



**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

**APPLICATION FOR HCAI SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

APPLICATION #: OSP-0301

HCAI Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Haakon Industries, Ltd.

Manufacturer's Technical Representative: Wade Gomer

Mailing Address: 11851 Dyke Road, Richmond, BC V7A4X8

Telephone: (604) 273-0161

Email: wade@haakon.com

Product Information

Product Name: Air Conditioning Units

Product Type: Air Conditioning Units - Custom

Product Model Number: Various (See Attachment)

General Description: Air conditioning unit cabinets with internal and external components as outline in the Product Matrices.

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: Structural Integrity Associates Inc.

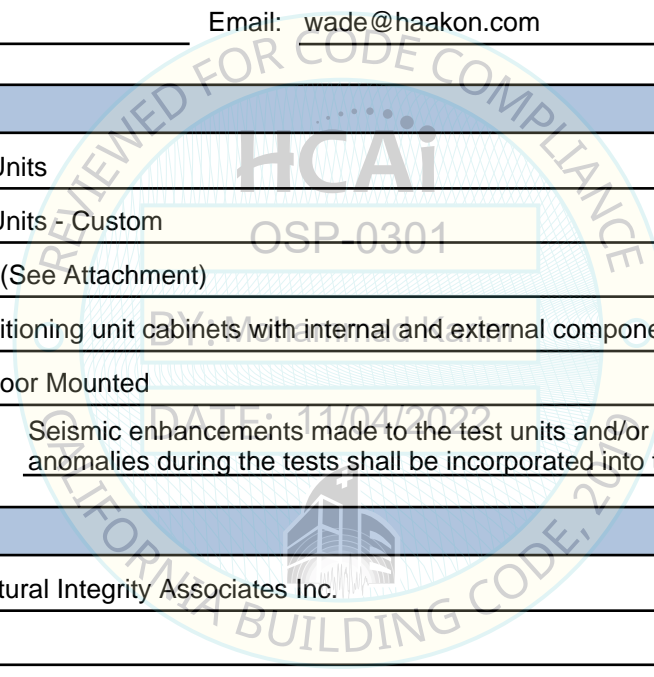
Contact Person: Katie Braman

Mailing Address: 233 SW Wilson Ave, Suite 101, Bend, OR 97702

Telephone: (541) 526-1947

Email: Kbraman@structint.com

Title: Program Manager





**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

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

Company Name: STRUCTURAL INTEGRITY ASSOCIATES, INC.
Name: Andrew Coughlin California License Number: S6082
Mailing Address: 5215 Hellyer Ave, Suite 101, San Jose, CA 95138-1025
Telephone: (415) 635-8461 Email: acoughlin@structint.com

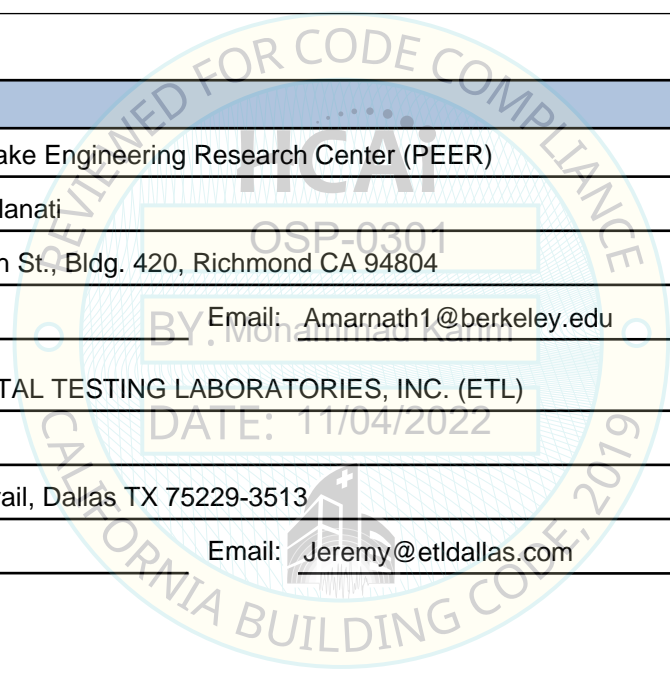
Certification Method

GR-63-Core ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
 Other (Please Specify): _____

Testing Laboratory

Company Name: Pacific Earthquake Engineering Research Center (PEER)
Contact Person: Amarnath Kasalanati
Mailing Address: 1301 South 46th St., Bldg. 420, Richmond CA 94804
Telephone: (510) 642-6475 Email: Amarnath1@berkeley.edu

Company Name: ENVIRONMENTAL TESTING LABORATORIES, INC. (ETL)
Contact Person: Jeremy Lange
Mailing Address: 11034 Indian Trail, Dallas TX 75229-3513
Telephone: (972) 247-9657 Email: Jeremy@etldallas.com





**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 4.50 (z/h = 1), 1.89 (z/h = 0)

SDS (Design spectral response acceleration at short period, g) = 2.00 (z/h = 1), 2.50 (z/h = 0)

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 2.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

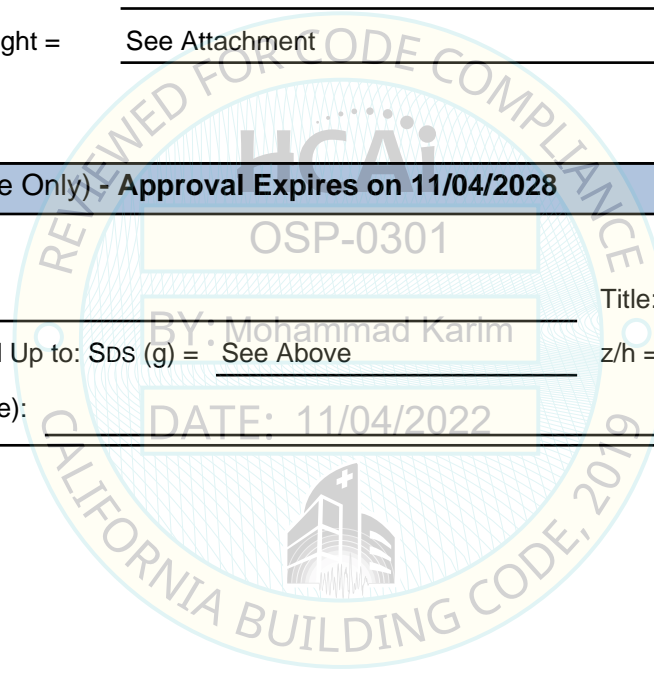
HCAI Approval (For Office Use Only) - Approval Expires on 11/04/2028

Date: 11/4/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: SDS (g) = See Above z/h = See Above

Condition of Approval (if applicable): DATE: 11/04/2022



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.					TABLE 1		
Model Line: Custom Air Handling Units							
Certified Product Construction Summary: Units shall be constructed in accordance with Haakon typical seismic details. 2"-4" deep 16ga-12ga insulated panels constructed of stainless steel(SS), galv. carbon steel(CS), or aluminum(AL). 22ga to 18ga solid or perforated wall liners (SS,CS,AL). 14ga to 10ga floor (SS,CS,AL). 22ga to 18ga floor liner (SS,CS,AL). 3.0-6.0 lb fiber board or pour foam insulation. 4" to 12" deep base framing perimeter c-channel. See Table 2.							
Certified Options Summary: With or without splits. Optional vestibule, casing cladding, or evaporative humidifier. Units within dimensions listed below certified for interior section, end section, or enclosed section. See representative unit drawings for more information on dimensional restrictions.							
Mounting Configuration: Base mounted - rigid Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.							
Building Code: CBC 2022		Seismic Certification Limits:			$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$		$I_P = 1.5$
Model Line	Model	Dimensions (in)			Weight ¹ (lb)	Notes	UUT ²
		Depth	Width	Height			
Custom Air Handling Units	Enclosures - 4 walls (No walls removed)	96.0	96.0	96.0	5,440	UUT: 85 psf; stainless steel, carbon steel	1
		...	...	...	...		Interp.
		118.0	120.0	144.0	13,810	UUT: 140 psf, carbon steel	4
		...	...	...	...		Interp.
		115.0	144.5	156.0	13,100	UUT: 114 psf; stainless steel, carbon steel, aluminum	2a
		...	...	...	...		Interp.
		120.0	185.0	148.3	15,818	UUT: 103 psf; carbon steel	14
		...	...	...	...		Interp.
		120.0	195.8	148.3	10,615	UUT: 65 psf; carbon steel	13
		...	...	...	...		Interp.
		120.0	240.0	156.0	13,100	UUT: 66 psf; stainless steel, carbon steel, aluminum	3a
		Enclosures - 3 walls (Inlet or outlet wall removed)	115.0	144.5	156.0	13,100	UUT: 114 psf; stainless steel, carbon steel, aluminum	2b
...	...	...	...		Interp.		
Additional Notes: 1. Max footprint weight of 140 psf for all interpolated and extrapolated sizes. 2. References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.							

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.					TABLE 1		
Model Line: Custom Air Handling Units							
Certified Product Construction Summary: Units shall be constructed in accordance with Haakon typical seismic details. 2"-4" deep 16ga-12ga insulated panels constructed of stainless steel(SS), galv. carbon steel(CS), or aluminum(AL). 22ga to 18ga solid or perforated wall liners (SS,CS,AL). 14ga to 10ga floor (SS,CS,AL). 22ga to 18ga floor liner (SS,CS,AL). 3.0-6.0 lb fiber board or pour foam insulation. 4" to 12" deep base framing perimeter c-channel. See Table 2.							
Certified Options Summary: With or without splits. Optional vestibule, casing cladding, or evaporative humidifier. Units within dimensions listed below certified for interior section, end section, or enclosed section. See representative unit drawings for more information on dimensional restrictions.							
Mounting Configuration: Base mounted - rigid Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.							
Building Code: CBC 2022		Seismic Certification Limits:			$S_{DS} = 2.0 g$ $z/h = 1.0$		$I_P = 1.5$
					$S_{DS} = 2.5 g$ $z/h = 0.0$		
Model Line	Model	Dimensions (in)			Weight ¹ (lb)	Notes	UUT ²
		Depth	Width	Height			
Custom Air Handling Units	Enclosures - 3 walls (Inlet and outlet wall removed)	104.25	165.5	110.25	8,124	UUT: 68 psf; carbon steel	11
		...	...	...	...	...	Interp.
		113.5	240.0	152.0	15,554	UUT: 82 psf; carbon steel	10
		...	...	...	...	...	Interp.
	Enclosures - 2 walls (Inlet and outlet wall removed)	120.0	240.0	156.0	13,100	UUT: 66 psf; stainless steel, carbon steel, aluminum	3b
		120.0	120.0	129.0	3,500	UUT: 35 psf; carbon steel	9
		...	...	...	...	...	Interp.
		115.0	144.5	156.0	13,100	UUT: 114 psf; stainless steel, carbon steel, aluminum	2c
		...	...	...	...	...	Interp.
		120.0	240.0	156.0	13,100	UUT: 66 psf; stainless steel, carbon steel, aluminum	3c

Additional Notes:
 1. Max footprint weight of 140 psf for all interpolated and extrapolated sizes.
 2. References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: AHU Construction/Materials	TABLE 2
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$ $S_{DS} = 2.5g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	-------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Description	Notes	UUT ¹
Wall and Roof Casing	Haakon	Standard (2"-4" depth)	Carbon Steel	UUT: 2" depth; 16 ga.	2, 9, 10, 11, 13, 14
			Stainless Steel	UUT: 4" depth; 16 ga.	4
			Aluminum	UUT: 2" depth; 16 ga.	1
			Aluminum	UUT: 2" depth; 12 ga.	3
Wall and Roof Liners	Haakon	Standard	Galv. Carbon Steel	UUT: 18, 20, 22 ga.	2, 3, 10, 11, 13, 14
			Stainless Steel	UUT: 18, 20, 22 ga.	1
			Aluminum	UUT: 18 ga.	2, 3
		Washdown / Thermal	Galv. Carbon Steel	UUT: 18, 20, 22 ga.	2, 3
			Stainless Steel	UUT: 18, 20, 22 ga.	1, 2, 3
			Aluminum	UUT: 18 ga.	2, 3
Bracing	Haakon	Standard	Carbon Steel	Constructed using 2"x2"x1/4" angles	2b,2c,3b, 3c,13,14
			Aluminum	Constructed using 2"x2"x1/4" angles	3c
Floor	Haakon	Standard	Carbon Steel	UUT: 14 ga.	2, 3
			Stainless Steel	UUT: 10, 12 ga.	1
		Checkerplate	Carbon Steel	UUT: 12 ga., 0.125"	2, 3, 10, 11, 13, 14
			Aluminum	UUT: 0.125", 0.1875"	2, 3

Additional Notes:
1. References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: AHU Construction/Materials	TABLE 2
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$ $S_{DS} = 2.5 g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	---------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Description	Notes	UUT ¹
Floor Liner	Haakon	Standard	Galv. Carbon Steel	UUT: 22 ga.	2,3,10,11
			Stainless Steel	UUT: 22 ga.	1
			Aluminum	UUT: 18 ga.	2, 3
Base Rail	Haakon	4" Height		C4x5.4	1
		...		...	Interp.
		6" Height		C6x8.2	4, 9, 10
		...	Carbon Steel	...	Interp.
		8" Height		C8x11.5	2,11,13,14
		...		...	Interp.
		12" Height		C12x20.7	3

Additional Notes:
1. References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Plenum Fans (Horizontal Belt Drive)	TABLE 3
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$ $S_{DS} = 2.5g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	-------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Weight (lb)	Notes ^{3,4,5}	UUT
EPF (9-Bladed Wheel), EPQ (12-Bladed Wheel)	Haakon	122	94	Arrangement: 3, 3HA; Classes I & II available.	5 ¹
		150	117		Interp.
		165	135		Interp.
		182	188		Interp.
		200	213		Interp.
		222	272		Interp.
		245	317	Arrangement: 3, 3HA, 3SM; Classes I, II & III available.	Interp.
		270	478		Interp.
		300	587		Interp.
		330	732		Interp.
		365	923		Interp.
		402	1,096		Interp.
		445	1,551		Interp.
		490	1,776		Interp.
		542	2,183		Interp.
		600	2,365		Arrangement: 3, 3SM; Classes I, II & III available.	Interp.
660	2,932	6 ²			

Additional Notes:

- UUT: EPF, arrangement 3HA, class I, carbon steel wheel.
- UUT: EPQ, arrangement 3SM, class III, carbon steel wheel.
- Carbon steel airfoil wheels. Continuously welded carbon steel frames.
- All plenum fans to be mounted on 1, 2, or 4" spring vibration isolators to AHU floor (see UUT summaries for tested configurations).
- Additional Options: Variable inlet vanes, inlet screen, inlet collar, belt guard, protective enclosure, piezometer ring.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Plenum Fans (Horizontal Direct Drive)	TABLE 4
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$ $S_{DS} = 2.5g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	-------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Weight (lb)	Notes ^{3,4,5}	UUT
EPFN (9-Bladed Wheel), EPQN (12-Bladed Wheel)	Haakon	122	94	Arrangement: 4; Classes I & II available.	4 ¹
		150	117		Interp.
		165	135		Interp.
		182	188		Interp.
		200	213		Interp.
		222	272		Interp.
		245	317	Arrangement: 4; Classes I, II & III available.	Interp.
		270	478		Interp.
		300	587		Interp.
		330	732		Interp.
		365	923		Interp.
		402	1,096		4 ²

Additional Notes:

- EPQN, arrangement 4, class I, aluminum wheel, stacked three (3) High.
- EPFN, arrangement 4, class III, aluminum wheel, stacked two (2) High.
- Aluminum airfoil wheels. Continuously welded carbon steel frame.
- All plenum fans to be mounted on 1, 2, or 4" spring vibration isolators to AHU floor (see UUT summaries for tested configurations).
- Additional Options: Variable inlet vanes, inlet screen, inlet collar, belt guard, protective enclosure, piezometer ring.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Plenum Fans (Vertical Direct Drive)	TABLE 5
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$ $S_{DS} = 2.5g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	-------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Weight (lb)	Notes ^{3,4,5}	UUT
EPQN (12-Bladed Wheel)	Haakon	122	94	Arrangement: 4; Classes I & II available.	1 ¹
		150	117		Interp.
		165	135		Interp.
		182	188		Interp.
		200	213	Arrangement: 4; Classes I, II & III available.	Interp.
		222	272		Interp.
		245	317		Interp.
		270	478		Interp.
		300	587		Interp.
		330	732		Interp.
		365	923		Interp.
		402	1,096		Interp.
		445	1,551		Interp.
		490	1,776		Interp.
542	2,183	7 ²			

Additional Notes:

- EPQN, mounted on top of stand on isolators, aluminum wheel, class II
- EPQN, mounted on top of stand on isolators, aluminum wheel, class III
- Aluminum airfoil wheels. Continuously welded carbon steel frame.
- All plenum fans to be mounted on 1, 2, or 4" spring vibration isolators to AHU floor (see UUT summaries for tested configurations).
- Additional Options: Variable inlet vanes, inlet screen, inlet collar, belt guard, protective enclosure, piezometer ring.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: MPQN Fans	TABLE 6
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g \quad z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 2.5g \quad z/h = 0.0$	

