**Price Varitherm® Series Personal Diffusers**

**Division 23 – Heating, Ventilating, and Air Conditioning**

**Section 23 37 13 – Diffusers, Registers, and Grilles**

The following specification is for a defined application. Price would be pleased to assist in developing a specification for your specific need.

**PART 1 – GENERAL**

* 1. **Section includes**:
1. Varitherm® Personal Diffusers
	1. **Related Requirements**
2. Section 01 30 00 – Administrative Requirements
3. Section 01 40 00 – Quality Requirements
4. Section 01 60 00 – Product Requirements
5. Section 01 74 21 – Construction/Demolition Waste Management and Disposal
6. Section 01 78 00 – Closeout Submittals
7. Section 01 79 00 – Demonstration and Training
	1. **Reference Standards**
8. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
9. ASHRAE Standard 55 – Thermal Environmental Conditions for Human Occupancy
10. ASHRAE Standard 70 – Method of Testing the Performance of Air Outlets and Air Inlets
11. ASTM 610 – Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
12. ASTM 714 – Test Method for Evaluating Degree of Blistering of Paints
13. ASTM D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
14. ASTM D1654 – Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
15. ASTM D4752 – Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
16. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems

**1.04 Submittals**

A. See Section 01 30 00 – Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation.

C. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication.

D. Certificates: Certify that air capacities, pressure drops, and selection procedures meet or exceed specified requirements.

E. Manufacturer's Installation Instructions: Indicate installation instructions.

F. Project Record Documents: Record actual locations of units and control components.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

**1.06 Quality Assurance**

1. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.

**1.07 Warranty**

1. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
2. The manufacturer shall warrant that the VAV diffuser shall be defect free in the material and workmanship for a period of 10 years from date of shipment.

**PART 2 – PRODUCTS**

**2.01 Manufacturer**

1. Basis of Design: Price Industries, Inc.
2. Varitherm® Personal Diffusers: Model VPD-C
3. Varitherm® Personal Diffusers: Model VPD-HC
4. General:
	1. The Varitherm® Series personal square plaque diffuser shall be supplied to deliver a 360 degree radial, horizontal air flow pattern. The back cone shall be a one-piece die-formed design with smooth, aerodynamically designed surfaces and no corner joints. This contoured design shall protect the ceiling from induced room air and help prevent smudging and streaking.

