



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

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

OFFICE USE ONLY

APPLICATION #: OSP-0673

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Haskris Company

Manufacturer's Technical Representative: Kerem Korunmus

Mailing Address: 100 Kelly Street, Elk Grove Village, IL 60007

Telephone: (847) 956-6420

Email: kerem@haskris.com

Product Information

Product Name: Chillers

Product Type: Chillers - Air Cooled

Product Model Number: OPC Process Chillers

General Description: Modular process fluid chillers constructed of carbon steel.

Mounting Description: Rigid, Neoprene Vibration Isolated, or Spring Vibration Isolated, 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: Manwill Engineering LLC

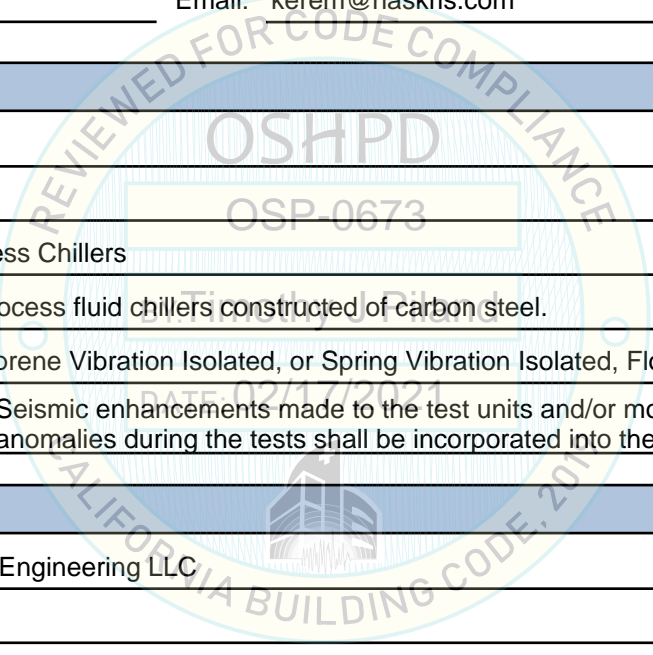
Contact Person: Derek Manwill

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102

Email: derek@manwillse.com

Title: President





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
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California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

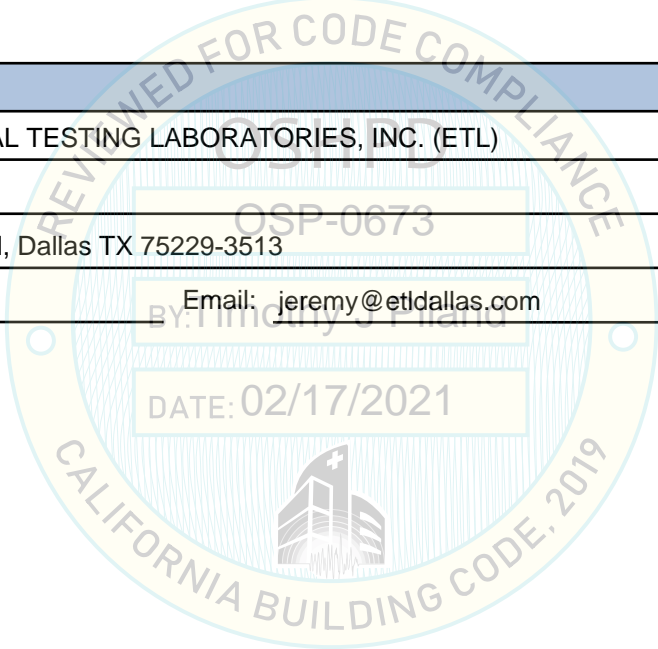
Company Name: MANWILL ENGINEERING LLC
Name: Derek Manwill California License Number: S6266
Mailing Address: PO Box 1194, Bend, OR 97709
Telephone: (541) 241-2102 Email: derek@manwillse.com

Certification Method

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

Testing Laboratory

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





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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 4.50 (SDS=2.00, z/h=1), 1.88 (SDS=2.50, 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