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes ^{2,3}	UUT ¹
		Depth	Width	Height				
MPQN (Twin City Fan)	122	23.25	23.25	22.00	149	Carbon steel inlet cone; aluminum airfoil wheel; carbon steel structural frame.	UUT: 4 Stack (class II)	2
	150	25.63	25.63	27.63	173		Interp.	
	165	28.25	28.25	28.76	250		Interp.	
	182	32.00	32.00	36.69	373		Interp.	
	200	34.63	34.63	38.00	467		Interp.	
	222	38.00	38.00	39.63	555		Interp.	
	245	43.38	43.38	44.43	748		Interp.	
	270	47.13	47.13	46.38	944		Interp.	
	300	51.63	51.63	52.06	1,164		Interp.	
	330	56.13	56.13	54.56	1,397		Interp.	
	365	61.38	61.38	64.25	1,738	UUT: 2 Stack (class I)	2b, 2c	

Additional Notes:

- References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.
- Floor mounted on spring isolators.
- Additional Options: Direct drive motor, 4-stack MPQN-122, triple stack configuration for up to MPQN-245, double stack up to MPQN-365, class I fan, class II fan, inlet screen, isolation gasket, shaft grounding ring, piezometer ring.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: BC SWSI Fans	TABLE 7
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$ $S_{DS} = 2.5 g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	---------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Weight (lb)	Notes ^{1,2,3}	UUT
BC SWSI	Twin City Fan	122	236	UUT: Arrangement 9, Class IV, BC	5
		135	268		Interp.
		150	315		Interp.
		165	349		Interp.
		182	436		Interp.
		200	498		Interp.
		222	617		Interp.
		245	818		Interp.
		270	941		Interp.
		300	1,180		Interp.
		330	1,412		Interp.
		365	1,678		Interp.
		402	2,056		Interp.
		445	2,620		Interp.
		490	3,037		Interp.
		542	4,186		Interp.
		600	5,235	UUT: Arrangement 9, Class I, BC	5

Additional Notes:

- Carbon steel wheel with flat single thickness blades, solid welded to the rim and back plate. Fan housing constructed of carbon steel sheet metal.
- Floor mounted on spring isolators.
- Additional Options: Horizontal fan; up, down, and horizontal discharge rotations; belt drive motor; duct outlet connection; slip-on outlet joint connection; SWSI arrangement 9; expansion bearing for high temperature airstreams; parallel and opposed blade dampers; class I, II, III and IV wheel.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: BC / BAF DWDI Fans	TABLE 8
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$ $S_{DS} = 2.5 g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	---------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Weight (lb)	Notes ^{1,2,3}	UUT
BC / BAF DWDI	Twin City Fan	122	139	Airfoil, downblast, class I, BAF.	7
		135	159		Interp.
		150	193		Interp.
		165	222		Interp.
		182	248		Interp.
		200	344		Interp.
		222	451		Interp.
		245	509		Interp.
		270	639		Interp.
		300	895		Interp.
		330	1,015		Interp.
		365	1,352		Interp.
		402	1,690		Interp.
		445	2,100		Interp.
		490	2,310		Interp.
		542	2,946		Interp.
		600	4,150		Interp.
660	5,300	Airfoil, top, horizontal, arrangement 3, class II, BC.	8		

Additional Notes:

- Carbon steel wheel with flat single thickness blades, solid welded to the rim and back plate. Fan housing constructed of carbon steel sheet metal.
- Floor mounted on spring isolators.
- Additional Options: Horizontal fan; up, down, and horizontal discharge rotations; belt drive motor; duct outlet connection; slip-on outlet joint connection; DWDI arrangement 3; expansion bearing for high temperature airstreams; parallel and opposed blade dampers; class I or II wheel.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: 686q Fans	TABLE 9
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 2.5g$ $z/h = 0.0$	

Component Type	Manufacturer	Model	Weight (lb)	Notes ^{1,3}	UUT ²
686q Fans	AcoustiFLO	1000	350		Extrap.
		...	...		Extrap.
		1532	410	9 blade wheel, 50% width, ICV, EGV	11
		...	...		Interp.
		1852	485	9 blade wheel, 80% width, ICV, IFC, EGV	10
		...	...		Interp.
		2042	497	12 blade wheel, 100% width, ICV, IS, EGV	11
		...	...		Interp.
		2052	487	12 blade wheel, 100% width, ICV, IFC, EGV	11
		...	...		Interp.
		2500	345	12 blade wheel, 50% width	11
		...	...		Interp.
		2502	405	12 blade wheel, 50% width, EGV	10
		...	...		Interp.
		2530	350	12 blade wheel, 50% width, ICV	10
		...	...		Interp.
2812	490	12 blade wheel, 80% width, IS, EGV	11		
...	...		Interp.		
2942	495	12 blade wheel, 90% width, ICV, IS, EGV	10		

Additional Notes:

1. Aluminum fan wheel, carbon steel fan housing.
2. UUT10 fans tested in a four fan array (2Wx2H). UUT11 fans tested in a five fan array (3 bottom, 2 top).
3. Options: 9 or 12 blade fan wheels, 50-100% wheel width, inlet silencer(IS), inlet check valve(ICV), exit guide vanes(EGV), outlet check valve(OCV).

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd. Model Line: Custom Air Handling Units		Table Description: Fan Motors			TABLE 10	
Building Code: CBC 2022		Seismic Certification Limits:			$S_{DS} = 2.0g \quad z/h = 1.0$ $S_{DS} = 2.5g \quad z/h = 0.0$	
					$I_p = 1.5$	
Component Type	Manufacturer	Model	Weight (lb)	Notes	UUT	
Fan Motor	Baldor	0.33 HP	20	Dual voltage motors. Motor voltage to match overall unit voltage (208/460V). ODP.	4	
		...	...		Interp.
		10 HP	255		4	
		...	...		Interp.
		30 HP	335		10, 11	
	...	...	Interp.		
	...	150 HP	1,775		6	
	TECO/Westinghouse	1 HP	53		Dual voltage motors. Motor voltage to match overall unit voltage (208/460V). ODP.	5
				Interp.
		10 HP	287			4
				Interp.
	...	150 HP	1,320		8	
	NIDEC Motor Corporation	1 HP	35		Dual voltage motors. Motor voltage to match overall unit voltage (208/460V). TEFC.	Extrap.
				Extrap.
		5 HP	70			11
...		...	Interp.			
...	30 HP	300	11			

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

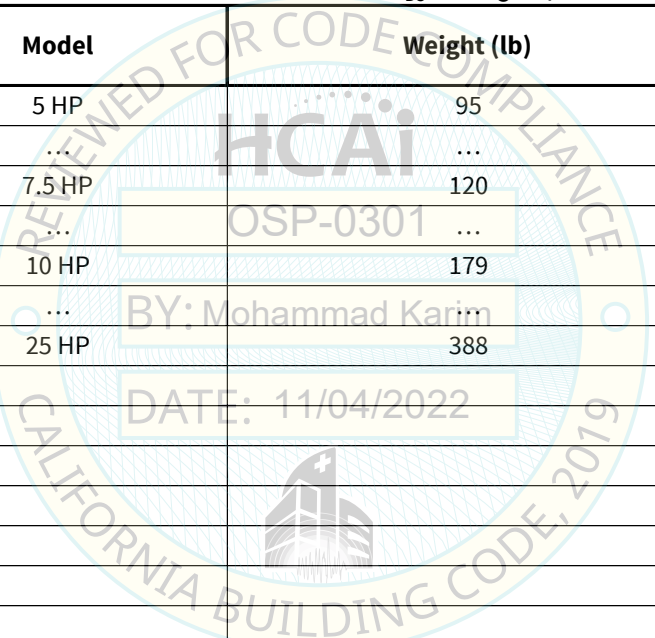
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Fan Motors	<h2>TABLE 10</h2>
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0\text{ g}$	$z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 2.5\text{ g}$	$z/h = 0.0$	

Component Type	Manufacturer	Model	Weight (lb)	Notes	UUT
Fan Motor	WEG	5 HP	95	Dual voltage motors. Motor voltage to match overall unit voltage (208/460V). TEFC.	10
		...	...		Interp.
		7.5 HP	120		11
		...	...		Interp.
		10 HP	179		10, 11
		...	...		Interp.
		25 HP	388		10



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Coils (Standard Coil Rack)	TABLE 11
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$	$S_{DS} = 2.5g$ $z/h = 0.0$
--------------------------------	--------------------------------------	-----------------------------	-------------	-----------------------------

Model Line (Manufacturer)	Model	Dimension (in) ¹			Weight ² (lb)	Material ⁴	Notes ⁵	UUT ³
		Depth	Width	Height				
Water Coils (Haakon)	Standard Rack Design, 6 rows max 0.02"-0.035" tube wall thickness, 0.006"-0.0095" fin thickness, 12 FPI max, stacked 1-3 high	6.0	24.0	24.0	63	Copper tube w/ aluminum or copper fins, galv. carbon steel or stainless steel casing.		Extrap.
		...	...	...	...			Extrap.
		10.0	113.0	43.5	775		UUT: QTY. 3, tested in (2) 3-high stacks with mixed coil types. 6 rows, 0.0075" aluminum fins, 12 fpi, 0.625" Ø copper tubes, 0.020" tube wall thickness.	3
		...	...	...	...			Interp.
		10.0	113.0	43.5	898		UUT: tested in 3-high stack with mixed coil types. 6 rows, 0.0095" aluminum fins, 12 fpi, 0.625" Ø copper tubes, 0.020" tube wall thickness.	3
		...	...	...	...			Interp.
		10.0	113.0	43.5	1,393		UUT: tested in 3-high stack with mixed coil types. 6 rows, 0.0075" copper fins, 12 fpi, 0.625" Ø copper tubes, 0.020" tube wall thickness.	3
		...	...	...	...			Interp.

Additional Notes:

- Dimensions represent individual (non-stacked) coils and include casing.
- Weights represent operating weights of individual coils including water weight.
- All certified coils available with extended headers (tested on (1) of the (2) triple stacks in UUT3).
- Combination of tube, fin, and row options can not exceed maximum certified weight.
- Standard coil rack can be used when coil weight per coil height does not exceed 43 lb/in.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Coils (Standard Coil Rack)	TABLE 11
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$	
		$S_{DS} = 2.5g$ $z/h = 0.0$		

Model Line (Manufacturer)	Model	Dimension (in) ¹			Weight ² (lb)	Material ⁴	Notes ⁵	UUT ³
		Depth	Width	Height				
Water Coils (Haakon)	Standard Rack Design, 6 rows max 0.02"-0.035" tube wall thickness, 0.006"-0.0095" fin thickness, 12 FPI max, stacked 1-3 high	10.0	113.0	43.5	1,857	Copper tube w/ aluminum or copper fins, galv. carbon steel or stainless steel casing.	UUT: tested in 3-high stack with mixed coil types. 6 rows, 0.0095" copper fins, 12 fpi, 0.625" Ø copper tubes, 0.035" tube wall thickness.	3
		...	...	...	...		Interp.	
		10.0	180.0	18.0	587		UUT: tested in 3-high stack with mixed coil types. 6 rows, 0.0075" aluminum fins, 8 fpi, 0.625" Ø copper tubes, 0.02" copper tube wall thickness, bottom coil.	13
		...	...	...	...		Interp.	
		7.5	180.0	54.0	1,343		UUT: tested in 3-high stack with mixed coil types. 2 rows, 0.0095" copper fins, 12 fpi, 0.625" Ø copper tubes, 0.035" copper tube wall thickness, middle coil.	13
		...	...	...	...		Interp.	

Additional Notes:

- Dimensions represent individual (non-stacked) coils and include casing.
- Weights represent operating weights of individual coils including water weight.
- All certified coils available with extended headers (tested on (1) of the (2) triple stacks in UUT3).
- Combination of tube, fin, and row options can not exceed maximum certified weight.
- Standard coil rack can be used when coil weight per coil height does not exceed 43 lb/in.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Coils (Standard Coil Rack)	TABLE 11
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$ $S_{DS} = 2.5g$ $z/h = 0.0$	$I_P = 1.5$
--------------------------------	-------------------------------------------------------------------------------------------------	-------------

Model Line (Manufacturer)	Model	Dimension (in) ¹			Weight ² (lb)	Material ⁴	Notes ⁵	UUT ³
		Depth	Width	Height				
Water Coils (Haakon)	Standard Rack Design, 6 rows max 0.02"-0.035" tube wall thickness, 0.006"-0.0095" fin thickness, 12 FPI max, stacked 1-3 high	8.5	180.0	54.0	1,831	Copper tube w/ aluminum or copper fins, galv. carbon steel or stainless steel casing.	UUT: tested in 3-high stack with mixed coil types. 5 rows, 0.0095" aluminum fins, 12 fpi, 0.625" Ø copper tubes, 0.035" copper tube wall thickness, top coil.	13
		...	...	...	...		Interp.
		10.0	180.0	54.0	1,857		Interp.	
	Standard Rack Design, 12 rows max, 0.02" tube wall thickness, 0.006"-0.0075" fin thickness, 6 FPI max, stacked 1 high	12.5	24.0	24.0	280		Interp.	
		...	...	...	...		Interp.
		18.0	63.0	24.0	696		UUT: 12 rows, 0.0075" copper fins, 6 fpi, 0.625" Ø copper tubes, 0.020" tube wall thickness, stacked 1 high.	1

Additional Notes:

- Dimensions represent individual (non-stacked) coils and include casing.
- Weights represent operating weights of individual coils including water weight.
- All certified coils available with extended headers (tested on (1) of the (2) triple stacks in UUT3).
- Combination of tube, fin, and row options can not exceed maximum certified weight.
- Standard coil rack can be used when coil weight per coil height does not exceed 43 lb/in.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Coils (Heavy Rack)	TABLE 12
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0 g$ $z/h = 1.0$	$I_p = 1.5$	
		$S_{DS} = 2.5 g$ $z/h = 0.0$		

Model Line (Manufacturer)	Model	Dimension (in) ¹			Weight ² (lb)	Material ⁴	Notes ^{5,6}	UUT ³	
		Depth	Width	Height					
Water Coils (Haakon)	Heavy Rack Design, 10 rows max, 0.02"-0.035" tube wall thickness, 0.006"- 0.0095" fin thickness, 12 FPI max, stacked 1- 3 high	6.0	24.0	24.0	63	Copper tube w/ aluminum or copper fins, galv. carbon steel or stainless steel casing.		Extrap.	
		...	...	...	...			Extrap.	
		15.0	160.0	42.0	2,505			UUT: tested in 3-high stack with mixed coil types. 10 rows, 0.0095" aluminum fins, 12 fpi, 0.625" Ø copper tubes, 0.035" copper tube wall thickness, middle coil.	14
		...	...	...	...				Interp.
		15.0	160.0	42.0	4,408			UUT: tested in 3-high stack with mixed coil types. 10 rows, 0.0095" copper fins, 12 fpi, 0.625" Ø copper tubes, 0.035" copper tube wall thickness, top coil.	14

Additional Notes:

- Dimensions represent individual (non-stacked) coils and include casing.
- Weights represent operating weights of individual coils including water weight.
- All certified coils available with extended headers (tested on (1) of the (2) triple stacks in UUT3).
- Combination of tube, fin, and row options can not exceed maximum certified weight.
- Heavy rack must be used when coil weight per coil height exceeds 43 lbs/in. Coil weight per coil height can not exceed 105 lbs/in.
- Heavy racks will be labeled.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Dampers & Louvers	TABLE 13
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$	$S_{DS} = 2.5g$ $z/h = 0.0$
--------------------------------	--------------------------------------	-----------------------------	-------------	-----------------------------

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT ¹
		Depth	Width	Height				
Dampers (Tamco)	1000 / 9000	4.0	12.0	12.0	8	Aluminum	UUT2: model 9000; UUT10: model 1000	2, 10
		...	...	...	...		Interp.	
		4.0	48.0	48.0	90		UUT: model 9000	2
		...	...	...	...		Interp.	
Airflow Measuring Dampers (Tamco/Ebtron)	Air IQ	18.0	13.5	12.0	22	Aluminum		10
		...	...	...	...		Interp.	
		18.0	60.0	60.0	200		UUT1: Tested with 3 inlet hoods	1, 10
Air Monitoring Dampers (Greenheck)	AMD-42	12.0	12.0	12.0	25	Galv. Carbon Steel		2
		...	...	...	...		Interp.	
		12.0	46.0	46.0	98			2a, 2b
Dampers (Greenheck)	VCD / SMD	5.0	12.0	12.0	17	Galv. Carbon Steel or Stainless Steel		2
		...	...	...	...		Interp.	
		5.0	48.0	48.0	91		UUT: VCD-33 (control damper)	2a, 2b
		5.0	48.0	50.0	71.5		UUT: SMD-401 (smoke damper)	2a, 2b
		...	...	...	...		Interp.	
		5.0	60.0	60.0	140		UUT: VCD-23-304SS (control damper, stainless steel)	10

