

	OF	FICE USE ONLY
CERTIFICATION PREAPPROVAL (OSP)	APPLICATION #	OSP - 0393 - 10
OSHPD Special Seismic Certification Preapproval (OSP)		
Type: New Renewal		
Manufacturer Information		
Manufacturer: Powerex, Inc.		
Manufacturer's Technical Representative: Joe Abt, Director of Engine	ering	
Mailing Address:150 Production Drive, Harrison, OH 45030		
Telephone: (513) 367-3273 Email: jabt@p	owerexinc.com	
Product Information		
Product Name:Medical Vacuum and Laboratory Vacuum Units	MA	
Product Type:Medical vacuum systems OSHPD		
Product Model Number:See attachment	· FZ	_
(List all unique product identification numbers and/or part numbers) $P = 0.393 - 10$	te contain numpe a	receiver tank controllor
and filters. Seismic enhancements made to the test units and req during the tests shall be incorporated into the production units.	uired to address the	anomalies observed
Mounting Description: Rigid base mounted and neoprene pad mount	ed – See Tables for a	allowed configurations.
	0	
Applicant Information		
Applicant Company Name: The VMC Group	CODY	
Contact Person: John Giuliano		
Mailing Address:113 Main Street, Bloomingdale, NJ 07403		
Telephone: (973) 838-1780 Email: john.gi	uliano@thevmcgroup	D.com
I hereby agree to reimburse the Office of Statewide Health F accordance with the California Administrative Code, 2016. Signature of Applicant:	Planning and Dev	elopment review fees in ate: <u>1/30/19</u>
Title: President Company Name: The VM	//C Group	
"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"	W/MM	OSHPD
STATE OF CALIFORNIA – HEALTH AND HUMAN SERVICES AGENCY OSH-FD-759 (REV 12/16/15)	. Inc.	Page 2 of 3

# OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)									
Company Name: The VMC Group									
Name:         Kenneth Tarlow         California License Number:         SE-2851									
Mailing Address: 113 Main Street, Bloomingdale, NJ 07403									
Telephone: <u>(973) 838-1780</u> Email: <u>Ken.tarlow@thevmcgroup.com</u>									
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									
<ul> <li>Testing in accordance with: ICC-ES AC156</li> <li>Other (Please Specify):</li> </ul>									
OSP-0393-10									
Testing Laboratory BY: Timothy J Piland									
Company Name: Dynamic Certification Laboratories 2/12/2019									
Contact Name: Josh Sailer, Laboratory Manager									
Mailing Address:1315 Greg Street, Suite 109, Sparks, NV 89431									
Telephone: (775) 358-5085									

OSP-0393-10

OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

Seismic Paramet
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Design in accordance with ASCE 7-10 Chapter 13: $\square$ Yes $\square$ No
Design basis of Equipment of Components $(F_p/W_p) = 1.40$ (Rigid), 4.39 (Internally isolated) Spec (Design spectral response acceleration at short period, $a$ ) = 1.95
$a_{\rm p}$ (In-structure equipment or component amplification factor) = 1.0 (Rigid) 2.5 (internally isolated system)
$R_{p}$ (Figure 1 of component response modification factor) = 2.5 (Rigid), 2.0 (internally isolated system)
$\Omega_0$ (System overstrength factor) = 2
$l_{\rm p}({\rm Importance factor}) = 1.5$
z/h (Height factor ratio) = 1
Equipment or Component Natural Frequencies (Hz) = See attachment
Overall dimensions and weight (or range thereof) = <u>See attachment</u>
Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15:  Yes No
$S_{DS}$ (Design spectral response acceleration at short period $d$ ) =
$S_{D1}$ (Design spectral response acceleration at 1 second period, g) =
R (Response modification coefficient) = $OSP-0393-10$
$\Omega_0$ (System overstrength factor) =
C₄ (Deflection amplification factor) =
$I_{\rm b}$ (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
<ul> <li>Test Report(s)</li> <li>Drawings</li> <li>Calculations</li> <li>Manufacturer's Catalog</li> <li>Other(s) (Please Specify):</li> </ul>
OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022
Signature: Mm III Date: December 12, 2019
Print Name: Timothy J. Piland Title: SSE
Special Seismic Certification Valid Up to : S <sub>DS</sub> (g) = See Above z/h = 1
Condition of Approval (if applicable):
"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"
STATE OF CALIFORNIA – HEALTH AND HUMAN SERVICES AGENCY DSH-FD-759 (REV 12/16/15) Page 3 of 3 Page 3 of 3

### Certified Components - Stacked Systems, Lubricated Rotary Vane

Manufacturer: Powerex

Product Line: Medic	al Vacuum and Lab	oratory Vacuum	n											
Medical system	Laboratory	Нр	Tank size <sup>1</sup>	Total number	Vertically stacked	Horizontally	Max.	dimension	ns (in)	Max. operating	Mounting	Sds (g),	Fp/Wp	Unit
model	system model	· · · ·	(gallons)	of pumps	pumps or layers	arrayed pumps	Length	Width	Height	weight (lb)	induiting	z/h=1	1 07	0
						Stacked Syst	ems			·				
						Duplex								
VPD0404	LVPD0404	5 (2)	120 V	2	2	1	55	64	76	1,340	Flexible base (neoprene)	1.95	4.39	UUT1
VPD0405	LVPD0405	5 (2)	200 V	2	2	1	55	64	83	1,600	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD0504	LVPD0504	5 (2)	120 V	2	2	1	55	64	76	1,685	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD0XXX	LVPD0XXX	5 (2)	200 V	2	2	1	70	45	80	1,940	Flexible base (neoprene)	1.95	4.39	UUT5 <sup>2</sup>
VPD0754	LVPD0754	7.5 (2)	120 V	2	2		55	64	76	1,760	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD0755	LVPD0755	7.5 (2)	200 V	2	2	JR 100	-55	64	83	1,960	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD1004	LVPD1004	10 (2)	120 V	2	2 5		55	64	76	2,050	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD1005	LVPD1005	10 (2)	200 V	2	62	1	55	64	83	2,250	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD1505	LVPD1505	15 (2)	200 V	2	2		70	90	87	4,280	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD2005	LVPD2005	20 (2)	200 V	2	2 Z		70	90	87	4,610	Flexible base (neoprene)	1.95	4.39	Interpolated
VPD2505	LVPD2505	25 (2)	200 V	2	2	1	70	90	87 1	5,130	Flexible base (neoprene)	1.95	4.39	UUT2
Triplex (based on 2-stack plus 1 layout)														
VPT0504	LVPT0504	5 (3)	120 V	3	2,1	2	55	96	76	1,950	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT0505	LVPT0505	5 (3)	200 V	3 24	2,1	2	55	96	83	2,350	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT0754	LVPT0754	7.5 (3)	120 V	3	2,1	2 prot	_ 55	96	76	2,400	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT0755	LVPT0755	7.5 (3)	200 V	3	2,1 • •	1 mo 2 my	55	- 96 <sup>10</sup>	83	2,600	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT1004	LVPT1004	10 (3)	120 V	3	2,1	2	55	96	76	3,000	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT1005	LVPT1005	10 (3)	200 V	3	2,1	2	55	96	83	<b>3,200</b>	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT1505	LVPT1505	15 (3)	200 V	3	2,1ATE	:122/12	/2 <del>0</del> 1	9 135	87	5,850	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT2005	LVPT2005	20 (3)	200 V	3	2,1	2	70	135	87	6,250	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
VPT2505	LVPT2505	25 (3)	200 V	3	2,1	2	71	135	87	6,800	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>3</sup>
	•				123	(Continued on Ne	ext Page)							
1. V in tank listing ind	licates vertical orie	ntation	-						4.					
2. UUT5 as tested wa	is a pump skid only	to certify altern	ate pumps. Skids	are structurally in-	dependent and flexibl	y connected.		5	$\mathcal{Y}$					
3. See Justification M	atrix for explanatic	on of extrapolate	ed units.		× A		illine in the second	CO						
BUILDING														
							TT							

(( ullet)) DCL <sub>Dynamic Certification Laboratories</sub>

Table 1 - Con	itinued nponents - S	Stacked Sv	stems. Lubri	icated Rota	rv Vane									
		rucked Sys			S	tacked Systems (C	ontinued)							
	Triplex (3-stack)													
VPT0304	LVPT0304	3 (3)	120 V	3	3	1	55	64 or 66	84	1,635	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPT0404	LVPT0404	5 (3)	120 V	3	3	1	55	64 or 66	84	1,710	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPT0504	LVPT0504	5 (3)	120 V	3	3	1	55	64 or 66	87	1,850	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPTOXXX	LVPTOXXX	7.5 (2), 3 (1)	N/A	3	3	1	55	32	85	1,680	Flexible base (neoprene)	1.95	4.39	UUT8 <sup>2</sup>
VPT0505	LVPT0505	5 (3)	200V	3	3	1	55	64 or 66	87	1,975	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPT0754	LVPT0754	7.5 (3)	120 V	3	3	1	55	64 or 66	87	2,425	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPT0755	LVPT0755	7.5 (3)	200 V	3	3	1	55	64 or 66	87	2,550	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
				•		Quadruple	x			•				
VPQ0505	LVPQ0505	5 (4)	200 V	4	2,2	2	55	96	83	2,850	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPQ0755	LVPQ0755	7.5 (4)	200 V	4	2,2	2	55	96	83	3,150	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPQ1005	LVPQ1005	10 (4)	200 V	4	2,2	$p^2CO$	D 55,	96	83	3,900	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPQ1505	LVPQ1505	15 (4)	200 V	4	2,2	2	70	135	87	7,150	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPQ2005	LVPQ2005	20 (4)	200 V	4	2,2	2	70	135	87	7,750	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPQ2505	LVPQ2505	25 (4)	200 V	4	2,2	2	71	135	87	8,600	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
Penta, Hexa and Octoplex variants using the same stack construction														
VPP2506	LVPP2506	25 (5)	240 V	5	2,2,1	3	80	180	96	9,800	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPH2506	LVPH2506	25 (6)	240 V	6	2,2,2	3	80	225	96	10,200	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPO2506	LVPO2506	25 (8)	240 V	8	2,2,2,2	)SP-4039	3 -80] (	225	96	11,900	Flexible base (neoprene)	1.95	4.39	UUT2, UUT13 <sup>3</sup>
				2		Expandable	e		MMM	H				
VPD0504-EX3	LVPD0504-EX3	5 (2)	120 V	2 (3)	2	1 (2)	55	64	76	1,685	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD0505-EX3	LVPD0505-EX3	5 (2)	200 V	2 (3)	2BY:T	imdt <sup>2</sup> hy	J 55P j	1.44no	83	1,905	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD0754-EX3	LVPD0754-EX3	7.5 (2)	120 V	2 (3)	2	1 (2)	55	64	76	<b>1,760</b>	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD0755-EX3	LVPD0755-EX3	7.5 (2)	200 V	2 (3 <mark>)</mark>	2	1 (2)	55	64	83	<mark>1,</mark> 960	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD1004-EX3	LVPD1004-EX3	10 (2)	120 V	2 (3)	<sup>2</sup> DATE	. 1 4(2) 1 0	/ 55 1	o <sup>64</sup>	76	<mark>2,050</mark>	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD1005-EX3	LVPD1005-EX3	10 (2)	200 V	2 (3)	2 2 2	• <u> </u>	55 -	64	83	2,250	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD1505-EX3	LVPD1505-EX3	15 (2)	200 V	2 (3)	2	1 (2)	70	90	87	4,280	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD2005-EX3	LVPD2005-EX3	20 (2)	200 V	2 (3)	2	1 (2)	70	90	87	4,610	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPD2505-EX3	LVPD2505-EX3	25 (2)	200 V	2 (3)	2	1 (2)	71	90	87	5,030	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPT0505-EX4	LVPT0505-EX4	5 (3)	200 V	3 (4)	P 2	2	55	96	83	2,350	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPT0755-EX4	LVPT0755-EX4	7.5 (3)	200 V	3 (4)	2	2	55	96	83	2,600	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPT1005-EX4	LVPT1005-EX4	10 (3)	200 V	3 (4)	2	$D = \frac{2}{2}$	55	96	83	3,200	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPT1505-EX4	LVPT1505-EX4	15 (3)	200 V	3 (4)	2	PULLD	I 70 0	135	87	5,850	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPT2005-EX4	LVPT2005-EX4	20 (3)	200 V	3 (4)	2	2	70	135	87	6,250	Flexible base (neoprene)	1.95	4.39	Extrapolated 4
VPT2505-EX4	LVPT2505-EX4	25 (3)	200 V	3 (4)	2	2	71	135	87	6,800	Flexible base (neoprene)	1.95	4.39	Extrapolated 4

1. V in tank listing indicates vertical orientation

2. UUT8 tested with a 7.5 HP claw pump (upper position), 7.5 HP lubricated pump (middle position), and 3 HP lubricated pump (lower position). Units are modular in nature; UUT8 was tested without a receiver tank and control panel skid. Receiver tanks and control panels are bookended by UUT1 and UUT2.

