



**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
FACILITIES DEVELOPMENT DIVISION**

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

OFFICE USE ONLY

APPLICATION #: **OSP – 0513 – 10**

**OSHPD 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](mailto:kevin@broadusa.com)

**Product Information**

Product Name: BS Series Steam Absorption Chillers

Product Type: Absorption Chillers

Product Model Number: BS20 – BS150

(List all unique product identification numbers and/or part numbers)

General Description: BS Series steam absorption chillers. Modifications made to the test units to address anomalies observed during the tests will be incorporated into productions units.

Mounting Description: Rigid base mounted

**Applicant Information**

Applicant Company Name: TRU Compliance, LLC

Contact Person: Matthew J. Tobolski, PhD, SE

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

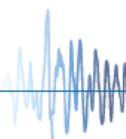
Telephone: 844.878.0200 Email: [mtobolski@trucompliance.com](mailto:mtobolski@trucompliance.com)

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant:  Date: 4/3/2017

Title: President & CEO Company Name: TRU Compliance, LLC

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
FACILITIES DEVELOPMENT DIVISION**

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

Company Name: TRU Compliance, LLC

Name: Matthew J. Tobolski, PhD, SE California License Number: S5648

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200 Email: [mtobolski@trucompliance.com](mailto:mtobolski@trucompliance.com)

**Supports and Attachments Preapproval**

- Supports and attachments are preapproved under OPM- \_\_\_\_\_  
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)
- Supports and attachments are not preapproved

**Certification Method**

- Testing in accordance with:  ICC-ES AC156
- Other (Please Specify): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Testing Laboratory**

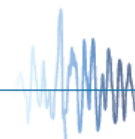
Company Name: Pacific Earthquake Engineering Research Center (PEER)

Contact Name: Nathaniel Knight

Mailing Address: 325 Davis Hall, University of California, Berkeley, CA 94720-1792

Telephone: 510.642.3437 Email: [peer\\_center@berkeley.edu](mailto:peer_center@berkeley.edu)

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**Seismic Parameters**

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

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

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

$a_p$  (In-structure equipment or component amplification factor) = 1.0

$R_p$  (Equipment or component response modification factor) = 2.5

$\Omega_0$  (System overstrength factor) = 2.0

$I_p$  (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0 ( $S_{DS} = 2.0g$ ); 0.0 ( $S_{DS} = 3.2g$ )

Equipment or Component Natural Frequencies (Hz) = See Attachment

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

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

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

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

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

R (Response modification coefficient) = \_\_\_\_\_

$\Omega_0$  (System overstrength factor) = \_\_\_\_\_

$C_d$  (Deflection amplification factor) = \_\_\_\_\_

$I_p$  (Importance factor) = 1.5

Height to Center of Gravity above base = \_\_\_\_\_

Equipment or Component Natural Frequencies (Hz) = \_\_\_\_\_

Overall dimensions and weight (or range thereof) = \_\_\_\_\_

Tank(s) designed in accordance with ASME BPVC, 2015:  Yes  No

**List of Attachments Supporting Special Seismic Certification**

Test Report(s)  Drawings  Calculations  Manufacturer's Catalog

Other(s) (Please Specify): See Attachment

**OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022**

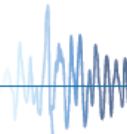
Signature:  Date: June 12, 2017

Print Name: Timothy J. Piland Title: SSE

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

Condition of Approval (if applicable): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



# SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16059



<b>Manufacturer:</b> Broad USA, Inc.	<b>TABLE 1</b>
<b>Model Line:</b> BS Series Steam Absorption Chillers	

**Certified Product Construction Summary:**  
Heavy gauge carbon steel construction.

**Certified Options Summary:**

**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 2016      **Seismic Certification Limits:**  $S_{DS} = 2.0 g$   $z/h=1.0$        $I_p = 1.5$   
 $S_{DS} = 3.2 g$   $z/h=0.0$

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
BS Steam Chiller	BS20 <sup>1</sup>	117	80	95	15,565		2
	BS30 <sup>1</sup>	167	80	95	18,000		Interp.
	BS50 <sup>1</sup>	197	80	95	23,000		Interp.
	BS75 <sup>1</sup>	221	79	100	28,000		Interp.
	BS100 <sup>1</sup>	220	88	100	34,000		Interp.
	BS125 <sup>1</sup>	266	88	101	41,000		Interp.
	BS150 <sup>1</sup>	264	93	118	45,820		1

<sup>1</sup> Includes seismic bracing upgrades between main shell and HTG shell. Weight listed includes solution weight.

# SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16059



<b>Manufacturer:</b> Broad USA, Inc.		<b>Table Description:</b> Control Devices			<b>TABLE 2</b>
<b>Model Line:</b> BS Series Steam Absorption Chillers					
<b>Building Code:</b> CBC 2016		<b>Seismic Certification Limits:</b>		$S_{DS} = 2.0g$ $z/h = 1.0$	$I_P = 1.5$
				$S_{DS} = 3.2g$ $z/h = 0.0$	
<b>Component Type</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>	<b>Notes</b>	<b>UUT</b>
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

TRU PROJECT NO. 16059



<b>Manufacturer:</b> Broad USA, Inc.	<b>Table Description:</b> Sensors	<b>TABLE 3</b>
<b>Model Line:</b> BS Series Steam Absorption Chillers		

<b>Building Code:</b> CBC 2016	<b>Seismic Certification Limits:</b>	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_P = 1.5$
		$S_{DS} = 3.2g$ $z/h = 0.0$	

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



**TRU PROJECT NO. 16059**

<b>Manufacturer:</b> Broad USA, Inc.	<b>UUT 1</b>
<b>Model Line:</b> BS Series Steam Absorption Chillers	
<b>Model Number:</b> BS136X10.79-35/27.8-5.6/13.3-150 <b>Serial Number:</b> 16120021	

**Product Construction Summary:**  
Heavy gauge carbon steel construction.

**Options/Subcomponent Summary:**  
Includes seismic bracing upgrades between main shell and HTG shell.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
45,820	257	91.5	118	13.6	9.7	19.7

<i>UUT Highest Passed Seismic Run Information</i>								
Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2016	ICC-ES AC156	2.0	1.0	1.5	3.2	2.4	2.13	0.85
		3.2	0.0					

**Test Mounting Details:**



Unit was rigid base mounted using 2" long 1/4" fillet welds every 12" along four 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



**TRU PROJECT NO. 16059**

<b>Manufacturer:</b> Broad USA, Inc.	<b>UUT 2</b>
<b>Model Line:</b> BS Series Steam Absorption Chillers	
<b>Model Number:</b> BS20x10.8-36.4/29.4-6.7/13.7-Fa-Ma <b>Serial Number:</b> 16120022	

**Product Construction Summary:**  
Heavy gauge carbon steel construction.

**Options/Subcomponent Summary:**  
Includes seismic bracing upgrades between main shell and HTG shell.

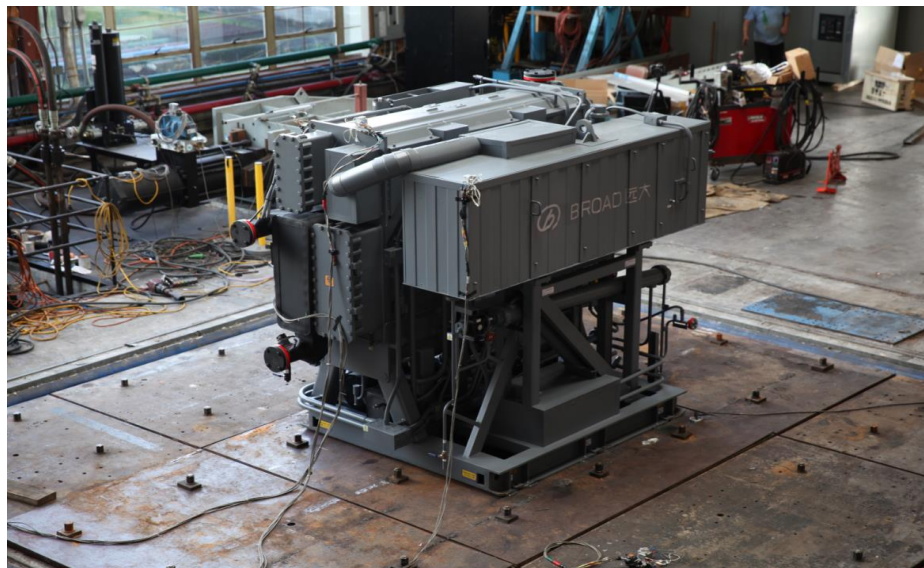
**UUT Properties**

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
15,565	117	79.5	95	6.8	7.0	17.7

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2016	ICC-ES AC156	2.0	1.0	1.5	3.2	2.4	2.13	0.85
		3.2	0.0					

**Test Mounting Details:**



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