Additional Notes:
1. References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Dampers & Louvers	TABLE 13
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0 g \quad z/h = 1.0$	$I_p = 1.5$	$S_{DS} = 2.5 g \quad z/h = 0.0$
--------------------------------	--------------------------------------	----------------------------------	-------------	----------------------------------

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT ¹
		Depth	Width	Height				
Louvers (Haakon)	Standard / Storm	2.0	12.0	12.0	2	Aluminum	Standard	Extrap.
		2.0	12.0	12.0	13		Storm	Extrap.
				Extrap.
		4.0	47.0	48.0	34		UUT: Standard	2a, 2b
		4.0	48.0	50.0	122		UUT: Storm	2a, 2b
				Interp.
		4.0	60.0	58.0	52		UUT: Standard	10
		4.0	61.0	60.0	181		UUT: Storm	10

Additional Notes:
 1. References to UUT2a, 2b, 2c, 3a, 3b and 3c indicate the component was tested in that configuration only. References to UUT2 or UUT3 indicate the component was tested in all configurations of that test unit.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

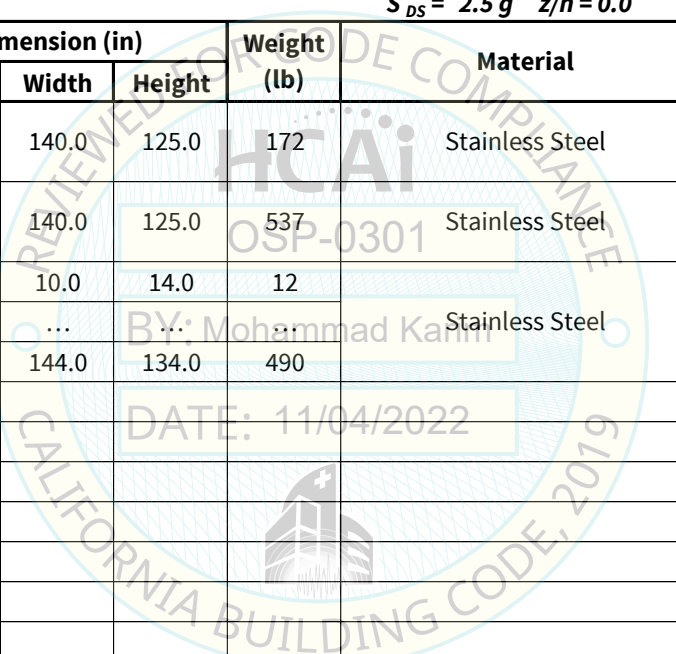
1800711-CR-001-R4



Manufacturer:	Haakon Industries, Ltd.	Table Description: Humidifier Grid	TABLE 14
Model Line:	Custom Air Handling Units		

Building Code:	CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g \quad z/h = 1.0$	$I_p = 1.5$
			$S_{DS} = 2.5g \quad z/h = 0.0$	

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Humidifier (Conair)	SAM-e	9.0	140.0	125.0	172	Stainless Steel		2
Humidifier (DriSteem)	UltraSorb LV	5.0	140.0	125.0	537	Stainless Steel		2
Humidifier (Armstrong)	Humidipack	8.5	10.0	14.0	12	Stainless Steel	UUT: 4" header	10
		...	...	...	...		Interp.	
		8.5	144.0	134.0	490		UUT: 4" headers	10



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

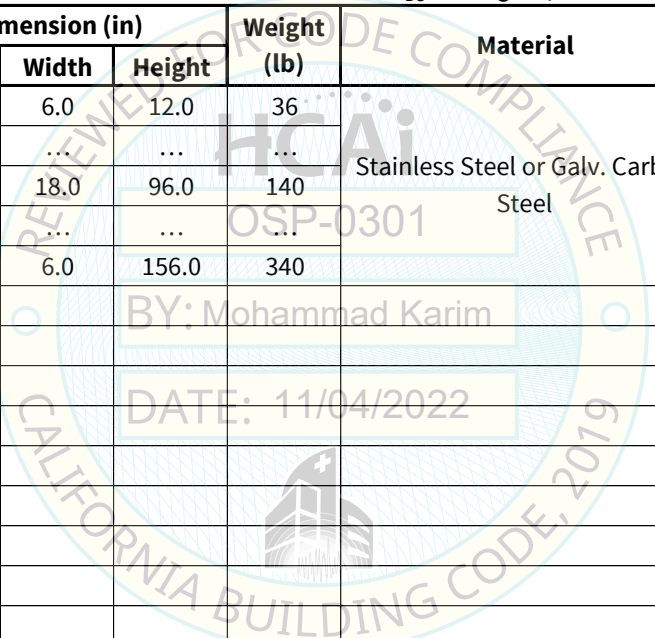
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Sound Attenuators	TABLE 15
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 2.5g$ $z/h = 0.0$	

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Sound Attenuators (Haakon)	Standard	36.0	6.0	12.0	36	Stainless Steel or Galv. Carbon Steel		Extrap.
		...	...	...	...			Extrap.
		36.0	18.0	96.0	140		UUT: galv. carbon steel	1
		...	...	...	...			Interp.
		84.0	6.0	156.0	340		UUT: stainless steel	3

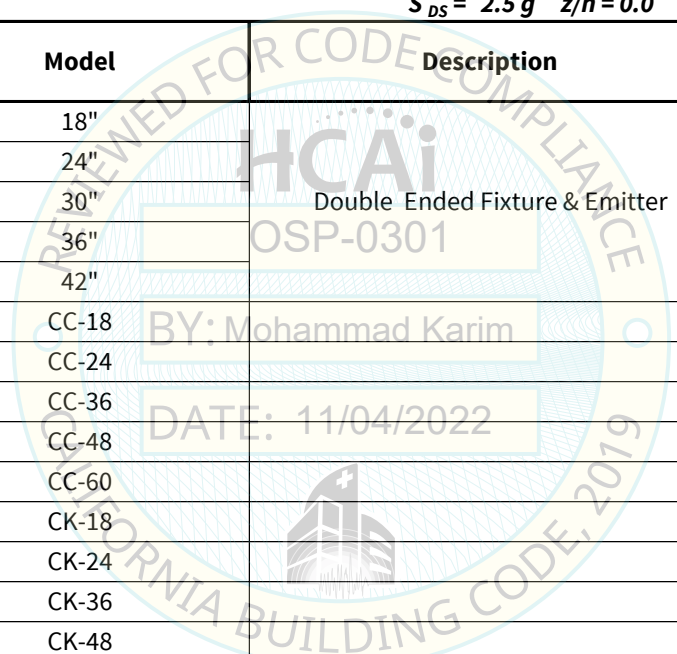


SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd. Model Line: Custom Air Handling Units		Table Description: UV Lights			TABLE 16	
Building Code: CBC 2022		Seismic Certification Limits:				
		$S_{DS} = 2.0\text{ g}$ $z/h = 1.0$			$I_p = 1.5$	
		$S_{DS} = 2.5\text{ g}$ $z/h = 0.0$				
Component Type	Manufacturer	Model	Description	Notes	UUT	
UV Lights	Steril-Aire	18"	Double Ended Fixture & Emitter	Stainless steel 16ga rack tested.	3	
		24"			3	
		30"			3	
		36"			3	
		42"			3	
UV Lights	American UV	CC-18	16ga 304 Stainless Steel UV light rack.		13	
		CC-24			Interp.	
		CC-36			Interp.	
		CC-48			Interp.	
		CC-60			13	
		CK-18			13	
		CK-24			Interp.	
		CK-36			Interp.	
		CK-48			Interp.	
		CK-60			13	
	UVDI	UVDI	VMOD2-18			13
			VMOD2-24			Interp.
			VMOD2-36			13
			VMAX2-21			13
			VMAX2-33			Interp.
VMAX2-48	Interp.					
VMAX2-61	13					



**SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX**

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Heaters	TABLE 17
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$ $S_{DS} = 2.5 g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	---------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Description	Notes	UUT
Baseboard Heater	King Electric	500W		UUT: 6.3 lbs	2
		...			Interp.
		1,500W		UUT: 14 lbs	2
Unit Heater	King Electric	3kW		UUT: 40 lbs	2
		...			Interp.
		5kW		UUT: 40 lbs	2
Thermostat	King Electric	BKT1 Thermostat			2
		1-Pole Unit Mounted Thermostat			2

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



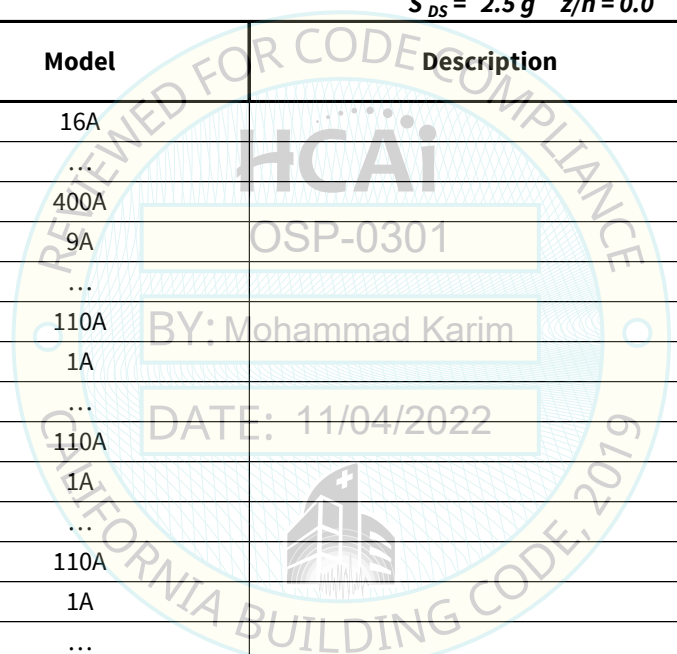
Manufacturer: Haakon Industries, Ltd. Model Line: Custom Air Handling Units		Table Description: Electrical Enclosures					TABLE 18	
Building Code: CBC 2022		Seismic Certification Limits:			$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$		$I_p = 1.5$	
Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Enclosures (Hoffman)	Electrical Enclosures	6.0	12.0	12.0	12	16ga Carbon Steel	NEMA 1 or NEMA 4	Extrap.
		...	...	...	...			Extrap.
		8.0	12.0	16.0	16			11
		12.0	36.0	48.0	131			Interp.
		...	...	...	...			Interp.
		12.0	36.0	60.0	165			2,3,4,11
Enclosures (Hammond)	CSKO10104	4.0	10.0	10.0	6.8	16ga Carbon Steel	NEMA 1	13
Enclosure (Rittal)	WM121206NC	6.0	12.0	12.0	15.4	16ga Carbon Steel	NEMA 3R	13

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd. Model Line: Custom Air Handling Units		Table Description: Electrical & Miscellaneous Components			TABLE 19	
Building Code: CBC 2022		Seismic Certification Limits:				
		$S_{DS} = 2.0\text{ g}$ $z/h = 1.0$			$I_p = 1.5$	
		$S_{DS} = 2.5\text{ g}$ $z/h = 0.0$				
Component Type	Manufacturer	Model	Description	Notes	UUT	
Disconnect	ABB	16A			2	
		...			Interp.	
		400A			2	
Contactor	ABB	9A			2	
		...			Interp.	
		110A			2	
Overload	ABB	1A			2	
		...			Interp.	
		110A			2	
MPP	ABB	1A			2	
		...			Interp.	
		110A			2	
Fuses	Feraz Shawmut/ Mersen	1A			2	
		...			Interp.	
		400A			2	
Distribution Blocks	Feraz Shawmut/ Mersen	175A			2	
		...			Interp.	
		380A			2	
Transformers	Square D	75VA			2	
		...			Interp.	
		2kVA			2	

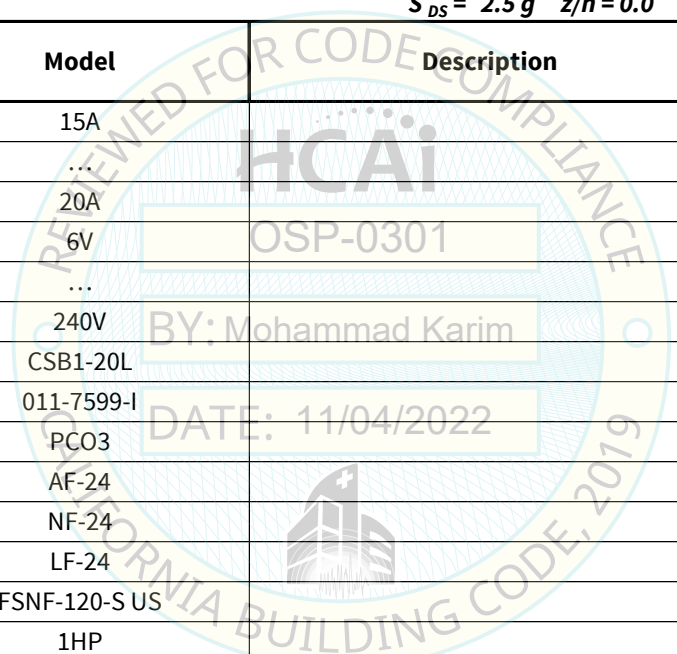


SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd. Model Line: Custom Air Handling Units		Table Description: Electrical & Miscellaneous Components			TABLE 19	
Building Code: CBC 2022		Seismic Certification Limits:				
		$S_{DS} = 2.0\text{ g}$ $z/h = 1.0$			$I_p = 1.5$	
		$S_{DS} = 2.5\text{ g}$ $z/h = 0.0$				
Component Type	Manufacturer	Model	Description	Notes	UUT	
Circuit Breaker	Square D	15A			2	
		...			Interp.	
		20A			2	
Relays	Eaton / Cutler Hammer	6V			2	
		...			Interp.	
		240V			2	
Light Switch	Leviton	CSB1-20L			2	
Receptacle	Leviton	011-7599-I			2	
Controller	Carel	PCO3			2	
Actuators	Belimo	AF-24			2	
		NF-24			2	
		LF-24			2	
		FSNF-120-S US		UUT: Qty 5 actuators	10	
ACH550 VFD	ABB	1HP			2	
		...			Interp.	
		150HP			2	
ACH580 VFD	ABB	5 HP			10	
		...			Interp.	
		25 HP			10	
		...			Interp.	
		60 HP			11	
ACS150 VFD	ABB	1HP			2	



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

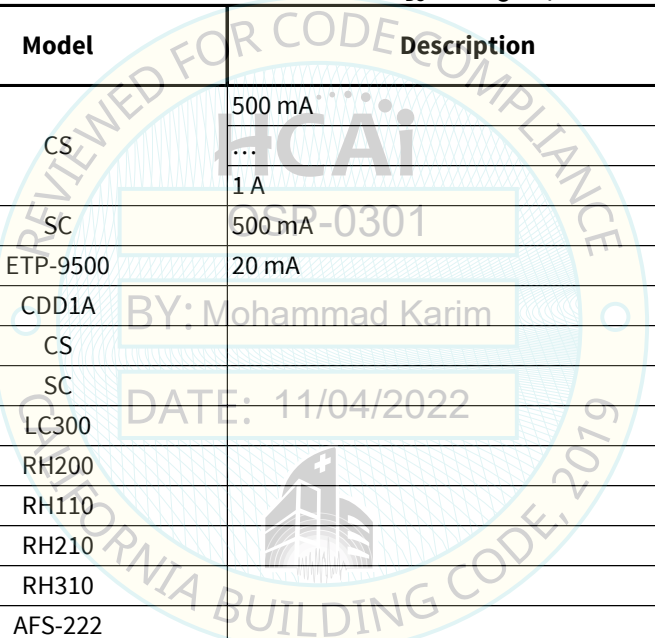
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Electrical & Miscellaneous Components	TABLE 19
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$ $S_{DS} = 2.5 g$ $z/h = 0.0$	$I_p = 1.5$
--------------------------------	---------------------------------------------------------------------------------------------------	-------------

Component Type	Manufacturer	Model	Description	Notes	UUT
Current Switches	Greystone	CS	500 mA		2
		SC	500.mA -0301		Interp.
		SC	1 A		2
Transducer	Greystone	ETP-9500	20 mA		2
CO2 Detector	Greystone	CDD1A			2
Current Sensor	Greystone	CS			2
		SC			2
Freezestat	Greystone	LC300			2
Humidity Transducer	Greystone	RH200			2
Humidity Transmitter	Greystone	RH110			2
		RH210			2
		RH310			2
Pressure Switch	Greystone	AFS-222			2
		AFS-262			2
		AFS460			2
Pressure Transducer	Greystone	LP2			2
Room Sensor	Greystone	TE500AE			2
Smoke Detector	Greystone	SL-2000			2
Probe Temperature Sensors/ Transducers	Greystone	TE200			2
		TE500			2
		TE511			2
		TE512			2



