



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0347

OSHPD Special Seismic Certification Preapproval (OSP)

Type: [] New [X] Renewal

Manufacturer Information

Manufacturer: Trane Commercial Systems

Manufacturer's Technical Representative: Justin Winters

Mailing Address: 2701 Wilma Rudolph Blvd., Clarksville, TN 37040

Telephone: (931) 221-3722 Email: Justin.Winters@Trane.com

Product Information

Product Name: Air Conditioning Units

Product Type: Air Conditioning Units - Split

Product Model Number: RAUJ-C20, RAUJ-C25, RAUJ-C30, RAUJ-C40, RAUJ-C50, RAUJ-C60, RAUJ-C80, RAUJ-D10, RAUJ-D12

General Description: Air-cooled condensing unit of HVAC split system.

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: None

Applicant Information

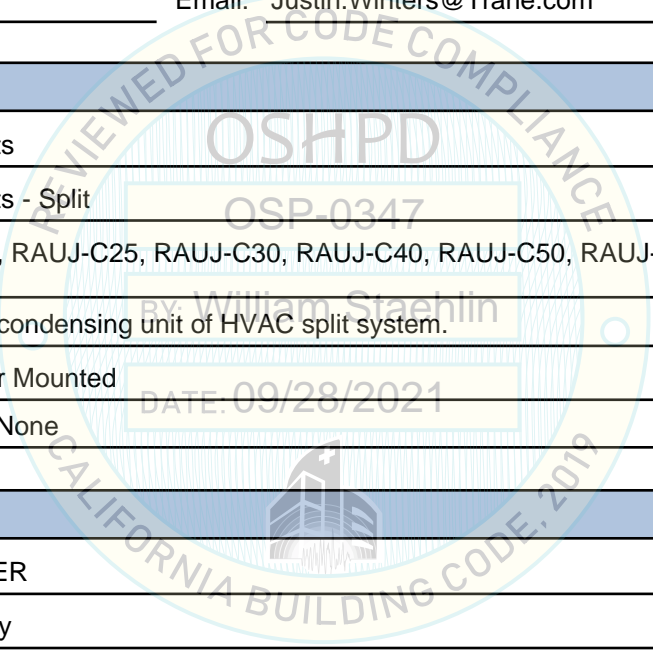
Applicant Company Name: BUEHLER

Contact Person: Gillian Montgomery

Mailing Address: 600 Q Streets, Suite 200, Sacramento, CA 95811

Telephone: (916) 430-0303 Email: gmontgomery@buehlerengineering.com

Title:





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

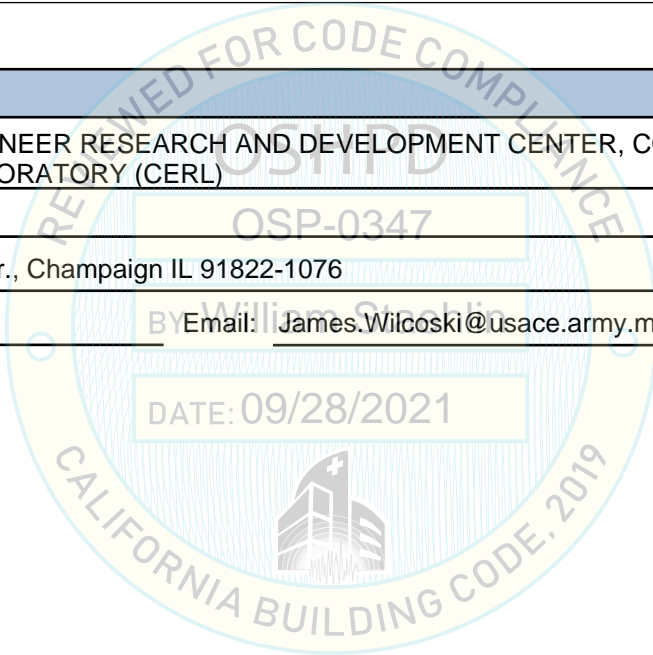
Company Name: BUEHLER
Name: Scott Hooker California License Number: S3937
Mailing Address: 600 Q St., Suite 200, Sacramento, CA 95811
Telephone: (916) 443-0303 Email: shooker@bbse.com

