



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

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

OFFICE USE ONLY

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 Engineering

Mailing Address: 150 Production Drive, Harrison, OH 45030

Telephone: (513) 367-3273 Email: jabt@powerexinc.com

**Product Information**

Product Name: Medical and Laboratory Vacuum Units

Product Type: Mechanical Equipment

Product Model Number: See Attachment

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

General Description: Each unit contains lubricated or claw pumps, tanks, controllers and intake filters.

Seismic enhancements made to the test units and required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid or flexible base mount (neoprene)

**Applicant Information**

Applicant Company Name: The VMC Group

Contact Person: John Giuliano

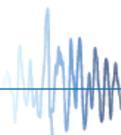
Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 8388-1780 Email: john.giuliano@thevmcgroup.com

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

Signature of Applicant:  Date: 9/19/16

Title: President Company Name: The VMC Group





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

Company Name: The VMC Group

Name: Ken Tarlow California License Number: SE-2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780 Email: Ken.tarlow@thevmcgroup.com

**Supports and Attachments Preapproval**

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

**Certification Method**

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

**Testing Laboratory**

Company Name: Dynamic Certification Laboratories

Contact Name: Kelly Laplace, Project Manager

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

Telephone: (775) 358-5085 Email: Kelly@shaketest.com





Seismic Parameters

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

Neoprene isolated: 4.5 (SDS = 2.50 g), 3.71 (SDS = 2.06 g), 3.60 (SDS = 2.00 g), 3.51 (SDS = 1.95 g)

Design Basis of Equipment or Components (Fp/Wp) = Rigid: 2.4 (SDS = 2.0 g)

SDS (Design spectral response acceleration at short period, g) = 2.50, 2.06, 2.00, or 1.95 (See attachment)

ap (In-structure equipment or component amplification factor) = 2.5 (neoprene isolated), 1.0 (rigid)

Rp (Equipment or component response modification factor) = 2.5 (neoprene isolated), 1.5 (rigid)

Omega\_0 (System overstrength factor) = 1.5

Ip (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = See attachments

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

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

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

SDS (Design spectral response acceleration at short period, g) =

SD1 (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Omega\_0 (System overstrength factor) =

Cd (Deflection amplification factor) =

Ip (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: [X] Yes [ ] No

List of Attachments Supporting Special Seismic Certification

[X] Test Report(s) [X] Drawings [ ] Calculations [X] Manufacturer's Catalog

[ ] Other(s) (Please Specify):

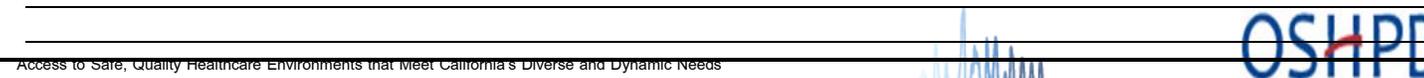
OSHPD Approval (For Office Use Only) - Approval Expires on December 31, 2022

Signature: [Handwritten Signature] Date: 11/2/2016

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : SDS (g) = See Above z/h = 1.0

Condition of Approval (if applicable):



## Special Seismic Certification



### Certified Components - Lubricated Rotary Vane

**Manufacturer:** Powerex

**Certified Product Line:** Medical & Lab Vacuum 5Hp through 25Hp lubricated vane type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

**Mounting Description:** Rigid or flexible base mount (neoprene)

Medical System Model	Laboratory System Model	Hp	Tank Size <sup>1</sup> (gallons)	Total Number of Pumps	Vertically Stacked Pumps or Layers	Horizontally Arrayed Pumps	Max. Dimensions (in)			Maximum Operating Weight (lb)	Mounting	Sds (g), z/h=1	Unit
							Width	Length	Height				
Stacked Systems													
Duplex													
VPD0404	LVPD0404	5 (2)	120 V	2	2	1	64	55	76	1,340	Flexible base mount (neoprene)	2.5	UUT1
VPD0405	LVPD0405	5 (2)	200 V	2	2	1	64	55	83	1,600		2.00	Interpolated
VPD0504	LVPD0504	5 (2)	120 V	2	2	1	64	55	76	1,685			Interpolated
VPD0XXX	LVPD0XXX	5 (2)	200 V	2	2	1	64	55	83	1,905		UUT5	
VPD0754	LVPD0754	7.5 (2)	120 V	2	2	1	64	55	76	1,760		1.95	Interpolated
VPD0755	LVPD0755	7.5 (2)	200 V	2	2	1	64	55	83	1,960			Interpolated
VPD1004	LVPD1004	10 (2)	120 V	2	2	1	64	55	76	2,050			Interpolated
VPD1005	LVPD1005	10 (2)	200 V	2	2	1	64	55	83	2,250			Interpolated
VPD1505	LVPD1505	15 (2)	200 V	2	2	1	90	70	87	4,280			Interpolated
VPD2005	LVPD2005	20 (2)	200 V	2	2	1	90	70	87	4,610			Interpolated
VPD2505	LVPD2505	25 (2)	200 V	2	2	1	90	70	87	5,130	1.95	UUT2	
Triplex (based on 2-stack plus 1 layout)													
VPT0504	LVPT0504	5 (3)	120 V	3	2,1	2	96	55	76	1,950	Flexible base mount (neoprene)	1.95	Extrapolated
VPT0505	LVPT0505	5 (3)	200 V	3	2,1	2	96	55	83	2,350			
VPT0754	LVPT0754	7.5 (3)	120 V	3	2,1	2	96	55	76	2,400			
VPT0755	LVPT0755	7.5 (3)	200 V	3	2,1	2	96	55	83	2,600			
VPT1004	LVPT1004	10 (3)	120 V	3	2,1	2	96	55	76	3,000			
VPT1005	LVPT1005	10 (3)	200 V	3	2,1	2	96	55	83	3,200			
VPT1505	LVPT1505	15 (3)	200 V	3	2,1	2	135	70	87	5,850			
VPT2005	LVPT2005	20 (3)	200 V	3	2,1	2	135	70	87	6,250			
VPT2505	LVPT2505	25 (3)	200 V	3	2,1	2	135	71	87	6,800			

1. V in tank listing indicates vertical orientation

2. See Justification Matrix for explanation of extrapolated units.

## Special Seismic Certification



### Certified Components - Lubricated Rotary Vane

**Manufacturer:** Powerex

**Certified Product Line:** Medical & Lab Vacuum 5Hp through 25Hp lubricated vane type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