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.		Table Description: Electrical & Miscellaneous Components			TABLE 19
Model Line: Custom Air Handling Units					
Building Code: CBC 2022		Seismic Certification Limits:			
		$S_{DS} = 2.0 g \quad z/h = 1.0$		$I_p = 1.5$	
		$S_{DS} = 2.5 g \quad z/h = 0.0$			
Component Type	Manufacturer	Model	Description	Notes	UUT
Temp. Transmitter	Greystone	TE500B			2
Ultra Low Pressure Transducer	Greystone	ULP			2
Ionization Bar	Active Air Solutions / Global Plasma Solutions	AAS-AirRailx8	Aluminum rail, stainless steel needles, 0.5lbs/ft		Extrap.
		...			Extrap.
		AAS-AirRailx36		UUT: 36" length	10
		...			Interp.
		AAS-AirRailx143		UUT: 143" length	10
Power Transformer	Active Air Solutions / Global Plasma Solutions	AAS-7504	High output power supply transformer	120/230VAC input, 24W, 6lbs	10
Stratification Eliminator	Haakon	Standard		UUT: 60" diameter	3a
Bellmouth Transition	Haakon	Standard		UUT: 60"W x 60"H	3a
Indicator Lights	Schneider Electric	XB4BVB3	Green light, 0.18 lbs.		13
		XB4BVB4	Red light, 0.18 lbs.		13
Disconnect Switch	ABB	OT63F3	0.55 lbs.		13
Terminal Block	Phoenix Contact	PHX3044102	0.1 lbs.		13
		PHX3045130	0.1 lbs.		13
		PHX3045143	0.1 lbs.		13
		PHX3044115	0.1 lbs.		13
		PHX3045127	0.1 lbs.		13

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	Table Description: Filters	TABLE 20
Model Line: Custom Air Handling Units		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$	$S_{DS} = 2.5g$ $z/h = 0.0$
--------------------------------	--------------------------------------	-----------------------------	-------------	-----------------------------

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Filter Rack ¹ (Haakon)	Angled Filter Rack		240.0	156.0	232	Stainless Steel or Galv. Carbon Steel	UUT: Stainless steel and galv. carbon steel	3
	HEPA Filter Rack		240.0	156.0	165		UUT: Stainless steel and galv. carbon steel	3
	Type 8 Filter Rack		240.0	156.0	148		UUT: Stainless steel and galv. carbon steel	3
Filter - Front Load (American Air)	Biocell VXL	12.0	24.0	12.0				3
		...	...	...				Interp.
	DriPak 2000	12.0	24.0	24.0				3
		12.0	12.0	20.0				3
		...	...	...				Interp.
	Varicel	36.0	24.0	24.0				3
		12.0	12.0	20.0				3
		...	...	...				Interp.
	Megacel I	36.0	24.0	24.0				3
		12.0	12.0	20.0				3
		...	...	...				Interp.
	AmAir 1100	36.0	24.0	24.0				3
		1.0	10.0	10.0				3
		...	...	...				Interp.
	Perfect Pleat Ultra	4.0	25.0	29.0				3
0.8		9.5	9.5				3	
...		...	...				Interp.	
		2.0	24.5	24.5				3

Additional Notes:
1. Maximum dimensions listed, smaller sizes available. Total depth matches installed filter.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.		Table Description: Filters					TABLE 20	
Model Line: Custom Air Handling Units		Building Code: CBC 2022					Seismic Certification Limits:	
		$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$					$I_p = 1.5$	
Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Filter - Front Load (Camfil Farr)	Hi-Flo ES	12.0	20.0	12.0			3	
		...	...	...			Interp.
		30.0	24.0	24.0			3	
	Durafil ES	12.0	12.0	20.0			3	
		...	...	...			Interp.
		12.0	12.0	24.0			3	
	Riga-Flo ph	12.0	12.0	12.0			3	
		...	...	...			Interp.
		12.0	24.0	12.0			3	
	30/30	1.0	10.0	10.0			3	
		...	...	...			Interp.
		4.0	25.0	29.0			3	
	AP-Eleven	1.0	16.0	12.0			3	
		...	...	...			Interp.
		4.0	24.5	24.5			3	
	AP-Thirteen	1.75	19.38	15.38			3	
		...	...	...			Interp.
		3.75	25.0	25.0			3	

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.

Model Line: Custom Air Handling Units

UUT	Unit Description	Report Number	Testing Lab	Year Tested	ISO 17025 Accredited?	S _{DS}	z/h	I _P
1	AHU Cabinet (0 Walls Removed) ¹	12346, Rev. 0 (UUT1)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
2a	AHU Cabinet (0 Walls Removed) ¹	12346, Rev. 0 (UUT2)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
2b	AHU Cabinet (1 Wall Removed) ¹	12346, Rev. 0 (UUT2)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
2c	AHU Cabinet (2 Walls Removed) ¹	12346, Rev. 0 (UUT2)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
3a	AHU Cabinet (0 Walls Removed) ¹	12346, Rev. 0 (UUT3)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
3b	AHU Cabinet (1 Wall Removed) ¹	12346, Rev. 0 (UUT3)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
3c	AHU Cabinet (2 Walls Removed) ¹	12346, Rev. 0 (UUT3)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
4	AHU Cabinet (0 Walls Removed) ¹	12346, Rev. 0 (UUT4)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
5	Fan Skid	12346, Rev. 0 (UUT5)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
6	Fan Skid	12346, Rev. 0 (UUT6)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
7	Fan Skid	12346, Rev. 0 (UUT7)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5

Notes:

1. Wall removal certifies units for use in configurations shown in the attached drawings.

UNIT UNDER TEST (UUT) SUMMARY SHEET



1800711-CR-001-R4

Manufacturer: Haakon Industries, Ltd.								
Model Line: Custom Air Handling Units								
UUT	Unit Description	Report Number	Testing Lab	Year Tested	ISO 17025 Accredited?	S _{DS}	z/h	I _P
8	Fan Skid	12346, Rev. 0 (UUT8)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
9	AHU Cabinet (2 Walls Removed) ¹	12346, Rev. 0 (UUT9)	Environmental Testing Laboratory (ETL)	2012	Yes	2.5 2.5	1.0 0.0	1.5
10	AHU Cabinet (1 Wall Removed) ¹	1800711-TR-001 R0 (UUT10)	Pacific Earthquake Engineering Research Center (PEER)	2019	Yes	2.0 3.1	1.0 0.0	1.5
11	AHU Cabinet (1 Wall Removed) ¹	1800711-TR-001 R0 (UUT11)	Pacific Earthquake Engineering Research Center (PEER)	2019	Yes	2.0 2.7	1.0 0.0	1.5
13	AHU Cabinet (0 Walls Removed) ¹	1800711-TR-002-R0 (UUT13)	Pacific Earthquake Engineering Research Center (PEER)	2022	Yes	2.0 2.5	1.0 0.0	1.5
14	AHU Cabinet (0 Walls Removed) ¹	1800711-TR-002-R0 (UUT14)	Pacific Earthquake Engineering Research Center (PEER)	2022	Yes	2.0 2.5	1.0 0.0	1.5

Notes:
1. Wall removal certifies units for use in configurations shown in the attached drawings.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 1
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
 Tested with four (4) walls in place.
 2" 16 ga stainless steel(SS) casing. 22, 20, 18 ga SS standard and thermal/washdown liners. 3-lb insulation. 10, 12 ga SS floor. 22 ga SS floor liner. Carbon steel(CS) C4x5.4 base rail.

Options/Subcomponent Summary:
 Model 122 EPQN fan (2" spring isolators), 24x60 cooling coil, 36" sound attenuator, three inlet hoods, 60x60 Tamco/Ebtron inlet damper.
 Please refer to Product Matrix for component details.

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
5,440	96.0	96.0	96.0	6.6	8.1	7.2

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67	
		2.5	0.0						

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

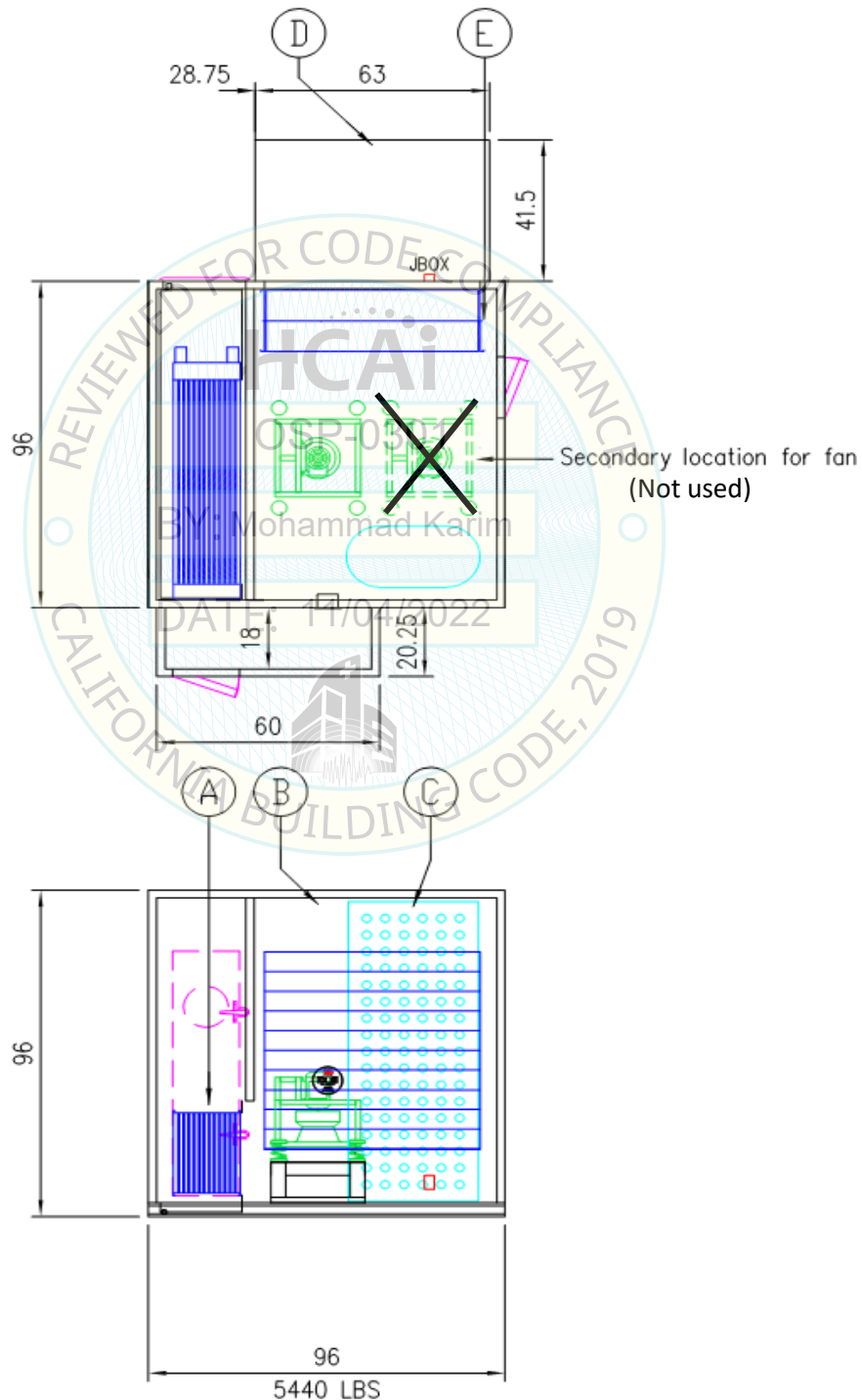
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 1

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer:	Haakon Industries, Ltd.	UUT 2a
Model Line:	Custom Air Handling Units	
Model Number:	Test Prototype	
Serial Number:		N/A

Product Construction Summary:
 Tested with four (4) walls in place.
 4" 16 ga carbon steel(CS) casing. 22, 20, 18 ga standard and washdown/thermal galv. CS liners. 22, 20, 18 ga washdown/thermal stainless steel(SS) liners. 18 ga washdown/thermal aluminum(AL) liners. 3-lb insulation. 0.1875" & 0.125" AL checkerplate floor. 14 ga CS floor. 12ga & 0.125" CS checkerplate. 22 ga CS floor liner. 18 ga AL floor liner. CS C8x11.5 base rail.


Options/Subcomponent Summary:
 48x48 Ultra Tek Dampers. 12x12, 48x48 Tamco Damper. (2) 12x12, 46x46, 48x50, 48x48 Greenheck Dampers. 47x48 Haakon storm louver. 48x50 Haakon standard louver. Dri-Steam & Nortec steam humidifiers. (4) Stack model 122 MPQN fans. 2kW heater. Nema-3R enclosure. Please refer to Product Matrix for component details.

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,100	115.0	144.5	156.0	4.1	3.6	4.2

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67	
		2.5	0.0						


Test Mounting Details:

Tamco damper




Tamco, Greenheck dampers

Ultratech damper



Greenheck damper

Haakon storm, Greenheck damper



Haakon standard, Greenheck smoke

Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

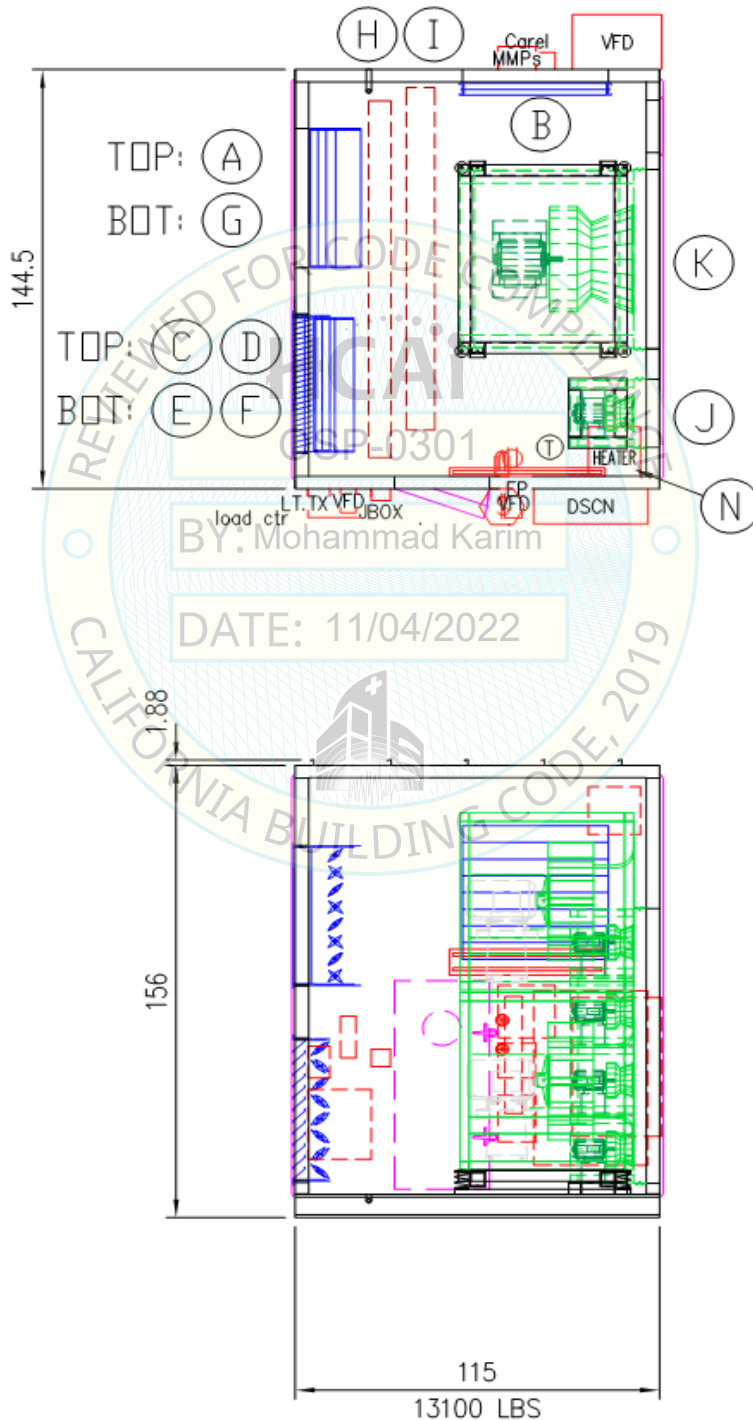
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 2a

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer:	Haakon Industries, Ltd.	UUT 2b
Model Line:	Custom Air Handling Units	
Model Number:	Test Prototype	
Serial Number:		N/A


Product Construction Summary:
 Tested with three (3) walls in place (inlet wall removed). Carbon steel(CS) bracing added in place of removed wall (see bracing dwg). 4" 16 ga CS casing. 22, 20, 18 ga standard and washdown/thermal galv. CS liners. 22, 20, 18 ga washdown/thermal stainless steel(SS) liners. 18 ga washdown/thermal aluminum(AL) liners. 3-lb insulation. 0.1875" & 0.125" AL checkerplate floor. 14 ga CS floor. 12ga & 0.125" CS checkerplate. 22 ga CS floor liner. 18 ga AL floor liner. CS C8x11.5 base rail.