Certification Method

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

Testing Laboratory

Company Name: U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER, CONSTRUCTION ENGINEERING
RESEARCH LABORATORY (CERL)
Contact Person: James Wilcoski
Mailing Address: 2902 Newmark Dr., Champaign IL 91822-1076
Telephone: (217) 373-6763 Email: James.Wilcoski@usace.army.mil





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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.65

SDS (Design spectral response acceleration at short period, g) = 2.20

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1

Natural frequencies (Hz) = see attached UUT sheets

Overall dimensions and weight = see attached Table 1

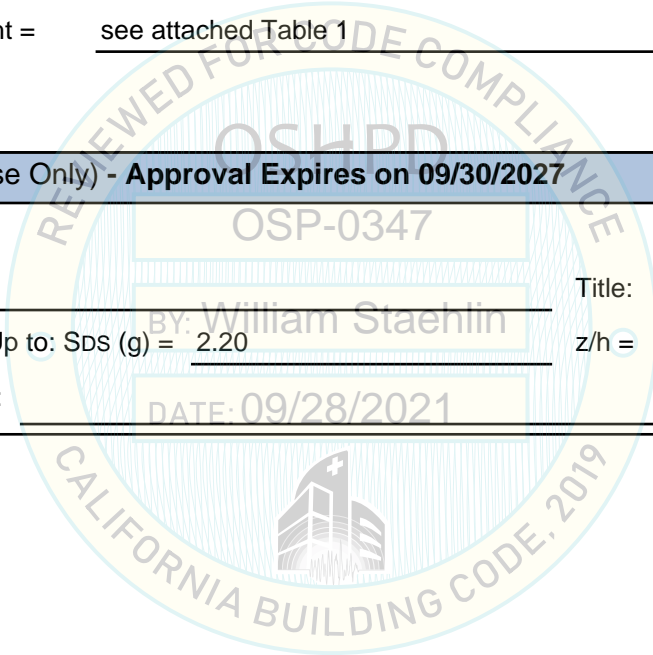
OSHPD Approval (For Office Use Only) - Approval Expires on 09/30/2027

Date: 9/28/2021

Name: William Staehlin Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: SDS (g) = 2.20 z/h = 1

Condition of Approval (if applicable): DATE: 09/28/2021





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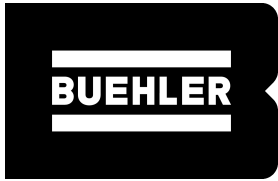
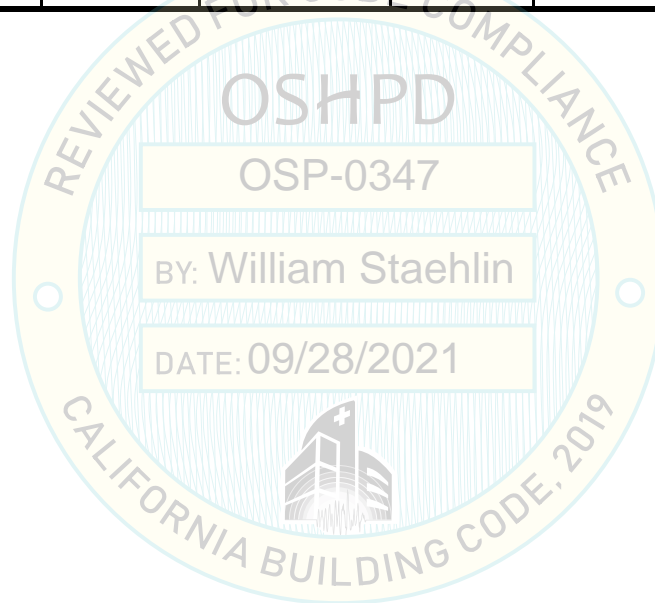