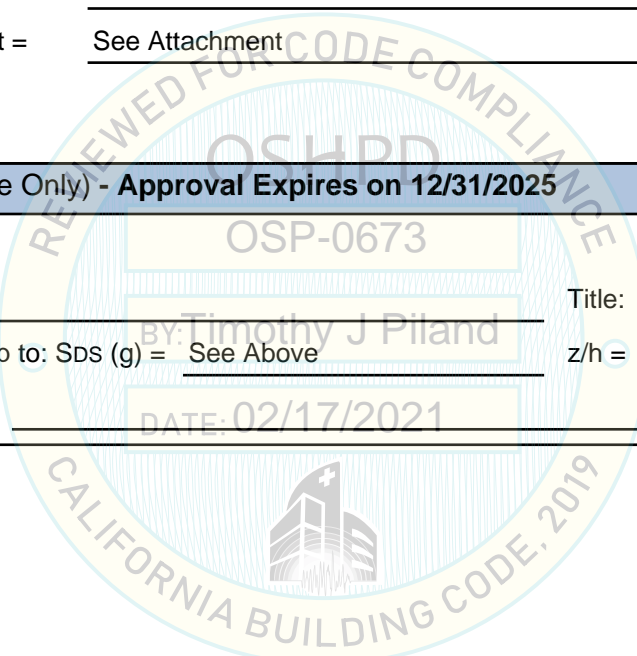
OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date: 2/17/2021

Name: Timothy Piland Title: Senior Structural Engineer

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

Condition of Approval (if applicable): DATE: 02/17/2021



ATTACHMENT 1: CERTIFIED COMPONENTS

SPECIAL SEISMIC CERTIFICATION

TABLE 1

DOCUMENT NO.: 20049CR1.0

MANUFACTURER: HASKRIS COMPANY						
PRODUCT FAMILY: OPC PROCESS CHILLERS						
MODEL NUMBER	DIMENSIONS (in)			MAX. WT. (lb)	DESCRIPTION / NOTES	BASIS
	DEPTH	WIDTH	HEIGHT			
OPC PROCESS CHILLERS						
OPC3	38	38	70	850	1-module	EXTRAP
OPC5	38	38	73	950	1-module	EXTRAP
OPC8	38	38	73	1,000	1-module	EXTRAP
OPC10	38	38	73	1,000	1-module	EXTRAP
OPC12	38	38	73	1,000	1-module	EXTRAP
OPC13	38	38	73	1,000	1-module	EXTRAP
OPC15	38	38	73	1,080	1-module	UUT 1
OPC16	38	76	73	2,000	2-module	INTERP
OPC20	38	76	73	2,000	2-module	INTERP
OPC24	38	76	73	2,000	2-module	INTERP
OPC26	38	76	73	2,000	2-module	INTERP
OPC30	38	114	73	2,600	3-module	INTERP
OPC36	38	114	73	2,800	3-module	INTERP
OPC39	38	114	73	2,800	3-module	INTERP
OPC40	38	152	73	3,600	4-module	INTERP
OPC48	38	152	73	3,600	4-module	INTERP
OPC52	38	152	73	3,600	4-module	INTERP
OPC60	38	190	73	4,096	5-module	UUT 2
MOUNTING:	Rigid floor mounted or isolated floor mounted on neoprene pads or spring isolators.			SEISMIC LEVELS:	$S_{DS} = 2.0g$ for $z/h = 1$ $S_{DS} = 2.5g$ for $z/h = 0$ $I_p = 1.5$	
NOTES:	Product Construction: Carbon steel frame and panels. The weight of an n-module unit must be less than or equal to the maximum weight listed above for the same number of modules. External water and power connections must be flexible. Options/Subcomponents: See Table 2 for a list of certified subcomponents. Voltage: 200-460V, 60Hz.					

