

DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION FACILITIES DEVELOPMENT DIVISION

OFFICE USE ONLY APPLICATION FOR HCAI SPECIAL SEISMIC **CERTIFICATION PREAPPROVAL (OSP)** APPLICATION #: OSP-0513 **HCAI Special Seismic Certification Preapproval (OSP)** Type: New Renewal **Manufacturer Information** Manufacturer: Broad USA, Inc. Manufacturer's Technical Representative: Kevin Fu Mailing Address: 401 Hackensack Ave. Suite 503, Hackensack, NJ 07601 Telephone: (201) 678-3010 Email: kevin@broadusa.com **Product Information** Product Name: Chillers Product Type: Chillers - Absorption Product Model Number: BS20 - BS150 BS Series steam absorption chillers, mad Karim General Description: Mounting Description: Rigid base mounted Seismic enhancements made to the test units and/or modifications required to address Tested Seismic Enhancements: 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 Suite 101, Bend, OR 92201

Email: kbraman@structint.com





Telephone: (541) 526-1947

Title: Program Manager

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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 X ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
Other (Please Specify):
EOR CODE CO
Testing Laboratory
Company Name: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)
Contact Person: Nathaniel Knight
Mailing Address: 1301 South 46th Street, Bldg 420, Richmond CA 94804
Telephone: (510) 665-2135 Email: peer_center@berkeley.edu
DATE: 09/27/2022





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Seismic Parameters	Se	eis	mi	c F	ar	am	net	ers
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Design Basis of Equipment or Components (Fp/Wp) = 1.44

SDS (Design spectral response acceleration at short period, g) = 2.00; z/h = 1; 3.20; z/h = 0

ap (Amplification factor) = 1.0

 R_p (Response modification factor) = 2.5

 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 09/27/2028

Date: 9/27/2022 OSP

Name: Mohammad Karim Title: Supervisor, Health Facilities

OSP-0513

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

Condition of Approval (if applicable):





09/27/2022

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX





	Broad USA, Inc. BS Series Team Absorp	TA	TABLE 1				
ertified Product Consti		ption chile	13				
eavy gauge carbon ste	=						
ertified Options Summ	ary:						
ounting Configuration	1:	OF	COL)FC			
ase mounted - rigid		O FUI			10		
te: Installed mounting conf	figuration must be of s <mark>imila</mark>	r configuratio	n and equiva	alent strength			
ıilding Code: CBC 2019	9	Seismic C	ertificatio	on Limits:	$S_{DS} = 2.0 g$ $S_{DS} = 3.2 g$		I _P = 1.5
Model Line	Model	Dimensions (in)		Weight	Notes	UUT	
Model Line	Model	Depth	Width	Height	(lb)	Notes	001
	BS20 ¹	B 117.0	ha79.5na	95.0rin	15,565		2
	BS30 ¹	167.0	80.0	95.0	18,000		Interp.
	BS50 ¹	197.0	80.0	95.0	23,000		Interp.
BS Steam Chiller	BS75 ¹	221.0	79.0	100.0	28,000		Interp.
	BS100 ¹	220.0	88.0	100.0	34,000		Interp.
	BS125 ¹	266.0	88.0	101.0	41,000		Interp.
	BS150 ¹	257.0	91.5	118.0	45,820		1
		AD	AND WILLIAM	NGC			
		D	JILD.	140			
		1					
otes:							

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2101287-CR-001-R0



Manufacturer: Broad USA, Inc. Table Description: Control Devices

Model Line: BS Series Team Absorption Chillers

TABLE 2

Building Code: CBC 2019 Seismic Certification Limits: $S_{DS} = 2.0 \text{ g}$ z/h = 1.0 $I_P = 1.5$