**Mounting Description:** Rigid or flexible base mount (neoprene)

Medical System Model	Laboratory System Model	Hp	Tank Size <sup>1</sup> (gallons)	Total Number of Pumps	Vertically Stacked Pumps or Layers	Horizontally Arrayed Pumps	Max. Dimensions (in)			Maximum Operating Weight (lb)	Mounting	Sds (g), z/h=1	Unit
							Width	Length	Height				
<b>Stacked Systems (Continued)</b>													
<b>Triplex (3-stack)</b>													
VPT0304	LVPT0304	3 (3)	120 V	3	3	1	64 or 66	55	84	1,635	Flexible base mount (neoprene)	2.00	Extrapolated
VPT0404	LVPT0404	5 (3)	120 V	3	3	1	64 or 66	55	84	1,710			Extrapolated
VPT0504	LVPT0504	5 (3)	120 V	3	3	1	64 or 66	55	87	1,850			Extrapolated
VPT0XXX	LVPT0XXX	7.5 (2), 3 (1)	N/A	3	3	1	64 or 66	55	87	1,950			UUT8 <sup>2</sup>
VPT0505	LVPT0505	5 (3)	200V	3	3	1	64 or 66	55	87	1,975			Extrapolated
VPT0754	LVPT0754	7.5 (3)	120 V	3	3	1	64 or 66	55	87	2,425			Extrapolated
VPT0755	LVPT0755	7.5 (3)	200 V	3	3	1	64 or 66	55	87	2,550			Extrapolated
<b>Quadruplex</b>													
VPQ0505	LVPQ0505	5 (4)	200 V	4	2,2	2	96	55	83	2,850	Flexible base mount (neoprene)	1.95	Extrapolated
VPQ0755	LVPQ0755	7.5 (4)	200 V	4	2,2	2	96	55	83	3,150			
VPQ1005	LVPQ1005	10 (4)	200 V	4	2,2	2	96	55	83	3,900			
VPQ1505	LVPQ1505	15 (4)	200 V	4	2,2	2	135	70	87	7,150			
VPQ2005	LVPQ2005	20 (4)	200 V	4	2,2	2	135	70	87	7,750			
VPQ2505	LVPQ2505	25 (4)	200 V	4	2,2	2	135	71	87	8,600			
<b>Expandable</b>													
VPD0504-EX3	LVPD0504-EX3	5 (2)	120V	2 (3)	2	1 (2)	64	55	76	1,685	Flexible base mount (neoprene)	1.95	Extrapolated
VPD0505-EX3	LVPD0505-EX3	5 (2)	200 V	2 (3)	2	1 (2)	64	55	83	1,905			
VPD0754-EX3	LVPD0754-EX3	7.5 (2)	120V	2 (3)	2	1 (2)	64	55	76	1,760			
VPD0755-EX3	LVPD0755-EX3	7.5 (2)	200 V	2 (3)	2	1 (2)	64	55	83	1,960			
VPD1004-EX3	LVPD1004-EX3	10 (2)	120V	2 (3)	2	1 (2)	64	55	76	2,050			
VPD1005-EX3	LVPD1005-EX3	10 (2)	200V	2 (3)	2	1 (2)	64	55	83	2,250			
VPD1505-EX3	LVPD1505-EX3	15 (2)	200 V	2 (3)	2	1 (2)	90	70	87	4,280			
VPD2005-EX3	LVPD2005-EX3	20 (2)	200 V	2 (3)	2	1 (2)	90	70	87	4,610			
VPD2505-EX3	LVPD2505-EX3	25 (2)	200 V	2 (3)	2	1 (2)	90	71	87	5,030			
VPT0505-EX4	LVPT0505-EX4	5 (3)	200 V	3 (4)	2	2	96	55	83	2,350			
VPT0755-EX4	LVPT0755-EX4	7.5 (3)	200 V	3 (4)	2	2	96	55	83	2,600			
VPT1005-EX4	LVPT1005-EX4	10 (3)	200 V	3 (4)	2	2	96	55	83	3,200			
VPT1505-EX4	LVPT1505-EX4	15 (3)	200 V	3 (4)	2	2	135	70	87	5,850			
VPT2005-EX4	LVPT2005-EX4	20 (3)	200 V	3 (4)	2	2	135	70	87	6,250			
VPT2505-EX4	LVPT2505-EX4	25 (3)	200 V	3 (4)	2	2	135	71	87	6,800			

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. See Justification Matrix for explanation of extrapolated units.

## Special Seismic Certification



### Certified Components - Lubricated Rotary Vane

**Manufacturer:** Powerex

**Certified Product Line:** Medical & Lab Vacuum 5Hp through 25Hp lubricated vane type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

**Mounting Description:** Rigid or flexible base mount (neoprene)

Medical System Model	Laboratory System Model	Hp	Tank Size <sup>1</sup> (gallons)	Total Number of Pumps	Vertically Stacked Pumps or Layers	Horizontally Arrayed Pumps	Max. Dimensions (in)			Maximum Operating Weight (lb)	Mounting	Sds (g), z/h=1	Unit
							Width	Length	Height				
Tank Over Systems													
VPDT0302	LVPT0302	3(2)	60 H	2	2	1	39	70	89	1,440	Rigid or flexible base mount (neoprene)	2.00	Extrapolated
VPDT0402	LVPDT0402	5 (2)	60 H	2	2	1	39	70	89	1,590			Extrapolated
VPDT0502	LVPDT0502	5 (2)	60 H	2	2	1	39	70	89	1,815			Extrapolated
VPDT0XXX	LVPDT0XXX	7.5 (1), 3 (1)	60 H	2	2	1	39	70	89	1,950			UUT6 <sup>2,3</sup>
VPDT0752	LVPDT0752	7.5 (2)	60 H	2	2	1	39	70	89	2,295			Extrapolated

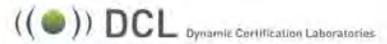
1. H in tank listing indicates horizontal orientation

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 for bookending of tank-over systems.

