034.0120		NONE	BULK				
.2	24		PERM POST		2	2	-	-			NONE					
..3	25	SCREW PLATE	SCREW PLATE	16GA	2	4	3.000 x 3.000	-		W	NONE	HAM P2			L	
..3	26	TUBE	2 X 2 X .120 STL. TUBE (230-08-203)	STL	1	2	77.875 in	155.75 in	230-08-203	W	NONE	WLD STL				
..3	27	MISC PART	SCREW 1/4-14X3/4 HEX WASH TEK 3	Generic	6	12	-	-	131-02-90		NONE	BULK				
.2	28	CORNER ANGLE	CORNERANGLE	12GA	2	2	61.500 x 2.329	-			NONE	HAM P3				A
.2	29	SCREW	SCREW #10-16X3/4 HEX WASH TEK	Generic	18	18	-	-	131-13-77		NONE	BULK				

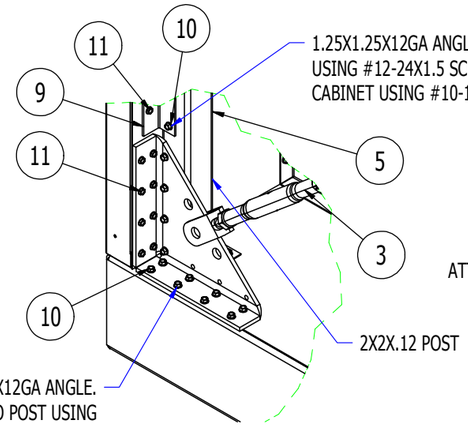




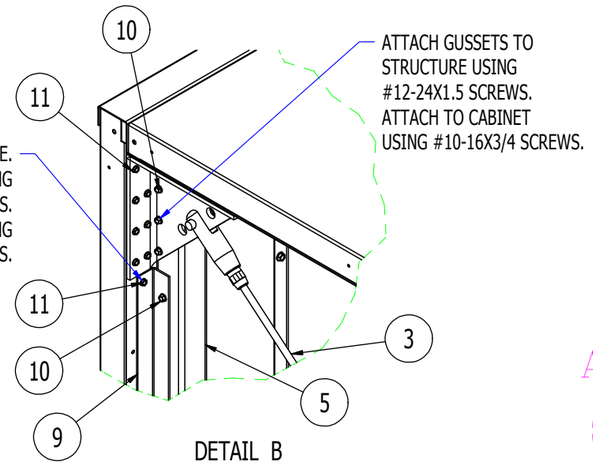


TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS: ±1/32 0.0: ±0.1 0.00: ±0.03 0.000: ±0.010 ANGLES: ±0.5° OTHER: SEE DOC. OMS000.01A		DRAWN BY: JJOHNSTON ISSUED ON: 01-23-2015 CHECKED BY: PART NO.:	3rd ANGLE PROJECTION JOB NO.: 00000-000 FILE NAME: CROSS BRACE DETAILS	HUNTAIR a CES Group Brand 19855 SW 124th AVE. TUALATIN, OR 97062 Phone (503) 639-0113 Fax (503) 692-0958 GEN II FANWALL CABLE BRACE DETAILS REV: SHEET 2 OF 2