Table 1. Certified Product List

Model Number	Nominal Capacity	Tested/ Interpolated	Length (in)	Width (in)	Height (in)	Operating Weight (lbs)
RAUJC2004EC13ABDF00000	20.0 tons	UUT-1	88.25	60.12	68	1,548
RAUJ-C20	20.0 tons	Interpolated	88.25	60.12	68	1,573
RAUJ-C25	25.0 tons	Interpolated	88.25	60.12	68	1,623
RAUJ-C30	30.0 tons	Interpolated	88.25	60.12	68	1,623
RAUJ-C40	40.0 tons	Interpolated	88.25	60.12	68	2,532
RAUJ-C50	50.0 tons	Interpolated	113.82	88.25	73	2,868
RAUJ-C60	60.0 tons	Interpolated	113.82	88.25	73	2,853
RAUJ-C80	80.0 tons	Interpolated	176.25	88.25	73	4,940
RAUJ-D10	100.0 tons	Interpolated	227.25	88.25	73	5,622
RAUJ-D12	120.0 tons	Interpolated	227.25	88.25	73	5,995
RAUJD124EB132BDFJ00	120.0 tons	UUT-2	227.25	88.25	73	5,995



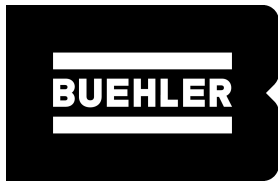


Table 2. Certified Sub-Component List

Pursuant to section 4.2 of AC 156, below is a list and rationale of major subassemblies/ components.

Compressor*						
Part Number	Weight (lb)	Nominal capacity	Voltage	Manufacturer	Material	Tested / Interpolated
570010515100	143	10.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570010515200	143	10.0 tons	380V	IR	Carbon steel housing	Interpolated
570010515200	143	10.0 tons	460V	IR	Carbon steel housing	UUT-1
570010515400	143	10.0 tons	575V	IR	Carbon steel housing	Interpolated
570010510100	145	10.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570010510200	145	10.0 tons	380V	IR	Carbon steel housing	Interpolated
570010510200	145	10.0 tons	460V	IR	Carbon steel housing	Interpolated
570010510400	145	10.0 tons	575V	IR	Carbon steel housing	Interpolated
570010520100	151	11.5 tons	208/230V	IR	Carbon steel housing	Interpolated
570010520200	151	11.5 tons	380V	IR	Carbon steel housing	Interpolated
570010520200	151	11.5 tons	460V	IR	Carbon steel housing	Interpolated
570010520400	151	11.5 tons	575V	IR	Carbon steel housing	Interpolated
570010530100	155	13.5 tons	208/230V	IR	Carbon steel housing	Interpolated
570010530200	155	13.5 tons	380V	IR	Carbon steel housing	Interpolated
570010530200	155	13.5 tons	460V	IR	Carbon steel housing	Interpolated
570010530400	155	13.5 tons	575V	IR	Carbon steel housing	Interpolated
570011405100	162	15.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570011405200	162	15.0 tons	380V	IR	Carbon steel housing	Interpolated
570011405200	162	15.0 tons	460V	IR	Carbon steel housing	Interpolated
570011405400	162	15.0 tons	575V	IR	Carbon steel housing	Interpolated
570011400100	160	15.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570011400200	160	15.0 tons	380V	IR	Carbon steel housing	Interpolated
570011400200	160	15.0 tons	460V	IR	Carbon steel housing	Interpolated
570011400400	160	15.0 tons	575V	IR	Carbon steel housing	Interpolated
570011054100	238	15.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570011054200	238	15.0 tons	380V	IR	Carbon steel housing	Interpolated
570011054200	238	15.0 tons	460V	IR	Carbon steel housing	Interpolated
570011054400	238	15.0 tons	575V	IR	Carbon steel housing	Interpolated
570011052100	241	15.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570011052200	241	15.0 tons	380V	IR	Carbon steel housing	Interpolated
570011052200	241	15.0 tons	460V	IR	Carbon steel housing	Interpolated
570011052400	241	15.0 tons	575V	IR	Carbon steel housing	Interpolated
570011062100	242	20.0 tons	208/230V	IR	Carbon steel housing	Interpolated
570011062200	242	20.0 tons	380V	IR	Carbon steel housing	Interpolated
570011062200	242	20.0 tons	460V	IR	Carbon steel housing	UUT-2
570011062400	242	20.0 tons	575V	IR	Carbon steel housing	Interpolated