3. 2-high 25 HP vacuum pump stack tested in UUT2. Octoplex controller tested in UUT13. 240 gallon tank tested in UUT4b. Dimensions and weight shown here for the VPO2506 are calculated, assuming octoplex system contains of four of the duplex pump stacks as tested in UUT2.

4. See Justification Matrix for explanation of extrapolated units

### Table 1 - Continued Certified Components - Stacked Systems, Lubricated Rotary Vane

		taenea o ja		tatea nota										
						Tank Over Sys	tems							
VPDT0302	LVPT0302	3(2)	60 H	2	2	1	74	39	89	1,440	Digid og flovible bese mennt	1.95	4.39	Extrapolated <sup>4</sup>
VPDT0402	LVPDT0402	5 (2)	60 H	2	2	1	74	39	89	1,590	(neonrene)	1.95	4.39	Extrapolated <sup>4</sup>
VPDT0502	LVPDT0502	5 (2)	60 H	2	2	1	74	39	89	1,815	(neoprene)	1.95	4.39	Extrapolated <sup>4</sup>
VPDT0XXX	LVPDT0XXX	7.5 (1), 3 (1)	60 H	2	2	1	74	39	89	1,450	Rigid base	1.95	1.40	UUT6 <sup>2,3</sup>
VPDT0752	LVPDT0752	7.5 (2)	60 H	2	2	1	74	39	89	2,295	Rigid or flexible base mount (neoprene)	1.95	4.39	Extrapolated <sup>4</sup>

1. H in tank listing indicates horizontal orientation

2. UUT6 tested with a 7.5 HP lubricated pump in the top position, and a 3 HP lubricated pump in the bottom position.

3. See UUT7, tested in flexible base mounted condition for bookending of tank-over systems.

4. See Justification Matrix for explanation of extrapolated units.



Extrapolation Justification Matrix for Stacked Systems, Lubricated Rotary Vane

Manufacturer: Powerex Product Line: Medical Vacuum and Laboratory Vacuum Justification Matrix for Extrapolated Lubricated Rotary Vane Units



Unit	Units used for extrapolation	Difference from units used for extrapolation
VPT0504	UUT 1 (VPD0404)	
VPT0505	$\land$	
VPT0754		
VPT0755		The duplex units tested in UUT1 and UUT2 consist of two pumps mounted on one side of the vertical tank. The
VPT1004		extrapolated triplex systems consist of two pumps mounted on one side of the vertical tank and one pump mounted
VPT1005		on the other side of the vertical tank. The pumps are mounted to independent skids.
VPT1505		
VPT2005	$\downarrow$	
VPT2505	UUT 2 (VPD2505)	
VPQ0505	UUT 1 (VPD0404)	
VPQ0755	↑	
VPQ1005		Ine duplex units tested in UUI1 and UUI2 consist of two pumps mounted on one side of the vertical tank. The
VPQ1505		mounted on the other side of the vertical tank. The pumps are mounted to independent skids.
VPQ2005	$\downarrow$	
VPQ2505	UUT 2 (VPD2505)	
VPP2505	UUT 2 (VPD2505)	The duplex unit tested in UUT2 consists of two 25 HP pumps mounted on one side of the vertical tank. The
VPH2505	UUT 2 (VPD2505)	tank and two additional two-pump stacks mounted on the other side of the vertical tank. The pumps are mounted
VPO2505	UUT 2 (VPD2505)	to independent skids. The octoplex controller was tested in UUT13.
VPD0504-EX3	UUT 1 (VPD0404)	
VPD0505-EX3		
VPD0754-EX3		T
VPD0755-EX3		OSP-0393-10
VPD1004-EX3	127	
VPD1005-EX3	P.	
VPD1505-EX3		The extrapolated expandable units consist of an independent receiver tank/control panel skid and an independent
VPD2005-EX3		pump skid. The tested units UUT1 and UUT2 consisted of independent receiver tank/control panel skid and an
VPD2505-EX3		independent pump skid.
VPT0505-EX4		DATE 10/10/2010
VPT0755-EX4	I.V.	DATE: 12/12/2019
VPT1005-EX4		
VPT1505-EX4		· · · · ·
VPT2005-EX4	¥ (***	
VPT2505-EX4	UUT 2 (VPD2505)	

Duplex System



Pentaplex System



Triplex System

Quadruplex System



Hexaplex System





### Table 2 - Continued

Extrapolation Justification Matrix for Stacked Systems, Lubricated Rotary Vane

Manufacturer: Powerex Product Line: Medical Vacuum and Laboratory Vacuum

#### Justification Matrix for Extrapolated Lubricated Rotary Vane Units (Continued)

Unit	Units used for extrapolation	Difference from units used for extrapolation						
VPD0504		UUT5 consists of a representative frame and base platform with a pump (RA0155A 5 HP) similar to that of UUT 1 in						
VPD0505	0015 (VI 2000)	the lower position and a larger claw pump (replacing the pump in UUT4) in the upper position.						
VPDT0302								
VPDT0402		UUT6 consists of a representative base and frame structure with a 3HP vacuum pump in the lower tier and a 7.5 HP						
VPDT0502		electrical control panel mounted to the frame system. Also see UUT7 for bookending of tank-over systems.						
VPDT0752								
VPT0304								
VPT0404		UUT8 consists of a representative base and frame structure. The top position is occupied by a claw pump heavier						
VPT0504		than the certified lube models, with the lowest position occupied by the lightest of the certified lube models and the						
VPT0505	υυι» (νρτοχχχ)	mid position by the largest pump in the certified list. Control and tank skid for certified units are the same as was						
VPT0754		tested in UUT1 and UUT2.						
VPT0755								

#### Tank Over Construction Duplex:



Triplex:



((
)) DCL Dynamic Certification Laboratories

### **Certified Components - Stacked Units, Claw Oil-Less**



Manufacturer: Powerex

Certified Product Lir	ne: Medical Vacuum ar	nd Laboratory \	/acuum											
Medical system	Laboratory system			Total number	Vertically stacked	Horizontally	Max.	Dimensio	ns (in)	Maximum		Sds (g)		
model	model	Нр	Tank size <sup>1</sup>	of pumps	pumps or layers	nps or layers arrayed pumps Le	Length	Width <sup>2</sup>	Height	Operating Weight (Ib)	Mounting	z/h=1	Fp/Wp	Unit
						Stacked Sys	tems							
	Duplex													
CVPD0504A	LCPD0504 <sup>3</sup>	5 (2)	120 V	2	2	1	55	64	76	1,690	Flexible base (neoprene)	1.95	4.39	UUT3
CVPD0504B	LCPD0604 <sup>3</sup>	6.4 (2)	120 V	2	2	1	55	64	76	1,925	Flexible base (neoprene)	1.95	4.39	Interpolated
CVPD0754A	LCPD0704	7.0 (2)	120 V	2	2	1	55	64	76	2,175	Flexible base (neoprene)	1.95	4.39	Interpolated
CVPD0754B	LCPD0904 <sup>3</sup>	9.1 (2)	120 V	2	2	1	55	64	76	2,400	Flexible base (neoprene)	1.95	4.39	Interpolated
CVPD1005	LCPD1005	10 (2)	200 V	2	2	$p^{1}CC$	55	64	83	2,875	Flexible base (neoprene)	1.95	4.39	Interpolated
CVPDXXXX	LCPDXXXX	15 (1), 5 (1)	N/A	2	2 1	$OK_1$	70	45	80	1,940	Flexible base (neoprene)	1.95	4.39	UUT5 <sup>4</sup>
CVPD1505	LCPD1505	15 (2)	200 V	2	2	1	74	90	88	3,800	Flexible base (neoprene)	1.95	4.39	UUT4
					Triples	x (based on 2-sta	ck plus 1 la	ayout)					-	
CVPT0504A	LCPT0504	5 (3)	120 V	3	2, 1	2	-55	96	76	2,150	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0505A	LCPT0505	5 (3)	200 V	3	2, 1	2	55	96	83	2,275	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0504B	LCPT0604	6.4 (3)	120 V	3	2,1	2	55	96	76	2,000	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0505B	LCPT0605	6.4 (3)	200 V	3	2,1	OSP <del>2</del> 039	355 1	96	83	2,150	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0755A	LCPT0705	7.0 (3)	200 V	3	2, 1	2	55	96	83	3,200	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0755B	LCPT0905	9.1 (3)	200 V	3 74	2, 1	2	55	96	83	3,500	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT1005	LCPT1005	10 (3)	200 V	3	2, BY : 7	'imo <b>²</b> thy	5₽	196 n	83	4,200	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT1505	LCPT1505	15 (3)	200 V	3 🔾	2, 1	2	71	135	88	4 <mark>,80</mark> 0	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
	-	-				Triplex (3-st	ack)	1						
CVPTOXXXX	LCVPT0XXXX	7.5 (2), 3 (1)	N/A	3 (1	3DATE	. 14/10	/ 55	1 Q <sup>32</sup>	85	<b>1,680</b>	Flexible base (neoprene)	1.95	4.39	UUT8 5
CVPT0304	LCVPT0304	3 (3)	120 V	3	3	1 - 1 - 2	55	64 or 66	84	2,200	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
CVPT0504A	LCVPT0504	4-5 (3)	120 V	3	3	1	55	64 or 66	84	2,235	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
CVPT0504B	LCVPT0604	5-6.4 (3)	120 V	3	3	1	55	64 or 66	87	2,360	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
CVPT0505A	LCVPT0505	4-5 (3)	200V	3	0 3	1	55	64 or 66	87	2,275	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
CVPT0505B	LCVPT0605	5-6.4 (3)	200V	3	<b>73</b>	1	55	64 or 66	87	2,400	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
CVPT0754A	LCVPT0754A	6.4-7.5 (2)	120 V	3	3	1	55	64 or 66	87	2,565	Flexible base (neoprene)	1.95	4.39	Extrapolated <sup>9</sup>
CVPT0755A	LCVPT0755A	6.4-7.5 (2)	200 V	3	3	Br.1	55	64 or 66	87	2,690	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0754B	LCVPT0754B	7.5-9.1 (2)	120 V	3	3	JII	_55	64 or 66	87	2,600	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
CVPT0755B	LCVPT0755B	7.5-9.1 (2)	200 V	3	3	1	55	64 or 66	87	2,725	Flexible base (neoprene)	1.95	4.39	Extrapolated 9
			Continued on Next Page											

1. V or H in tank listing indicates vertical or horizontal orientation

2. When touchscreen controls are used, additional 2 inch space is required between skids

3. No drawing available for these models - configuration is same as equivalent Medical unit

4. UUT5 was tested as a pump skid only to certify alternate pumps

5. UUT8 was tested as a pump skid only to certify alternate pumps. UUT8 tested with a 7.5 HP claw pump (upper position), 7.5 HP lubricated pump (middle position), and 3 HP lubricated pump (lower position). 3 HP claw pump tested in UUT6. Receiver tanks and control panels bookended by UUT3 and UUT4.

6. Octoplex controller tested in UUT13; 2-high 15 HP vacuum pump stack tested in UUT4. Dimensions and weight shown here for the CVPO1506 are calculated, assuming octoplex system consists of four of the duplex pump stacks as tested in UUT4.