ATTACHMENT 1: CERTIFIED SUBCOMPONENTS

SPECIAL SEISMIC CERTIFICATION

TABLE 2 - SUBCOMPONENTS

DOCUMENT NO.: 20049CR1.0

MANUFACTURER: HASKRIS COMPANY						
PRODUCT FAMILY: OPC PROCESS CHILLERS						
MODEL NUMBER	DIMENSIONS (in)			MAX. WT. (lb)	DESCRIPTION / NOTES	BASIS
	DEPTH	WIDTH	HEIGHT			
Copeland - Scroll Compressor						
ZR38K5E-TFD	9.7	9.7	19.9	61	3HP, 460V	EXTRAP
ZR38K5E-TF5	9.7	9.7	19.9	61	3HP, 230V	UUT 2
ZR68KCE-TFD	9.7	9.7	17.8	86	5.5HP, 460V	INTERP
ZR68KCE-TF5	9.7	9.7	17.8	86	5.5HP, 230V	INTERP
ZR108KCE-TFD	10.4	11.2	21.0	132	8HP, 460V	INTERP
ZR108KCE-TF5	10.4	11.2	21.0	132	8HP, 230V	INTERP
ZR125KCE-TFD	10.4	11.2	21.0	135	10HP, 460V	INTERP
ZR125KCE-TF5	10.4	11.2	21.0	135	10HP, 230V	INTERP
ZR144KCE-TFD	10.4	11.2	21.0	135	12HP, 460V	INTERP
ZR144KCE-TF5	10.4	11.2	21.0	135	12HP, 230V	INTERP
ZR160KCE-TFD	10.4	11.2	21.7	143	13HP, 460V	INTERP
ZR190KCE-TFD	10.4	11.2	21.7	146	15HP, 460V	UUT 2
Copeland - Scroll Compressor						
ZB30KCE-TFD	9.7	10.1	17.2	78	4HP, 460V	EXTRAP
ZB45KCE-TFD	9.7	10.1	17.2	87	6HP, 460V	UUT 2
ZB58K5E-TFD	12.3	14.3	19.9	126	8HP, 460V	INTERP
ZB76K5E-TFD	12.3	14.3	21.5	135	10HP, 460V	INTERP
ZB95K5E-TFD	12.3	14.3	22.2	143	13HP, 460V	INTERP
ZB114KCE-TFD	12.3	14.3	22.2	146	15HP, 460V	UUT 1
Danfoss - Scroll Compressor						
SZ147A4ALB	9.6	9.6	20.8	148	460V	UUT 2
Grundfos - Vertical Pump (stainless steel)						
CRI1-5	8.3	8.3	20.9	55	1/2HP, 230V/460V	EXTRAP
CRI5-5	8.3	8.3	26.5	75	2HP, 230V/460V	UUT 1
CRI15-3	10.1	9.8	34.7	163	5.4HP, 460V	INTERP
CRI15-4	10.1	9.8	36.5	196	7.5HP, 460V	UUT 2
Grundfos - Horizontal Pump (stainless steel)						
CM5-3	13.6	5.6	7.6	38	1.4HP, 230V/460V	EXTRAP
CM5-4	16.3	7.0	7.9	53	2.3HP, 230V/460V	UUT 2
CM5-5	18.7	7.0	7.9	68	3.4HP, 230V/460V	INTERP
CM10-2	19.3	7.8	8.3	69	3.4HP, 230V/460V	INTERP
CM10-3	20.0	7.8	8.7	84	5.4HP, 230V/460V	INTERP
CM15-2	20.0	7.8	8.7	83	5.4HP, 230V/460V	INTERP
CM15-3	22.0	9.0	9.7	108	8.1HP, 230V/460V	UUT 2
EBM - Fan & Motor Assembly						
W3G800-HK21-68A				94	460V, 800mm blade	UUT 2
Ziehl-Abegg - Fan & Motor Assemblies						
FN050-ZIQ.DC.V7P2-230V	25.8	25.8	7.4	39	1.0kW, 500mm blade	UUT 2
FN050-ZIQ.DC.V7P2-460V	25.8	25.8	7.4	39	1.0kW, 500mm blade	INTERP
FN080-ZIQ.GL.V7P3-230V	38.2	38.2	9.7	113	3.1kW, 800mm blade	INTERP
FN080-ZIQ.GL.V7P3-460V	38.2	38.2	9.7	113	3.1kW, 800mm blade	UUT 1,2
NOTES: Table continues on the next page. Additional notes, information, and seismic parameters are shown at the end of the table.						