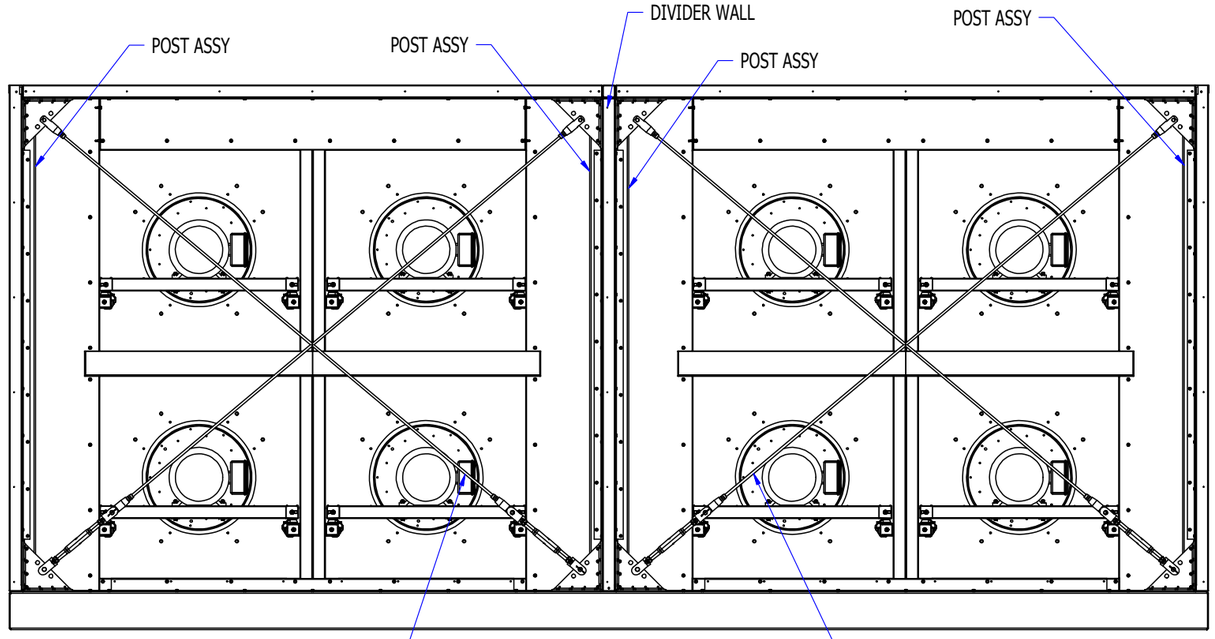
DUAL TUNNEL REQUIRED WHEN CABINET O.D. IS WIDER THEN 130".



