APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0762

HCAI Special Seismic Certification Preapproval (OSP)

Type: [X] New [ ] Renewal

Manufacturer Information

Manufacturer: Tri-Tech Medical

Manufacturer's Technical Representative: Sunil Parikh

Mailing Address: 35401 Avon Commerce Parkway, Avon, OH 44011

Telephone: (440) 822-5149 Email: sunilparikh@tri-techmedical.com

Product Information

Product Name: Medical Gas and Vacuum Systems

Product Type: Medical Gas Systems

Product Model Number: See Attachments

General Description: Medical gas automatic changeover manifolds with regulators, circuit boards, power supply, transducers, switches, valves, gages, and pipe adapters.

Mounting Description: Rigid, Wall Mounted

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: Dynamic Certification Laboratories

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg Parkway #109, Sparks, NV 89431

Telephone: (775) 385-5085 Email: kelly@shaketest.com

Title: Business Manager

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

Company Name: THE VMC GROUP

Name: Kenneth Tarlow California License Number: S2851

Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814

Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.com

Certification Method

☐ GR-63-Core ☒ ICC-ES AC156 ☐ IEEE 344 ☐ IEEE 693 ☐ NEBS 3

☐ Other (Please Specify):

Testing Laboratory

Company Name: DYNAMIC CERTIFICATION LABORATORY (DCL)

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg St., Ste 109, Sparks NV 89431

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

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.5

S_{DS} (Design spectral response acceleration at short period, g) = 2.0

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 03/23/2029

Date: 3/23/2023

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = 2.0 z/h = 1

Condition of Approval (if applicable):

Special Seismic Certification
Table 1- Certified Components

DCL DYNAMIC CERTIFICATION LABORATORIES,LLC

DCL Project Number: 64509-2301

Manufacturer: Tri-Tech Medical

Product Line: Medical Gas Automatic Changeover Manifolds

Mounting: Rigid Wall Mount

Tri-Tech Medical Model Number [1,2,3]	Control	Gas Containers [4]	Cabinet	Delivery Pressure (psi)	Dimensions (inches)			Weight (lb.)	Unit
					Width	Depth	Height		
NPCU12AI1L	Analog	C x C	Standard	50	15	9	25	66	UUT28
NPCU12xxxx	Analog	C x C	Standard	50, 80 or 170	15	9	25	66 to 70	Interpolated
NPCU22xxxx	Analog	C x C	Weatherproof		19	11	27		Interpolated
CCU12xxxx	Digital	C x C	Standard		15	9	25		Interpolated
CCU22xxxx	Digital	C x C	Weatherproof		19	11	27		Interpolated
PLU12xxxx	Digital	L x C	Standard		15	9	25		Interpolated
PLU22xxxx	Digital	L x C	Weatherproof		19	11	27		Interpolated
LLU12xxxx	Digital	L x L	Standard		15	9	25		Interpolated
LLU22xxxx	Digital	L x L	Weatherproof		19	11	27		Interpolated
LLU22NT3H	Digital	L x L	Weatherproof	170	19	11	27	70	UUT29

1. First and second lower case "x" in model number stand for medical gas type: AI=medical air, CD=carbon dioxide, IA=instrument air, NT=nitrogen, NO=nitrous oxide, OX=oxygen, AR=argon, HE=helium, OC=medical breathing mixture, HO=hyperberic oxygen, TG=tri-gas, NX=N2O-oxygen mixtures, OH=oxygen-helium mixtures
2. Third lower case "x" in model number stands for delivery pressure in psi: 1=50, 2=80, 3=170
3. Fourth lower case "x" in model number stands for Flow: L = Standard Flow; H = High Flow; W=Standard Flow with Heaters; X=High Flow with Heaters
4. Gas Containers: C x C = Cylinder x Cylinder; L x L = Liquid x Liquid; L x C = Liquid x Cylinder