4. See Justification Matrix for explanation of extrapolated units.

**Special Seismic Certification**



**Justification Matrix - Lubricated Rotary Vane**

**Manufacturer:** Powerex

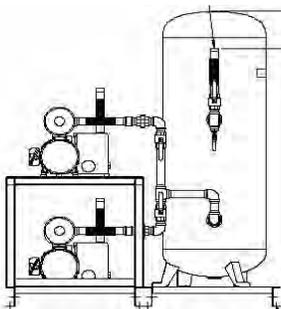
**Product Line:** Medical Vacuum, Lab Vacuum small 5 HP through 25 HP lubricated vane type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

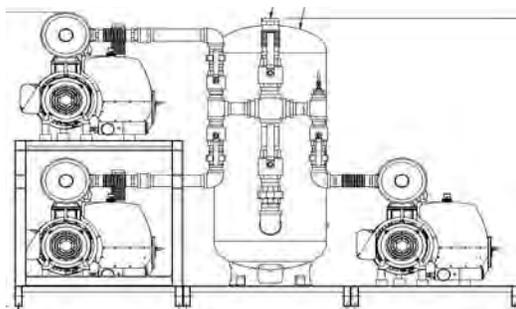
**Justification Matrix for Extrapolated Lubricated Rotary Vane Units**

Unit	Units Used for Extrapolation	Difference from Units Used for Extrapolation
VPT0504	UUT 1 (VPD0404) ↑ ↓	The duplex units tested in UUT1 and UUT2 consist of two pumps mounted on one side of the vertical tank. The 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 pumps are mounted to independent skids.
VPT0505		
VPT0754		
VPT0755		
VPT1004		
VPT1005		
VPT1505		
VPT2005		
VPT2505	UUT 2 (VPD2505)	
VPQ0505	UUT 1 (VPD0404)	The duplex units tested in UUT1 and UUT2 consist of two pumps mounted on one side of the vertical tank. The extrapolated quadraplex systems consist of two pumps mounted on one side of the vertical tank and two pump mounted on the other side of the vertical tank. The pumps are mounted to independent skids.
VPQ0755	↑ ↓	
VPQ1005		
VPQ1505		
VPQ2005		
VPQ2505	UUT 2 (VPD2505)	
VPD0504-EX3	UUT 1 (VPD0404)	The extrapolated expandable units consist of an independent receiver tank/control panel skid and an independent pump skid. The tested units UUT1 and UUT2 consisted of independent receiver tank/control panel skid and an independent pump skid.
VPD0505-EX3		
VPD0754-EX3		
VPD0755-EX3		
VPD1004-EX3		
VPD1005-EX3		
VPD1505-EX3		
VPD2005-EX3		
VPD2505-EX3		
VPT0505-EX4		
VPT0755-EX4		
VPT1005-EX4		
VPT1505-EX4		
VPT2005-EX4		
VPT2505-EX4	UUT 2 (VPD2505)	

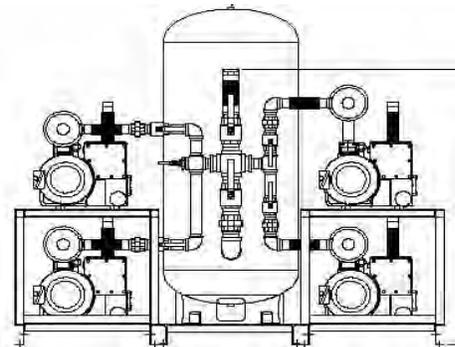
Duplex System



Triplex System



Quad-Plex System



**Special Seismic Certification**



**Justification Matrix - Lubricated Rotary Vane**

**Manufacturer:** Poworex

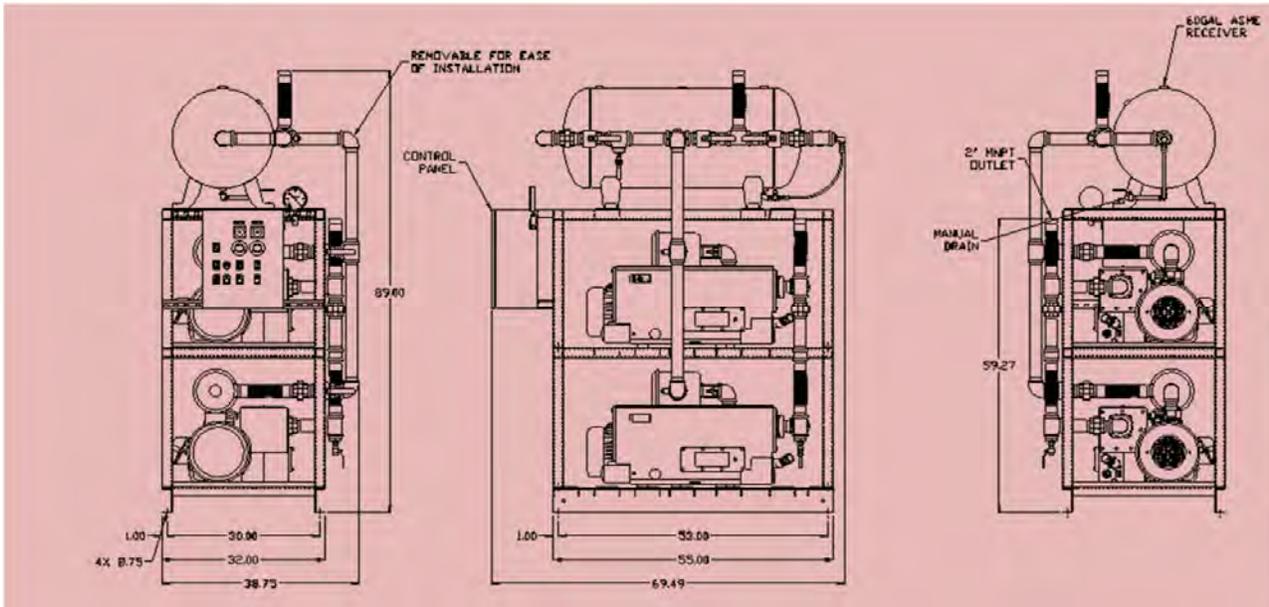
**Product Line:** Medical Vacuum, Lab Vacuum small 5HP through 25 HP lubricated vane type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base