7. UUT7 tested with a 7.5 HP claw pump in the top position, and a 3 HP claw pump in the bottom position.

8. See UUT6 for bookending of tank-over systems.

9. See Justification Matrix for explanation of extrapolated units.

Table 3 - Cont	Table 3 - Continued													
Certified Components - Stacked Units, Claw Oil-Less														
	-					Quadrupl	ex							
CVPQ0505A	LCPQ0505	5 (4)	200 V	4	2,2	2	55	96	83	2,500	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPQ0505B	LCPQ0605	6.4 (4)	200 V	4	2,2	2	55	96	83	2,700	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPQ0755A	LCPQ0705	7.0 (4)	200 V	4	2,2	2	55	96	83	3,600	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPQ0755B	LCPQ0905	9.1 (4)	200 V	4	2,2	2	55	96	83	4,000	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPQ1005	LCPQ1005	10 (4)	200 V	4	2,2	2	55	96	83	4,900	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPQ1505	LCPQ1505	15 (4)	200 V	4	2,2	2	71	135	88	5,600	Flexible base (neoprene)	1.95	4.39	Extrapolated
Penta, Hexa and Octoplex variants using the same stack construction														
CVPP1506	LCPP1506	15 (5)	240 v	5	2,2,1	2	180	80	96	6,200	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPH1506	LCPH1506	15 (6)	240 v	6	2,2,2	2	225	80	96	6,800	Flexible base (neoprene)	1.95	4.39	Extrapolated
CVPO1506	LCPO1506	15 (7)	240 v	8	2,2,2,2	2	225	80	96	9,850	Flexible base (neoprene)	1.95	4.39	UUT4, UUT13 <sup>6</sup>
						P CC	DP							
		T			F	Tank Over Sy	stems	Co			T	•	•	r
CVPDT0302	LCVPT0302	3(2)	60 H	2	2	1	74	39	89	1,600	Rigid or flexible base (neoprene)	1.95	4.39	Extrapolated
CVPDT0XXX	LCVPT0XXXX	7.5 (1), 3 (1)	60 H	2	2	1	74	39	89	1,910	Flexible base (neoprene)	1.95	4.39	UUT7 <sup>7, 8</sup>
CVPDT0502A	LCVPDT0502	4-5 (2)	60 H	2	2		74	39	89	1,860		1.95	4.39	Extrapolated
CVPDT0502B	LCVPDT0602	5-6.4 (2)	60 H	2	2	1	74	39	89	1,910	Rigid or flexible base	1.95	4.39	Extrapolated
CVPDT0752A	LCVPDT0702	6.4-7.5 (2)	60 H	2 /	2	OSP1039	3741	39	89	2,030	(neoprene)	1.95	4.39	Extrapolated
CVPDT0752B	LCVPDT0752	7.5-9.1 (2)	60H	2 5	2	2	74	39	89	2,145		1.95	4.39	Extrapolated
1. V or H in tank listin	ig indicates vertical or	horizontal orier	ntation	14						L-a				
2. When touchscreen	controls are used, ac	lditional 2 inch s	pace is require	d between skids	BY:	<b>Fimothy</b>	JP	ilan	a ///////					
3. No drawing availab	ole for these models -	configuration is	same as equiv	alent Me <mark>dic</mark> al ur	nit		0 -	0						
4. UUT5 was tested a	s a pump skid only to	certify alternate	e pumps											
5. UUT8 was tested a	s a pump skid only to	certify alternate	e pumps. UUT&	8 tested w <mark>ith a 7</mark>	.5 HP claw pump (up	oper position), 7.5	HP lubric	ated pump	<mark>o (</mark> middle p	osition), and 3	HP lubricated pump (lower posit	ion). 3 HP d	claw pump	tested in UUT6.
Receiver tanks and co	ontrol panels booken	led by UUT3 and	d UUT4.	P			1/20			7				
6. Octoplex controller	r tested in UUT13; 2-ł	nigh 15 HP vacuu	um pump stack	tested in UUT4.	Dimensions and we	eight shown here	for the CV	PO1506 a	e calculate	ed, assuming or	ctoplex system consists of four of	the duplex	pump stac	ks as tested in
UUT4.	7.5.110 -1	4h - 4								V /				
7. UUT7 tested with a	a 7.5 HP claw pump in	the top position	n, and a 3 HP CI	aw pump in the	bottom position.				A					
8. See UUT6 for book	ending of tank-over s	ystems.			TAN		5		0 <sup>70</sup> /					
9. See Justification M	atrix for explanation	of extrapolated	units.		1 LA			C,C	) -					
					- 1	BITTT	TNI	5						
						201 LI	) T N							
L														

#### Extrapolation Justification Matrix for Stacked Systems, Claw Oil-Less



Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Justification Matrix for Extrapolated Oilless Claw Type										
Unit	Units used for extrapolation	Difference from units used for extrapolation								
CVPT0504A	UUT 3 (CVPD0504A)									
CVPT0505A	<b>^</b>									
CVPT0504B										
CVPT0505B		The duplex units tested in UUT3 and UUT4 consist of two pumps mounted on one side of the vertical tank. The								
CVPT0755A		extrapolated triplex systems consist of two pumps mounted on one side of the vertical tank and one pump mounted on the other side of the vertical tank. The number are mounted to independent skids								
CVPT0755B										
CVPT1005	$\checkmark$									
CVPT1505	UUT 4 (CVPD1505)									
CVPQ0505A	UUT 3 (CVPD0504A)									
CVPQ0505B	$\wedge$									
CVPQ0755A		The duplex units tested in UU13 and UU14 consist of two pumps mounted on one side of the vertical tank. The								
CVPQ0755B		mounted on the other side of the vertical tank. The pumps are mounted to independent skids.								
CVPQ1005	$\checkmark$									
CVPQ1505	UUT 4 (CVPD1505)	CO.D.								
CVPP1506	UUT 4 (CVPD1505)	The duplex unit tested in UUT4 consists of two 15 HP pumps mounted on one side of the vertical tank. The								
CVPH1506	UUT 4 (CVPD1505)	extrapolated pentaplex, hexaplex and octoplex systems consist of two pumps mounted on one side of the vertical tank and two additional two-pump stacks mounted on the other side of the vertical tank. The pumps are mounted								
CVPO1506	UUT 4 (CVPD1505)	to independent skids. The octoplex controller was tested in UUT13.								
	127									



Pentaplex System



Octoplex System



### Table 4 - Continued

Manufacturer: Powerex

**Extrapolation Justification Matrix for Claw Oil-Less** 

((
)) DCL Dynamic Certification Laboratories

Product Line: Medical Vacuum and Laboratory Vacuum



	ponents - S	tacked Systems - Flexibl	e base			(	(•)) DC	Dynar	nic Certificati	ion Laboratories
			Lubricated Van	e Vacuum Pum	ps					
Model <sup>1</sup>	Manufacturer	Material	Dimensions (in) L x W x H	HP	Voltage tested	Voltage certified	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
RA0063	Busch		28 x 19 x 12	3	208 V			1.95	4.39	UUT8
RC0101	Busch		29 x 19 x 12	5	208V			1.95	4.39	UUT1
RA0101	Busch		29 x 19 x 12	5	n/a			1.95	4.39	Interpolated
RC0155	Busch		38 x 22 x 16.5	5	n/a			1.95	4.39	Interpolated
RA0155A	Busch		31.5 x 20 x 13.5	5	460V			1.95	4.39	UUT5
RC0205	Busch	Cast Iron lubricated vane vacuum	41 x 24 x 16.5	7.5 or 8	n/a			1.95	4.39	Interpolated
RA0205	Busch	pump with Face mounted TEFC	41 x 24 x 16.5	7.5 or 8	208V	208-	Flexible base	1.95	4.39	UUT8
RC0305	Busch	Pump has rubber isolation feet.	44 x 24 x 16.5	C 10	n/a	230/400	(neoprene)	1.95	4.39	Interpolated
RA0255	Busch		44 x 24 x 16.5	0010E	n/a			1.95	4.39	Interpolated
RA0305	Busch		44 x 24 x 16.5	10	n/a			1.95	4.39	Interpolated
RC0400	Busch		54 x 38 x 26.5	15	n/a 🖉			1.95	4.39	Interpolated
RC0502	Busch		65.5 x 38 x 26.5	20	n/a	2		1.95	4.39	Interpolated
RC0630	Busch		69 x 40 x 26.5	25	460 V			1.95	4.39	UUT2
			Claw Oil-Less	Vacuum Pump	L U	C E				
Model	Manufacturer	Material	Claw Oil-Less Dimensions (in)	Vacuum Pump	-Voltage tested	Voltage	Mounting	Sds (g)	Fp/Wp	Unit
Model	Manufacturer	Material	Claw Oil-Less Dimensions (in) LxWx H Timot	Vacuum Pumps	voltage tested	Voltage certified	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
Model MM1102	Manufacturer Busch	Material	Claw Oil-Less Dimensions (in) L×W× A Timot 40 x 17 x 16 42 x 17 x 16	Vacuum Pumps hy <sup>HP</sup> J I 4.5 to 5	Voltage tested	Voltage certified	Mounting	Sds (g) z/h=1 1.95	Fp/Wp 4.39	Unit UUT3
Model MM1102 MM1142 MM1202	Manufacturer Busch Busch	Material	Claw Oil-Less Dimensions (in) L x W x H Timot 40 x 17 x 16 42 x 17 x 16 42 x 17 x 16 43 x 20 x 18	Vacuum Pumps hy HPJ I 4.5 to 5 / 15 to 6.4	Voltage tested 230V	Voltage certified	Mounting	Sds (g) z/h=1 1.95 1.95	Fp/Wp 4.39 4.39	Unit UUT3 Interpolated
Model MM1102 MM1142 MM1202 MM1252	Manufacturer Busch Busch Busch Busch	Material Cast Iron lubricated vane vacuum pump with Face mounted TEFC	Claw Oil-Less Dimensions (in) L x W x H Timot 40 x 17 x 16 42 x 17 x 16 43 x 20 x 18 43 x 20 x 18	Vacuum Pumps hy HPJ I 4.5 to 5 / 15 to 6.4 6.4 to 7	voltage tested 230v 0 n/a n/a 208v / 230v	Voltage certified 97 208-	Mounting Flexible base	Sds (g) z/h=1 1.95 1.95 1.95	Fp/Wp 4.39 4.39 4.39	Unit UUT3 Interpolated Interpolated
Model MM1102 MM1142 MM1202 MM1252 MM1402	Manufacturer Busch Busch Busch Busch Busch	Material Cast Iron lubricated vane vacuum pump with Face mounted TEFC motor, steel and aluminum body.	Claw Oil-Less Dimensions (in) L xWx H TIMOT 40 x 17 x 16 42 x 17 x 16 43 x 20 x 18 43 x 20 x 18 48 x 20 x 18	Vacuum Pumps hy HPJ F 4.5 to 5 / 15 to 6.4 6.4 to 7 7.5 to 9.1 9 to 10.2	Voltage tested 230V 0 n/a n/a 208V / 230V	Voltage certified 9 208- 230/460	Mounting Flexible base (neoprene)	Sds (g) z/h=1 1.95 1.95 1.95 1.95	Fp/Wp 4.39 4.39 4.39 4.39 4.39	Unit UUT3 Interpolated Interpolated UUT8 Interpolated
Model           MM1102           MM1142           MM1202           MM1252           MM1402           MM1322	Manufacturer Busch Busch Busch Busch Busch Busch	Material Cast Iron lubricated vane vacuum pump with Face mounted TEFC motor, steel and aluminum body. Pump has rubber isolation feet.	Claw Oil-Less Dimensions (in) L xWx H Timot 40 x 17 x 16 42 x 17 x 16 43 x 20 x 18 43 x 20 x 18 48 x 20 x 18 48 x 20 x 18	Vacuum Pumps hy HPJ F 4.5 to 5 / 15 to 6.4 6.4 to 7 7.5 to 9.1 9 to 10.2 9 to 10.2	Voltage tested 230V 0 n/a n/a 208V / 230V n/a n/a	Voltage certified 208- 230/460	Mounting Flexible base (neoprene)	Sds (g) z/h=1 1.95 1.95 1.95 1.95 1.95 1.95	Fp/Wp           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39	Unit UUT3 Interpolated Interpolated UUT8 Interpolated Interpolated
Model           MM1102           MM1142           MM1202           MM1252           MM1402           MM1322           M1502	Manufacturer Busch Busch Busch Busch Busch Busch Busch	Material Cast Iron lubricated vane vacuum pump with Face mounted TEFC motor, steel and aluminum body. Pump has rubber isolation feet.	Claw Oil-Less Dimensions (in) L xWx H TIMOT 40 x 17 x 16 42 x 17 x 16 43 x 20 x 18 43 x 20 x 18 48 x 20 x 18 48 x 20 x 18 48 x 20 x 18 48 x 31 x 27	Vacuum Pumps hy HPJ P 4.5 to 5 / 15 to 6.4 6.4 to 7 7.5 to 9.1 9 to 10.2 9 to 10.2 15	Voltage tested 230V 1 0 n/a n/a 208V / 230V n/a n/a 460V	Voltage certified 97 208- 230/460	Mounting Flexible base (neoprene)	Sds (g) z/h=1 1.95 1.95 1.95 1.95 1.95 1.95 1.95	Fp/Wp           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39	Unit UUT3 Interpolated Interpolated UUT8 Interpolated Interpolated
Model           MM1102           MM1142           MM1202           MM1252           MM1402           MM1322           MI1502	Manufacturer Busch Busch Busch Busch Busch Busch Busch Busch	Material Cast Iron lubricated vane vacuum pump with Face mounted TEFC motor, steel and aluminum body. Pump has rubber isolation feet.	Claw Oil-Less Dimensions (in) L x W x H T 1 m of 40 x 17 x 16 42 x 17 x 16 43 x 20 x 18 43 x 20 x 18 48 x 20 x 18 48 x 20 x 18 48 x 20 x 18 48 x 31 x 27 54.5 x 20 x 18	Vacuum Pumps hy HPJ I 4.5 to 5 / 15 to 6.4 6.4 to 7 7.5 to 9.1 9 to 10.2 9 to 10.2 15	Voltage tested 230V 230V n/a 208V / 230V n/a n/a 460V	Voltage certified 97 208- 230/460	Mounting Flexible base (neoprene)	Sds (g) z/h=1 1.95 1.95 1.95 1.95 1.95 1.95 1.95 1.9	Fp/Wp           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39           4.39	Unit UUT3 Interpolated Interpolated UUT8 Interpolated Interpolated UUT4 UUT5