Special Seismic Certification
Table 2 - Certified Subcomponents

DCL DYNAMIC CERTIFICATION LABORATORIES,LLC

DCL Project Number: 64509-2301

Product Line: Medical Gas Automatic Changeover Manifolds

Model	Manufacturer	Description	Material	Unit
PT	Tri-Tech Medical	Standard Enclosure	Powder-coated carbon steel, NEMA 1	UUT28
PLU	Tri-Tech Medical	Weatherproof Enclosure	Powder-coated carbon steel, NEMA 1	UUT29
68-0017R	Harris	Line regulator standard flow 5-125 psig	Brass	UUT28
68-0004R	Harris	Line regulator standard flow 5-125 psig	Brass	UUT29
68-0003R	Victor	Primary regulator	Brass	UUT28
68-0002R	Victor	Line regulator high flow 5-125 psig	Brass	UUT28, UUT29
68-0001R	Victor	Line regulator high flow 10-200 psig	Brass	UUT28, UUT29
89-0440R	Victor	Primary regulator with TTM heating assembly	Brass	Extrapolated[1]
35-1007R	IDC	Circuit board	Phenolic and electrical components	UUT28
35-1003R	IDC	Circuit board	Phenolic and electrical components	Interpolated
35-1004R	IDC	Circuit board	Phenolic and electrical components	UUT29
35-2013R	Hughes Peters	Power supply	Various including copper and stainless steel	UUT28, UUT29
14-3001R	Measurement Specialties	0-2500 psig transducer w/ 3' cable for left or right banks	Stainless steel housing, internal electronics	UUT29
14-3002	Measurement Specialties	0-500 psig transducer w/ 3' cable for left or right banks and emergency reserve in use	Stainless steel housing, internal electronics	UUT29
14-3024	Tri-Tech Medical	0-250 psig transducer w/ 1.5' cable N2	Aluminum housing, internal electronics	UUT29
14-3025	Tri-Tech Medical	0-100 psig transducer w/ 1.5' cable Oxy	Aluminum housing, internal electronics	UUT29
14-3026	Tri-Tech Medical	0-100 psig transducer w/ 1.5' cable Med Air	Aluminum housing, internal electronics	UUT29
14-3027	Tri-Tech Medical	0-100 psig transducer w/ 1.5' cable N20	Aluminum housing, internal electronics	UUT29
14-3028	Tri-Tech Medical	0-100 psig transducer w/ 1.5' cable CO2	Aluminum housing, internal electronics	UUT29
14-3001-12R	Tri-Tech Medical	0-2500 psig transducer w/ 12' cable for emergency reserve low	Stainless steel housing, internal electronics	UUT29
14-3001-5R	Tri-Tech Medical	0-2500 psig transducer w/ 15' cable for right bank low	Stainless steel housing, internal electronics	UUT29
14-2013	United Electric	Left bank pressure switch	Plastic, stainless steel & brass	UUT28
14-2014	United Electric	Right bank pressure switch	Plastic, stainless steel & brass	UUT28
48-1007R	TTM	Solenoid Valve	Brass	UUT28
48-1008R	TTM	Left Solenoid Valve for LLU/PLU	Brass	UUT29
48-1009R	TTM	Right Solenoid Valve for LLU/PLU	Brass	UUT29
17-4003R	TTM	Intermediate check valve 1/2" NPT male x 1/2" OD tube	Brass	UUT28, UUT29
14-1018	WIKA	0-4000 psig 1-1/2" x 1/8" M NPT center back gage	Plastic & brass	UUT28, UUT29
14-1016	WIKA	0-400 psig 2" x 1/4" M NPT bottom port gage	Plastic & brass	UUT28, UUT29
14-1017	WIKA	0-400 psig 1-1/2" x 1/8" M NPT center back gage	Plastic & brass	UUT28, UUT29
14-1009	WIKA	0-300 psig 1-1/2" x 1/8" M NPT center back gage	Plastic & brass	UUT28, UUT29
14-1008	WIKA	0-100 psig 1-1/2" x 1/8" M NPT center back gage	Plastic & brass	UUT28, UUT29
RV-22-075	Rego	75 psig x 1/2" M NPT inlet w/ pipe away adapt	Brass	UUT28, UUT29
RV-22-150	Rego	150 psig x 1/2" M NPT inlet w/ pipe away adapt	Brass	UUT28, UUT29
RV-22-250	Rego	250 psig x 1/2" M NPT inlet w/ pipe away adapt	Brass	UUT28, UUT29
RV-11-400	Rego	400 psig x 1/4" M NPT inlet w/ pipe away adapt	Brass	UUT28, UUT29
17-0169	Fairview Fittings	Union 3 piece 1/2" M NPT x 1/2" M NPT 1" 11-1/2 NPS	Brass	UUT28, UUT29