* select compressors are dual voltage (380V and 460V) and thus share the same part number

**Table 2. Certified Sub-Component List**

Condenser Coils - Microchannel					
Part Number	Weight (lb)	Nominal Capacity	Manufacturer	Material	Tested / Interpolated
438656020100	18	20 to 30 ton	Delphi	Aluminum	UUT-1
438656010100	35	20 to 30 ton	Delphi	Aluminum	UUT-1
438653020100	26	20 to 55 ton	Delphi	Aluminum	Interpolated
438653010100	44	20 to 55 ton	Delphi	Aluminum	Interpolated
438653040100	25	60 to 75 ton	Delphi	Aluminum	Interpolated
438653030100	57	60 to 75 ton	Delphi	Aluminum	Interpolated
438654840100	31	120 ton	Delphi	Aluminum	UUT-2
438654840100	70	120 ton	Delphi	Aluminum	UUT-2

Condenser Fan				
Part Number	Weight (lb)	Manufacturer	Material	Tested / Interpolated
X38010335010	3	Hessaire Products Inc	Carbon steel hub, Aluminum blades	UUT-1 & 2

Condenser Fan Motor				
Part Number	Weight (lb)	Manufacturer	Material	Tested / Interpolated
X7037026-	28	RBC Manufacturing Corp.	Carbon steel	UUT-1 & 2

Low Ambient Damper Assembly					
Part Number	Weight (lb)	Unit Nominal Capacity	Mfr	Material	Tested / Interpolated
438656470100	65	20 - 30 ton	IR	Carbon Steel	Interpolated
438656470200	65	20 - 30 ton	IR	Carbon Steel	UUT-1
438656470300	65	20 - 30 ton	IR	Carbon Steel	Interpolated
438656480100	62	40 ton	IR	Carbon Steel	Interpolated
438656480200	62	40 ton	IR	Carbon Steel	Interpolated
438656480300	62	40 ton	IR	Carbon Steel	Interpolated
438656450100	62	50 - 60 ton	IR	Carbon Steel	Interpolated
438656450200	62	50 - 60 ton	IR	Carbon Steel	Interpolated
438656450300	62	50 - 60 ton	IR	Carbon Steel	Interpolated
438656490100	62	80 - 120 ton	IR	Carbon Steel	Interpolated
438656490200	62	80 - 120 ton	IR	Carbon Steel	UUT-2

Low Ambient Damper - Actuator						
Part Number	Weight (lb)	Nominal Capacity	Voltage	Manufacturer	Material	Tested / Interpolated
X13611434010	1	N/A	24V	Belimo	Carbon Steel	UUT-1 & 2



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Table 2. Certified Sub-Component List