Table 5 - Continue	ed				(	((•)) DC	Dynau	mic Cortificat	ion Laboratorios
Certified Subcom	ponents - S	tacked Systems - Flexibl	e base	anks			, E Dynar	nic certificat	
							Sds (g)		
Model <sup>1</sup>	Manufacturer	Material	Dimensions (in)	Capacity (gal)	Orientation	Mounting	z/h=1	Fp/Wp	Unit
AR0274xxxx	Campbell	Steel ASMF	24" Dia x 71" H	120		Elevible base	1.95	4.39	UUT1 UUT3
AR0512xxxx	Hausfeld <sup>2</sup>	construction 200 psig <sup>3</sup>	30" Dia x 77" H	200	Vertical	(neoprene)	1.95	4.39	UUT4
AR05130xAJ	<u> </u>		30" Dia x 89"H	240			1.95	4.39	UUT4b
VES04767		Steel ASME	24" Dia x 70" H	120		Elovible base			UUT 31b
VES07303	Morganton	construction 200 psig <sup>3</sup>	30" Dia x 80" H	200	Vertical	(neoprene)	1.95	4.39	interpolated
VES07072			30" Dia x 92"H	240		(			UUT 30b
<ol> <li>xxxx in model number is f</li> <li>Campbell Hausfeld is alter</li> <li>Construction in accordance</li> </ol>	or variations in p rnately branded a ce with ASME BP <sup>1</sup>	aint color and threaded port sizes, not as Twin Lakes Manufacturing VC Section VIII. Tanks have an allowat	affecting structural elements.	CODE	COMP				
			Cont	trollers					
Model	Manufacturer	Description	Material	NEMA rating	Dimensions (in)	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
BASIC_PVM (24x20x8)	Powerex	No Touchscreen	Powder coated carbon steel	12	24"H x 20"W x 8"D		1.95	4.39	Extrapolated <sup>1</sup>
BASIC_PVM (30x24x8)	Powerex	No Touchscreen	Powder coated carbon steel	hy <sup>12</sup> j P	30"H x 24"W x 8"D		1.95	4.39	Extrapolated <sup>1</sup>
BASIC_PVM (36x30x8)	Powerex	No Touchscreen	Powder coated carbon steel	12	36"H x 30"W x 8 <mark>"D</mark>		1.95	4.39	Extrapolated <sup>1</sup>
HMI_PXMI (30x24x8)	Powerex	Human Machine Interface:	Powder coated carbon steel?	/1 712/20	30"H x 24"W x 8"D	1	1.95	4.39	UUT1
HMI_PXMI (36x30x8)	Powerex	Touchscreen	P. DELT.	/ 14/ 40	<sup>1</sup> 36"H x 30"W x 8"D	1	1.95	4.39	Interpolated
PBMI_PXMI (30x24x8)	Powerex	Powerex Building Management	Powder coated carbon steel	12	30"H x 24"W x 8"D	Flexible base (neoprene)	1.95	4.39	Interpolated
PBMI_PXMI (36x30x8)	Powerex	additional communications card			36"H x 30"W x 8"D	(neoprene)	1.95	4.39	UUT2
PBMI_VFD (42x30x12)	Powerex	Same as above with lead pump VFD	Powder coated carbon steel	12	42"H x 30"W x 12"D		1.95	4.39	UUT3, UUT4
PBMI_PXMI (42 x 30 x12)	Powerex	Powerex Building Management Integrator: HMI panel with additional communications card. Control configured for up to 8 pumps.	Powder coated carbon steel	LDIN	42"H x 30"W x 12"D		1.95	4.39	UUT13
1. BASIC_PVM controller car	n be extrapolated	I because it is a depopulated version o	of the controllers tested in UUT1, 7	2, 3 and 4.					
			Intak	e Filters					
Model	Manufacturer	Material	Dimensions (in)		Connection certified	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
CSL-150C	Solberg Mfg.	Powder coated steel housing with	6.8 L x 7.3 Dia.		1-1/2" NPT	Flexible base	1.95	4.39	UUT1, UUT3
CSL-200C	Solberg Mfg.	NPT intake and outlet	10.3 L x 8.8 Dia.		2" NPT	(neoprene)	1.95	4.39	Interpolated
CSL-300C	Solberg Mfg.	<u> </u>	15.8 L x 13.3 Dia.		3" NPT		1.95	4.39	UUT4

### Certified Subcomponents - Tank-Over Systems - Flexible base

		Vacu	ium Pumps						
Manufacturer	Material	Dimensions (in) L x W x H	HP	Voltage tested	Voltage certified	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
Busch		28 x 19 x 12	3	208 V			1.95	4.39	UUT6 <sup>2</sup>
Busch	Cast iron lubricated vane	29 x 19 x 12	5	208V			1.95	4.39	Interpolated
Busch	vacuum pump with face	29 x 19 x 12	5	n/a			1.95	4.39	Interpolated
Busch	and aluminum body rubber	38 x 22 x 16.5	5	n/a			1.95	4.39	Interpolated
Busch	isolation feet attached to	31.5 x 20 x 13.5	5	460V			1.95	4.39	Interpolated
Busch	pump	41 x 24 x 16.5	7.5 or 8	n/a		Elexible base	1.95	4.39	Interpolated
Busch		41 x 24 x 16.5	7.5 or 8	208V	208-230/460	(neoprene)	1.95	4.39	UUT6 <sup>2</sup>
Busch	Oilless claw pump, with	41 x 17 x 16	325	208V			1.95	4.39	UUT7
Busch	integrated lubricated cast	40 x 17 x 16	4.5 to 5	230V			1.95	4.39	Interpolated
Busch	box. C face motor with	42 x 17 x 16	5 to 6.4	n/a			1.95	4.39	Interpolated
Busch	aluminum finned shell,	43 x 20 x 18	6.4 to 7	n/a	$\sim$		1.95	4.39	Interpolated
Busch	rubber isolation feet attached to steel foot rails	43 x 20 x 18	7.5 to 9.1	208V / 230V	E.		1.95	4.39	UUT7
	0	BY:Timo	thy J P Tank	iland					
Manufacturer	Material	Dimensions (in)	Capacity (gal)	Orie	entation	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
Campbell Hausfeld <sup>2</sup>	Steel, ASME construction 200 psig <sup>3</sup>	DATE: 12 20" Dia x 47" L	1/12/20 60	19 Но	rizontal	Flexible base (neoprene)	1.95	4.39	UUT7
ariations in paint co ely branded as Twir th ASME BPVC Sect	lor and threaded port sizes, not a Lakes Manufacturing ion VIII. Tanks have an allowabl	affecting structural ele e working pressure rat	ing of 200 psig.	G CODE					
	Manufacturer Busch Configuration and Manufacturer Campbell Hausfeld <sup>2</sup> ariations in paint cce ely branded as Twin th ASME BPVC Sect	Manufacturer         Material           Busch         Cast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump           Busch         Oilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails           1, RA0205, RA0255 and RA0305 are structurally ide e configuration and serves as the lower bookend.           Manufacturer         Material Campbell Hausfeld <sup>2</sup> Construction 200 psig <sup>3</sup> ariations in paint color and threaded port sizes, not ely branded as Twin Lakes Manufacturing th ASME BPVC Section VIII. Tanks have an allowabl	ManufacturerMaterialDimensions (in) L x W x HBuschCast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump29 x 19 x 12 29 x 19 x 12 38 x 22 x 16.5 31.5 x 20 x 13.5BuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails41 x 24 x 16.5 40 x 17 x 16 43 x 20 x 18HBuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails43 x 20 x 18 20 x 181, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX mod configuration and serves as the lower bookend.By TimoManufacturerMaterial Construction 200 psig 3Dimensions (in) 20" Dia x 47" L 20" Dia x 47" L 20" Dia x 47" LManufacturerMaterial construction 200 psig 3Dimensions (in) 20" Dia x	ManufacturerMaterialDimensions (in) L x W x HHPBuschCast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump29 x 19 x 123Buschcast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump29 x 19 x 125Buschisolation feet attached to pump31.5 x 20 x 13.55BuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails41 x 17 x 164.5 to 5BuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails43 x 20 x 186.4 to 7Buschrubber isolation feet attached to steel foot rails43 x 20 x 187.5 to 9.111, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX models, interpolated construction 200 psig20" Dia x 47" t60Campbell Hausfeld 2 construction 200 psig20" Dia x 47" t6060O'' Dia x 47" t60606060Hausfeld 2 construction 200 psig20" Dia x 47" t60BuschSteel, ASME construction 200 psig20" Dia x 47" t60BuschSteel, ASME construction 200 psig20" Dia x 47" t60Campbell Hausfeld 2Steel, ASME construction 200 psig20" Dia x	ManufacturerMaterialDimensions (in) L x W x HHPVoltage testedBuschCast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump28 x 19 x 125208 VBuschand aluminum body, rubber isolation feet attached to pump31.5 x 20 x 13.55460VBuschoptimized cast isolation feet attached to pump41 x 24 x 16.57.5 or 87.6 or 8BuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, to steel foor rails41 x 17 x 163208VBuschrubber isolation feet attached to steel foor rails43 x 20 x 186.4 to 7n/aHundacturerMaterialDimensions (in) da x 20 x 18Capacity (gal)Oride capacity (gal)1, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX models, interpolated based on UUT configuration and serves as the lower bookend.Bit is a structurally identical to RCXXXX models, interpolated based on UUT configuration and serves as the lower bookend.ManufacturerMaterialDimensions (in) Capacity (gal)Oride campbell construction 200 psig 3ariations in paint color and threaded port sizes, not affecting structural elements. ely branded as Twin Lakes Manufacturing th ASME BPVC Section VIII. Tanks have an allowable working pressure rating of 200 psig.But the structural elements.BuschVIII. Tanks have an allowable working pressure rating of 200 psig.	Wanufacturer         Material         Dimensions (in)         HP         Voltage         voltage certified           Busch         Cast iron lubricated vane vacuum pump with face         29 x 19 x 12         3         208 V         29 x 19 x 12         5         208V           Busch         cast iron lubricated vane vacuum pump with face         29 x 19 x 12         5         208 V         29 x 19 x 12         5         208 V           Busch         mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump         31.5 x 20 x 13.5         5         460V         400V         208-230/460         208-230/460           Busch         Oilless claw pump, with integrated lubricated cast box, C face motor with aluminum finned shell, urbber isolation feet attached to steel foot rails         41 x 24 x 16.5         7.5 or 8         208V         208-230/460           Busch         Oilless claw pump, with aluminum finned shell, urbber isolation feet attached to steel foot rails         43 x 20 x 18         7.5 to 9.1         208V / 230V         208-230/460           11, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX models, interpolated based on UUT6 test to configuration and serves as the lower bookend.         BY T Time they J Piland           Manufacturer         Material         Dimensions (in)         Capacity (ga)         Orientation           Campbell         Steel, ASME	Vacuum Pumps           Manufacturer         Material         Dimensions (in)         HP         Voltage tested         Voltage certified         Mounting           Busch         Cast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, ruber isolation feet attached to pump         29 x 19 x 12         5         208V         29 x 19 x 12         5         n/a           Busch         notated TEFC motor, steel and aluminum body, ruber isolation feet attached to pump         31.5 x 20 x 13.5         5         460V         208-230/460         Flexible base (neoprene)           Busch         Oilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, ubber isolation feet attached to steel foor rails         40 x 17 x 16         5 to 6.4         n/a           Busch         rubber isolation feet attached to steel foor rails         43 x 20 x 18         7 5 to 9.1         208V / 230V           11, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX models, interpolated based on UUT6 test to onfiguration and serves as the lower bookend.         BY: Timothy J Piland           Manufacturer         Material         Dimensions (in)         Capacity (gal)         Orientation         Mounting (neoprene)           arations in paint color and threaded port sizes, not affecting structural elements. ely branded as Twin Lakes Manufacturing th ASME BPVC Section VIII. Tanks have an allowable working pressur	Waterial         Dimensions (in)         HP         Voltage tested         Voltage certified         Mounting         Sds (g) z/h=1           Busch         Cast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to Busch         28 x 19 x 12         5         208 V         1.95         1.95           Busch         mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump         38 x 22 x 16.5         5         n/a         1.95         1.95           Busch         pump         41 x 24 x 16.5         7.5 or 8         n/a         208-230/460         Flexible base (neoprene)         1.95           Busch         Oilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust aluminum finned shell, aluminum finned shell,	Vacuum PumpsManufacturerMaterialDimensions (n) L x W x HHP HPVoltage testedVoltage certifiedMountingSds (g) z/h=1Fp/WpBuschCast iron lubricated value29 x19 x123208 V1.954.39Buschand alumin body, rubbe29 x19 x125n/a1.954.39Buschisolation feet attached to pump21.5 x20 x13.55n/a1.954.39BuschOilless claw pump, with integrated lubricated cast, exhaust41 x24 x16.57.5 or.8208 VBuschOilless claw pump, with aluminum finded shell, aluminum finded shell, alux 20 x18.66.4 to 7n/aBuschordive gearbox, exhaust aluminum finded shell, aluminum finded shell, alux 20 x18.66.4 to 7n/aBuschrubber isolation feet attached to stef foot ralis00 x17 x164.5 to 5 is 2.30/4001.95Buschrubber isolation feet attached to stef foot ralis3.4 x20 x18.66.4 to 7n/aBuschrubber isolation feet attached to stef foot ralis3.2 x0 x18.66.4 to 7n/aBuschrubber isolation feet attached to stef foot ralis3.2 x0 x18.66.4 to 7n/aBuschrubber isolation feet attached to stef foot ralis20 x18.67.5 to 9.1208V / 230VBuschrubber isolation feet attached to stef foot ralis20 x

