



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

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

OFFICE USE ONLY

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

General Description: BS Series steam absorption chillers.

Mounting Description: Rigid base 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.

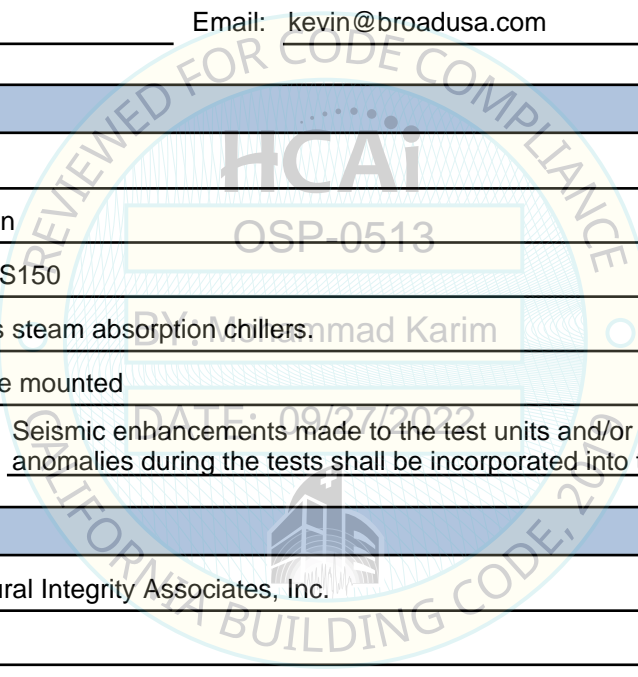
Contact Person: Katie Braman

Mailing Address: 233 SW Wilson Suite 101, Bend, OR 92201

Telephone: (541) 526-1947

Email: kbraman@structint.com

Title: Program Manager





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

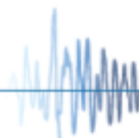
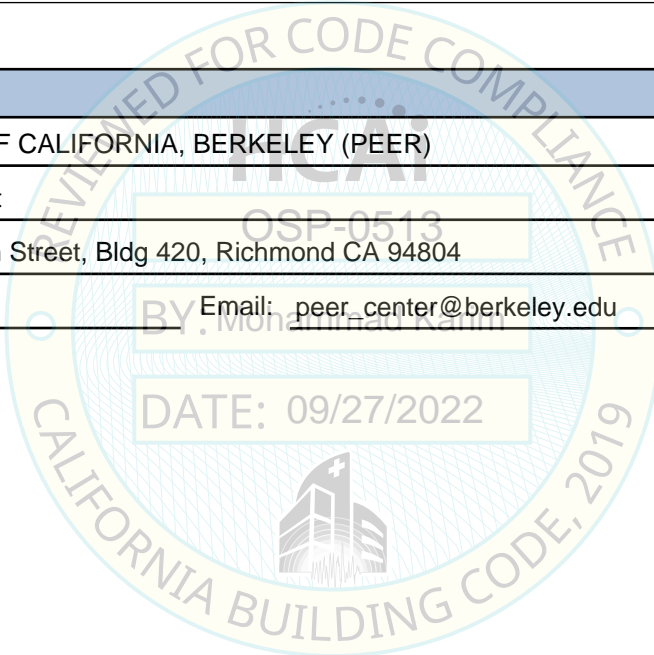
Company Name: STRUCTURAL INTEGRITY ASSOCIATES, INC.
Name: Andrew Coughlin California License Number: S6082
Mailing Address: 5215 Hellyer Ave, Suite 101, San Jose, CA 95138-1025
Telephone: (415) 635-8461 Email: acoughlin@structint.com

Certification Method

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

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





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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.44

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

a_p (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

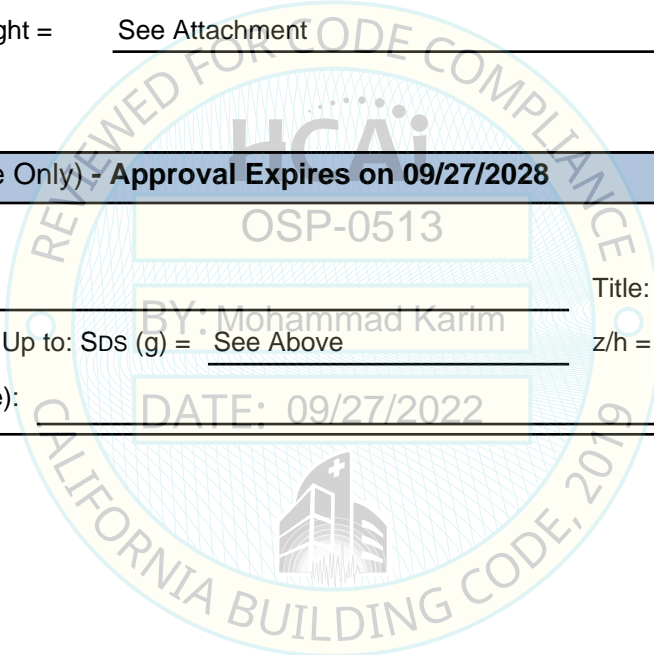
HCAI Approval (For Office Use Only) - Approval Expires on 09/27/2028