Control Box Assembly					
Part Number	Weight (lb)	Unit Nominal Capacity	Mfr	Material	Tested / Interpolated
570746560200	500	20 ton	IR	Galv steel housing	Interpolated
570746560300	500	20 ton	IR	Galv steel housing	UUT-1
570746560400	500	20 ton	IR	Galv steel housing	Interpolated
570746562000	500	20 ton	IR	Galv steel housing	Interpolated
570746562300	500	20 ton	IR	Galv steel housing	Interpolated
570746560500	500	25 ton	IR	Galv steel housing	Interpolated
570746560600	500	25 ton	IR	Galv steel housing	Interpolated
570746560700	500	25 ton	IR	Galv steel housing	Interpolated
570746562100	500	25 ton	IR	Galv steel housing	Interpolated
570746562400	500	25 ton	IR	Galv steel housing	Interpolated
570746560800	500	30 ton	IR	Galv steel housing	Interpolated
570746560900	500	30 ton	IR	Galv steel housing	Interpolated
570746561000	500	30 ton	IR	Galv steel housing	Interpolated
570746562200	500	30 ton	IR	Galv steel housing	Interpolated
570746562500	500	30 ton	IR	Galv steel housing	Interpolated
570746570200	500	40 ton	IR	Galv steel housing	Interpolated
570746570300	500	40 ton	IR	Galv steel housing	Interpolated
570746570400	500	40 ton	IR	Galv steel housing	Interpolated
570746572200	500	40 ton	IR	Galv steel housing	Interpolated
570746572500	500	40 ton	IR	Galv steel housing	Interpolated
570746570500	500	50 ton	IR	Galv steel housing	Interpolated
570746570600	500	50 ton	IR	Galv steel housing	Interpolated
570746570700	500	50 ton	IR	Galv steel housing	Interpolated
570746572300	500	50 ton	IR	Galv steel housing	Interpolated
570746572600	500	50 ton	IR	Galv steel housing	Interpolated
570746570800	500	60 ton	IR	Galv steel housing	Interpolated
570746570900	500	60 ton	IR	Galv steel housing	Interpolated
570746571000	500	60 ton	IR	Galv steel housing	Interpolated
570746572400	500	60 ton	IR	Galv steel housing	Interpolated
570746572700	500	60 ton	IR	Galv steel housing	Interpolated
570746580200	500	80 ton	IR	Galv steel housing	Interpolated
570746580300	500	80 ton	IR	Galv steel housing	Interpolated
570746580400	500	80 ton	IR	Galv steel housing	Interpolated
570746581100	500	80 ton	IR	Galv steel housing	Interpolated
570746580500	500	100 ton	IR	Galv steel housing	Interpolated
570746580600	500	100 ton	IR	Galv steel housing	Interpolated
570746580700	500	100 ton	IR	Galv steel housing	Interpolated
570746581200	500	100 ton	IR	Galv steel housing	Interpolated
570746580800	500	120 ton	IR	Galv steel housing	Interpolated
570746580900	500	120 ton	IR	Galv steel housing	UUT-2
570746581000	500	120 ton	IR	Galv steel housing	Interpolated
570746581300	500	120 ton	IR	Galv steel housing	Interpolated



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RAUJ Model Number Nomenclature

20 to 60-Ton Units¹

Digit 1 – Unit Type

R = Condensing Unit

Digit 2 – Condenser

A = Air Cooled

Digit 3 – Airflow

U = Upflow

Digit 4 – Development Sequence

J = Third

Digits 5,6,7 – Nominal Capacity

C20 = 20 Tons

C25 = 25 Tons

C30 = 30 Tons

C40 = 40 Tons

C50 = 50 Tons

C60 = 60 Tons

Digit 8 – Voltage and Start Characteristics

E = 200/60/3 XL

D = 415/50/3 XL

F = 230/60/3 XL

4 = 460/60/3 XL

5 = 575/60/3 XL

9 = 380/50/3 XL

Digit 9 – System Control

B = No System Control

C = Constant Volume Control

E = Supply Air VAV Control

P = EVP Control

Digit 10 – Design Sequence

(Factory Assigned)

A = First

B = Second

Etc.

DIGIT 11 – Ambient Control

0 = Standard

1 = 0°F (Low Ambient Dampers)

DIGIT 12 – Agency Approval

0 = None

3 = cULus (not available for 50 Hz)

DIGIT 13

A = Non Fused Unit Disconnect Switch

DIGIT 14

B = Hot Gas Bypass Valve

DIGIT 15

D = Suction Service Valves

DIGIT 16

F = Pressure Gauges and Piping

Digit 17

G = Return Air Sensor

Digit 18

J = Corrosion Protected Condenser Coil

Digit 19

C = Remote Chiller Evaporator & Install Kit

T = Flow Switch (EVP Control Only)

Digit 20

1 = Spring Isolators

2 = Neoprene Isolators

Digit 13 – Number of Circuits

2 = Dual (All 80-120 Ton)