		$S_{DS} = 3.2 g z/h = 0.0$							
Component Type	Manufacturer	Model	R CODE Description	Notes	UUT				
		GD310-004G-4-UL	HTG Solution Pump Inverter		1				
Inverter	INVT	GD20-1R5G-4-UL	HTG Solution Pump Inverter		2				
inverter	IINVI	GD20 <mark>-1R5G-4-UL</mark>	LTG Solution Pump Inverter		1				
		GD20-0R7G-4-UL	LTG Solution/Refrigerant Pump Inverter		2				
Touch Screen	Siemens	6AV2 <mark>124-0</mark> MC01-0AX0	Cooling water pump inverter touch screen		1, 2				
Controller	Siemens	S1500 BY• N	Programmable logic controller		1, 2				
Fan	Sunon	A2175-HBL	Control Cabinet Fan		1, 2				
		DN10	Sampling/purge/detecting		1, 2				
		DN15	Drain valve		1, 2				
		DN20	Vacuum vent & manual valve		1, 2				
Valves	Broad	DN25	Angle valve		1, 2				
		DN50	Angle valve		1				
		DN100	Steam angle valve		2				
		DN150	Steam angle valve		1				
		NP70-40D/321H2/4-F	HTG Solution Pump		1, 2				
Dumns	Teikoku	NP65-40C/122H2/4-B	LTG Solution Pump		1, 2				
Pumps	Telkoku	NP40-20A2/121H2/4-B	Refrigerant Pump		1, 2				
		LY-015H4-0103R-A	Air Vent Pump		1, 2				
	_								

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2101287-CR-001-R0



Manufacturer: Broad USA, Inc. Table Description: Sensors

Model Line: BS Series Team Absorption Chillers

TABLE 3

Building Code: CBC 2019 Seismic Certification Limits: $S_{DS} = 2.0 \text{ g} \quad z/h = 1.0$ $S_{DS} = 2.0 \text{ g} \quad z/h = 0.0$

Building Code: CBC 2019 Seismic Certification Limits: $S_{DS} = 3.2 g$ z/h = 0.0 Component Type Manufacturer Model Description Notes Gauge Beijing Brighty 01~0.3MPA Compound Gauge									
Component Type Manufacture Gauge Beijing Brigh Temperature		Model	R CODE Description	Notes	иит				
Gauge	Beijing Brighty	01~0.3MPA	01~0.3MPA Compound Gauge		1, 2				
		ST02-145E3L100-60	Inlet/outlet temperature sensor		1, 2				
-	Therncway	ST02-145E3L100-100	Inlet/outlet temperature sensor		1				
2611201		ST02-145E3M100A-60	HTG Temperature sensor		1, 2				
Flow Switch	Broad	LKB-01BbYD	Chilled/cooling water flow switch		1, 2				
Pressure Control	Danfoss	KP135 BY· N	Pressure Control		1, 2				
		BROADKY1	HTG solution level probe		1, 2				
		BROADKY2	Refrigerant level probe		1, 2				
Probes	Broad	BROADKY4	Auto vent probe		1, 2				
		BROADKY5	LTG solution level probe		1, 2				
		BROADKY6	Absorber solution level probe		1, 2				
		PA							
		1A	Blanca						
			OILDING						

UNIT UNDER TEST (UUT) SUMMARY SHEET





Manuf	acturer: Broad USA, Inc	· ·						
Model	Line: BS Series Tear	n Absorption Chillers		-		T		
UUT	Unit Description (Mounting)	Report Number (UUT #)	Testing Lab	Year Tested	ISO 17025 Accredited?	S _{DS}	z/h	l _P
1	BS150 Absorption Chiller (Base mounted - rigid)	16059-TR-001, rev01 (UUT1)	Pacific Earthquake Engineering Research Center (PEER)	2017	Yes	2.0 3.2	1.0 0.0	1.5
2	BS20 Absorption Chiller (Base mounted - rigid)	16059-TR-001, rev01 (UUT2)	Pacific Earthquake Engineering Research Center (PEER)	2017	Yes	2.0 3.2	1.0 0.0	1.5
		EDFOR	ODE COMP					
		U OS	P-0513	PACE				
		BY: Moha	mmad Karim					
		DATE: 0	9/27/2022	2019				
		CPNIA PLU	COD					
		80]	LDING					
Notes:								

UNIT UNDER TEST (UUT) SUMMARY SHEET

2101287-CR-001-R0



UUT 1

Manufacturer: Broad USA, Inc.