Date: 9/27/2022

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: 09/27/2022



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2101287-CR-001-R0



Manufacturer: Broad USA, Inc. Model Line: BS Series Team Absorption Chillers		Table Description: Control Devices			TABLE 2	
Building Code: CBC 2019		Seismic Certification Limits:			$S_{DS} = 2.0g \quad z/h = 1.0$ $S_{DS} = 3.2g \quad z/h = 0.0$	
					$I_p = 1.5$	
Component Type	Manufacturer	Model	Description	Notes	UUT	
Inverter	INVT	GD310-004G-4-UL	HTG Solution Pump Inverter		1	
		GD20-1R5G-4-UL	HTG Solution Pump Inverter		2	
		GD20-1R5G-4-UL	LTG Solution Pump Inverter		1	
		GD20-0R7G-4-UL	LTG Solution/Refrigerant Pump Inverter		2	
Touch Screen	Siemens	6AV2124-0MC01-0AX0	Cooling water pump inverter touch screen		1, 2	
Controller	Siemens	S1500	Programmable logic controller		1, 2	
Fan	Sunon	A2175-HBL	Control Cabinet Fan		1, 2	
Valves	Broad	DN10	Sampling/purge/detecting		1, 2	
		DN15	Drain valve		1, 2	
		DN20	Vacuum vent & manual valve		1, 2	
		DN25	Angle valve		1, 2	
		DN50	Angle valve		1	
		DN100	Steam angle valve		2	
		DN150	Steam angle valve		1	
Pumps	Teikoku	NP70-40D/321H2/4-F	HTG Solution Pump		1, 2	
		NP65-40C/122H2/4-B	LTG Solution Pump		1, 2	
		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. Model Line: BS Series Team Absorption Chillers		Table Description: Sensors			TABLE 3	
Building Code: CBC 2019		Seismic Certification Limits:			$S_{DS} = 2.0g \quad z/h = 1.0$ $S_{DS} = 3.2g \quad z/h = 0.0$	
					$I_p = 1.5$	
Component Type	Manufacturer	Model	Description	Notes	UUT	
Gauge	Beijing Brighty	01~0.3MPA	Compound Gauge		1, 2	
Temperature Sensor	Therncway	ST02-145E3L100-60	Inlet/outlet temperature sensor		1, 2	
		ST02-145E3L100-100	Inlet/outlet temperature sensor		1	
		ST02-145E3M100A-60	HTG Temperature sensor		1, 2	
Flow Switch	Broad	LKB-01BbYD	Chilled/cooling water flow switch		1, 2	
Pressure Control	Danfoss	KP135	Pressure Control		1, 2	
Probes	Broad	BROADKY1	HTG solution level probe		1, 2	
		BROADKY2	Refrigerant level probe		1, 2	
		BROADKY4	Auto vent probe		1, 2	
		BROADKY5	LTG solution level probe		1, 2	
		BROADKY6	Absorber solution level probe		1, 2	

UNIT UNDER TEST (UUT) SUMMARY SHEET



2101287-CR-001-R0

Manufacturer: Broad USA, Inc.	UUT 1
Model Line: BS Series Team Absorption Chillers	
Model Number: BS136X10.79-35/27.8-5.6/13.3-150 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 Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
45,820	257.0	91.5	118.0	13.63	9.74	19.72

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	2.13	0.85	
		3.2	0.0						

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

Manufacturer: Broad USA, Inc.	UUT 2
Model Line: BS Series Team Absorption Chillers	
Model Number: BS20x10.8-36.4/29.4-6.7/13.7-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)

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
15,565	117.0	79.5	95.0	6.76	7.02	17.70

<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	2.0	1.0	1.5	3.20	2.40	2.13	0.85	
		3.2	0.0						

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.