Digit 14

B = Hot Gas Bypass Valve

Digit 15

D = Suction Service Valves

Digit 16

F = Pressure Gauges and Piping

Digit 17

J = Corrosion Protected Condenser Coil

Digit 18

1 = Spring Isolators

Digit 19

C = Remote Chiller Evap & Install Kit

3 = Flow Switch (EVP Control only)

80 to 120-Ton Units²

Digit 1 – Unit Type

R = Remote Condensing Unit

Digit 2 – Condenser

A = Air-Cooled

Digit 3 – Airflow

U = Upflow

Digit 4 – Development Sequence

J = Third

Digits 5,6,7 – Nominal Capacity

C80 = 80 Tons

C100 = 100 Tons

C120 = 120 Tons

Digits 8 – Voltage and Start Characteristics

E = 200/60/3 XL

F = 230/60/3 XL

4 = 460/60/3 XL

5 = 575/60/3 XL

* = 380/50/3 XL²

* = 415/50/3 XL²

Digit 9 – System Control

B = No System Control

E = Supply Air VAV Control

P = EVP Control

Digit 10 – Design Sequence

(Factory Assigned)

A = First

B = Second

Etc.

Digit 11 – Ambient Control

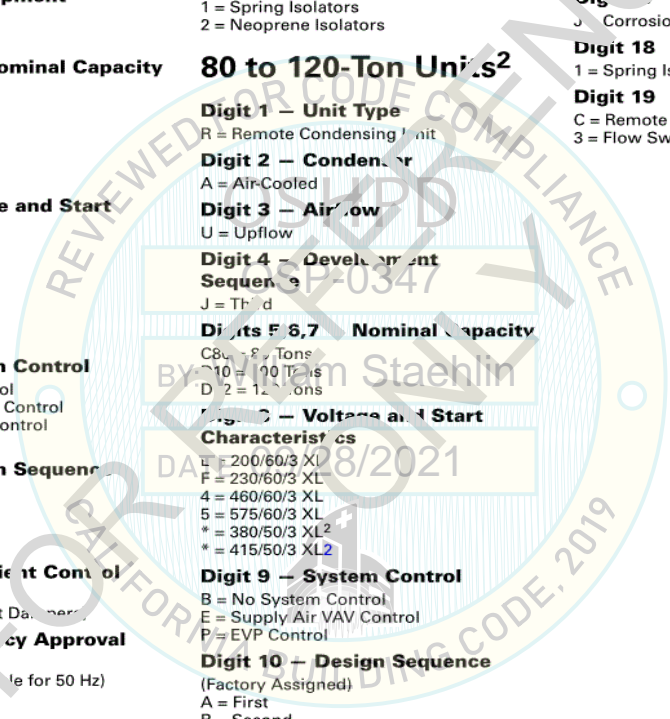
0 = Standard

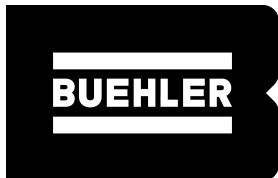
1 = 0°F (Low Ambient Dampers)

Digit 12 – Agency Approval

0 = None

3 = cULus (not available for 50 Hz)





UUT-1 Test Summary

Testing Lab:	US ARMY ERDC-CERL
Testing Report:	2012-0278.00
Testing Unit Num:	RAUJC2004EC13ABDF00000

Model Number	Nominal Capacity	Measured Operating Weight (lbs)	Mounting	Excitation Direction	Frequency (Hz)	Length (in)	Width (in)	Height (in)	
RAUJ-C20	20 tons	1,548	Base - Rigid Mount	X	Front-Back	7.8	88.25	60.12	68
				Y	Side-Side	15.0			
				Z	Vertical	>33.3			

Notes: Frequencies are for units prior to ICC ES AC-156 testing.
Model Number is based on nomenclature from the Trane Catalog. Refer to Nomenclature.