Note:

1. Extrapolated regulator is a Victor 68-0003R regulator with a TTM heating assembly installed. The weight, mounting, and attachments are identical to the tested Victor 68-0003R regulator in UUT-28.

Special Seismic Certification
Table 3 - Tested Units

DCL Project Number: 64509-2301

Manufacturer: Tri-Tech Medical

Product Line: Medical Gas Automatic Changeover Manifolds

Type	Tri-Tech Medical Model	Control	Gas Container Type[1]	Cabinet	Delivery Pressure	Flow[2]	Dimensions (inches)			Weight (lb.)	Mounting	Unit
							Depth	Width	Height			
Medical Gas Automatic Changeover Manifolds	NPCU12AI1L	Analog	C x C	Standard	50 PSIG	L	9	15	25	66	Rigid wall	UUT28
	LLU22NT3H	Digital	L x L	Weatherproof	170 PSIG	H	11	19	27	70	Rigid wall	UUT29

Notes:

1. C x C = Cylinder x Cylinder, and L x L = Liquid x Liquid
2. Flow: L = Standard Flow; H = High Flow

UUT28 - DCL Test Report 41182-1701c

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: Tri-Tech Medical

Product Line: Medical Gas Automatic Changeover Manifolds

Model Number: NPCU12AI1L (Tri-Tech Medical Model)

Product Construction Summary: Powder coated carbon steel enclosure

Options / Component Summary: Regulators, circuit boards, power supply, transducers, switches, valves, gages and pipe adapters

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)	Dimensions (in)				Lowest Natural Frequency (Hz)		
	Tested Unit	Depth	Width	Height	Front-Back	Side-Side	Vertical
66	UUT28	9.0	15.0	25.0	N/A	N/A	N/A

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 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:

The unit was mounted to the shake table wall fixture with a combination of two manufacturer-provided channeled mounting brackets mounted near the top of the enclosure back plate, and two 3/8-inch diameter Grade 5 bolts spaced approximately 20'' on center installed near the middle of the enclosure back plate. For the two mounting brackets, one was attached to the back plate of the cabinet with two 5/16-inch diameter Grade 5 bolts, and one was attached to the shake table interface frame with two 3/8-inch diameter Grade 5 bolts, and ¼-inch thick plate washers as a backing between the wall bracket and the shake table interface fixture. The mounting locations were spaced 11'' in the vertical direction.

UUT28 Overall View

UUT29 - DCL Test Report 41182-1701c

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: Tri-Tech Medical

Product Line: Medical Gas Automatic Changeover Manifolds

Model Number: LLU22NT3H (Tri-Tech Medical Model)

Product Construction Summary: Powder coated carbon steel enclosure

Options / Component Summary: Regulators, circuit boards, power supply, transducers, switches, valves, gages and pipe adapters

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)	Dimensions (in)				Lowest Natural Frequency (Hz)		
	Tested Unit	Depth	Width	Height	Front-Back	Side-Side	Vertical
70	UUT29	11.0	19.0	27.0	N/A	N/A	N/A

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 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:

The unit was mounted to the shake table wall fixture with a combination of two manufacturer-provided channeled mounting brackets mounted near the top of the enclosure back plate, and two 3/8-inch diameter Grade 5 bolts spaced approximately 20'' on center installed near the middle of the enclosure back plate. For the two mounting brackets, one was attached to the back plate of the cabinet with two 5/16-inch diameter Grade 5 bolts, and one was attached to the shake table interface frame with two 3/8-inch diameter Grade 5 bolts, and ¼-inch thick plate washers as a backing between the wall bracket and the shake table interface fixture. The mounting locations were spaced 11'' in the vertical direction.

UUT29 Overall View