(( ullet)) DCL <sub>Dynamic Certification Laboratories</sub>

Table 6 - Continued Certified Subcompo	nents - Tank	-Over Systems - Flex	ible base			(( • )	) DCL .	ynamic Certificat	ion Laboratories
			Co	ntrollers					
Model	Manufacturer	Description	Material	NEMA rating	Dimensions (in)	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
BASIC_PVM (24x20x8)		No Touchscreen	Powder coated carbon steel	12	24″H x 20″W x 8″D		1.95	4.39	UUT6 <sup>1</sup>
BASIC_PVM (30x24x8)					30"H x 24"W x 8"D		1.95	4.39	Interpolated
BASIC_PVM (36x30x8)					36"H x 30"W x 8"D		1.95	4.39	Interpolated
HMI_PXMI (30x24x8)	Powerex	Human Machine Interface:	Powder coated	CODR	30"H x 24"W x 8"D	Flexible base	1.95	4.39	Interpolated
HMI_PXMI (36x30x8)		Touchscreen	carbon steel	C CL E	36"H x 30"W x 8"D	(neoprene)	1.95	4.39	Interpolated
PBMI_PXMI (30x24x8)		Powerex Building Management Integrator: HMI	Powder coated	12	30"H x 24"W x 8"D		1.95	4.39	Interpolated
PBMI_PXMI (36x30x8)		panel with additional communications card	carbon steel		36"H x <mark>30"W</mark> x 8"D		1.95	4.39	Interpolated
PBMI_VFD (42x30x12)		Same as above with lead pump VFD	Powder coated carbon steep P -	03 <b>9</b> 3-1	42"H x 30"W x 12"D		1.95	4.39	UUT7
1. UUT 6 was tested in rigid base	e configuration and	serves as the lower bookend.			H				
		0	BY:Timna	ake filters	iland				
Model	Manufacturer	Material	Dimensions	; (in)	Connection size	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
CSL-200C	Solberg Mfg.	Powder coated steel housing with NPT intake and outlet	DATE: 12 10.3 L x 8.8	/12/20 Dia.	2" NPT	Flexible base (neoprene)	1.95	4.39	UUT7
			ORNIA BU	LDIN	3 CODÉ				

# Certified Subcomponents - Tank-Over Systems - Rigid Base

		Vacu	um Pumps						
Manufacturer	Material	Dimensions (in) L x W x H	HP	Voltage tested	Voltage certified	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
Busch		28 x 19 x 12	3	208 V			1.95	1.40	UUT6
Busch	Cast iron lubricated vane	29 x 19 x 12	5	208V			1.95	1.40	Interpolated
Busch	vacuum pump with face	29 x 19 x 12	5	n/a			1.95	1.40	Interpolated
Busch	and aluminum body, rubber	38 x 22 x 16.5	5	n/a			1.95	1.40	Interpolated
Busch	isolation feet attached to	31.5 x 20 x 13.5	5	460V			1.95	1.40	Interpolated
Busch	pump	41 x 24 x 16.5	7.5 or 8	n/a			1.95	1.40	Interpolated
Busch		41 x 24 x 16.5	7.5 or 8	208V	208-230/460	Rigid base	1.95	1.40	UUT6
Busch	Oilless claw pump, with	41 x 17 x 16	50 D C	208V			1.95	1.40	UUT7
Busch	integrated lubricated cast	40 x 17 x 16	4.5 to 5	230V			1.95	1.40	Interpolated
Busch	box. C face motor with	42 x 17 x 16	5 to 6.4	n/a			1.95	1.40	Interpolated
Busch	aluminum finned shell,	43 x 20 x 18 📃	6.4 to 7	n/a			1.95	1.40	Interpolated
Busch	rubber isolation feet attached	43 x 20 x 18	7.5 to 9.1	208V / 230V	The second		1.95	1.40	UUT7 <sup>2</sup>
ase configuration a	nd serves as the upper bookend	BY:Timo	thy J P	iland					
			Tank						
Manufacturer	Material	Dimensions (in) 2	Capacity (gał)	19 <sup>Orie</sup>	entation	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
Campbell Hausfeld <sup>2</sup>	Steel, ASME construction 200 psig <sup>3</sup>	20" Dia x 47" L	60	Hor	rizontal	Rigid base	1.95	1.40	UUT6
ariations in paint cc ely branded as Twir th ASME BPVC Sect	lor and threaded port sizes, not n Lakes Manufacturing ion VIII. Tanks have an allowabl	e working pressure rat	ing of 200 psig.	G CODE					
	Manufacturer Busch Character Campbell Hausfeld <sup>2</sup> ariations in paint ccelly branded as Twire th ASME BPVC Sect	ManufacturerMaterialBuschCast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pumpBuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails1, RA0205, RA0255 and RA0305 are structurally ide ase configuration and serves as the upper bookendManufacturerMaterial Campbell Hausfeld 2 construction 200 psig 3ManufacturerMaterial construction 200 psig 3ManufacturerMaterial construction 200 psig 3ASME BPVC Section VIII. Tanks have an allowable	VacuManufacturerMaterialDimensions (in) L x W x HBuschCast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump29 x 19 x 12 29 x 19 x 12 29 x 19 x 12 38 x 22 x 16.5Buschisolation feet attached to pump31.5 x 20 x 13.5BuschOilless claw pump, with integrated lubricated cast iron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails40 x 17 x 16Buschiron drive gearbox, exhaust box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails43 x 20 x 181, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX modulase construction 200 psig 320" Dia x 47" LManufacturerMaterialDimensions (in) 20" Dia x 47" LManufacturerMaterialDimensions (in) 20" Dia x 47" LManufacturerMaterialDimensions (in) 20" Dia x 47" LASME BPVC Section VIII. Tanks have an allowable working pressure rat	Vacuum PumpsManufacturerMaterialDimensions (in) L × W × HHPBuschCast iron lubricated vane vacuum pump with face mounted TEFC motor, steel and aluminum body, rubber isolation feet attached to pump29 × 19 × 125Buschand aluminum body, rubber isolation feet attached to pump31.5 × 20 × 13.55Buschoilless claw pump, with integrated lubricated cast integrated lubricated cast integrated lubricated cast ion drive gearbox, exhaust box, C face motor with aluminum finned shell, to steel foot rails41 × 24 × 16.57.5 or 8Buschoilless claw pump, with integrated lubricated cast to steel foot rails43 × 20 × 186.4 to 7Ruschrubber isolation feet attached to steel foot rails43 × 20 × 186.4 to 7I, RA0205, RA0255 and RA0305 are structurally identical to RCXXXX models, interpolated ase configuration and serves as the upper bookend.BY : Timochy J PManufacturerMaterialDimensions (in) Capacity (gal)Capacity (gal)Campbell Hausfeld 2Steel, ASME construction 200 psig 320" Dia x 47" L60ASME BPVC Section VIII.Tanks have an allowable working pressure rating of 200 psig.	Vacuum Pumps           Manufacturer         Material         Dimensions (in)         HP         Voltage tested           Busch         Cast iron lubricated vane vacuum pump with face         28 x 19 x 12         3         208 V           Busch         cast iron lubricated vane vacuum pump with face         29 x 19 x 12         5         208 V           Busch         and aluminum body, rubber isolation feet attached to pump         31.5 x 20 x 13.5         5         460V           Busch         Oilless claw pump, with integrated lubricated cast box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails         41 x 24 x 16.5         7.5 or 8         208V           Busch         Oilless claw pump, with integrated lubricated cast box, C face motor with aluminum finned shell, rubber isolation feet attached to steel foot rails         43 x 20 x 18         6.4 to 7         n/a           Busch         aluminum finned shell, rubber isolation feet attached to steel foot rails         43 x 20 x 18         7.5 to 9.1         208V / 230V           1, RA0205, RA025S and RA0305 are structurally identical to RCXXX models, interpolated based on UUT         38 x 22 x 18         7.5 to 9.1         208 V / 230V           1, RA0205, range as the upper bookend.         BY : Timothy J Piland         Tank           Manufacturer         Material         Dimensions (in)         Capacity (gal)	Vacuum Pumps           Manufacturer         Material         LxW xH         HP         Voltage certified           Busch         Cast iron lubricated vane         28 x 19 x 12         3         208 V           Busch         Vacuum pump with face         29 x 19 x 12         5         208 V           Busch         vacuum pump with face         29 x 19 x 12         5         1/a           Busch         mounted TEFC motor, steel         31.5 x 20 x 13.5         5         1/a           Busch         pump         41 x 24 x 16.5         7.5 or 8         n/a           Busch         pump         41 x 24 x 16.5         7.5 or 8         n/a           Busch         olitless claw pump, with         41 x 17 x 16         3         208V           Busch         on drive gearbox, exhaut         40 x 17 x 16         5 to 6.4         n/a           Busch         rubber isolation feet attached dato         43 x 20 x 18         6.4 to 7         n/a           Busch         to steel foot rails         43 x 20 x 18         6.4 to 7         n/a           J, RA0205, RA0255 and RA0305 are structurally identical to RCXXX models, interpolated based on UUT6 test ase configuration and serves as the upper bookend.         BY: Timothy J Piland           Manufacturer         Material </td <td>Wanufacturer         Material         Dimensions (in) LXWXH         HP         Voltage tested         Voltage certified         Mounting           Busch         Cast iron lubricated van aucuum pump with face mounted TEFC motor, steel and aluminum body, rubber Busch         29 x 19 x 12         5         0/0         7/0           Busch         isolation feet attached to pump         38 x 22 x 16.5         5         n/a         208-230/460         Rigid base           Busch         oliest claw pump, with integrated lubricated cast for drive gearbox, exhaust box, C face motor with aluminum finned shell, aucumpump to bookend.         41 x 24 x 16.5         7.5 or 8         n/a           Busch         Oilless claw pump, with integrated lubricated cast for drive gearbox, exhaust box, C face motor with aluminum finned shell, aluminum finned s</td> <td>Vacuum Pumps           Manufacturer         Material         Dimensions (L x W x H)         HP         Voltage certified         Mounting         Sds (g) z/h=1           Busch         Cast iron lubricated vane wacuum pump with face monuted TFC motor, stell         29 x 19 x 12         5         208 V         1.95           Busch         monuted TFC motor, stell         29 x 19 x 12         5         n/a         1.95           Busch         monuted TFC motor, stell         31.5 x 20 x 13.5         5         460V         1.95           Busch         gausch         31.5 x 20 x 13.5         5         n/a         1.95           Busch         pump         41 x 24 x 16.5         7.5 or 8         n/a         1.95           Busch         integrated lubricated cast         40 x 17 x 16         4.5 to 5         208 v         208 v 230/460         Rigid base         1.95           Busch         integrated lubricated cast         40 x 17 x 16         4.5 to 5         208 v         208 v<td>Manufacturer         Material         Dimensions (n) LX × 14 × 12         Voltage certified         Mounting         Sols (g) 2/h=1         Fp/Wp           Busch         Cast iron lubricated van Busch         28 × 19 × 12         3         208 V         1.95         1.40           Busch         Cast iron lubricated van mounted TFC motor, stell         29 × 19 × 12         5         n/a         1.95         1.40           Busch         mounted TFC motor, stell         38 × 22 × 16.5         5         n/a         1.95         1.40           Busch         pump         01145 × 12 × 15.5         5         n/a         1.95         1.40           Busch         pump         01145 × 12 × 12.5         5         n/a         1.95         1.40           Busch         pump         0114 × 12 × 13.5         7.5 or 8         n/a         1.95         1.40           Busch         filt x 12 × 16.5         3         208 V         208 - 230/460         Rigid base         1.95         1.40           Busch         filt x 12 × 16.5         14 × 12 × 16.5         2.50 × 7         208 - 230/460         1.95         1.40           Busch         to stell foor tails         filt x 12 × 16.5         16.0 filt n/a         1.95         1.40      <t< td=""></t<></td></td>	Wanufacturer         Material         Dimensions (in) LXWXH         HP         Voltage tested         Voltage certified         Mounting           Busch         Cast iron lubricated van aucuum pump with face mounted TEFC motor, steel and aluminum body, rubber Busch         29 x 19 x 12         5         0/0         7/0           Busch         isolation feet attached to pump         38 x 22 x 16.5         5         n/a         208-230/460         Rigid base           Busch         oliest claw pump, with integrated lubricated cast for drive gearbox, exhaust box, C face motor with aluminum finned shell, aucumpump to bookend.         41 x 24 x 16.5         7.5 or 8         n/a           Busch         Oilless claw pump, with integrated lubricated cast for drive gearbox, exhaust box, C face motor with aluminum finned shell, aluminum finned s	Vacuum Pumps           Manufacturer         Material         Dimensions (L x W x H)         HP         Voltage certified         Mounting         Sds (g) z/h=1           Busch         Cast iron lubricated vane wacuum pump with face monuted TFC motor, stell         29 x 19 x 12         5         208 V         1.95           Busch         monuted TFC motor, stell         29 x 19 x 12         5         n/a         1.95           Busch         monuted TFC motor, stell         31.5 x 20 x 13.5         5         460V         1.95           Busch         gausch         31.5 x 20 x 13.5         5         n/a         1.95           Busch         pump         41 x 24 x 16.5         7.5 or 8         n/a         1.95           Busch         integrated lubricated cast         40 x 17 x 16         4.5 to 5         208 v         208 v 230/460         Rigid base         1.95           Busch         integrated lubricated cast         40 x 17 x 16         4.5 to 5         208 v         208 v <td>Manufacturer         Material         Dimensions (n) LX × 14 × 12         Voltage certified         Mounting         Sols (g) 2/h=1         Fp/Wp           Busch         Cast iron lubricated van Busch         28 × 19 × 12         3         208 V         1.95         1.40           Busch         Cast iron lubricated van mounted TFC motor, stell         29 × 19 × 12         5         n/a         1.95         1.40           Busch         mounted TFC motor, stell         38 × 22 × 16.5         5         n/a         1.95         1.40           Busch         pump         01145 × 12 × 15.5         5         n/a         1.95         1.40           Busch         pump         01145 × 12 × 12.5         5         n/a         1.95         1.40           Busch         pump         0114 × 12 × 13.5         7.5 or 8         n/a         1.95         1.40           Busch         filt x 12 × 16.5         3         208 V         208 - 230/460         Rigid base         1.95         1.40           Busch         filt x 12 × 16.5         14 × 12 × 16.5         2.50 × 7         208 - 230/460         1.95         1.40           Busch         to stell foor tails         filt x 12 × 16.5         16.0 filt n/a         1.95         1.40      <t< td=""></t<></td>	Manufacturer         Material         Dimensions (n) LX × 14 × 12         Voltage certified         Mounting         Sols (g) 2/h=1         Fp/Wp           Busch         Cast iron lubricated van Busch         28 × 19 × 12         3         208 V         1.95         1.40           Busch         Cast iron lubricated van mounted TFC motor, stell         29 × 19 × 12         5         n/a         1.95         1.40           Busch         mounted TFC motor, stell         38 × 22 × 16.5         5         n/a         1.95         1.40           Busch         pump         01145 × 12 × 15.5         5         n/a         1.95         1.40           Busch         pump         01145 × 12 × 12.5         5         n/a         1.95         1.40           Busch         pump         0114 × 12 × 13.5         7.5 or 8         n/a         1.95         1.40           Busch         filt x 12 × 16.5         3         208 V         208 - 230/460         Rigid base         1.95         1.40           Busch         filt x 12 × 16.5         14 × 12 × 16.5         2.50 × 7         208 - 230/460         1.95         1.40           Busch         to stell foor tails         filt x 12 × 16.5         16.0 filt n/a         1.95         1.40 <t< td=""></t<>