Attachment Method	Base mounted with (4) 1/2" dia. bolts	Seismic Parameters							
		Building Code	Test Criteria	S _{Ds} (g)	z/h	Horizontal		Vertical	
CBC 2016 CBC 2019	AC 156					2.20	1.0	A _{FLX-H}	A _{RIG-H}
Seismic Modifications	none								
Test Anomaly	none								

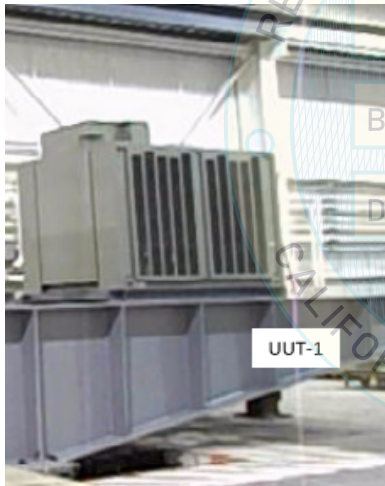


Figure UUT-1.1: Unit on the shake table



Figure UUT-1.2: Unit mounting

Notes: The UUTs were full of contents during the test.
Unit maintained structural integrity and remained functional per manufacture requirements after shake table test

UUT-1 Summary Tested Sub-Component

Sub-Component	Weight	Part Number	Manufacturer	Material
Compressor	143 lb	570010515200	IR	Carbon steel housing
Condenser Coil	18 lb	438653010100	Delphi	Aluminum
Condenser Coil	35 lb	438656010100	Delphi	Aluminum
Condenser Fan	3 lb	X38010335010	Hessaire Products Inc	Carbon steel hub, Aluminum blades
Condenser Fan Motor	28 lb	X7037026-	RBC Manufacturing Corp.	Carbon steel
Low Ambient Damper Assembly	65 lb	438656470200	IR	Carbon steel
Low Ambient Damper - Actuator	1 lb	X13611434010	Belimo	Carbon steel
Control Panel Assembly	500 lb	570746560300	IR	Galv steel housing



UUT-2 Test Summary

Testing Lab: US ARMY ERDC-CERL
 Testing Report: 2012-0278.00
 Testing Unit Num: RAUJD124EB132BDFJ00

Model Number	Nominal Capacity	Measured Operating Weight (lbs)	Mounting	Excitation Direction	Frequency (Hz)	Length (in)	Width (in)	Height (in)	
RAUJ-D12	120 tons	5,995	Base - Rigid Mount	X	Front-Back	7.5	227.25	88.25	73
				Y	Side-Side	14.0			
				Z	Vertical	>33.3			

Notes: Frequencies are for units prior to ICC ES AC-156 testing.
 Model Number is based on nomenclature from the Trane Catalog. Refer to Nomenclature.

Attachment Method	Base mounted with (8) 1/2" dia. bolts	Seismic Parameters							
		Building Code	Test Criteria	S _{Ds} (g)	z/h	Horizontal		Vertical	
A _{FLX-H}	A _{RIG-H}					A _{FLX-V}	A _{RIG-V}		
Seismic Modifications	none	CBC 2016	AC 156	2.20	1.0	3.52	2.64	1.47	0.59
Test Anomaly	none	CBC 2019							



Figure UUT-2.1: Unit on the shake table



Figure UUT-2.2: Unit mounting

Notes: The UUTs were full of contents during the test.
 Unit maintained structural integrity and remained functional per manufacture requirements after shake table test

UUT-2 Summary Tested Sub-Component

Sub-Component	Weight	Part Number	Manufacturer	Material
Compressor	242 lb	570011062200	IR	Carbon steel housing
Condenser Coil	31 lb	438654840100	Delphi	Aluminum
Condenser Coil	70 lb	438654840100	Delphi	Aluminum
Condenser Fan	3 lb	X38010335010	Hessaire Products Inc	Carbon steel hub, Aluminum blades
Condenser Fan Motor	28 lb	X7037026-	RBC Manufacturing Corp.	Carbon steel
Low Ambient Damper Assembly	62 lb	438656490200	IR	Carbon steel
Low Ambient Damper - Actuator	1 lb	X13611434010	Belimo	Carbon steel
Control Panel Assembly	500 lb	570746580900	IR	Galv steel housing