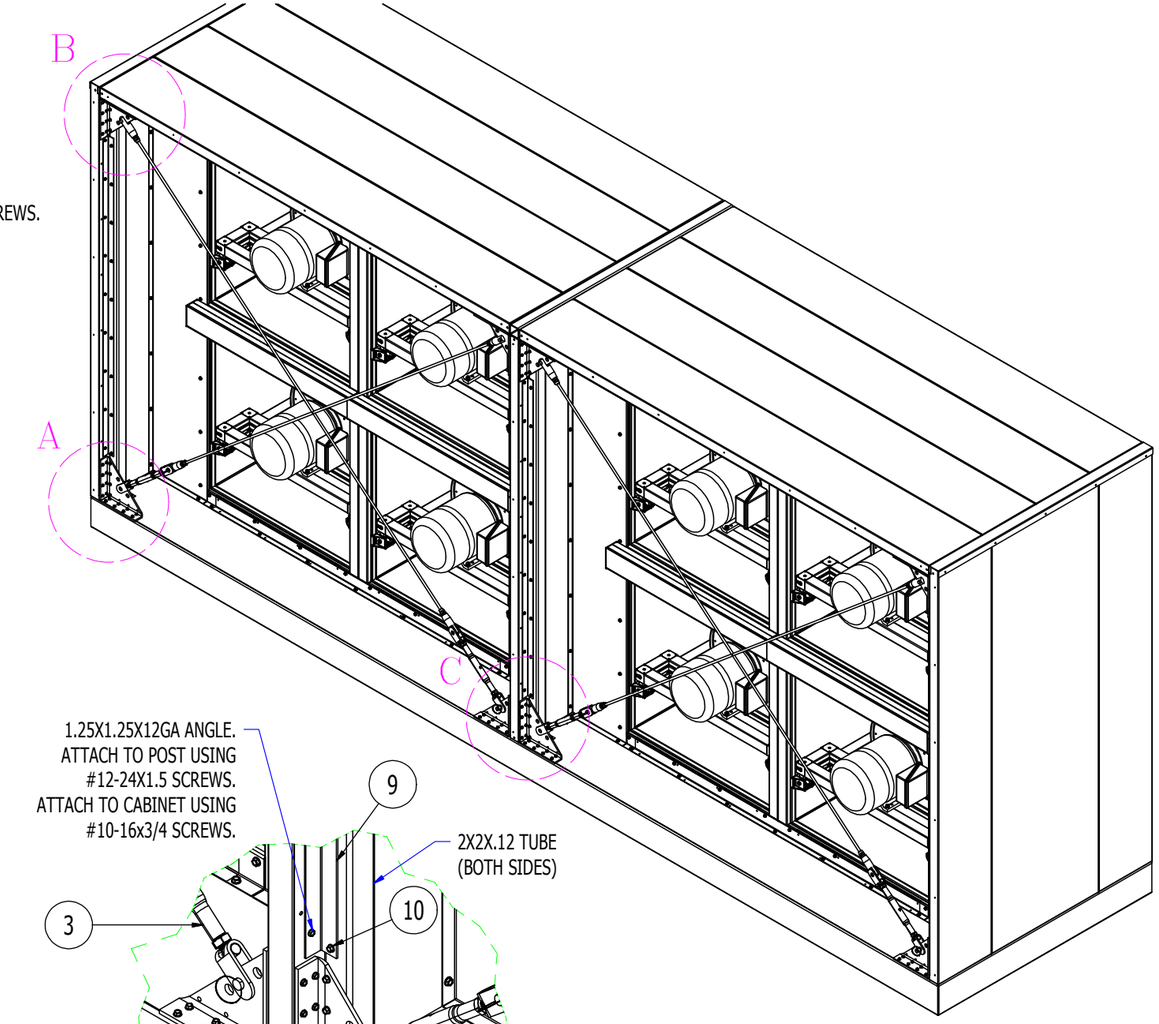
DETAIL A
(LOWER CROSS BRACE ATTACHMENT)



DETAIL B
(UPPER CROSS BRACE ATTACHMENT)