ATTACHMENT 1: CERTIFIED SUBCOMPONENTS

SPECIAL SEISMIC CERTIFICATION

TABLE 2 - SUBCOMPONENTS (continued)

DOCUMENT NO.: 20049CR1.0

MANUFACTURER: HASKRIS COMPANY						
PRODUCT FAMILY: OPC PROCESS CHILLERS						
MODEL NUMBER	DIMENSIONS (in)			MAX. WT. (lb)	DESCRIPTION / NOTES	BASIS
	DEPTH	WIDTH	HEIGHT			
Haskris - Water Tank (polyethylene)						
SP0012-RT				109	12 gallon, water weight included	UUT 2
Haskris - Water Tank (polyethylene)						
14609				227	25 gallon, water weight included	UUT 1
Haskris - Water Tank (polyethylene)						
45192				568	65 gallon, water weight included	UUT 2
SWEP - Brazed Plate Heat Exchangers						
B80x12	2.6	4.7	20.7	10	B80 w/12 plates	EXTRAP
B80x20	3.3	4.7	20.7	13	B80 w/20 plates	EXTRAP
B80x30	4.2	4.7	20.7	17	B80 w/30 plates	EXTRAP
B80x42	5.3	4.7	20.7	20	B80 w/40 plates	EXTRAP
B80x48	6.0	4.7	20.7	24	B80 w/48 plates	UUT 2
B80x60	6.9	4.7	20.7	27	B80 w/60 plates	INTERP
B80x66	7.4	4.7	20.7	30	B80 w/66 plates	UUT 1,2
Sanhua - Condenser						
HX-L125-99-HASxxx				21		UUT 1,2
Luvata - Condenser						
M254CR2101LB-029.60x029				21		UUT 2
Refrigeration Research - Refrigerant Receiver						
3390	5.0	5.0	20.0	12		UUT 1,2
Refrigeration Research - Refrigerant Accumulators						
HX3738	5.0	5.0	13.0	9		EXTRAP
HX3700	6.0	6.0	15.0	15		UUT 1,2
HX3706	6.0	6.0	20.3	21		UUT 2
Ensto - Electrical Boxes						
OPCP202013G	5.2	7.8	7.8	10	Weight includes internals	EXTRAP
OPCP204013G	5.2	15.8	7.8	20	Weight includes internals	EXTRAP
OPCP404013G	5.2	15.7	15.7	35	Weight includes internals	UUT 1,2
OPCP406013G	5.2	23.6	15.7	65	Weight includes internals	UUT 2
Micron - Control Circuit Transformers						
B150PU7	4.0	3.8	3.8	6.0	150VA, 240/480 x 24	EXTRAP
B150-2014-GAF	4.0	4.5	4.0	8.5	150VA, 240/480 x 24	UUT 2
B200PU7	4.4	4.5	4.4	8.9	200VA, 240/480 x 24	INTERP
B250PU7	4.4	4.5	4.4	9.3	250VA, 240/480 x 24	INTERP
B150-2003-1F	5.0	3.8	3.8	9.5	150VA, 208/230/460 x 24/115	INTERP
B200-2004-1F	4.4	4.5	4.4	9.8	200VA, 208/230/460 x 24/115	INTERP
B150-2104-GAF	4.0	4.5	4.0	10.0	150VA, 208/230/460 x 24/115	INTERP
B200-2015-GAF	4.0	4.5	4.0	10.0	200VA, 240/480 x 24	INTERP
B200-2105-GAF	4.0	4.5	4.0	10.0	200VA, 208/230/460 x 24/115	INTERP
B250-2016-GAF	4.0	4.5	4.0	11.0	250VA, 240/480 x 24	INTERP
B250-2006-GAF	4.0	4.5	4.0	11.0	250VA, 208/230/460 x 24/115	INTERP
B300PU7	4.8	4.5	4.4	11.0	300VA, 240/480 x 24	INTERP
B250-2005-1F	4.8	4.5	4.4	11.3	250VA, 208/230/460 x 24/115	UUT 1
NOTES: Table continues on the next page. Additional notes, information, and seismic parameters are shown at the end of the table.						