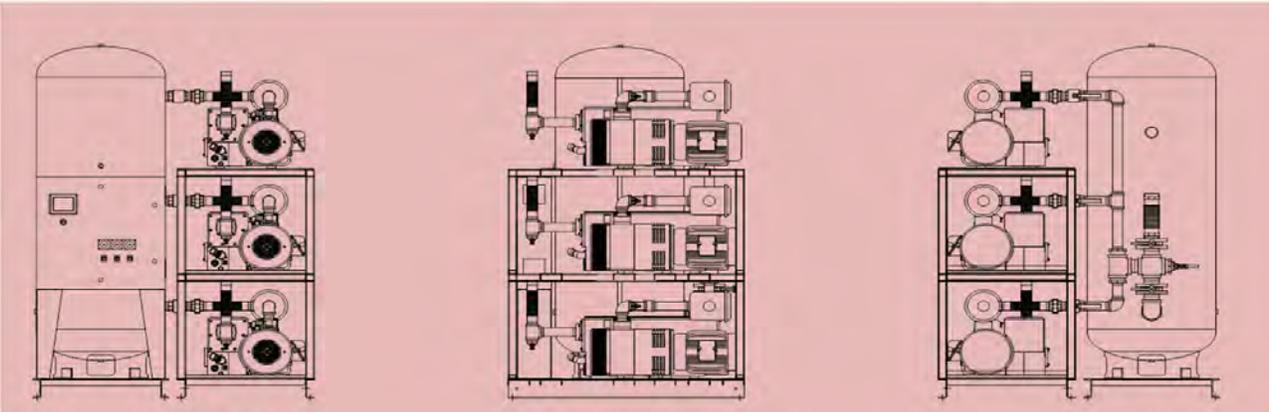
**Justification Matrix for Extrapolated Lubricated Rotary Vane Units (Continued)**

Unit	Units Used for Extrapolation	Difference from Units Used for Extrapolation
VPD0504	UUT5 (VPD0XXX)	UUT5 consists of a representative frame and base platform with a pump (RA0155A 5 HP) similar to that of UUT 1 in the lower position and a larger claw pump (replacing the pump in UUT4) in the upper position.
VPD0505		
VPDT0302	UUT6 (VPDT0XXX)	UUT6 consists of a representative base and frame structure with a 3HP vacuum pump in the lower tier and a 7.5 HP vacuum pump in the upper pump tier, with a 60 gallon horizontal tank rigidly bolted above, plumbed and with electrical control panel mounted to the frame system. Also see UUT7 for bookending of tank-over systems.
VPDT0402		
VPDT0502		
VPDT0752		
VPT0304	UUT8 (VPT0XXX)	UUT8 consists of a representative base and frame structure. The top position is occupied by a claw pump heavier than the certified lube models, with the lowest position occupied by the lightest of the certified lube models and the mid position by the largest pump in the certified list. Control and tank skid for certified units are the same as was tested in UUT1 and UUT2.
VPT0404		
VPT0504		
VPT0505		
VPT0754		
VPT0755		

**Tank Over Construction - Duplex systems**



**Triplex Stack Systems**



## Special Seismic Certification



### Certified Components - Claw Oil-Less

**Manufacturer:** Powerex

**Certified Product Line:** Medical & Lab Vacuum 5Hp through 15Hp oilless claw type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

**Mounting Description:** Rigid or flexible base mount (neoprene)

Model Number Medical Systems	Model Number Laboratory Systems	Hp	Tank size <sup>1</sup>	Total Number of Pumps	Vertically Stacked Pumps or Layers	Horizontally Arrayed Pumps	Max. Dimensions (in)			Maximum Operating Weight (lb)	Mounting	Sds (g), z/h=1	UUT		
							Length	Width *	Height						
<b>Stacked Systems</b>															
<b>Duplex</b>															
CVPD0504A	LCPD0504**	5 (2)	120 V	2	2	1	55	64	76	1,690	Flexible base mount (neoprene)	2.5	UUT3		
CVPD0504B	LCPD0604**	6.4 (2)	120 V	2	2	1	55	64	76	1,925		2.06	Interpolated		
CVPD0754A	LCPD0704	7.0 (2)	120 V	2	2	1	55	64	76	2,175					
CVPD0754B	LCPD0904**	9.1 (2)	120 V	2	2	1	55	64	76	2,400					
CVPD1005	LCPD1005	10 (2)	200 V	2	2	1	55	64	83	2,875					
CVPDXXXX	LCPDXXXX	15 (1), 5 (1)	N/A	2	2	1	70	45	80	1500				2.00	UUT5
CVPD1505	LCPD1505	15 (2)	200 V	2	2	1	74	90	88	3,800				2.06	UUT4
* (When touchscreen controls are used, additional 2 inch space is required between skids.)															
** No drawing available for these models, configuration is same as equivalent Medical unit.															
<b>Triplex (based on 2-stack plus 1 layout)</b>															
CVPT0504A**	LCPT0504	5 (3)	120 V	3	2, 1	2	55	96	76	2,150	Flexible base mount (neoprene)	2.06	Extrapolated		
CVPT0505A	LCPT0505	5 (3)	200 V	3	2, 1	2	55	96	83	2,275					
CVPT0504B	LCPT0604	6.4 (3)	120 V	3	2, 1	2	55	96	76	2,000					
CVPT0505B	LCPT0605	6.4 (3)	200 V	3	2, 1	2	55	96	83	2,150					
CVPT0755A	LCPT0705	7.0 (3)	200 V	3	2, 1	2	55	96	83	3,200					
CVPT0755B	LCPT0905	9.1 (3)	200 V	3	2, 1	2	55	96	83	3,500					
CVPT1005	LCPT1005	10 (3)	200 V	3	2, 1	2	55	96	83	4,200					
CVPT1505	LCPT1505	15 (3)	200 V	3	2, 1	2	71	135	88	4,800					
<b>Triplex (3-stack)</b>															
CVPT0XXXX	LCVPT0XXXX	7.5 (2), 3 (1)	N/A	3	3	1	64 or 66	55	87	1950	Flexible base mount (neoprene)	2.00	UUT8 <sup>2</sup>		
CVPT0304	LCVPT0304	3 (3)	120 V	3	3	1	64 or 66	55	84	2200			Extrapolated		
CVPT0504A	LCVPT0504	4-5 (3)	120 V	3	3	1	64 or 66	55	84	2235			Extrapolated		
CVPT0504B	LCVPT0604	5-6.4 (3)	120 V	3	3	1	64 or 66	55	87	2360			Extrapolated		
CVPT0505A	LCVPT0505	4-5 (3)	200V	3	3	1	64 or 66	55	87	2275			Extrapolated		
CVPT0505B	LCVPT0605	5-6.4 (3)	200V	3	3	1	64 or 66	55	87	2400			Extrapolated		
CVPT0754A	LCVPT0754A	6.4-7.5 (2)	120 V	3	3	1	64 or 66	55	87	2565			Extrapolated		
CVPT0755A	LCVPT0755A	6.4-7.5 (2)	200 V	3	3	1	64 or 66	55	87	2690			Extrapolated		
CVPT0754B	LCVPT0754B	7.5-9.1 (2)	120 V	3	3	1	64 or 66	55	87	2600			Extrapolated		
CVPT0755B	LCVPT0755B	7.5-9.1 (2)	200 V	3	3	1	64 or 66	55	87	2725			Extrapolated		