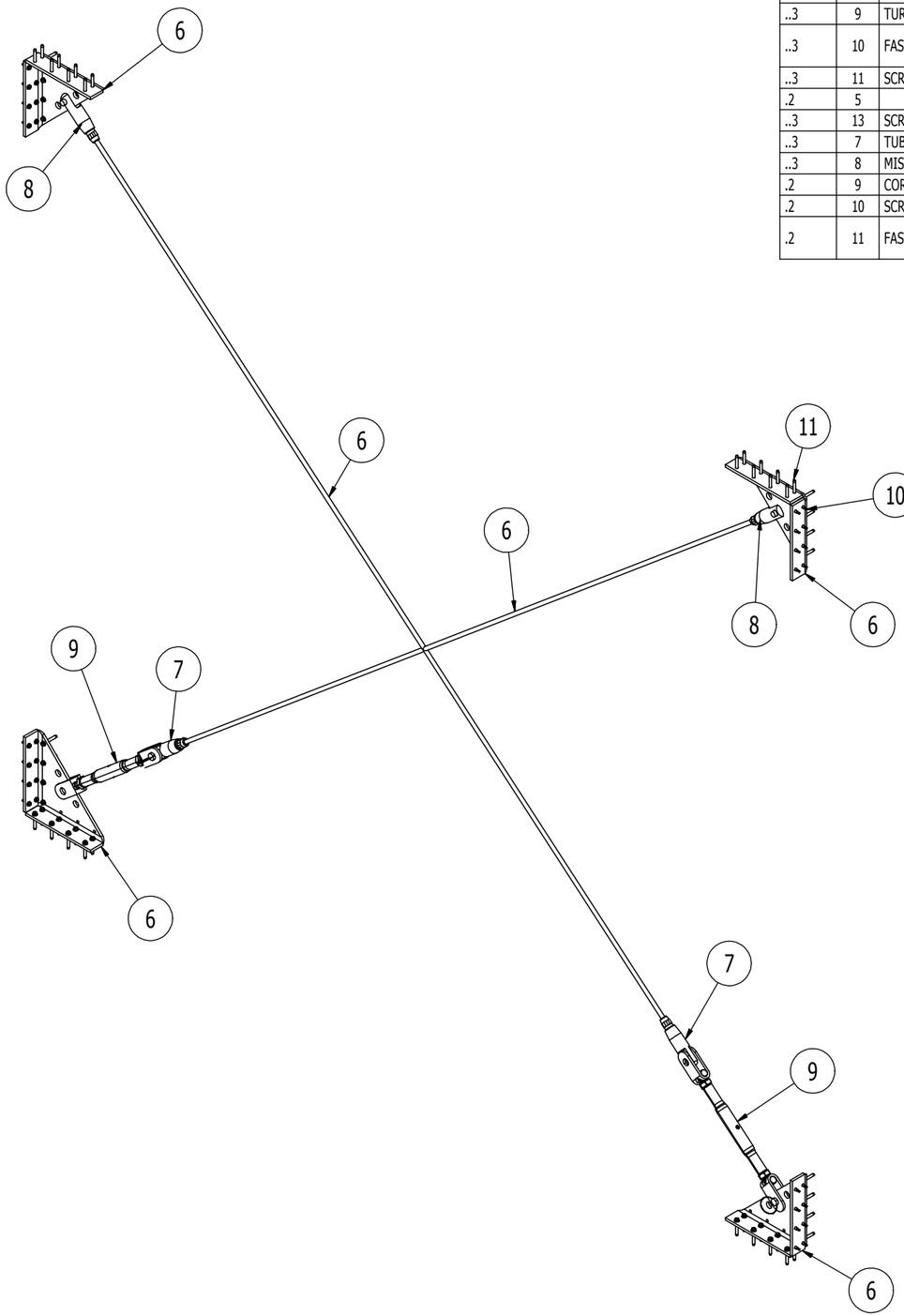
DISCHARGE VIEW

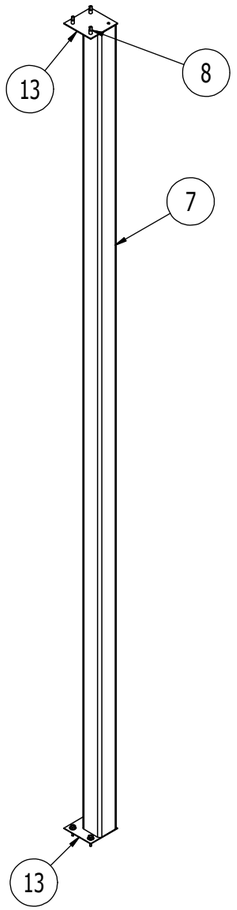


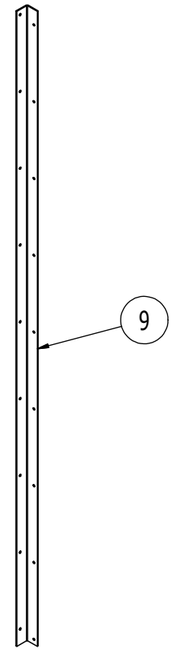
DETAIL C
(CENTER CROSS BRACE ATTACHMENT)