Options/Subcomponent Summary:
 48x48 Ultra Tek Dampers. 12x12, 48x48 Tamco Damper. (2) 12x12, 46x46, 48x50, 48x48 Greenheck Dampers. 47x48 Haakon storm louver. 48x50 Haakon standard louver. Dri-Steem & Nortec steam humidifiers. (4) Stack model 122 MPQN fans. (2) Stack model 365 MPQN fans (2" spring isolators – upgraded to seismic grade isolators after initial isolator fail). 2kW heater. Nema-3R enclosure. Please refer to Product Matrix for component details.


UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,100	115.0	144.5	156.0	4.1	2.9	4.5

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67	
		2.5	0.0						

Test Mounting Details:



Front



Left

Ultratech damper

Haakon storm, Greenheck damper

Greenheck damper

Haakon standard, Greenheck smoke

Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

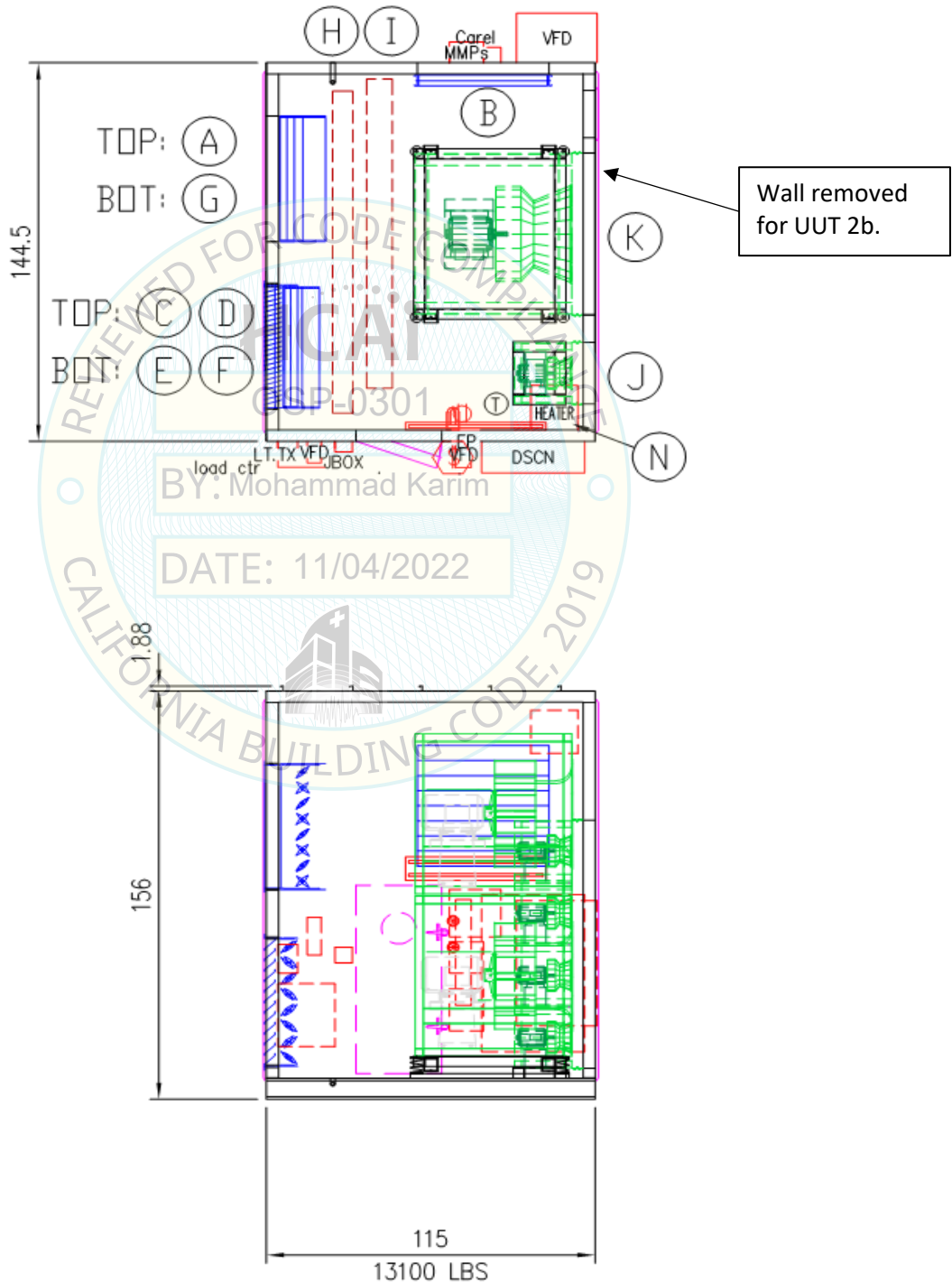
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 2b

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 2c
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
 Tested with two (2) walls in place (inlet and outlet walls removed). Carbon steel(CS) bracing added in place of removed walls (see bracing dwg). 4" 16 ga CS casing. 22, 20, 18 ga standard and washdown/thermal galv. CS liners. 22, 20, 18 ga washdown/thermal stainless steel(SS) liners. 18 ga washdown/thermal aluminum(AL) liners. 3-lb insulation. 0.1875" & 0.125" AL checkerplate floor. 14 ga CS floor. 12ga & 0.125" CS checkerplate. 22 ga CS floor liner. 18 ga AL floor liner. CS C8x11.5 base rail.

Options/Subcomponent Summary:
 12x12, 48x48 Tamco Dampers. (2) 12x12 Greenheck Dampers. Dri-Steem & Nortec steam humidifiers. (4) Stack model 122 MPQN fans. (2) Stack model 365 MPQN fans (2" spring isolators – upgraded to seismic grade isolators after initial isolator fail). 2kW heater. Nema-3R enclosure. Please refer to Product Matrix for component details.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,100	115.0	144.5	156.0	4.3	2.8	4.5

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

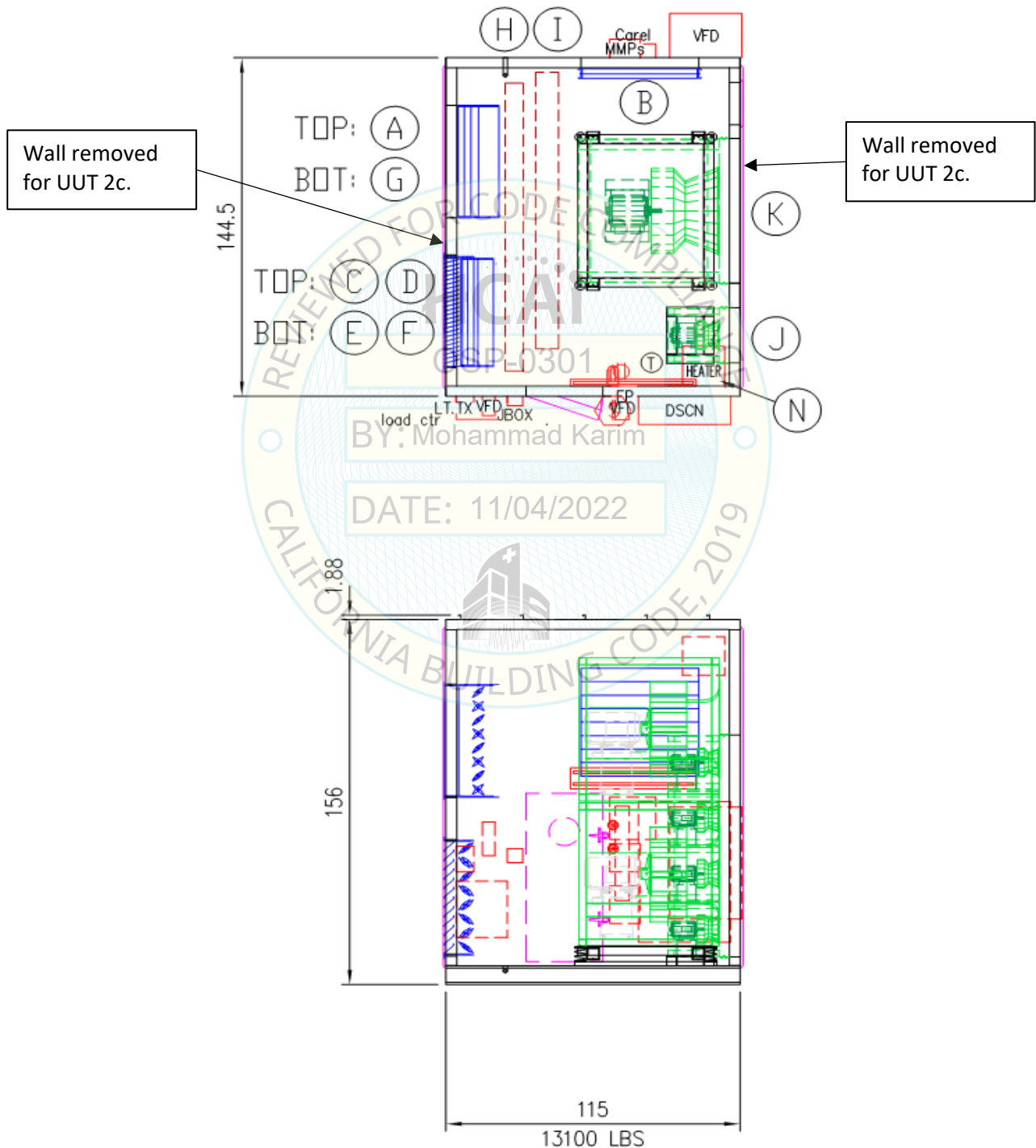
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 2c

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 3a
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
 Tested with four (4) walls in place.
 2" 12 ga AL casing. 22, 20, 18 ga standard and washdown/thermal galv. CS liner. 22, 20, 18 ga washdown/thermal stainless steel(SS) liner. 18 ga standard and washdown/thermal AL liner. 6-lb insulation. 14 ga CS floor. 0.1875, 0.125" AL checkerplate. 12 ga, 0.125" CS checkerplate. 22 ga CS floor liner. 18 ga AL floor liner. CS C12x20.7 base rail.

Options/Subcomponent Summary:
 240"W x 156"H Filter rack (angled, type 8, HEPA). 84" sound attenuator. 18, 24, 30, 36, & 42" UV lights. (6) 42"x110" cooling coils. 60" stratification eliminators. 60" bellmouth transition. Nema-1 enclosure.
 Please refer to Product Matrix for component details.

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,100	120.0	240.0	156.0	6.9	>33.3	>33.3

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67	
		2.5	0.0						

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4

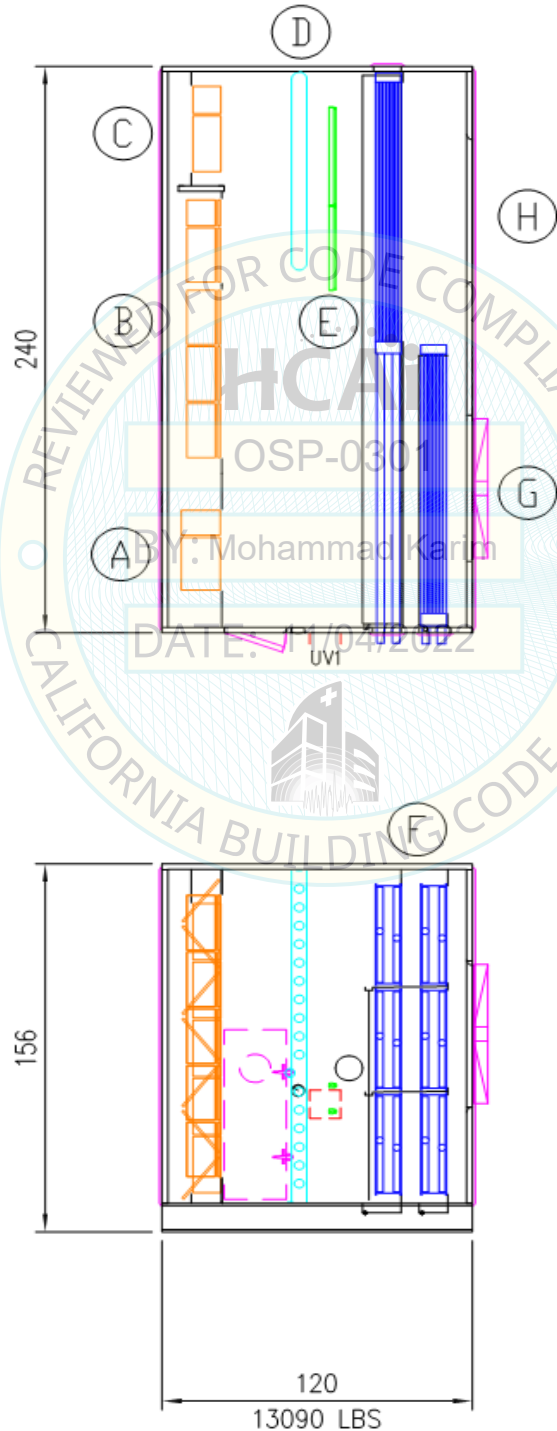


Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype

Serial Number: N/A

UUT 3a

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer:	Haakon Industries, Ltd.	UUT 3b
Model Line:	Custom Air Handling Units	
Model Number:	Test Prototype	
Serial Number:		N/A

Product Construction Summary:
 Tested with three (3) walls in place (inlet wall removed). Carbon steel(CS) bracing added in place of removed wall (see bracing dwg).
 2" 12 ga aluminum(AL) casing. 22, 20, 18 ga standard and washdown/thermal galv. CS liner. 22, 20, 18 ga washdown/thermal stainless steel(SS) liner. 18 ga standard and washdown/thermal AL liner. 6-lb insulation. 14 ga CS floor. 0.1875, 0.125" AL checkerplate. 12 ga, 0.125" CS checkerplate. 22 ga CS floor liner. 18 ga AL floor liner. CS C12x20.7 base rail.

Options/Subcomponent Summary:
 240"W x 156"H Filter rack (angled, type 8, HEPA). 84" sound attenuator. 18, 24, 30, 36, & 42" UV lights. (6) 42"x110" cooling coils. Nema-1 enclosure.
 Please refer to Product Matrix for component details.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,100	120.0	240.0	156.0	12.7	13.4	>33.3

<i>UUT Highest Passed Seismic Run Information</i>									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67	
		2.5	0.0						

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4

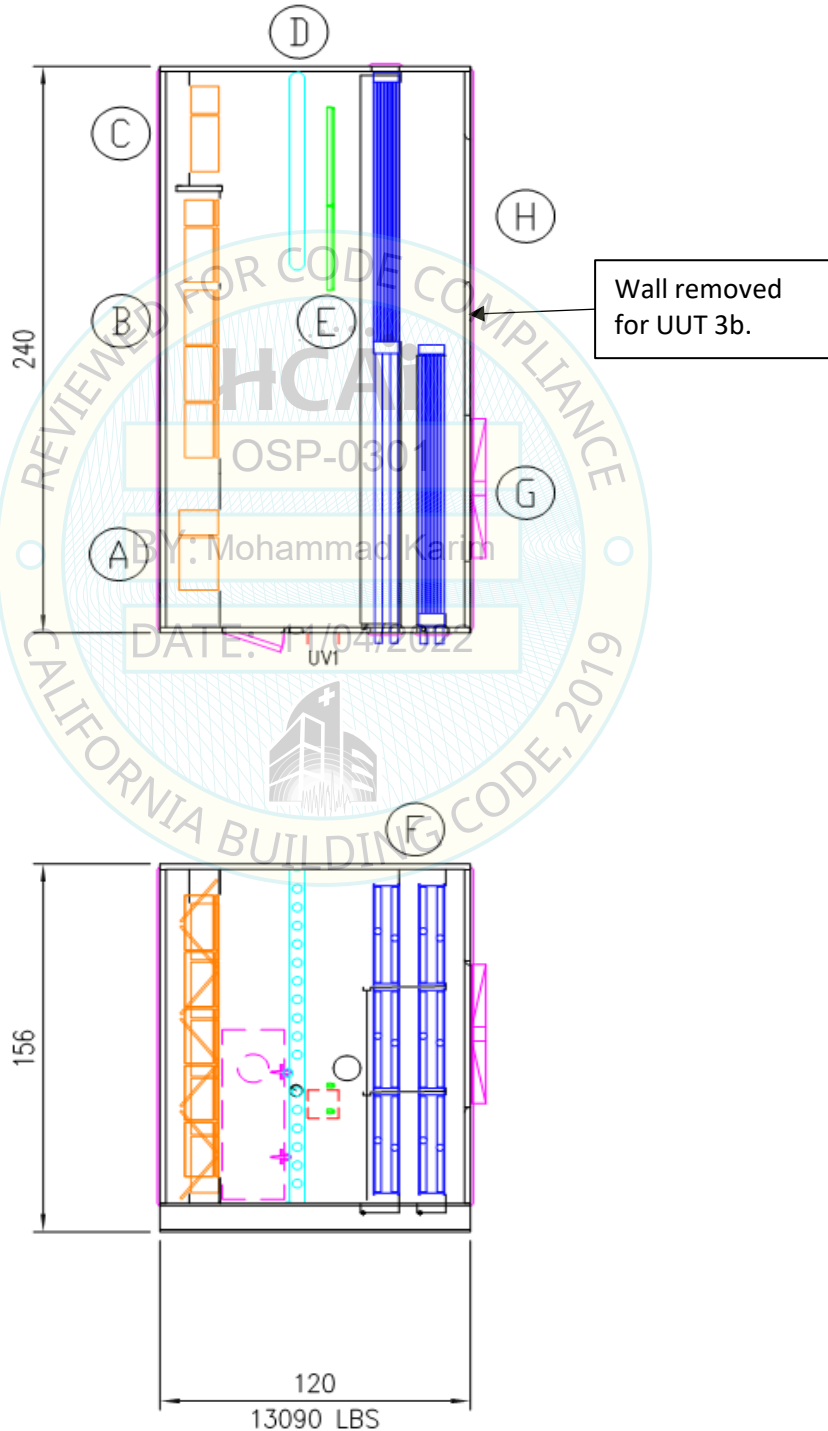


Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype

Serial Number: N/A

UUT 3b

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 3c
Model Line: Custom Air Handling Units	
Model Number: Test Prototype	
Serial Number: N/A	

Product Construction Summary:
 Tested with two (2) walls in place (inlet and outlet walls removed). Carbon steel(CS) & aluminum(AL) bracing added in place of removed walls (see bracing dwg).
 2" 12 ga AL casing. 22, 20, 18 ga standard and washdown/thermal galv. CS liner. 22, 20, 18 ga washdown/thermal stainless steel(SS) liner. 18 ga standard and washdown/thermal AL liner. 6-lb insulation. 14 ga CS floor. 0.1875, 0.125" AL checkerplate. 12 ga, 0.125" CS checkerplate. 22 ga CS floor liner. 18 ga AL floor liner. CS C12x20.7 base rail.