## Special Seismic Certification



### Certified Components - Claw Oil-Less

**Manufacturer:** Powerex

**Certified Product Line:** Medical & Lab Vacuum 5Hp through 15Hp oilless claw type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

**Mounting Description:** Rigid or flexible base mount (neoprene)

Model Number Medical Systems	Model Number Laboratory Systems	Hp	Tank size <sup>1</sup>	Total Number of Pumps	Vertically Stacked Pumps or Layers	Horizontally Arrayed Pumps	Max. Dimensions (in)			Maximum Operating Weight (lb)	Mounting	Sds (g), z/h=1	UUT
							Length	Width *	Height				
Quadruplex													
CVPQ0505A	LCPQ0505	5 (4)	200 V	4	2,2	2	55	96	83	2,500	Flexible base mount (neoprene)	2.06	Extrapolated
CVPQ0505B	LCPQ0605	6.4 (4)	200 V	4	2,2	2	55	96	83	2,700			
CVPQ0755A	LCPQ0705	7.0 (4)	200 V	4	2,2	2	55	96	83	3,600			
CVPQ0755B	LCPQ0905	9.1 (4)	200 V	4	2,2	2	55	96	83	4,000			
CVPQ1005	LCPQ1005	10 (4)	200 V	4	2,2	2	55	96	83	4,900			
CVPQ1505	LCPQ1505	15 (4)	200 V	4	2,2	2	71	135	88	5,600			
Tank Over Systems													
CVPDT0302	LCVPT0302	3(2)	60 H	2	2	1	39	70	89	1,600	Rigid or flexible base mount (neoprene)	2.00	Extrapolated
CVPDT0XXX	LCVPT0XXX	7.5 (1), 3 (1)	60 H	2	2	1	39	70	89	1,650			UUT7 <sup>3,4</sup>
CVPDT0502A	LCVPDT0502	4-5 (2)	60 H	2	2	1	39	70	89	1,860			Extrapolated
CVPDT0502B	LCVPDT0602	5-6.4 (2)	60 H	2	2	1	39	70	89	1,910			Extrapolated
CVPDT0752A	LCVPDT0702	6.4-7.5 (2)	60 H	2	2	1	39	70	89	2,030			Extrapolated
CVPDT0752B	LCVPDT0752	7.5-9.1 (2)	60H	2	2	2	39	70	89	2,145			Extrapolated

1. V or H in tank listing indicates vertical or horizontal 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). 3 HP claw pump tested in UUT6. Receiver tanks and control panels bookended by UUT3 and UUT4.

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

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

5. See Justification Matrix for explanation of extrapolated units.

# Special Seismic Certification

## Justification Matrix- Claw Oil-Less

**Manufacturer:** Powerex

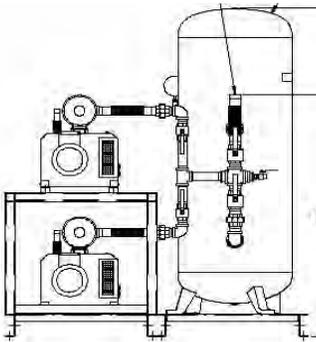
**Product Line:** Medical & Lab Vacuum 5Hp through 15Hp oilless claw type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base skid with a combination of welded and bolted cross members, upper pump mounted to welded steel frame with a combination of welded and bolted cross members.

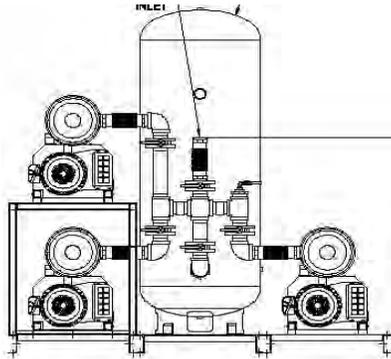
### Justification Matrix for Extrapolated Oilless Claw Type

Unit	Units Used for Extrapolation	Difference from Units Used for Extrapolation
CVPT0504A**	UUT 3 (CVPD0504A)	The duplex units tested in UUT3 and UUT4 consist of two pumps mounted on one side of the vertical tank. The 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 pumps are mounted to independent skids.
CVPT0505A	↕	
CVPT0504B		
CVPT0505B		
CVPT0755A		
CVPT0755B		
CVPT1005	UUT 4 (CVPD1505)	
CVPQ0505A	UUT 3 (CVPD0504A)	The duplex units tested in UUT3 and UUT4 consist of two pumps mounted on one side of the vertical tank. The extrapolated quadraplex systems consist of two pumps mounted on one side of the vertical tank and two pump mounted on the other side of the vertical tank. The pumps are mounted to independent skids.
CVPQ0505B	↕	
CVPQ0755A		
CVPQ0755B		
CVPQ1005		
CVPQ1505		

