

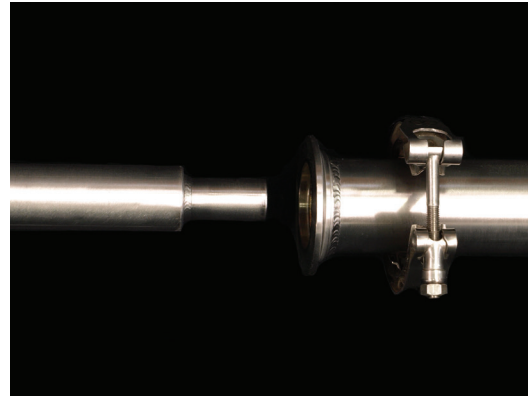
MVIP PRO[®] RIGID PIPE

MODULAR VACUUM INSULATED RIGID PIPE

All MVIP Pro[®] Vacuum Insulated Pipe rigid products come with Chart's renowned customer service, from conceptual design to implementation, and are backed by a ten year warranty.* MVIP Pro rigid is an all stainless steel coaxial vacuum insulated piping system. Modular by design, MVIP Pro rigid spools are joined together with shrink fit bayonet connections. Each section is evacuated, sealed and then tested for vacuum integrity. This advanced piping system minimizes heat gain between the inner carrier pipe and the outer jacket. Chart offers a complete line of components including in-line venting devices, phase separators and gas traps to maximize the system performance. MVIP Pro rigid pipe's smooth bore inner with periodic internal bellows, minimizes pressure drop and improves flow characteristics. By incorporating strategically located flexible sections when required, MVIP Pro rigid is easy to install for both indoor and outdoor installations. MVIP Pro rigid is used in a wide variety of installations including food and beverage, MBE's, environmental temperature chambers, test handlers, nanotechnology and R&D.



MVIP Pro Rigid Installation



MVIP Pro Rigid Pipe

RIGID BENEFITS

- MVIP Pro rigid pipe is durable, easy to install and practically maintenance free
- Excellent flow characteristics make MVIP Pro rigid ideal for pipe mains
- MVIP Pro rigid can mate to MVIP Pro flex's bendable pipe for inside drops
- Multilayer superinsulation and chemical gettering assures long term vacuum integrity*
- Fabricated by an ASME B31.3 code shop by certified welders (TIG Welded)
- Rigid sections are less expensive, have better heat leak and less pressure drop than flexible vacuum insulated pipe
- Rigid section will not dip between hangers and will minimize gas traps
- Rigid sections have a long life and have been known to last as long as 30 years

*Chart Vacuum Technology™ (CVT 10/20):
10 year limited vacuum insulated pipe
warranty, 20 year design life.



Innovation. Experience. Performance. ®

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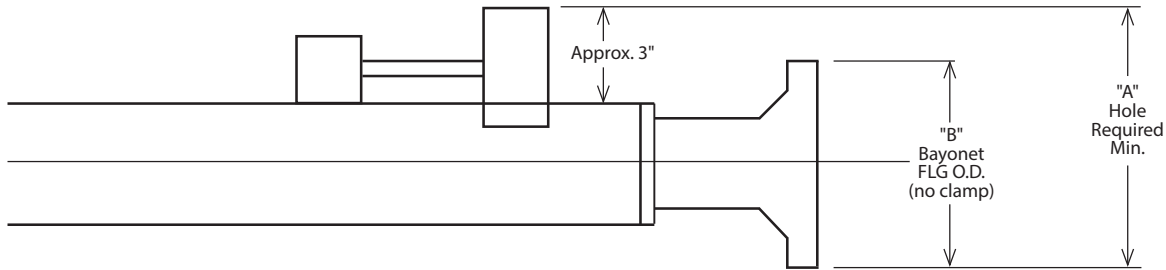
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Technical Specifications

Smart Number	Inner Pipe Size	Outer Jacket Diameter*	Actual Flow Diameter	Standard Overall Lengths	"A"	"B"	Weight / Length	MAWP (psi)
					Hole Required to Accommodate Pump Out**	Bayonet FLG O.D. (no clamp)		
PR-08-PR	½"	2"	0.710"	2, 3, 4, 5, 6, 15, 18, 20, 30'	5.75"	2.755"	3.0 lb/ft (3.4 kg/m)	150
PR-16-PR	1"	3"	1.185"	2,3,4,5,6,10,15,18,20,30'	6.75"	3.761"	4.5 lb/ft (6.2 kg/m)	150
PR-24-PR	1 ½"	3 ½"	1.770"	3', 4', 5', 6', 10',	7.50"	4.396"	5.5 lb/ft (7.4 kg/m)	150
PR-32-PR	2"	3 ½"	2.245"	15', 18', 20', 30'	7.75"	4.923"	6.0 lb/ft (8.4 kg/m)	150

* Not including pump out.

** Pump out with no Thermocouple (TC)



Performance Data

Smart Number	Cool Down			Static Heat Leak		LN ₂ Bayonet Pair Heat Leak	
	kJ/m	kg/m*	lb of LN ₂ /ft	BTU/hr/ft	Watt/m	BTU/hr	Watt
PR-08-PR	39	0.20	0.13	0.32	0.31	14.1	4.13
PR-16-PR	58	0.29	0.19	0.48	0.46	20.8	6.09
PR-24-PR	85	0.43	0.29	0.58	0.56	22.1	6.47
PR-32-PR	107	0.54	0.36	0.79	0.76	19.3	5.65

* LN₂ at one bar.

LN₂ Flow Guideline

Smart Number	Pipe Size	100 ft	200 ft	300 ft	400 ft	500 ft
PR-08-PR	½" PS	4.8 gpm	3.5 gpm	2.9 gpm	2.6 gpm	2.2 gpm
PR-16-PR	1" PS	29.0 gpm	20.0 gpm	16.0 gpm	12.0 gpm	11.0 gpm
PR-24-PR	1 ½" PS	63.0 gpm	50.0 gpm	42.0 gpm	38.0 gpm	36.0 gpm
PR-32-PR	2" PS	110.0 gpm	80.0 gpm	70.0 gpm	62.0 gpm	58.0 gpm

Pressure Drop (psi/ft)*

Smart Number	Flow (gal/min)							
	2	5	10	25	50	75	100	150
PR-08-PR	0.006	0.039	0.154	0.964				
PR-16-PR		0.003	0.011	0.063	0.262	0.570	1.014	
PR-24-PR			0.001	0.008	0.040	0.070	0.125	0.280
PR-32-PR				0.002	0.009	0.193	0.034	0.077

*Pressure drop numbers listed do not account for elevation changes. Chart recommends pressure drop be kept to 5 psi or less.

Your Local Representative



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