**2.02 Varitherm® Series**

1. Description:
	1. Furnish and install Price Varitherm® Series personal self-modulating diffusers in sizes and capacities as shown by the plans and air distribution schedule.
	2. The diffuser shall provide variable air volume control and regulate supply air volume to maintain room temperature settings. The variable air volume (VAV) actuator assembly shall be fully independent of electric or pneumatic drives and will respond only via thermal wax actuators.
2. Construction:
	1. Diffuser construction shall be of steel with one-piece back pan, fully supported chassis, and hinged plaque faceplate.
	2. The hinged plaque must be rigidly fastened to the chassis on one side with an interlocked piano hinge to allow for access to and free adjustment of the temperature set-points or minimum air flow. Removable plaques are not acceptable.
	3. The plaque must be retained when closed, by rare earth magnets, for consistent closing and for easy opening.
	4. Instruction for use must be placed on the inside of the plaque.
	5. The diffuser shall integrate with all duct sizes shown on the plans without affecting the face size and appearance of the unit.
	6. The face panel shall have smooth edges and rounded corners to blend with the back cone.
	7. The diffuser ceiling module size shall be 24 x 24 inches (600 x 600 millimeters).
3. Controls:
	1. Each set-point shall be adjustable by hand (without tools) through the range of 70 degrees Fahrenheit to 78 degrees Fahrenheit.
	2. Default factory set-point of the minimum flow is twenty percent of maximum flow (adjustable).
	3. Minimum air flow adjustment must be accessible from the room side of the chassis and hidden behind the hinged plaque. The minimum air flow dial shall be adjustable by hand (without tools) and must have a readable gauge with a range from 5cfm to 50 percent of maximum flow.
	4. Balancing mode must be accessible from the room side of the chassis without opening the hinged plaque. Release of the balancing lever by hand (without tools) dial will place the unit into balancing mode.
	5. (**VPD-HC only**) Room temperature set-point adjustment shall be completed by rotating a thumbwheel in correspondence to the provided scale, independent adjustment shall be provided for heating and cooling modes. The adjustment must be made on the chassis system and accessible from behind the hinged plaque.
		1. The VAV diffuser damper shall open when the unit is in cooling mode and the room air temperature rises above setpoint, and (**VPD-HC only**) when the unit is in heating mode and the room air temperature lowers below setpoint.
		2. The diffuser damper shall close when the unit is in cooling mode and the room air temperature lowers below setpoint, and (**VPD-HC only**) when the unit is in heating mode and the room air temperature lowers below setpoint.
		3. The changeover thermostat must be factory installed and calibrated to engage heating mode when the supply air temperature exceeds 80 degrees Fahrenheit and engage cooling mode when the supply air temperature drops below 68 degrees Fahrenheit.
	6. Static pressure at the inlet of the diffuser shall be at least 0.05 inches water gauge (12 Pascal) and maximum of 0.25 inches water gauge (62 Pascal). Static pressures below 0.05 inches water gauge (12 Pascal) will result in low air flow, and poor thermal comfort. Operation at a static pressure above 0.25 inches water gauge (62 Pascal) will result in excessive noise.
4. Paint Specification:
	1. Paint finish shall be (**select one**):
		1. Baked-on powder coat finish.
			1. The paint film thickness shall be a minimum of 2 mils.
			2. The finish shall have a hardness of 2H as tested in accordance with ASTM D3363.
			3. The finish shall pass an ASTM B117 Corrosive Environment Salt Spray Test for 1000 hours with no measurable creep, rusting or blistering as per ASTM D1654, D610 and D714.
			4. The finish shall pass an ASTM D870 Water Immersion test of a minimum of 500 hours with no measurable with no rusting or blistering as per ASTM D610 and D714.
			5. The finish shall have an impact resistance of 100 inch-pounds in accordance with ASTM D2794.
		2. All components shall have a custom finish in a color to match a customer supplied sample.
5. Mounting Frame:
6. The diffuser mounting frame shall be suitable for lay-in or surface mount applications with the following frame style (select one):
7. 15/16 inch wide flat T-bar
8. 9/16 inch wide T-bar with drop frame
9. Surface mount with frame
10. Options (**select all that apply**):
11. Insulated Back Pan (T-bar mounting frame only):
12. The diffuser back pan shall be externally insulated with a molded heavy duty foil/scrim vapor barrier with an R-value of six. The insulation shall meet the requirements of UL 181 and NFPA 90A.
13. Pressure Relief Collar:
14. A pressure relief collar (PRC) shall be fitted to the inlet collar of the Varitherm® diffuser to relieve excess static pressure arising from modulation of the air flow by the Varitherm® diffuser.
15. Pressure Control Valve:
16. Furnish and install Price variable volume control valve assemblies of the series and capacities as shown on the plans.
17. The duct shall be constructed of 24 gauge zinc-coated steel for round ducts, and 22 gauge zinc-coated steel for rectangular ducts.
18. The damper shall be 22 gauge zinc-coated steel, with polyethylene damper shaft bearings and damper gasket. The damper shaft shall be zinc-coated steel.
19. The control enclosure and mounting bracket shall be zinc coated steel.
20. In the full closed position, air leakage past the closed damper shall not exceed two percent of the nominal catalogue rating at three inches water gauge inlet static pressure when tested in accordance with ASHRAE 130.
21. An air flow sensor of a cross configuration shall be located at the inlet of the assembly. The sensor shall have twelve total pressure sensing ports and center averaging chamber designed to accurately average the flow across the inlet of the assembly. The sensor shall provide accuracy within five percent with a 90 degree sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal.
22. Operational Mode:
23. The operational mode shall be defined by model selection (**select one**):
	* + 1. Varitherm® Personal Diffusers, Model VPD-C
			2. Varitherm® Personal Diffusers, Model VPD-HC

**2.03 Varitherm® Personal Diffuser, VPD-C**

1. Operational Mode:
	1. The Price Varitherm® Personal Diffuser Model VPD-C operational mode shall provide VAV cooling.
	2. The forced open damper mode shall allow for system balancing at maximum flow.
	3. The temperature set-point shall be adjustable at the diffuser with the use of one set-point thumbwheel.

**2.04 Varitherm® Personal Diffuser, VPD-HC**

1. Operational Mode:
	1. The Price Varitherm® Personal Diffuser Model VPD-HC operational mode shall provide VAV cooling and VAV heating.
	2. The forced open damper mode shall allow for system balancing at maximum flow.
	3. The dual temperature set-points for heating and cooling shall be adjustable at the diffuser with the use of two set-point thumbwheels.

**PART 3 – EXECUTION**

**3.01 Examination**

1. Verify that conditions are suitable for installation.
2. Verify that field measurements are as shown on the drawings.

**3.02 Installation**

1. Install in accordance with manufacturer’s instructions.
2. See drawings for the size(s) and locations of diffusers.

**3.03 Field Quality Control**

1. See Section 01 40 00 – Quality Requirements for additional requirements.

**3.05 Cleaning**

1. See Section 01 74 19 – Construction Waste Management and Disposal for additional requirements.

**3.06 Closeout Activities**

1. See Section 01 78 00 – Closeout Submittals for closeout documentation requirements.
2. See Section 01 79 00 – Demonstration and Training for additional requirements.