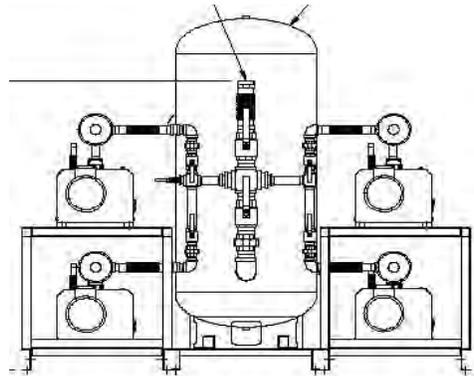
Duplex System



Triplex System



Quad-Plex System



**Special Seismic Certification**

**Justification Matrix - Claw Oil-Less**



**Manufacturer:** Powerex

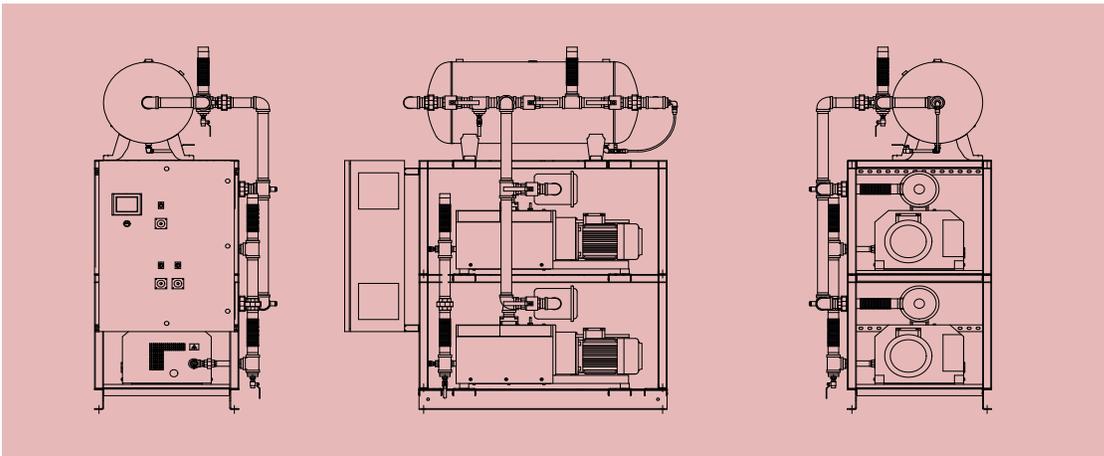
**Product Line:** Medical & Lab Vacuum 5Hp through 15Hp oilless claw type

**Certified Product Construction:** Powder-coated carbon steel frame, pump with bolted on flange face motor, rubber isolators between pump and frame. Lower pump mounted to steel base

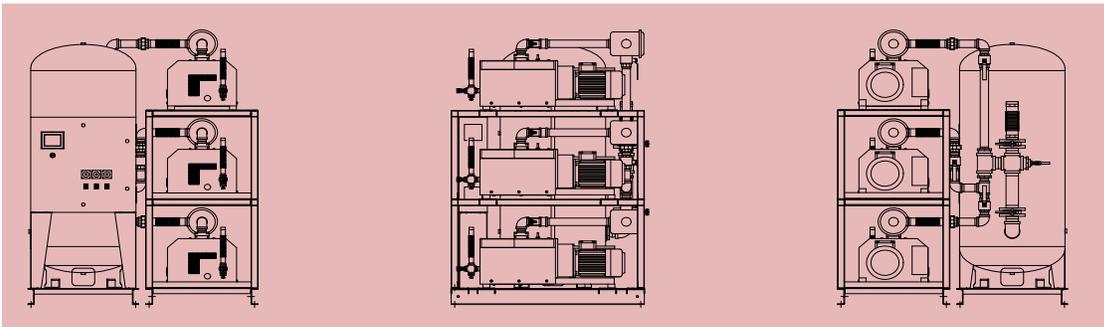
**Justification Matrix for Extrapolated Oilless Claw Type (Continued)**

Unit	Units Used for Extrapolation	Difference from Units Used for Extrapolation
CVPD1505	UUT5	UUT5 demonstrates an alternate 15HP claw pump; as the pump used in UUT4 is replaced by a similar, yet structurally different pump designated MM1502. The MM1502 pump is tested in the upper position of the frame set.
CVPDT0302	UUT7	UUT7 consists of a representative frame and base platform with a pump, MM1144, similar to that of UUT 3 in the lower position and a 7.5HP pump MM1252 in the upper position. These two pumps encompass the range for the Tank-Over construction.
CVPDT0502A		
CVPDT0502B		
CVPDT0752A		
CVPDT0752B		
CVPT0303	UUT8	UUT8 consists of a triplex stack utilizing a base and frame as tested in previously certified models. UUT8 has the 7.5 Oilless Claw pump in the highest (top) position and alternate pumps in the lower positions. Tank and Control skids are the same as tested in UUT3, UUT4.
CVPT0503A		
CVPT0504A		
CVPT0505A		
CVPT0504B		
CVPT0505B		
CVPT0754A		
CVPT0754B		
CVPT0755A		
CVPT0755B		

**Duplex Tank Over Construction**



**Triplex Stack Construction**



# Special Seismic Certification Certified Subcomponents



**Manufacturer:** Powerex

**Certified Product Line:** Medical Vacuum / Lab Vacuum

**Certified Subcomponents:** Lubricated Vane Vacuum Pump, Claw Oil-Less Vacuum Pump, Tanks

Lubricated Vane Vacuum Pump								
Model No.	Manufacturer	Material	Dimensions (in) L x W x H	HP	Voltage Tested	Voltage Certified	Sds (g) z/h=1	Unit
RA0063	Busch	Cast Iron pump with cast aluminum exhaust box; Baldor cast iron shell, aluminum end frame tri-voltage NEMA C Face motor; rubber isolation feet	28 x 19 x 12	3	208 V	208/230V or 460V	2.00	UUT6, UUT8
RC0101	Busch		29 x 19 x 12	5	208V		2.50	UUT1
RA0101	Busch		29 x 19 x 12	5	n/a		2.50	Interpolated
RC0155	Busch		38 x 22 x 16.5	5	n/a		1.95	Interpolated
RA0155A	Busch		31.5 x 20 x 13.5	5	460V			UUT5
RC0205	Busch		41 x 24 x 16.5	7.5 or 8	n/a			Interpolated
RA0205	Busch		41 x 24 x 16.5	7.5 or 8	208V			UUT6, UUT8
RC0305	Busch		44 x 24 x 16.5	10	n/a			Interpolated
RA0255	Busch		44 x 24 x 16.5	10	n/a			
RA0305	Busch		44 x 24 x 16.5	10	n/a			
RC0400	Busch		54 x 38 x 26.5	15	n/a			
RC0502	Busch		65.5 x 38 x 26.5	20	n/a			
RC0630	Busch		69 x 40 x 26.5	25	460 V			1.95

Note: Pumps with Model No. RA0101, RA0205, RA0255 and RA0305 are structurally identical to RCXXX models, interpolated based on UUT1 and UUT2.