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS: ±1/32 0.0: ±0.1 0.00: ±0.03 0.000: ±0.010 ANGLES: ±0.5° OTHER: SEE DOC. OMS000.01A	THIS DRAWING, SPECIFICATIONS, AND CONCEPTS CONTAINED HEREIN ARE THE SOLE PROPERTY OF CES GROUP, LLC, AND MAY NOT BE REPRODUCED OR USED IN ANY FASHION WITHOUT THE PRIOR WRITTEN PERMISSION OF CES GROUP, LLC.	DRAWN BY: JJOHNSTON ISSUED ON: 01-30-2015 CHECKED BY: PART NO.:	3rd ANGLE PROJECTION JOB NO.: 00000-000 FILE NAME: CROSS BRACE DETAILS - DOUBLE	HUNTAIR a CES Group Brand 19855 SW 124th AVE. TUALATIN, OR 97062 Phone (503) 639-0113 Fax (503) 692-0958 GEN II FANWALL CABLE BRACE DETAILS DUAL TUNNEL REV: SHEET 1 OF 2

LEVEL	ITEM	NOMENCLATURE	DESCRIPTION	MATERIAL	QTY	TOTA	DIMENSION	TOTAL DIM	DAX ITEM NO	WELD	PAINT	SOURCE	NOTE	RV	SHIP	BOX
.2	3	OSHPD BRACING	X-BRACING ASSEMBLY		2	2	-	-			NONE	STDASSY				
..3	6	CORNER BRACE	CORNER BRACKET	STL 0.250	4	8	9.549 x 9.549	-		W	GRY STD	HAM P2				
..3	6	CABLE	WIRE ROPE NYLON-COATED 7X19 STRAND 3/8-15/32	STL	2	4	89.52 in	358.079 in	038.0067		NONE	STOCK				
..3	7	CLEVIS BOLT	EYE BOLT FOR 3/8 ROPE ZNC	STL	2	4	-	-	034.0404		NONE	STOCK				
..3	8	EYE BOLT	EYE BOLT FOR 3/8 ROPE ZNC	STL	2	4	-	-	034.0405		NONE	STOCK				
..3	9	TURNBUCKLE	TURNBUCKLE 5/8-11X6 JAW-JAW GALV	STL	2	4	-	-	175-72-160		NONE	STOCK				
..3	10	FASTENER	SCREW #12-24X1.5 UNSLTD HWH TEK CLIMASEAL	Generic	48	96	-	-	034.0120		NONE	BULK				
..3	11	SCREW	SCREW #10-16X3/4 HEX WASH TEK	Generic	32	64	-	-	131-13-77		NONE	BULK				
.2	5		PERM POST		4	4	-	-			NONE					
..3	13	SCREW PLATE	SCREW PLATE	16GA	2	8	3.000 x 3.000	-		W	NONE	HAM P2			L	
..3	7	TUBE	2 X 2 X .120 STL. TUBE (230-08-203)	STL	1	4	77.875 in	311.5 in	230-08-203	W	NONE	WLD STL				
..3	8	MISC PART	SCREW 1/4-14X3/4 HEX WASH TEK 3	Generic	6	24	-	-	131-02-90		NONE	BULK				
.2	9	CORNER ANGLE	CORNERANGLE	12GA	4	4	61.500 x 2.329	-			NONE	HAM P3			A	A
.2	10	SCREW	SCREW #10-16X3/4 HEX WASH TEK	Generic	36	36	-	-	131-13-77		NONE	BULK				
.2	11	FASTENER	SCREW #12-24X1.5 UNSLTD HWH TEK CLIMASEAL	Generic	36	36	-	-	034.0120		NONE	BULK				







TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS: ±1/32 0.0: ±0.1 0.00: ±0.03 0.000: ±0.010 ANGLES: ±0.5° OTHER: SEE DOC. OMS000.01A		DRAWN BY: JJOHNSTON ISSUED ON: 01-30-2015 CHECKED BY: PART NO.:	3rd ANGLE PROJECTION JOB NO.: 00000-000 FILE NAME: CROSS BRACE DETAILS - DOUBLE	HUNTAIR a CES Group Brand 19855 SW 124th AVE. TUALATIN, OR 97062 Phone (503) 639-0113 Fax (503) 692-0958 GEN II FANWALL CABLE BRACE DETAILS REV: SHEET 2 OF 2