Options/Subcomponent Summary:
 240"W x 156"H Filter rack (angled, type 8, HEPA). 84" sound attenuator. 18, 24, 30, 36, & 42" UV lights. (6) 42"x110" cooling coils. Nema-1 enclosure.
 Please refer to Product Matrix for component details.

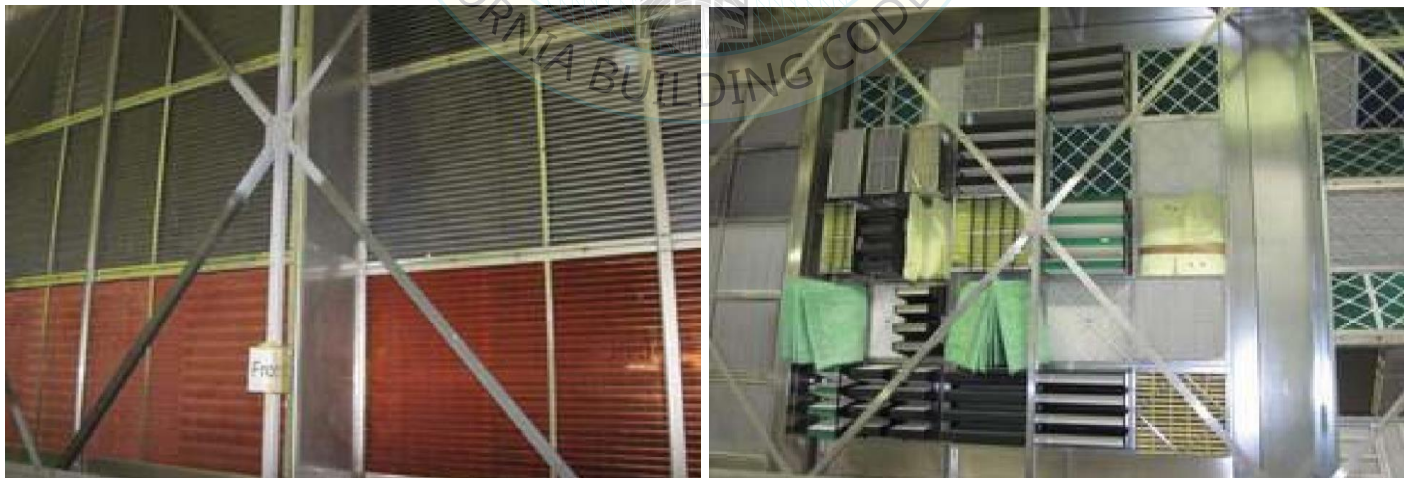
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,100	120.0	240.0	156.0	12.7	13.4	>33.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{Ds} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

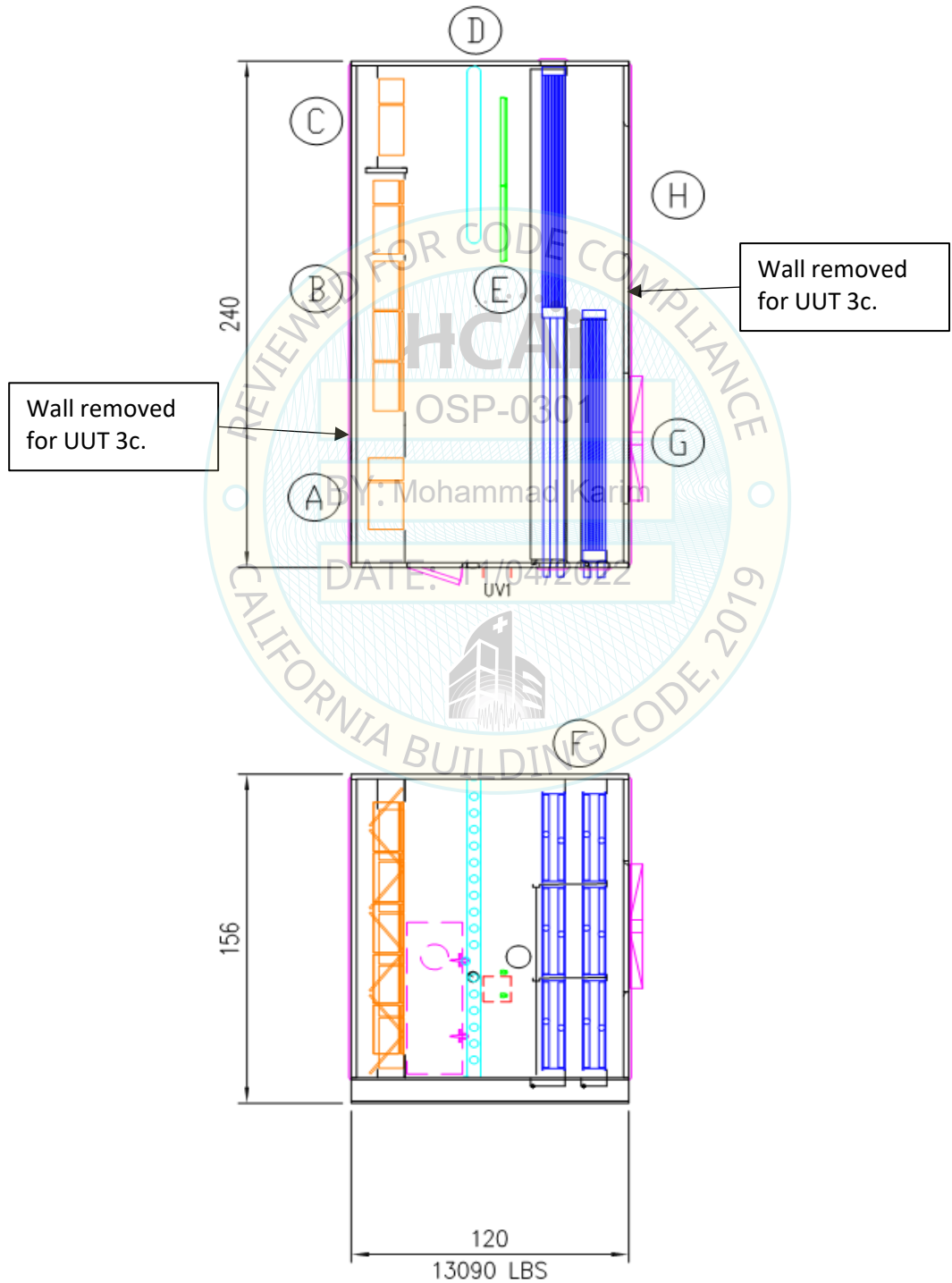
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 3c

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 4
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
 Tested with four (4) walls in place.
 2" 16 ga carbon steel(CS) casing. CS C6x8.2 base rail.

Options/Subcomponent Summary:
 (3) EPQN model 122 fans (1" spring isolators). (2) EPFN model 402 fans (2" spring isolators). Nema-3R enclosure.
 Please refer to Product Matrix for component details.

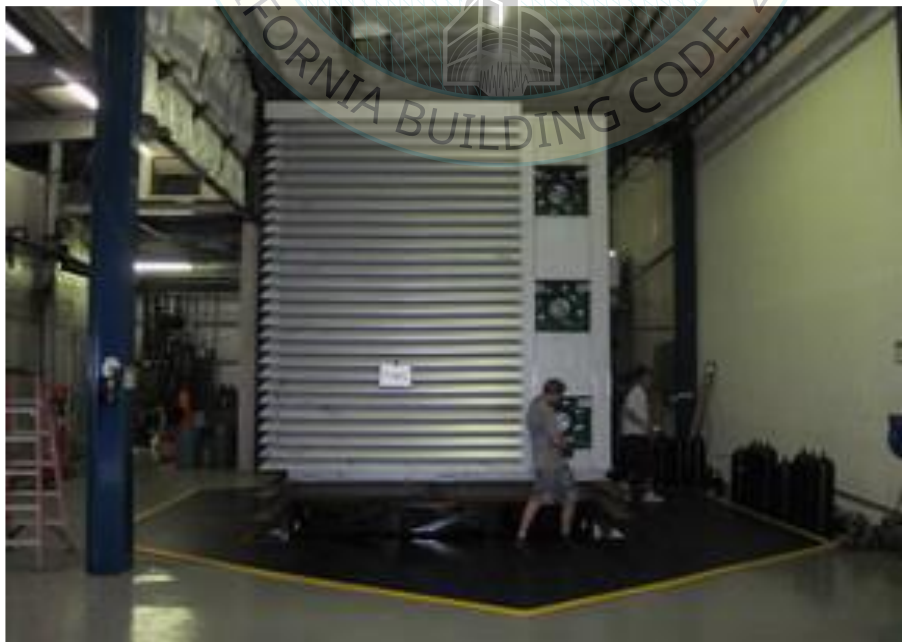
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13,810	118.0	120.0	144.0	3.4	5.9	10.9

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

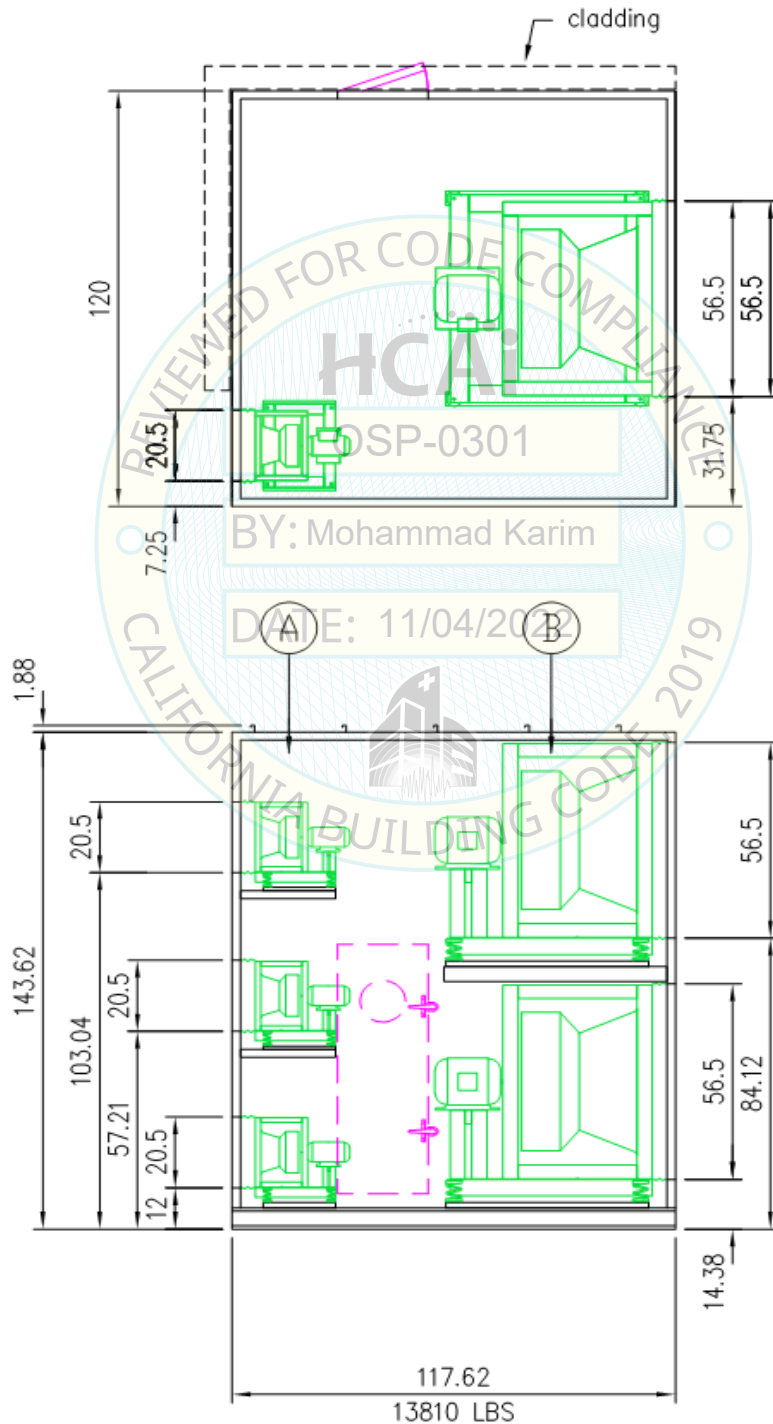
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 4

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 5
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
Fan Skid

Options/Subcomponent Summary:
EPF model 122 fan. BC SWSI model 122 fan. BC SWSI model 600 fan. EPQN model 122 (vertical) fan. (all 2" spring isolators)
Please refer to Product Matrix for component details.