Claw Oil-Less Vacuum Pump								
Model No.	Manufacturer	Material	Dimensions (in) L x W x H	HP	Voltage Tested	Voltage Certified	Sds (g) z/h=1	Unit
MM1144	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	41 x 17 x 16	3	208V	208/230V or 460V	2.00	UUT7
MM1102	Busch		40 x 17 x 16	4.5 to 5	230V		2.50	UUT3
MM1142	Busch		42 x 17 x 16	5 to 6.4	n/a		2.00	Interpolated
MM1202	Busch		43 x 20 x 18	6.4 to 7	n/a			UUT7, UUT8
MM1252	Busch		43 x 20 x 18	7.5 to 9.1	208V / 230V		Interpolated	
MM1402	Busch		48 x 20 x 18	9 to 10.2	n/a		2.00	Interpolated
MM1322	Busch		48 x 20 x 18	9 to 10.2	n/a		2.00	UUT4
MI1502	Busch		48 x 31 x 27	15	460V		2.06	UUT5
MM1502	Busch		54.5 x 20 x 18	15	460V			

Note: Interpolated pumps are similar in construction to smallest and largest as tested in UUT 3 and UUT 4.

Tanks								
Model No.	Manufacturer	Material	Dimensions (in)	Orientation	Capacity (gal)	Sds (g) z/h=1	Unit	
AR0273xxxx	Campbell Hausfeld	Steel, ASME construction 200 psig*	24" Dia x 50.5" H	Vertical	120	2.50	UUT1 UUT3	
AR0512xxxx	Campbell Hausfeld	Steel, ASME construction 200 psig*	30" Dia x 77" H	Vertical	200	2.06	UUT4	
AR8029xxx	Campbell Hausfeld	Steel, ASME construction 200 psig*	20" Dia x 47" L	Horizontal	60	2.00	UUT6 UUT7	

xxxx in model number is for variations in paint color and threaded port sizes, not affecting structural elements.

\*In accordance with ASME BPVC Section VIII. Tanks have an allowable working pressure rating of 200 psig.

# Special Seismic Certification Certified Subcomponents



**Manufacturer:** Powerex

**Certified Product Line:** Medical Vacuum / Lab Vacuum

**Certified Subcomponents:** Controllers and Intake Filters

### Controllers

Model No.	Manufacturer	Description	Material	NEMA Rating	Dimensions (in)	Sds (g), z/h=1	Unit
BASIC_PVM (24x20x8)	Powerex	No Touchscreen	Powder coated carbon steel	12	24"H x 20"W x 8"D	2.00	UUT6
BASIC_PVM (30x24x8)					30"H x 24"W x 8"D	2.50	Interpolated
BASIC_PVM (36x30x8)					36"H x 30"W x 8"D	2.06	Interpolated
HMI_PXMI (30x24x8)		Human Machine Interface: Touchscreen	Powder coated carbon steel	12	30"H x 24"W x 8"D	2.50	UUT1
HMI_PXMI (36x30x8)					36"H x 30"W x 8"D	1.95	Interpolated
PBMI_PXMI (30x24x8)		Powerex Building Management Integrator: HMI panel with additional communications card	Powder coated carbon steel	12	30"H x 24"W x 8"D	1.95	Interpolated
PBMI_PXMI (36x30x8)					36"H x 30"W x 8"D	1.95	UUT2
PBMI_VFD (42x30x12)					Same as above with Lead pump VFD	Powder coated carbon steel	12

\* BASIC\_PVM controller can be extrapolated because it is similar to HMI\_PXMI controller except has no touch screen.

### Intake filters

Model No.	Manufacturer	Material	Dimensions (in)	Connection size tested	Connection Certified	Sds (g), z/h=1	Unit
CSL-150C	Solberg Mfg.	Powder coated steel housing with NPT intake and outlet	6.8 L x 7.3 Dia.	1-1/2" NPT	1-1/2" NPT	2.50	UUT1 UUT3
CSL-200C	Solberg Mfg.	Powder coated steel housing with NPT intake and outlet	10.3 L x 8.8 Dia.	n/a	2" NPT	2.00	UUT6, UUT7
CSL-300C	Solberg Mfg.	Powder coated steel housing with NPT intake and outlet	15.8 L x 13.3 Dia.	3" NPT	3" NPT	2.06	UUT4

# Special Seismic Certification



## Tested Units

**Manufacturer:** Powerex

**Product Line:** Medical Vacuum / Lab Vacuum

**Tested Product Construction:** Powder-coated carbon steel frame

**Tested Options:**

Pumps: Lube vane type 5 HP through 25 HP with fully integrated multi voltage motor. Claw type 5 HP through 15 HP with fully integrated multi-voltage motor.

Tank -120 gallon to 200 gallon, manual drain option, auto drain option.

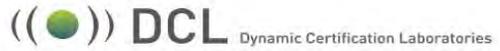
Control 208 volt to 460 volt, Touchscreen option, Bacnet Gateway Option, VFD Option

**Tested Mounting Description:** Rigid or flexible base mount (neoprene)

Model Number	Type	Pump HP	Receiver Size	Total number of pumps	Vertically stacked pumps or layers	Horizontally arrayed pumps	Dimensions (inches)			Weight (lb)	Mounting	Sds (g), z/h=1	UUT
							Length	Width	Height				
<b>Stacked Systems</b>													
VPD04042L1	Duplex	(2) 5HP	120 Gal	2	2	1	55.0	64.0	76.0	1,340	Flexible base mount (neoprene)	2.50	UUT1
VPQ25055588940	Duplex	(2) 25HP	200 Gal	2	2	1	70.0	90.0	87.0	5,130		1.95	UUT2
CVPD0504A3F1	Duplex	(2) 5HP	120 Gal	2	2	1	55.0	64.0	76.0	1,690	Flexible base mount (neoprene)	2.50	UUT3
CVPTQ15055588940	Duplex	(2) 15HP	200 Gal	2	2	1	74.0	90.0	88.0	3,800		2.06	UUT4
VPD0XXX/CVPD0XXX	Duplex	(1) 15HP, (1) 5HP	N/A	2	2	1	70	45	80	1,940	Flexible base mount (neoprene)	2.00	UUT5
VPT0XXX/CVPT0XXX	Triplex	(2) 7.5HP, (1) 3HP	N/A	3	3	1	55	32	85	1,680	Flexible base mount (neoprene)	2.00	UUT8
<b>Tank Over Systems</b>													
VPDT0XXX	Duplex Tank Over	(1) 7.5HP, (1) 3HP	60 Gal	2	2	1	70	32	89	1,450	Rigid base mount	2.00	UUT6
CVPTD0XXX	Duplex Tank Over	(1) 7.5HP, (1) 3HP	60 Gal	2	2	1	74	32	89	1,910	Flexible base mount (neoprene)	2.00	UUT7