ATTACHMENT 1: CERTIFIED SUBCOMPONENTS

SPECIAL SEISMIC CERTIFICATION

TABLE 2 - SUBCOMPONENTS (continued)

DOCUMENT NO.: 20049CR1.0

MANUFACTURER: HASKRIS COMPANY						
PRODUCT FAMILY: OPC PROCESS CHILLERS						
MODEL NUMBER	DIMENSIONS (in)			MAX. WT. (lb)	DESCRIPTION / NOTES	BASIS
	DEPTH	WIDTH	HEIGHT			
Micron - Control Circuit Transformers (continued)						
B250-2005-1F	4.8	4.5	4.4	11.3	250VA, 208/230/460 x 24/115	INTERP
B350PU7	4.8	4.5	4.4	11.6	350VA, 240/480 x 24	UUT 2
Hammond Power Solutions - Control Circuit Transformers						
PH150QR	4.0	4.9	3.8	5.7	150VA, 240/480 x 12/24	EXTRAP
PH250QR	4.5	5.4	3.8	7.5	250VA, 240/480 x 12/24	EXTRAP
PH150MLI	4.0	5.4	3.8	7.6	150VA, 208/230/460 x 24/115	EXTRAP
PH250MLI	4.5	5.2	4.4	10.1	250VA, 208/230/460 x 24/115	EXTRAP
PH350QR	4.5	5.2	4.4	10.1	350VA, 240/480 x 12/24	UUT 2
PH350MLI	4.5	5.6	4.4	11.0	350VA, 208/230/460 x 24/115	UUT 2
MOUNTING:	Mounted within unit.			SEISMIC LEVELS:	$S_{DS} = 2.0g$ for $z/h = 1$ $S_{DS} = 2.5g$ for $z/h = 0$	$I_p = 1.5$
NOTES:	Construction/Options: Model number uniquely identifies manufacturer, materials, and configuration of subcomponents. 1. All subcomponents with "UUT 2" as basis were present in both UUT 2a and UUT 2b in Attachment 2.					

BY: Timothy J Piland

DATE: 02/17/2021



ATTACHMENT 2: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 1

DOCUMENT NO.: 20049CR1.0

MANUFACTURER:		HASKRIS COMPANY				
MODEL NUMBER:		OPC15				
UNIT FUNCTION:		PROCESS CHILLER				
SERIAL NUMBER:		N/A				
DIMENSIONS (in)			WEIGHT (lb)	RES. FREQ. (Hz)		
DEPTH	WIDTH	HEIGHT		F-B	S-S	V
38	38	73	1080	13.6	7.8	27.9
CODE & CRITERIA:		2019 CBC		ICC-ES AC156		
TEST LABORATORY:		ENVIRONMENTAL TESTING LABORATORY				
REPORT & DATE:		20049TR1.0		September 9, 2020		
S_{DS} (g)	z/h	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)	
2.0	1	3.20	2.40	1.68	0.68	
2.5	0					
IMPORTANCE FACTOR, I_p = 1.5						
Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.						
MOUNTING:		Rigid floor mounted using (4) 5/8in ASTM A574 socket head bolts. Underneath the bolt head, there is (1) standard Grade 8 round washer and (1) 1.375in x 0.17in thick square plate washer.				
CONSTRUCTION:		Carbon steel frame and panels.				
SUBCOMPONENTS:		Copeland - Scroll Compressor (ZB114KCE-TFD), Grundfos - Vertical Pump (CRI5-5), Ziehl-Abegg - Fan & Motor Assembly (FN080-ZIQ.GL.V7P3-460V), Haskris - Water Tank (14609), SWEP - Braze Plate Heat Exchanger (B80x66), Sanhua - Condenser (HX-L125-99-HASxxx [qty=3]), Refrigeration Research - Refrigerant Receiver (3390), Refrigeration Research - Refrigerant Accumulator (HX3700), Ensto - Electrical Box (OPCP404013G), Micron - Control Circuit Transformer (B250-2005-1F)				
TESTING NOTES:		The unit was anchored using internal 10GA welded tabs, specifically added for seismic applications. The external anchor holes were not used.				