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6,540	141.0	110.0	140.0	2.5	1.9	5.7

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67	
		2.5	0.0						

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4

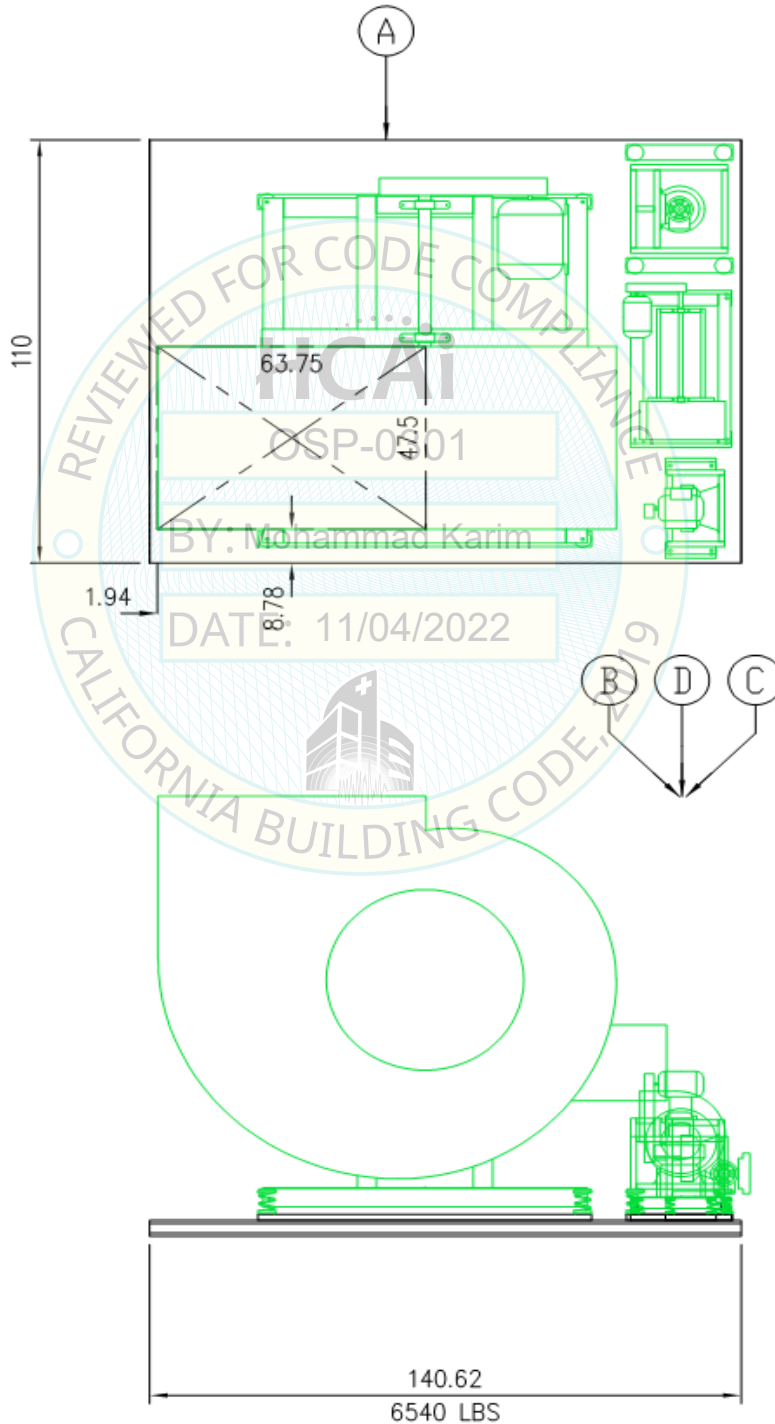


Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype

Serial Number: N/A

UUT 5

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 6
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
Fan Skid

Options/Subcomponent Summary:
EPQ model 660 fan (4" spring isolators).
Please refer to Product Matrix for component details

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
5,910	84.0	146.0	135.0	1.8	2.6	3.9

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

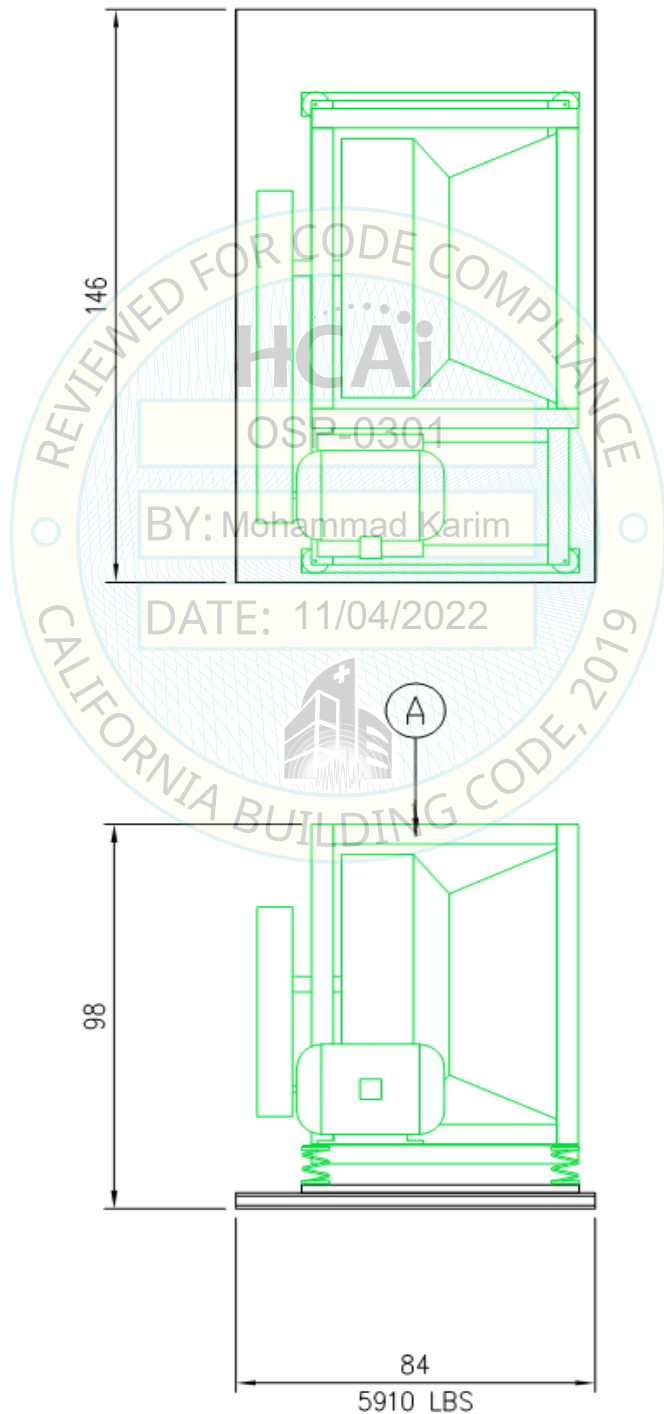
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 6

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 7
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
Fan Skid

Options/Subcomponent Summary:
EPQN Model 542 fan (2" spring isolators). BAF DWDI model 122 fan (1" spring isolators).
Please refer to Product Matrix for component details.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
5,050	132.0	118.0	80.0	2.8	2.4	9.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

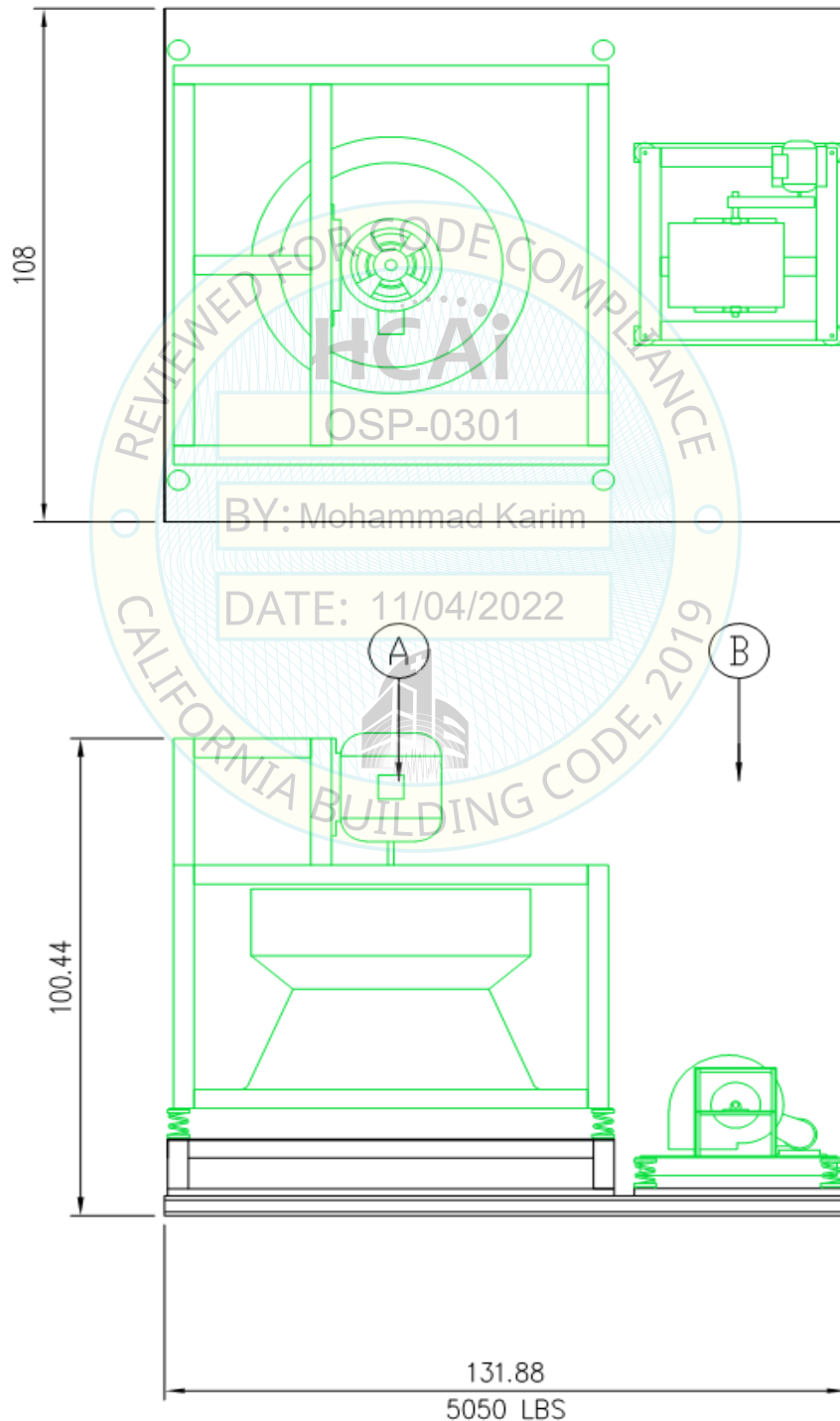
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype
Serial Number: N/A

UUT 7

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 8
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
Fan Skid

Options/Subcomponent Summary:
BC DWDI model 660 fan (2" spring isolators).
Please refer to Product Matrix for component details.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11,000	138.0	130.0	153.0	2.5	4.2	4.2

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

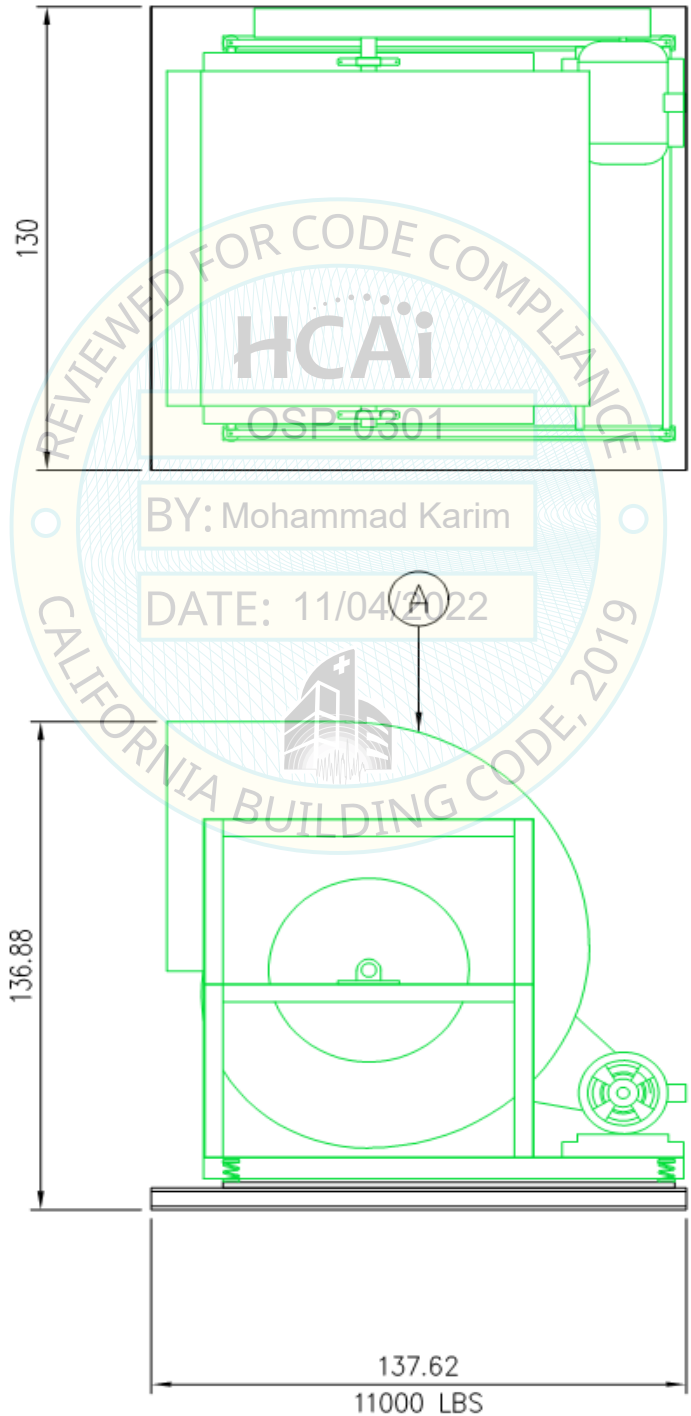
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 8

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 9
Model Line: Custom Air Handling Units	
Model Number: Test Prototype Serial Number: N/A	

Product Construction Summary:
 Tested with two (2) walls in place.
 2" 16 ga carbon steel(CS) casing. CS C6x8.2 base rail.

Options/Subcomponent Summary:
 Evaporative Humidifier.
 Please refer to Product Matrix for component details.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,500	120.0	120.0	129.0	5.9	>33.3	6.1

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.5	1.0	1.5	4.00	3.00	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit mounted to test fixture using ten (10) grade 5 3/4" diameter hex head bolts.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

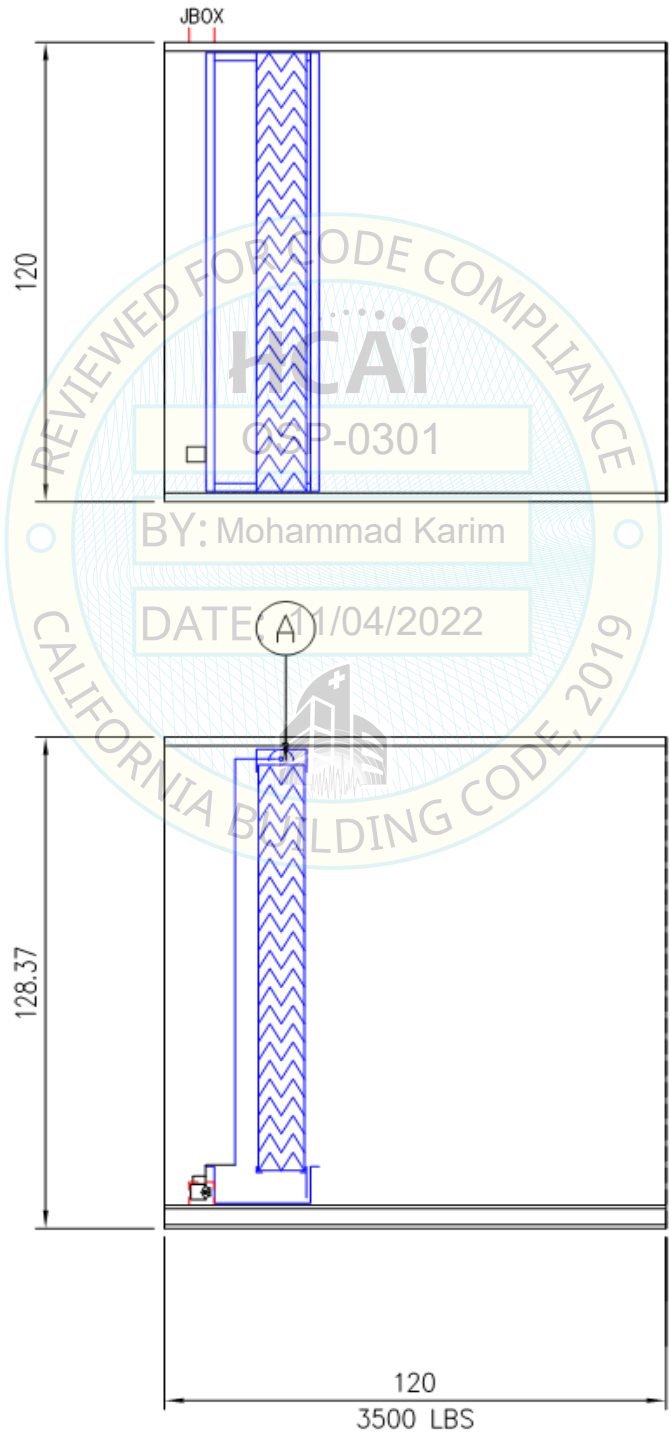
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 9

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET



1800711-CR-001-R4

Manufacturer:	Haakon Industries, Ltd.	UUT 10
Model Line:	Custom Air Handling Units	
Model Number:	Test Prototype	
Serial Number:		19-5574-473-C

Product Construction Summary:
 Tested with three (3) walls in place.
 2" 16 ga. carbon steel (CS) casing. 22 ga CS standard liners. 3-lb insulation. 12 ga CS checkerplate floor. 22 ga CS floor liners. CS C6x8.2 base rails.

Options/Subcomponent Summary:
 Active Air Solutions AAS-AirRailx36 ionization bar (36" length). Active Air Solutions AAS-AirRailx143 ionization bar (143" length). Active Air Solutions AAS-7504 power transformer. Armstrong Humidipack humidifier (144"W x 134"H x 8.5"D). Armstrong Humidipack humidifier (24"W x 24"H x 8.5"D). 686q AcoustiFLO fan array (4W x 4H standard configuration) with one (1) Baldor fan motor and three (3) WEG fan motors. Two (2) ABB ACH580 VFD's. Tamco model 1000 damper (12"W x 12"H, parallel horizontal blades) with Ebtron air measurement station (13.5"W x 12"H) and Belimo FSNF120-S US actuator. Tamco model 1000 damper (60"W x 60"H, parallel horizontal blades) with Ebtron air measurement station and four (4) FSNF120-S US Belimo actuators. Haakon storm louver (61"W x "60"H, vertical blades). Haakon standard louver (60"W x 58"H, horizontal blades). Greenheck VCD23-304SS damper (60"W x 60"H, parallel horizontal blades).