# UNIT UNDER TEST - Summary Sheet

## UUT 1



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Lubricated Vane Unit

**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 Properties

UUT 1	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	1,340	55	64	76	7.0	6.5	21.3

### 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	2.50	1.0	1.5	4.00	3.00	1.68	0.68

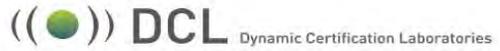
### Unit Mounting Description:



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. Each skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts. Total anchorage for the UUT was (8) 1/2"-dia Grade 5 bolts.

# UNIT UNDER TEST - Summary Sheet

## UUT 2



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Lubricated Vane Unit

**Model Number:** VPQ250S5588940

**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

UUT 2	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	5,130	70	90	87	4.50	3.80	10.25

### 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	1.95	1.0	1.5	3.12	2.34	1.31	0.53

### Unit Mounting Description:



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. Each skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts. Total anchorage for the UUT was (8) 1/2"-dia Grade 5 bolts.

**UNIT UNDER TEST - Summary Sheet**  
**UUT 3**



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Oilless Claw Unit

**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**

UUT 3	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	1,690	55	64	76	6.25	6.25	13.00

**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	2.50	1.0	1.5	4.00	3.00	1.68	0.68

**Unit Mounting Description:**



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. Each skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts. Total anchorage for the UUT was (8) 1/2"-dia Grade 5 bolts.

# UNIT UNDER TEST - Summary Sheet

## UUT 4



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Oilless Claw Unit

**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.

### UUT Properties

UUT 4	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	3,800	74	90	88	4.50	4.75	11.75

### 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	2.06	1.0	1.5	3.30	2.47	1.38	0.56

### Unit Mounting Description:



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. Each skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts. Total anchorage for the UUT was (8) 1/2"-dia Grade 5 bolts.

**UNIT UNDER TEST - Summary Sheet**  
**UUT 5**



**Manufacturer:** Powerex  
**Product Line:** Medical Vacuum Lubricated Vane / Oilless Claw Unit  
**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.

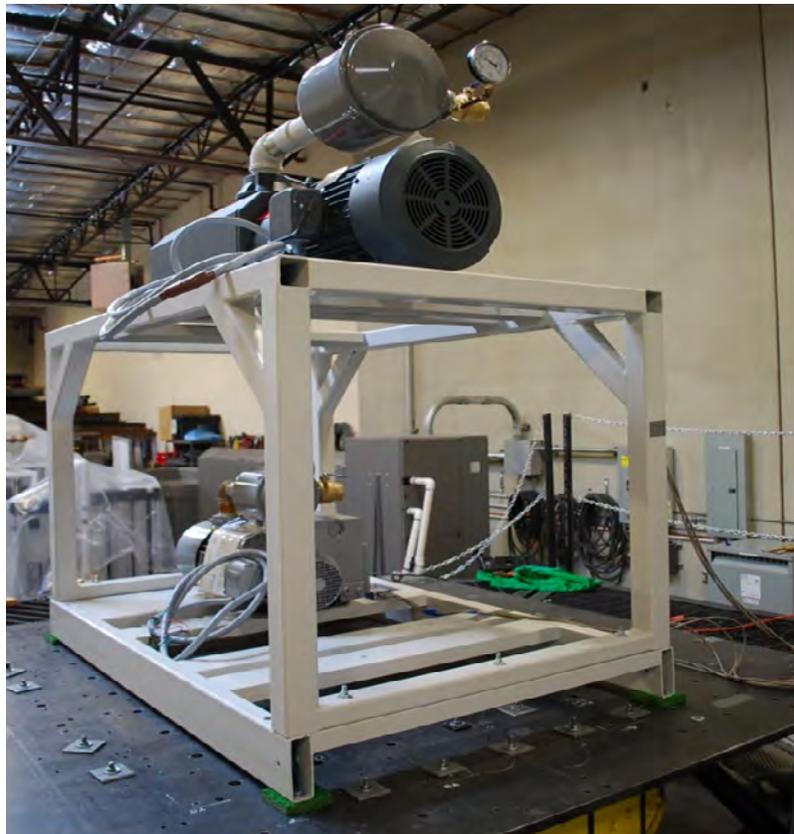
**UUT Properties**

UUT 5	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	1,940	70	45	80	6.0	4.0	10.0

**Seismic Test Parameters**

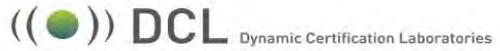
Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.34	0.54

**Unit Mounting Description:**



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. The skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts.

**UNIT UNDER TEST - Summary Sheet**  
**UUT 6**



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Lubricated Vane / Oilless Claw Unit

**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 Properties**

UUT 6	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	1,450	70	32	89	6.5	6.0	13.0

**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	1.5	3.20	2.40	1.34	0.54

**Unit Mounting Description:**



The skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts.

**UNIT UNDER TEST - Summary Sheet**  
**UUT 7**



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Lubricated Vane / Oilless Claw Unit

**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.*

**UUT Properties**

UUT 7	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	1,910	74	32	89	4.5	4.5	11.0

**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	1.5	3.20	2.40	1.34	0.54

**Unit Mounting Description:**



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. The skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts.

**UNIT UNDER TEST - Summary Sheet**  
**UUT 8**



**Manufacturer:** Powerex

**Product Line:** Medical Vacuum Lubricated Vane / Oilless Claw Unit

**Model Number:** VPXXXX/CVPTXXXX

**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.

**UUT Properties**

UUT 8	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Length	Width	Height	Front-Back	Side-Side	Vertical
	1,680	55	32	85	4.0	3.5	11.5

**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	1.5	3.20	2.40	1.34	0.54

**Unit Mounting Description:**



Flexible mounted at the base using Airloc model 32 neoprene vibration isolation pads. The skid was anchored to the shake table interface frame with (4) 1/2"-dia Grade 5 bolts.