(( )) DCL Dynamic Certification Laboratories

			Co	ontrollers					
Model	Manufacturer	Description	Material	NEMA rating	Dimensions (in)	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
BASIC_PVM (24x20x8)		No Touchscreen	Powder coated carbon steel	12	24"H x 20"W x 8"D		1.95	1.40	UUT6
BASIC PVM (30x24x8)					30"H x 24"W x 8"D	-	1.95	1.40	Interpolated
ASIC_PVM (36x30x8)	-				36"H x 30"W x 8"D	-	1.95	1.40	Interpolated
HMI PXMI (30x24x8)	Powerex	Human Machine Interface:	Powder coated	CODE	30"H x 24"W x 8"D	Rigid base	1.95	1.40	Interpolated
HMI_PXMI (36x30x8)	_	Touchscreen	carbon steel	C(12)E	→ 36"H x 30"W x 8"D	_	1.95	1.40	Interpolated
PBMI_PXMI (30x24x8)	]	Powerex Building Management Integrator: HMI	Powder coated		30"H x 24"W x 8"D		1.95	1.40	Interpolated
PBMI_PXMI (36x30x8)		panel with additional communications card	carbon steel	SHPU	36"H x 30"W x 8"D		1.95	1.40	Interpolated
PBMI_VFD (42x30x12)		Same as above with lead pump VFD	Powder coated carbon steep P	03 <b>9</b> 3-10	42"H x 30"W x 12"D		1.95	1.40	UUT7 <sup>1</sup>
JT 7 was tested in flexible	base configuration a	no serves as the upper bookend	BY:Tima	ake filters P1	Land				
Model	Manufacturer	Material	Dimension	s (in)	Connection size	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
CSL-200C	Solberg Mfg.	Powder coated steel housing with NPT intake and outlet	DATE: 12 10.3 L x 8.8	2/12/201 3 Dia.	2" NPT	Rigid base	1.95	1.40	UUT6
CSL-200C	Solberg Mfg.	Powder coated steel housing with NPT intake and outlet	10.3 L x 8.8	ILDING	2" NPT	Rigid base	1.95	1.40	UUT

### **Certified Components - Tank Mounted Vertical Systems**



Manufacturer: Powerex

Product Line: Mee	dical Vacuum and La	borat	ory Vacuum												
Madical system	Laboratory system		Tank sizo	Total number	Vertically	Horizontally	Max.	dimensior	ns (in)	Maximum		Cortified	Sele (a)		
model	model <sup>1</sup>	Нр	(gallons)	of pumps	stacked pumps or layers	arrayed pumps	Length	Width	Height	operating weight (Ib)	Tested mounting	mounting	z/h=1	Fp/Wp	Unit
					Tanl	Mounted Vertion	cal System	s with Lub	ricated Ro	tary Vane Pumps					
VVTD0153	LVVD0153	1.5	80	2	1	2	43	30	74	710	Rigid base		1.95	1.40	UUT21 <sup>2</sup>
VVTD0203	LVVD0203	2	80	2	1	2	42	30	75	835	N/A		1.95	1.40	Interpolated
VVTD0204	LVVD0204	2	120	2	1	2	44	50	75.5	880	N/A		1.95	1.40	Interpolated
VVTD0303	LVVD0303	3	80	2	1	2	55	30	85	1,260	Rigid base		1.95	1.40	UUT22 <sup>3</sup>
VVTD0304	LVVD0304	3	120	2	1	2	54	37	Ľ 84	1,475	N/A	Rigid base	1.95	1.40	Interpolated
VVTD0403	LVVD0403	4	80	2	1	2 5	54	37	84.5	1,350	N/A		1.95	1.40	Interpolated
VVTD0404	LVVD0404	4	120	2	1	~~, 2	54	37	84.5	1,500	N/A		1.95	1.40	Interpolated
VVTD0503	LVVD0503	5	80	2	1	2	58	37	87	1,260	N/A		1.95	1.40	Interpolated
VVTD0504	LVVD0504	5	120	2	1	2	59	35	85	1,670	Rigid base		1.95	1.40	UUT24 <sup>5</sup>
		-	-	-	Ла	nk Mounted Ver	rtical Syste	ms with O	illess Rota	y Vane Pumps				-	•
VVOTD0153	LVVOD0153	1.5	80	2	1 [2]	2	43	30	74	710	Rigid base		1.95	1.40, 4.39	UUT21 <sup>2,6</sup>
VVOTD0203	LVVOD0203	2	80	2	124	2	53	34	80	930 [7]	N/A		1.95	1.40, 4.39	Interpolated
VVOTD0303	LVVOD0303	3	80	2	1	Ev.T	53	b. <sup>34</sup> т	80	1,100	N/A		1.95	1.40, 4.39	Interpolated
VVOTD0304	LVVOD0304	3	120	2	1	2	53	34	89	1,180	N/A	Rigid or flexible	1.95	1.40, 4.39	Interpolated
VVOTD0403	LVVOD0403	4	80	2	1	2	53	34	80	1,125	N/A	base	1.95	1.40, 4.39	Interpolated
VVOTD0404	LVVOD0404	4	120	2	1	BATE	. 532	1 34 / 1	0 89 0	1,200	N/A	(neoprene)	1.95	1.40, 4.39	Interpolated
VVOTD0503	LVVOD0503	5	80	2	1	2	53	34	90	1,320	N/A		1.95	1.40, 4.39	Interpolated
VVOTD0504	LVVOD0504	5	120	2	1	2	53	34	90	1,170	Flexible base (neoprene)		1.95	1.40, 4.39	UUT23 <sup>4,6</sup>
						Tank Mounted	Vertical S	ystems wit	h Oilless C	law pumps					
CVTD0203V	LCVD0203	2	80	2	1	12	55	30	85	1,260	Rigid base		1.95	1.40	UUT22 3
CVTD0303V	LCVD0303	3	80	2	1	2	> 35	56	82	1,500	N/A	Rigid base	1.95	1.40	Interpolated
CVTD0504AV	LCVD0504AV	4	120	2	1	2	<sup>∼</sup> 59 ∏	L B5 I	84	1,650	N/A	hight buse	1.95	1.40	Interpolated
CVTD0504BV	LCVD0604	5	120	2	1	2	59	35	85	1,670	Rigid base		1.95	1.40	UUT24 5

1. Lab systems identical to medical systems (software change only).

2. UUT21 tested with conventional 80 gal tank, one 1.5HP lubricated rotary vane pump and one 1.5HP oilless rotary vane pump.

3. UUT22 tested with frame style 80 gal tank, one 3 HP lubricated rotary vane pump and one 2 HP oilless claw pump.

4. UUT23 tested with conventional style 120 gal tank and two 5 HP oilless rotary vane pumps.

5. UUT24 tested with frame style 120 gal tank, one 5 HP lubricated rotary vane pump and one 5 HP oilless claw pump.

6. UUT 21 was tested in rigid base configuration and serves as the lower bookend, UUT 23 was tested in flexible base confiugration and serves as the upper bookend

Table 9 Certified Subco	mponents - Tai	nk Mounted Vertical	Systems - Elexible Bas	e			((•)) D	CL Dyr	namic Certificatio	on Laboratories
Model	Manufacturer	Material	Dimensions (L x W x H, in)	НР	Voltage tested	Voltage available	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
			Oilless Rota	iry Vane Pu	mps		•	· - <i>/</i> ·· =		
SV1025	Busch		20 x 10 x 11	1.5	208 V			1.95	4.39	UUT21 <sup>1</sup>
SV1040	Busch	Oilless vane type vacuum pump	22 x 10 x 11	2	n/a	1		1.95	4.39	Interpolated
SV1063	Busch	with flange mounted motor	30 x 17 x 14	3	n/a	208-230/460	Flexible base	1.95	4.39	Interpolated
SV1080	Busch	on pump/motor	31 x 17 x 14	4	n/a	1	(neoprene)	1.95	4.39	Interpolated
SV1100	Busch		33 x 17 x 14	5	460V	1		1.95	4.39	UUT23
1. UUT 21 was tested in r	rigid base configuration	and serves as the lower bookend	3							
			OR	anks D ]	7		1			
Model <sup>1</sup>	Manufacturer	Material	Dimensions (in)	Capacity (gal)	CON	уре	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
AR0630xxx	Campbell Hausfeld <sup>2</sup>	Steel, ASME	24" Dia x 53" H	80	Conv	entional	Flexible base	1.95	4.39	UUT21 <sup>4</sup>
AR0568xxx		construction 200 psig	30" Dia x 53" H	120	Conv	entional	(neoprene)	1.95	4.39	UUT23
4. UUT 21 was tested in r	igid base configuration	and serves as the lower bookend	BY:Timot	hy J Itrollers	Piland					
Туре	Model	Manufacturer	Description: 12/	Material	NEMA Rating	Dimensions (W x H x D, in)	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
Basic Dupley controller	PVM239xxAB		NEMA 12 Enclosure integrated	*		20 x 24 x 8		1.95	4.39	UUT21 <sup>3</sup>
busic bupics controller	or CB <sup>1</sup>		to Enclosure frame, containing PLC, transformers, relays, motor	Powder		24 x 24 x 8	Flavible base	1.95	4.39	Interpolated
Premium Dupley	<b>ΡΒΜΙ</b> //269χχΔΒ	Powerex	contactor and motor protector	carbon	12	30 x 30 x 8	(neoprene)	1.95	4.39	Interpolated
controller includes HMI	or CB <sup>1</sup>		motors, optional HMI and	steel	G	30 x 36 x 8		1.95	4.39	Interpolated
			Optional VFD.	UD 1		24 x 36 x 8		1.95	4.39	UUT23
<ol> <li>Where First x = 1,2,3,5</li> <li>Where First x = 1,2,3,5</li> <li>UUT 21 was tested in r</li> </ol>	;,7,A for HP, Second X = ;7,A for HP, Second x = rigid base configuration	2, 3, 4 for voltage (208, 230, 400 2, 3, 4 for voltage (208, 230, 460 and serves as the lower bookend	IV)	or the telli	Scruture switch					