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
15,554	113.5	240.0	152.0	4.1	6.8	8.3

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.07	0.83	
		3.1	0.0						

Test Mounting Details:



Unit was mounted to a wide flange beam test frame using thirty (30) 5/16" fillet welds (spaced at 8" O.C. max. along both sides). Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4

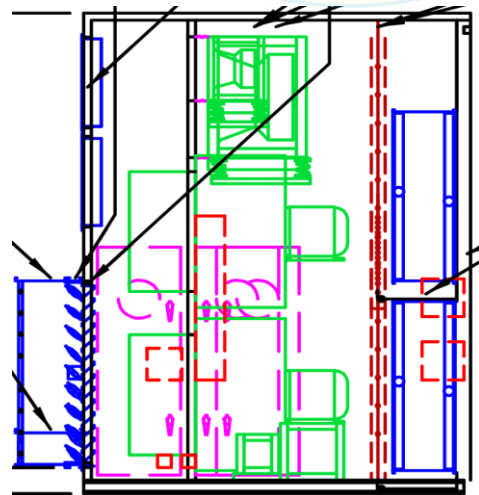
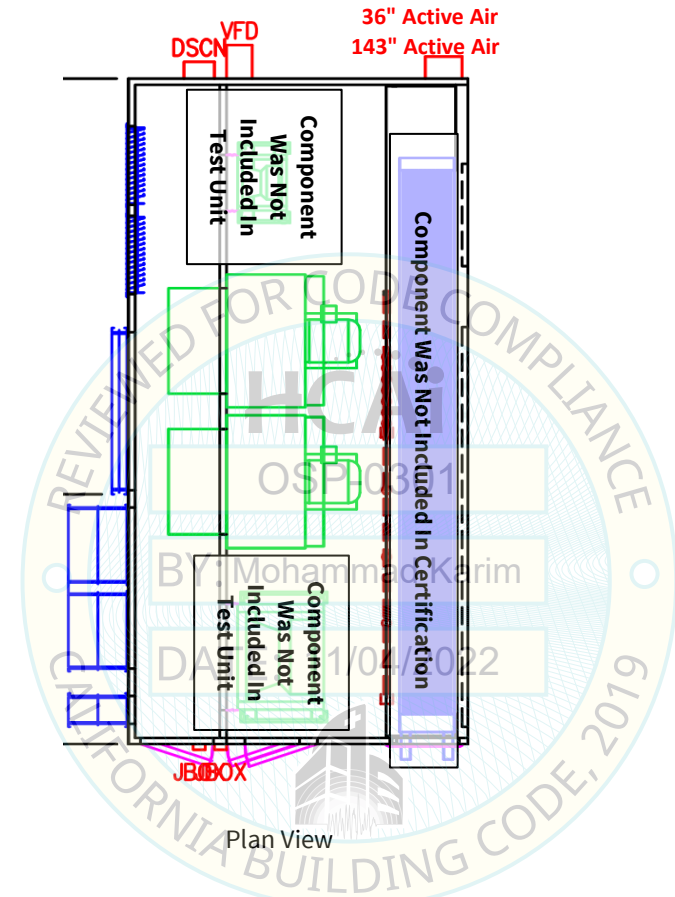


Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype

UUT 10

Serial Number: 19-5574-473-C

Unit Drawings:



Right Elevation View

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.	UUT 11
Model Line: Custom Air Handling Units	
Model Number: Test Prototype	
Serial Number: 19-5574-474-C	

Product Construction Summary:
 Tested with three (3) walls in place.
 2" 16 ga. carbon steel(CS) casing. 22 ga CS standard liners. 3-lb insulation. 12 ga CS checkerplate floor. 22 ga CS floor liners. CS C8x11.5 base rails.

Options/Subcomponent Summary:
 686q AcoustiFLO fan array (staggered configuration, 3 on bottom / 2 on top) with one (1) Baldor fan motor, two (2) WEG fan motors and two (2) NIDEC fan motors. Hoffman electrical panel (36"W x 60"H x 12"D). MMP panel (12"W x 16"H x 8.5"D). ABB ACH580 VFD.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
8,124	104.3	165.5	110.3	4.2	17.8	13.4

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	1.80	0.72
		2.7	0.0					

Test Mounting Details:



Unit was mounted to a wide flange beam test frame using ten (10) 3/4"-10 SAE grade 8 bolts with leveling washers, spring washers and nuts (spaced at 24" O.C. max. along both sides). Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4

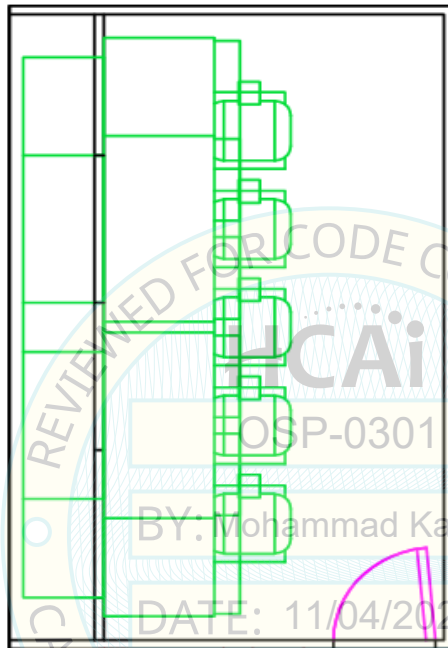


Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype

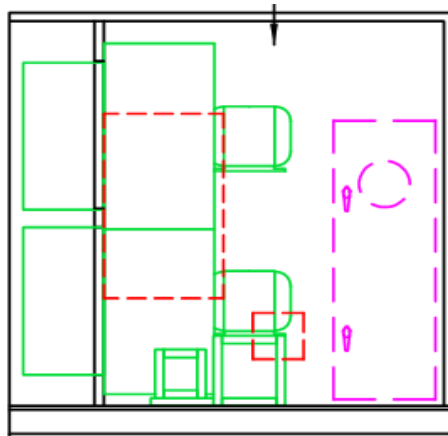
UUT 11

Serial Number: 19-5574-474-C

Unit Drawings:



Plan View



Right Elevation View

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

UUT 13

Product Construction Summary:

Tested with four (4) walls in place.
 4" 16 ga carbon steel(CS) casing. 22 ga CS standard liners. 3-lb insulation. 1/8" CS checkerplate floor. No floor liners. CS C8x11.5 base rails. Standard CS split frame 6" upstream from coil rack.

Options/Subcomponent Summary:

Stainless steel 3-high standard coil rack (16-12 ga, Haakon). (1) 18"H x 180"W 6 row coil (bottom, 5/8" O.D. CU tubes, 0.02" tube wall, 8 fpi, 0.0075" AL fins, Haakon). (1) 54"H x 180"W 2 row coil (middle, 5/8" O.D. CU tubes, 0.035" tube wall, 12 fpi, 0.0095" CU fins, Haakon). (1) 54"H x 180"W 5 row coil (top, 5/8" O.D. CU tubes, 0.035" tube wall, 12 fpi, 0.0095" AL fins, Haakon). CC-18 UV light (American UV). CC-60 UV light (American UV). CK-18 UV light (American UV). CK-60 UV light (American UV). VMOD2-18 UV light (UVDI). VMOD2-36 UV light (UVDI). VMAX2-21 UV light (UVDI). VMAX2-61 UV light (UVDI). 16ga 304 stainless steel UV light rack (Haakon). (2) UV light power supply panels (UVDI). CK series UV light power supply pannel (American UV). CSK010104 IP20 electrical panel (Hammond Manufacturing). 12"H x 12"W x 6"D UV light control box (Haakon).

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
10,615	120.0	195.75	148.25	9.2	15.6	8.5

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	1.67	0.67
		2.5	0.0					

Test Mounting Details:



Unit was mounted to the shake table using twelve (12) 3/4"-10 SAE grade 8 bolts with leveling washers and flat washers. 3 on the end of each short side spaced at 12" O.C. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4

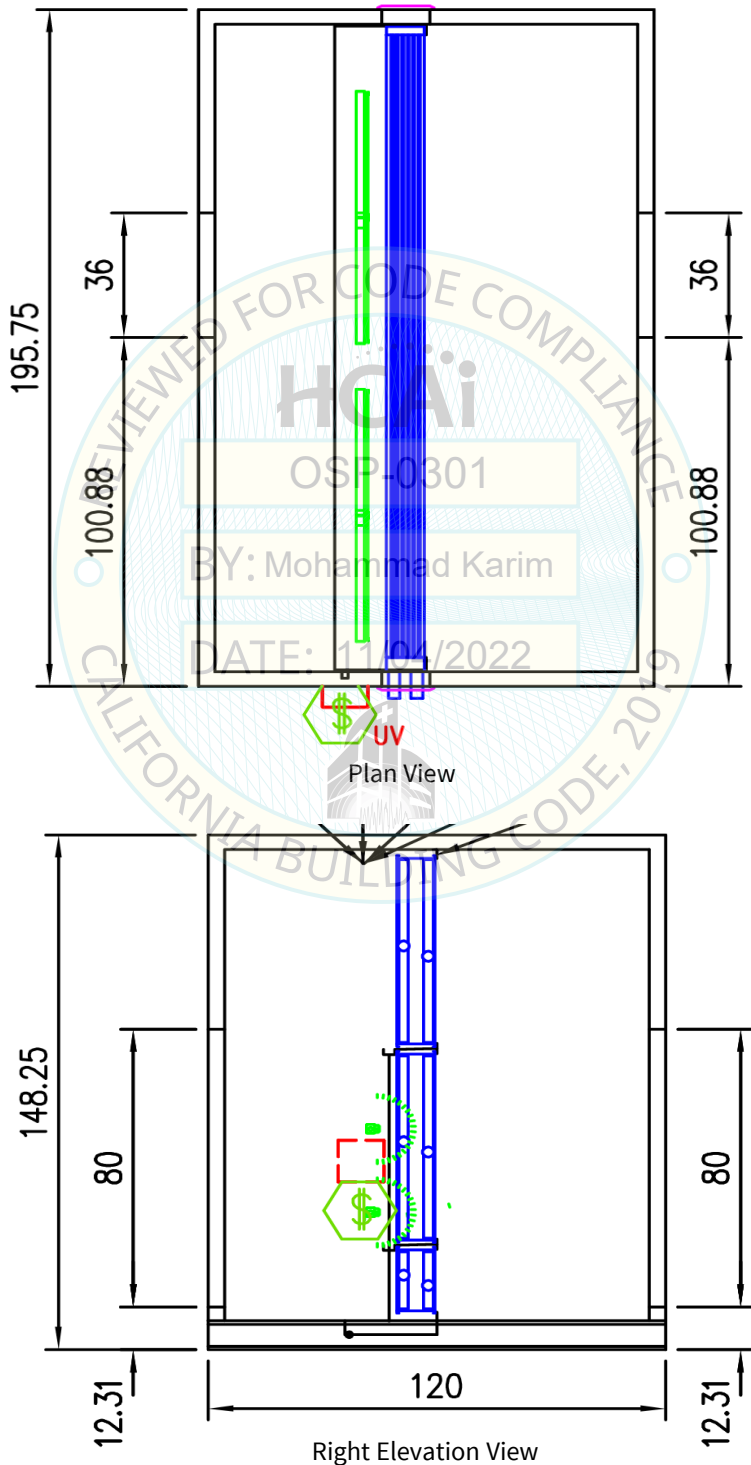


Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype

Serial Number: N/A

UUT 13

Unit Drawings:



UNIT UNDER TEST (UUT) SUMMARY SHEET

1800711-CR-001-R4



Manufacturer:	Haakon Industries, Ltd.	UUT 14
Model Line:	Custom Air Handling Units	
Model Number:	Test Prototype	
Serial Number:		N/A

Product Construction Summary:
 Tested with four (4) walls in place.
 4" 16 ga carbon steel(CS) casing. 22 ga CS standard liners. 3-lb insulation. 1/8" CS checkerplate floor. No floor liners. CS C8x11.5 base rails. Standard CS split frame 6" upstream from coil rack.

Options/Subcomponent Summary:
 Stainless steel 3-high heavy coil rack (12 ga, Haakon). (1) 42"H x 160"W 10 row coil (middle, 5/8" O.D. CU tubes, 0.035" tube wall, 12 fpi, 0.0095" AL fins, Haakon). (1) 42"H x 160"W 10 row coil (top, 5/8" O.D. CU tubes, 0.035" tube wall, 12 fpi, 0.0095" CU fins, Haakon). 48"H x 36"W x 12"D NEMA 4 electrical box (Hoffman).
 (1) Coil was tested empty due to shipping damage: 42"Hx 160"W 10 row coil (bottom, 5/8" O.D. CU tubes. 0.02" tube wall, 8 fpi, 0.0075" AL fins, Haakon).

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
15,818	120.0	185.0	148.25	9.5	9.5	8.5

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	1.67	0.67	
		2.5	0.0						

Test Mounting Details:



Unit was mounted to the shake table using twelve (12) 3/4"-10 SAE grade 8 bolts with leveling washers and flat washers. 3 on the end of each short side spaced at 12" O.C.
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions, with the exception of the lower coil. The lower coil, identical to the middle coil, was damaged in shipping. The identical middle coil, more seismically vulnerable due to position, passed the seismic test. Unit can not exceed the tested weight.

UNIT UNDER TEST (UUT) SUMMARY SHEET

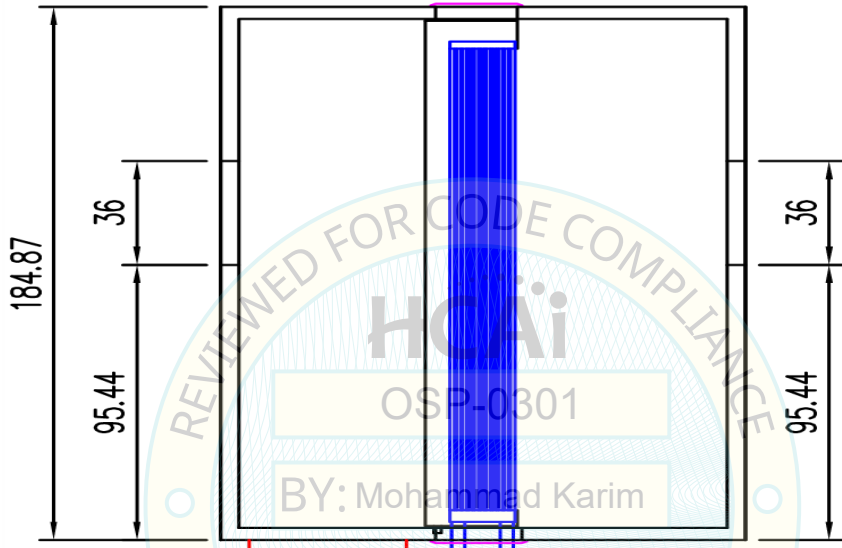
1800711-CR-001-R4



Manufacturer: Haakon Industries, Ltd.
Model Line: Custom Air Handling Units
Model Number: Test Prototype **Serial Number:** N/A

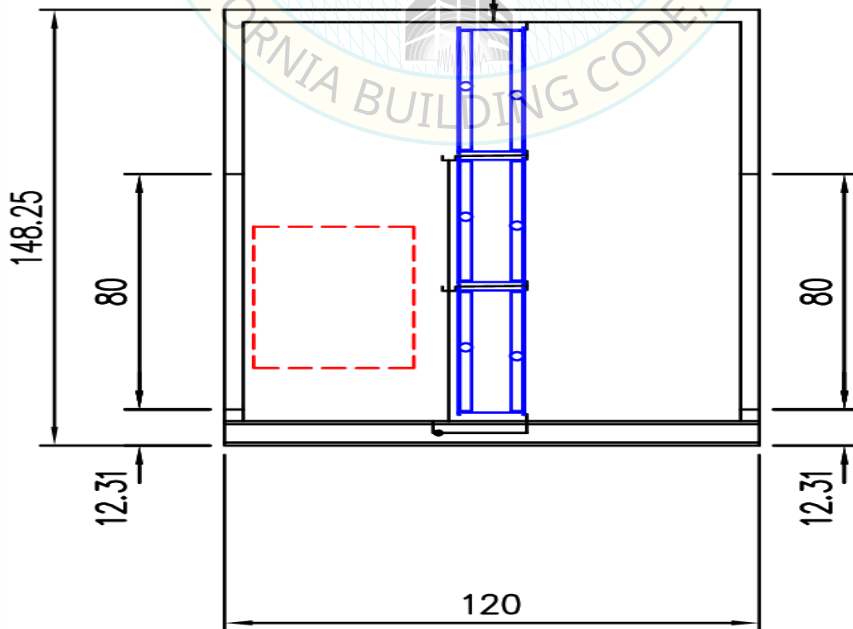
UUT 14

Unit Drawings:



NEAM4 JBOX 48x36x12 11/04/2022

Plan View



Right Elevation View