Model Line: BS Series Team Absorption Chillers

Model Number: BS136XI0.79-35/27.8-5.6/13.3-150 **Serial Number:** 16120021

Product Construction Summary:

Heavy gauge carbon steel construction.

Options/Subcomponent Summary:

Includes seismic bracing upgrades between main shell and HTG shell.

Inverter: INVT (GD310-004G-4-UL, GD20-1R5G-4-UL); Touch Screen: Siemens (6AV2124-0MC01-0AX0);

Controller: Siemens (S1500); Fan: Sunon (A2175-HBL); Valves: Broad (DN10, DN15, DN20, DN25, DN50, DN150);

Pumps: Teikoku (NP70-40D/321H2/4-F, NP65-40C/122H2/4-B, NP40-20A2/121H2/4-B, LY-015H4-0103R-A); **Gauge:** Beijing Brighty (01~0.3MPA); **Flow Switch:** Broad (LKB-01BbYD); **Pressure Control:** Danfoss (KP135);

Temperature Sensor: Therncway (ST02-145E3L100-60, ST02-145E3L100-100, ST02-145E3M100A-60);

Probes: Broad (BROADKY1, BROADKY2, BROADKY4, BROADKY5, BROADKY6)

			UUT Pr	operties		7						
Weight		Dimension (in	Lowest Natural Frequency (Hz)									
(lb)	Depth	Width	OSITIE	right 13	Front	-Back	Side	-Side	Vertical			
45,820	257.0	91.5 118.0			13.63		9.74		19.72			
		UUT Highe	st Passed S	eismic Run	Informa	tion						
Buildi	ng Code	Test Crit	teria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)		
СВС	2022	ICC-ES A	C156 09/	272.0	2 1.0 0.0	1.5	3.20	2.40	2.13	0.85		

Test Mounting Details:



UUT1 was base mounted - rigid using 2" long 1/4" fillet welds every 12" along four (4) base channels.
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

2101287-CR-001-R0



UUT 2

Manufacturer: Broad USA, Inc.

Model Line: BS Series Team Absorption Chillers

Model Number: BS20xI0.8-36.4/29.4-6.7/13.7-Fa-Ma **Serial Number:** 6120022

Product Construction Summary:

Heavy gauge carbon steel construction.

Options/Subcomponent Summary:

Includes seismic bracing upgrades between main shell and HTG shell.

Inverter: INVT (GD20-1R5G-4-UL, GD20-0R7G-4-UL); **Touch Screen:** Siemens (6AV2124-0MC01-0AX0); **Controller:** Siemens (S1500); **Fan:** Sunon (A2175-HBL); **Valves:** Broad (DN10, DN15, DN20, DN25, DN100); **Pumps:** Teikoku (NP70-40D/321H2/4-F, NP65-40C/122H2/4-B, NP40-20A2/121H2/4-B, LY-015H4-0103R-A); **Gauge:** Beijing Brighty (01~0.3MPA); **Flow Switch:** Broad (LKB-01BbYD); **Pressure Control:** Danfoss (KP135);

Temperature Sensor: Therncway (ST02-145E3L100-60, ST02-145E3M100A-60); Probes: Broad (BROADKY1, BROADKY2, BROADKY4, BROADKY5, BROADKY6)

			UUT P	roperties		7					
Weight		Dimension (in)				Lowest Natural Frequency (Hz)					
(lb) Depth		Width	Width Sheight 13		Front-Back		Side-Side		Vertical		
15,565	117.0	79.5	79.5 95.0			.76	7.02		17.70		
		UUT Highe	st Passed :	Seismic Run	Informa	tion					
Buildi	ng Code	Test Crit	eria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g	
СВС	2022	ICC-ES A	C156 09	$\frac{72.0}{3.2}$	2 1.0 0.0	1.5	3.20	2.40	2.13	0.85	

Test Mounting Details:



UUT2 was base mounted - rigid using 2" long 1/4" fillet welds every 12" along two (2) base channels.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.