ATTACHMENT 2: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 2a (Neoprene Pads)

DOCUMENT NO.: 20049CR1.0

MANUFACTURER:		HASKRIS COMPANY				
MODEL NUMBER:		OPC60				
UNIT FUNCTION:		PROCESS CHILLER				
SERIAL NUMBER:		N/A				
DIMENSIONS (in)			WEIGHT (lb)	RES. FREQ. (Hz)		
DEPTH	WIDTH	HEIGHT		F-B	S-S	V
38	190	73	4096	5.1	6.4	12.5
CODE & CRITERIA:		2019 CBC		ICC-ES AC156		
TEST LABORATORY:		ENVIRONMENTAL TESTING LABORATORY				
REPORT & DATE:		20049TR1.0		September 9, 2020		
S_{DS} (g)	z/h	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)	
2.0	1	3.20	2.40	1.68	0.68	
2.5	0					
IMPORTANCE FACTOR, I_p = 1.5						
Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.						
MOUNTING:		Isolated floor mounted on (8) 4in x 8in and (4) 4in x 4in Mason Super WMH 40 durometer neoprene pads (3/4in pad thickness with 1/4in steel plate) using (20) 1/2in ASTM A574 socket head bolts. Underneath the bolt head, there is (1) standard Grade 8 round washer, (1) 1.375in x 0.17in thick square plate washer, and (1) Mason HG-50 grommet.				
CONSTRUCTION:		Carbon steel frame and panels.				
SUBCOMPONENTS:		Copeland - Scroll Compressors (ZR38K5E-TF5, ZR190KCE-TFD, ZB45KCE-TFD), Danfoss - Scroll Compressor (SZ147A4ALB), Grundfos - Vertical Pump (CRI15-4), EBM - Fan & Motor Assembly (W3G800-HK21-68A), Ziehl-Abegg - Fan & Motor Assemblies (FN050-ZIQ.DC.V7P2-230V, FN080-ZIQ.GL.V7P3-460V [qty=2]), Haskris - Water Tanks (SP0012-RT, 45192), SWEP - Brazed Plate Heat Exchanger (B80x48, B80x66 [qty=3]), Sanhua - Condenser (HX-L125-99-HASxxx [qty=8]), Luvata - Condenser (M254CR2101LB-029.60x029 [qty=2]), Refrigeration Research - Refrigerant Receiver (3390 [qty=4]), Refrigeration Research - Refrigerant Accumulator (HX3700 [qty=3], HX3706), Ensto - Electrical Boxes (OPCP404013G, OPCP406013G), Micron - Control Circuit Transformers (B150-2014-GAF, B350PU7), Hammond Power Solutions - Control Circuit Transformers (PH350QR, PH350MLI)				
TESTING NOTES:		Each module of the unit was anchored using internal 10GA welded tabs, specifically added for seismic applications. The external anchor holes were not used.				



ATTACHMENT 2: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 2a (Spring Isolators)

DOCUMENT NO.: 20049CR1.0

MANUFACTURER:		HASKRIS COMPANY				
MODEL NUMBER:		OPC60				
UNIT FUNCTION:		PROCESS CHILLER				
SERIAL NUMBER:		N/A				
DIMENSIONS (in)			WEIGHT (lb)	RES. FREQ. (Hz)		
DEPTH	WIDTH	HEIGHT		F-B	S-S	V
38	190	73	4096	3.0	2.7	6.0
CODE & CRITERIA:		2019 CBC		ICC-ES AC156		
TEST LABORATORY:		ENVIRONMENTAL TESTING LABORATORY				
REPORT & DATE:		20049TR1.0		September 10, 2020		
S_{DS} (g)	z/h	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)	
2.0	1	3.20	2.40	1.68	0.68	
2.5	0					
IMPORTANCE FACTOR, I_p = 1.5						
Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.						
MOUNTING:		Isolated floor mounted on spring isolators. Unit is rigidly bolted to a structural steel frame (C6x8.2 perimeter with W6x8.5 cross members) using (20) 5/8in ASTM A574 socket head bolts. Underneath the bolt head, there is (1) standard Grade 8 washer and (1) 1.375in x 0.17in thick square plate washer. The steel frame is bolted to (4) Mason SLRSO-C2-610 and (4) Mason SLRSO-C2-880 spring isolators using (16) 5/8in Grade 8 bolts.				
CONSTRUCTION:		Carbon steel frame and panels.				
SUBCOMPONENTS:		See UUT 2a above.				
TESTING NOTES:		Each module of the unit was anchored using internal 10GA welded tabs, specifically added for seismic applications. The external anchor holes were not used. Weight of base plus isolators is 568-lb (not included in unit weight above).				