Table 10										
<b>Certified Subco</b>	mponents - Ta	nk Mounted Vertical	Systems - Rigid base					UCL Dyr	namic Certificatio	on Laboratories
Model	Manufacturer	Material	Dimensions (L x W x H, in)	HP	Voltage tested	Voltage available	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
			Lubricated Ro	otary Vane P	umps					
RA0025	Busch		25 x 14 x 10.5	1.5	208 V			1.95	1.40	UUT21
RA0040	Busch	Cast iron pump with face	26 x 14 x 10.5	2	n/a			1.95	1.40	Interpolated
RA0063	Busch	aluminum body, rubber	28 x 19 x 12	3	n/a	208-230/460	Rigid base	1.95	1.40	UUT22
RA0101	Busch	isolation feet on pump/motor	29 x 19 x 12	5	n/a			1.95	1.40	Interpolated
RA0155A	Busch		31.5 x 20 x 13.5	5	460V			1.95	1.40	UUT24
	•		Oilless Rota	ary Vane Pur	nps			-	-	
SV1025	Busch		20 x 10 x 11	1.5	208 V			1.95	1.40	UUT21
SV1040	Busch	Oilless vane type vacuum pump	22 x 10 x 11	$CO^2D$ z	n/a			1.95	1.40	Interpolated
SV1063	Busch	assembly, rubber isolation feet	30 x 17 x 14	3	n/a	208-230/460	Rigid base	1.95	1.40	Interpolated
SV1080	Busch	on pump/motor	31 x 17 x 14	4	n/a M			1.95	1.40	Interpolated
SV1100	Busch		33 x 17 x 14	5	460V			1.95	1.40	UUT23 <sup>1</sup>
			Oilless	Claw Pumps						
MM1104	Busch	Oilless claw pump, with	40 x 17 x 16	2	460V	E.F.		1.95	1.40	UUT22
MM1144	Busch	integrated lubricated cast iron drive gearbox, exhaust box, C	41 x 17 x 16	3	n/a	208-230/460	Rigid base	1.95	1.40	Interpolated
MM1102	Busch	face motor with aluminum finned shell, rubber isolation	40 x 17 x 16 imot	4.5 to 5	Pi¶and	200 250/400	nigia base	1.95	1.40	Interpolated
MM1142	Busch	feet attached to steel foot rails	42 x 17 x 16	5 to 6.4	460V			1.95	1.40	UUT24
1. UUT 23 was tested in	flexible base configurat	ion and serves as the upper book	DATE: 12/		IG COT	507				

Table 10 - Cont Certified Subco	inued mponents - Tan	k Mounted Vertical	Systems - Rigid base				((•)) D	CL Dyr	amic Certificatio	on Laboratories
	•			Tanks						
Model <sup>1</sup>	Manufacturer	Material	Dimensions (in)	Capacity (gal)	T	уре	Mounting	Sds (g) z/h=1	Fp/Wp	Unit
AR0630xxx	Campbell Hausfeld <sup>2</sup>	Steel, ASME	24" Dia x 53" H	80	Conve	entional	Rigid or flexible base	1.95	1.40	UUT21
AR0568xxx		construction 200 psig	30" Dia x 53" H	120	Conve	entional	(neoprene)	1.95	1.40	UUT23
AR0273xxx	Comphell Housfold <sup>2</sup>	Steel, ASME	24" Dia x 50.5" H	80	Fr	ame	Rigid base	1.95	1.40	UUT22
AR0614xxx	Campbell Hausield	construction 200 psig <sup>3</sup>	30" Dia x 52" H	120	Fr	ame	Nigiu base	1.95	1.40	UUT24
VES07285		Steel ASME	24" Dia x 49" H	80						UUT31a
VES04865	Morganton	construction 200 nsig $^3$	30" Dia x 52" H	120	Fr	ame	Rigid base	1.95	1.40	Interpolated
VES07072		construction 200 psig	30" Dia x 92"H	240						UUT30a
3. Construction is in acco	ordance with ASME BPVC	Section VIII. Tanks have an all	owable working pressure rating of	200 psig.	D	I'				
Туре	Model	Manufacturer	Description OSP-(	Material	NEMA Rating	Dimensions (W x H x D, in)	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
Basic Dupley controller	PVM239xxAB		BV.Timot	T. M	Diland	20 x <mark>24 x 8</mark>		1.95	1.40	UUT21
basic bupick controller	or CB <sup>1</sup>		to Enclosure frame, containing	Powder	e i lanu	24 x <mark>24 x 8</mark>		1.95	1.40	Interpolated
Premium Dunley	PBMIV269xxAB	Powerex	PLC, transformers, relays, motor contactor and motor protector	coated	01012	30 x 30 x 8	Rigid base	1.95	1.40	Interpolated
controller includes HMI	or CB <sup>1</sup>		circuit breaker for up to 2	steel		30 x 36 x 8	4	1.95	1.40	Interpolated
			Optional VFD.			24 x 36 x 8	-	1.95	1.40	Interpolated
Premium with VFD	PBMIV269xxCV <sup>2</sup>					30 x 40 x 12		1.95	1.40	UUT24
1. Where First x = 1,2,3,5 2. Where First x = 1,2,3,5	5,7,A for HP, Second x = 2 5,7,A for HP, Second x = 2	2, 3, 4 for voltage (208, 230, 46 2, 3, 4 for voltage (208, 230, 46	0V), and A or C relates to the value 0V)	of the tem	perature switch					



Manufacturer: Powerex Product Line: Medical Vac

Product Line: Medical Vacuum and Laboratory Va

Product Line: Medical Vac	uum and Labo	ratory vacuum												
Model number	Туре	Pump HP	Tank	size (gal)	Vertically stacked	Horizontally	Dime	ensions (in	iches)	Weight (lb)	Mounting	Sds (g),	Fp/Wp	Unit
					pumps	arrayed pumps	Length	Width	Height			z/n=1		
						Stacked Systems	1		1			1		
VPD04042L1	Duplex	(2) 5HP		120	2	1	55.0	64.0	76.0	1,340	Flexible base (neoprene)	2.50	5.63	UUT1
VPQ2505S5588940	Duplex	(2) 25HP		200	2	1	70.0	90.0	87.0	5,130	Flexible base (neoprene)	1.95	4.39	UUT2
CVPD0504A3F1	Duplex	(2) 5HP		120	2	1	55.0	64.0	76.0	1,690	Flexible base (neoprene)	2.50	5.63	UUT3
CVPQ150S5588940	Duplex	(2) 15HP		200	2	1	74.0	90.0	88.0	3,800	Flexible base (neoprene)	2.06	4.64	UUT4
VPD0xxx/CVPD0xxx	Duplex	(1) 15HP, (1) 5HP		N/A	2 10	r Godi	70.0	45.0	80.0	1,940	Flexible base (neoprene)	2.00	4.50	UUT5
VPT0xxx/CVPT0xxx	Triplex	(2) 7.5HP, (1) 3HP		N/A	$\mathbf{D}^{3}$	1	55.0	32.0	85.0	1,680	Flexible base (neoprene)	2.00	4.50	UUT8
VPO150x/CVPO150x controller	Octoplex controller	N/A		N/A	N/A	N/A D	55.0	32.0	65.0	410	Flexible base (neoprene)	2.00	3.60	UUT13
				15		Tank Over Systems	Y		1-1					
VPDT0xxx	Duplex	(1) 7.5HP, (1) 3HP		60	2		74.0	39.0	89.0	1,450	Rigid base	2.00	1.44	UUT6
CVPDT0xxx	Duplex	(1) 7.5HP, (1) 3HP		60	2	1 1	74.0	39.0	89.0	1,910	Flexible base (neoprene)	2.00	4.50	UUT7
		(1) 5111		M	Medical	Air Stacked Scroll Sy	stems <sup>1</sup>	1	Innna	-		I		
MSD15064L5 (receiver/drver skid)	N/A	N/A		240	B <sub>N/A</sub> :Ti	mothy J	P <sub>84.0</sub> 1	ar32.0	96.0	1,310	Flexible base (neoprene)	2.42	4.36	UUT4b
1. Medical Air Stacked Scro	ll System inclu	ded here for bookending of 2	40 gallon vei	tical tank.								I		
				C V		10/10/0	010			0				
Model number	Type	Dump HD	Tank size	Tank style	Vertically stacked	- Horizontally	Max.	dimensio	ns (in) 📂	Woight (lb)	Mounting	Sds (g),	En/M/n	Unit
Wodernamber	Type	Fulliphie	(gal)	Talik Style	pumps	arrayed pumps	Length	Width	Height	weight (ib)	Wounting	z/h=1	rp/wp	Onic
				TT.	Vertic	al Tank Mounted Sys	stems		<sup>v</sup>					
VVTD0153 / VVOTD0153	Duplex	(1) 1.5 HP lube vane, (1) 1. 5 HP oilless vane	80	Conventional	1	2	43.0	30.0	74.0	710	Rigid base	2.00	1.44	UUT21
VVTD0303 / CVTD0203V	Duplex	(1) 3 HP lube vane, (1) 2 HP oilless claw	80	Frame	1	2	55.0	30.0	85.0	1,260	Rigid base	2.00	1.44	UUT22
VVOTD0504	Duplex	(2) 5 HP oilless vane	120	Conventional	1 B	UTTDT	3 53.0	34.0	90.0	1,170	Flexible base (neoprene)	2.00	4.50	UUT23
VVTD0504 / CVTD0504BV	Duplex	(1) 5 HP lube vane, (1) 5 HP oilless claw	120	Frame	1		59.0	35.0	85.0	1,670	Rigid base	2.00	1.44	UUT24
		120 gallon and 240 gallon vertical tank on a platform frame base	120, 240	Frame <sup>1</sup>	NA	NA	33.5	60.0	94.0	1,010	Rigid base	2.00	1.44	UUT 30a
Tank Skid		120 gallon and 240 gallon vertical tank on a platform frame base	120, 240	Frame <sup>1</sup>	NA	NA	33.5	60.0	94.0	1,010	Flexible base (neoprene)	2.00	4.50	UUT 30b
		80 gallon, 120 gallon vertical tank on a ladder frame base	80, 120	Frame <sup>1</sup>	NA	NA	32.0	55.0	75.0	630	Rigid base	2.00	1.44	UUT31a
		80 gallon, 120 gallon vertical tank on a ladder frame base	80, 120	Frame <sup>1</sup>	NA	NA	32.0	55.0	75.0	630	Flexible base (neoprene)	2.00	4.50	UUT31b

1. Larger tank on skid is associated with stack style tank mounting

 $(( \bullet))$  DCL Dynamic Certification Laboratories



Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VPD04042L1

Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex system. Lubricated vane vacuum pump (5 HP), 208V. 120 gallon vertical receiver tank. HMI\_PXMI controller in NEMA 12 enclosure. 1-1/2" intake filter element.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UUT	T Properties				
	Operating W	oight (lb)	[	Dimensions (in	ו)	Lowest N	latural Freque	ency (Hz)
UUT 1		eigint (ib)	Length	Width	Height	Front-Back	Side-Side	Vertical
	1,34	0	55	64	76	7.0	6.5	21.3
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.50	1.0 0 1	1.5	4.00	3.00	1.68	0.68

### Unit Mounting Description:



UUT1, view from front right

UUT1, view from left

Base mounted using Airloc model 32 neoprene vibration isolation pads. Both skids were anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced approximately 30" widthwise and 53" lengthwise on center for each skid (eight total).



#### Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

### Model Number: VPQ2505S5588940

### Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex system. Lube vane vacuum pump (25 HP), 460V. 200 gallon vertical receiver tank. PBMI\_PXMI controller in NEMA 12 enclosure.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

UUT Properties											
	Operating Maight (lh)		[	Dimensions (ir	ו)	Lowest Natural Frequency (Hz)					
UUT 2		eigint (ib)	Length	Width	Height	Front-Back	Side-Side	Vertical			
	5,13	0	70	90	87	4.50	3.80	10.25			
			Seismic	Test Paramete	ers						
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)			
CBC 2016	ICC-ES AC156	1.95	1.0 OF	G.5D1	3.12	2.34	1.31	0.53			

### Unit Mounting Description:



UUT2, view from front



Base mounted using Airloc model 32 neoprene vibration isolation pads. Both skids were anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced approximately 88" widthwise and 34" lengthwise on center for each skid (eight total).



Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: CVPD0504A3F1

### Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex system. Oilless Claw pump (5 HP), 230V. 120 gallon vertical receiver tank. PBMI\_VFD controller in NEMA 12 enclosure. 1-1/2" intake filter element.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

UUT Properties										
	Operating Weight (lb) 1,690		[	Dimensions (ir	ı)	Lowest Natural Frequency (Hz)				
UUT 3			Length	Width	Height	Front-Back	Side-Side	Vertical		
			55	64	76	6.25	6.25	13.00		
			Seismic	Test Paramete	ers					
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)		
CBC 2016	ICC-ES AC156	2.50	1.0 OF	G.9D1	4.00	3.00	1.68	0.68		

### Unit Mounting Description:



UUT3, view from front

UUT3, view from left

Base mounted using Airloc model 32 neoprene vibration isolation pads. Both skids were anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced approximately 30" widthwise and 48" lengthwise for each skid (eight total). The control panel was braced to the skid with one piece of B-Line B45 14 gage galvanized carbon steel channel, attached with B-Line B230 brackets (one bracket per channel end) and two 1/2"- diameter Grade 2 bolts and nuts with flat washers per bracket.



Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: CVPQ15054R2

Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex system. Oilless claw pump (15 HP), 460V. 200 gallon vertical receiver tank. PBMI\_VFD controller in NEMA 12 enclosure. 3" intake filter element.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties					
	UUT 4 Operating Weight (lb) 3,800		[	Dimensions (in	ו)	Lowest Natural Frequency (Hz)			
UUT 4			Length	Width	Height	Front-Back	Side-Side	Vertical	
			74	90	88	4.50	4.75	11.75	
			Seismic	Test Paramet	ers				
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)	
CBC 2016	ICC-ES AC156	2.06	1.0 OF	G.9D1	3.30	2.47	1.38	0.56	

### Unit Mounting Description:



UUT4, view from front right

UUT4, view from left

Base mounted using Airloc model 32 neoprene vibration isolation pads. Both skids were anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers (eight total).

Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VPD0XXX/CVPD0XXX

Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex system. Lubricated vane vacuum pump (5 HP), oilless claw pump (5 HP), 460V.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

UUT Properties											
	Our constinue Mariabet (IIb)		I	Dimensions (ir	ו)	Lowest Natural Frequency (Hz)					
UUT 5	Operating w	eigiit (in)	Length	Width	Height	Front-Back	Side-Side	Vertical			
	1,94	0	70	45	80	6.0	4.0	10.0			
			Seismic	Test Paramete	ers						
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)			
CBC 2016	ICC-ES AC156	2.00	1.0 F	(1.5 D)	3.20	2.40	1.34	0.54			

### Unit Mounting Description:



Base mounted using Airloc model 32 neoprene vibration isolation pads. The skid was anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced at approximately 43" widthwise and 68" lengthwise on center.

UUT6	
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Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VPDT0XXX

Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex tank-over system. Lubricated vane vacuum pump (3 and 7.5 HP), 208V, 60 gallon horizontal tank, 24" BASIC\_PVM controller, 2" NPT intake filter.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UUT	T Properties						
	Operating Weight (lb)		[	Dimensions (in	n)	Lowest Natural Frequency (Hz)				
			Length	Width	Height	Front-Back	Side-Side	Vertical		
UUT 6			70	32						
	1,450		(74 to	(39 to	89	6.5	6.0	13.0		
			outside of	outside of						
			pipe)	_ pipe) $D_{\perp}$	T.			Ļ		
	Seismic Test Parameters									
Building Code	Test Criteria	Sds (g)	z/h		Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)		
CBC 2016	ICC-ES AC156	2.00	1.0	<b>D</b> 1.5	3.20	2.40	1.34	0.54		
						57				





The skid was anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced at approximately 30" widthwise and 54" lengthwise on center.



Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: CVPDT0XXX

Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Duplex tank-over system. Oilless claw pump (3 and 7.5 HP), 208V, 60 gallon horizontal tank, 42" PBMI VFD controller, 2" NPT intake filter.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties						
	Operating Weight (lb)		[	Dimensions (in	ו)	Lowest Natural Frequency (Hz)				
			Length	Width	Height	Front-Back	Side-Side	Vertical		
UUT 7			70	32	89	4.5	4.5	11.0		
			(74 to	(39 to						
		•	outside of	outside of			_			
			pipe)	pipe) D 1	7					
	Seismic Test Parameters									
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)		
CBC 2016	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.34	0.54		





Base mounted using Airloc model 32 neoprene vibration isolation pads. The skid was anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced at approximately 30" widthwise and 54" lengthwise on center.



Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VPT0XXX/CVPT0XXX

Product Construction Summary: Powder coated carbon steel skid and frame

Options / Component Summary: Triplex system. Lubricated vane vacuum pump (3 and 7.5 HP), oilless claw pump (7.5 HP), 208V.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties					
	Operating Weight (lb)		I	Dimensions (i	n)	Lowest Natural Frequency (Hz)			
UUT 8	Operating w	eigint (ib)	Length	Width	Height	Front-Back	Side-Side	Vertical	
	1,68	0	55	32	85	4.0	3.5	11.5	
			Seismic	Test Paramet	ers				
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)	
CBC 2016	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.34	0.54	

### Unit Mounting Description:



Base mounted using Airloc model 32 neoprene vibration isolation pads. The skid was anchored to the shake table interface plate with four 1/2"-diameter Grade 5 bolts and washers spaced at approximately 30" widthwise and 53" lengthwise on center.



Manufacturer: Powerex

Product Line: Medical Air and Laboratory Air

Model Number: MSD15064L5 (receiver/dryer skid)

Product Construction Summary: Powder coated structural steel skid and frame

**Options / Component Summary:** 

240 gallon vertical receiver tank and PMD111 desiccant air dryer.

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties				
<b>Operating Weight</b>	Lowest N	Natural Frequency (Hz)						
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
1,310	UUT4	ŀb	84*	32	96*	5.5	5.0	22.5
			Seismic	Test Paramete	ers			
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.42	1.0 OF	- <u>4.</u> 9 <i>D1</i>	3,87	2.90	1.61	0.65

\*Note: Length and height are combined dimensions for UUT4a and UUT4b (reference DCL Test Report 33299-1301).

### Unit Mounting Description:



Base mounted using Airloc model 32 neoprene vibration isolation pads. The skid was mounted to the shake table interface frame using four 1/2"-diameter, Grade 5 bolts and washers spaced approximately 30" widthwise and 82" lengthwise on center.



#### Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VPO150x/CVPO150x controller

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: PBMI\_PXMI octoplex controller

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties				
<b>Operating Weight</b>		latural Frequ	uency (Hz)					
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
410	UUT1	13	55	32	65	9.0	9.0	>33.3
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53
			T					

### Unit Mounting Description:



Base mounted using Airloc model 32 neoprene vibration isolation pads. The skid was attached to the shake table interface plate with four 1/2"-diameter, Grade 5 bolts and washers spaced at 30" widthwise and 53" lengthwise on center, and four 1 1/4"x1 1/4" x 3/8" malleable iron bevel washers, plain finish. The control panel was braced to the skid with one piece of B-Line B45 14 gage galvanized carbon steel channel, attached with B-Line B230 brackets (one bracket per channel end) and two Grade 2, 1/2"-diameter bolts and nuts with flat washers per bracket.



### Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VVTD0153 / VVOTD0153

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: 1.5 HP lubricated rotary vane pump, 1.5 HP oilless rotary vane pump, 80 gallon conventional tank and duplex PVM controller

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties					
Operating Weight Dimensions (in) Lowest Natural Freq									
(lb)		Length Width Height Front-Back Side-Side							
710	UUT2	21	43	30	74	15.0	13.5	15.0	
			Seismic	Test Paramet	ers				
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)	
CBC 2016	ICC-ES AC156	2 00	10	(15)D	3 20	2 40	1 33	0.53	

### Unit Mounting Description:



The unit was base mounted with three 1/2"-diameter Grade 5 bolts and washers spaced approximately 27" on center from eachother in a triangular pattern.



### Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VVTD0303 / CVTD0203V

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: 3 HP lubricated rotary vane pump, 2 HP oilless claw pump, 80 gallon frame tank and duplex PBM controller with HMI

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties							
<b>Operating Weight</b>		D	imensions (in	Lowest Natural Frequency (Hz)							
(lb)		Front-Back	Side-Side	Vertical							
1,260	UUT2	22	55	30	85	4.5	4.5	7.5			
	Seismic Test Parameters										

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.00	1.0 F	(1.5 D)	3.20	2.40	1.33	0.53

### Unit Mounting Description:



The unit was base mounted with four 1/2"-diameter Grade 5 bolts and washers spaced approximately 38" widthwise and 30" lengthwise on center and four 1 1/4"x1 1/4" x 3/8" malleable iron bevel washers, plain finish.

2.00

### **UNIT UNDER TEST (UUT) Summary Sheet**

Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

ICC-ES AC156

Model Number: VVOTD0504

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: 5 HP oilless rotary vane pumps, 80 gallon conventional tank and duplex PBM controller with HMI

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

1.0

			UU	T Properties				
<b>Operating Weight</b>		D	imensions (in	Lowest N	latural Freque	ency (Hz)		
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
1,170	UUT2	23	53	34	90	7.5	7.5	28.4
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)

1.5

3.20

2.40

1.33

0.53

### Unit Mounting Description:

CBC 2016



The unit was base mounted with four Airloc model 32 neoprene pads, four 1/2"-diameter Grade 5 bolts and washers spaced approximately 19" widthwise and 19" lengthwise on center, and four 2"x2"x3/16" low carbon steel black oxide finish plate washers.



#### Manufacturer: Powerex

Product Line: Medical Vacuum and Laboratory Vacuum

Model Number: VVTD0504 / CVTD0504BV

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: 5 HP lubricated rotary vane pump, 5 HP oilless claw oilless rotary vane pump, 120 gallon frame tank and premium PBM controller with VFD

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties				
<b>Operating Weight</b>		D	imensions (in	)		Lowest Natural Frequency (Hz)		
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
1,670	UUT2	24	59	35	85	4.5	19.5	>33.3
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.00	1.0 0 5	GGDI	3.20	2.40	1.33	0.53

Unit Mounting Description:



Brace attachment detail



The unit was base mounted with four 1/2"-diameter Grade 5 bolts and washers spaced approximately 38" widthwise and 31" lengthwise on center and four 1 1/4"x1 1/4" x 3/8" malleable iron bevel washers, plain finish. The right and left sides were braced with 2.5" wide, 1/4" thick structural steel angle, with each end of the angle attached to the vertical members of the UUT frame with one 1/2"-diameter Grade 5 bolt and four 4"x4"x1/4" galvanized finish low carbon steel washers at each attachment location.



Manufacturer: Powerex

Product Line: Medical Air and Laboratory Air

Model Number: VES07285 (80gal tank), VES07072 (240gal tank)

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: Platform frame mounted tanks

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties					
<b>Operating Weight</b>		D	imensions (in	)		Lowest Natural Frequency (Hz)			
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical	
1,010	UUT3	0a	33.5	60.0	94.0	4.0	5.5	31.5	
			Seismic	Test Paramet	ers				
Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)	
CBC 2016	ICC-ES AC156	2.00	1.0 F	$G_{0}D_{1}$	3.20	2.40	1.33	0.53	

### Unit Mounting Description:



UUT 30a was base mounted with four 1/2" diameter Grade 5 bolts and washers spaced approximately 50" widthwise and 31" lengthwise on center.



Manufacturer: Powerex

Product Line: Medical Air and Laboratory Air

Model Number: VES07285 (80gal tank), VES07072 (240gal tank)

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: Platform frame mounted tanks

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties				
<b>Operating Weight</b>		D	imensions (in	Lowest Natural Frequency (Hz)				
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
1,010	UUT3	0b	33.5	60.0	94.0	3.0	3.5	10.5
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	7/h	In	$\Delta fl_{X}-H(\sigma)$	$\Delta rig_{-}H(g)$	Δflx-V (σ)	Arig-V (g)

Building Code	Test Criteria	Sas (g)	z/n	Ip	Afix-H (g)	Arig-H (g)	Afix-V (g)	Arig-v (g
CBC 2016	ICC-ES AC156	2.00	1.0 F	G.5 D E	3.20	2.40	1.33	0.53
			HO		CO			

### Unit Mounting Description:



UUT 30b was base mounted with four 1/2" diameter Grade 5 bolts and washers spaced approximately 50" widthwise and 31" lengthwise on center through an Airloc model 32 neprene pad.



Manufacturer: Powerex

Product Line: Medical Air and Laboratory Air

Model Number: VES07285 (80gal tank), VES04767 (120gal tank)

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: Ladder frame mounted tanks

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties				
<b>Operating Weight</b>		D	imensions (in)			Lowest Natural Frequency (Hz)		
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
630	UUT3	1a	32	55	75	8.5	11.5	>33.3
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.00	1.0 F	(1.5D)	3.20	2.40	1.33	0.53

Unit Mounting Description:



UUT 31a was base mounted with four 1/2" diameter Grade 5 bolts and washers spaced approximately 53" widthwise and 30" lengthwise on center and four 1 1/4"x1 1/4" x 3/8" malleable iron bevel washers.



Manufacturer: Powerex

Product Line: Medical Air and Laboratory Air

Model Number: VES07285 (80gal tank), VES04767 (120gal tank)

Product Construction Summary: Powder coated structural steel skid

Options / Component Summary: Ladder frame mounted tanks

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component and attachment system and force-resisting systems was maintained.

			UU	T Properties				
<b>Operating Weight</b>		D	imensions (in	Lowest N	Natural Frequ	ency (Hz)		
(lb)			Length	Width	Height	Front-Back	Side-Side	Vertical
630	UUT3	1b	32	55	75	8.0	9.5	16.0
			Seismic	Test Paramet	ers			
Building Code	Test Criteria	Sds (g)	z/h	lp	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.00	1.0	G.5D)	3.20	2.40	1.33	0.53

### Unit Mounting Description:



UUT 31b was base mounted with four 1/2" diameter Grade 5 bolts and washers spaced approximately 53" widthwise and 30" lengthwise on center and four 1 1/4"x1 1/4" x 3/8" malleable iron bevel washers through an Airloc model 32 neprene pad.