

Super Insulated Vacuum Line (SIVL)

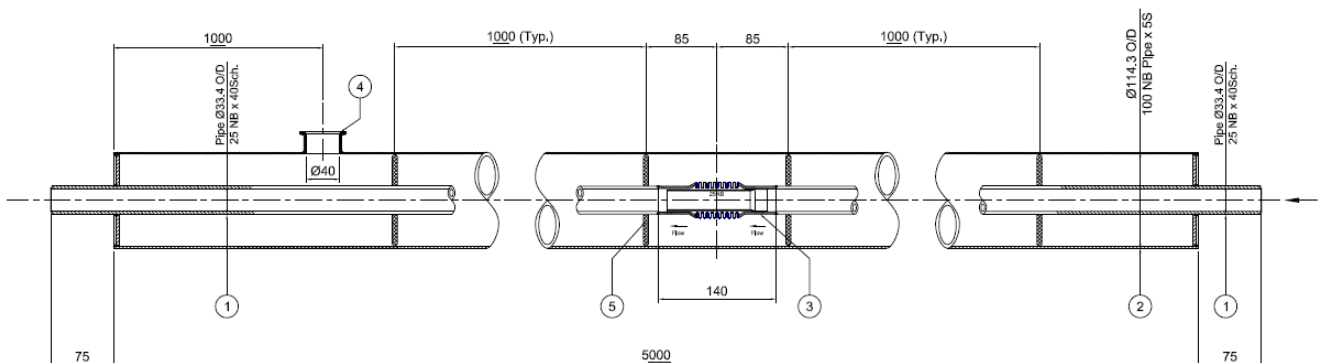
Introduction:

INDUS Vacuum and Cryogenic Systems, Mumbai designs, manufactures and installs stainless steel super insulated Vacuum Jacketed Piping (VJP) systems used for the transfer of liquid nitrogen, oxygen, argon, natural gas, carbon dioxide and helium. Each VJP system is custom designed to meet the requirements of the application while keeping the system economics within budget.

Our Major Customers are:

1. Sandoz Pharmaceuticals, Raigarh, Maharashtra , Cryogenic Condenser with 25 mtr piping
2. Cryogenic Grinding Machines, LIN distribution systems with 50 mtr. SIVL for SATVAM Nutrifoods, Himmatnagar, Gujarat
3. Rakesh Masala, Kanpur SIVL, with 55 mtr piping, 40NB/80NB
4. Gandhi Spices, Hathi Masala, Rajkot, 100 mtr SIVL Piping
5. Fluidline Valves LN2 unit for the Valve Testing with distribution SIVL of 12 mtrs.
6. Axle Tech, Pune, LN2 unit for the material treatment.
7. Patel Retail Pvt. Ltd, BHUJ, SIVL, 50 mtrs, 25NB
8. Virgo Valves, Pune, Valve testing facility using LN2, 40 mtr. SIVL piping
9. IIT Bombay LN2 distribution system at Nano Science Centre, 40 Mtr Flexible SIVL
10. Cadilla Pharmaceuticals, Ankaleshwar 110 mtr. SIVL Piping

With extensive quality control and the use of a helium mass spectrometer test for every welded joint, **SIVL** systems enjoy a long field life. Vacuum Jacketed Pipe is 50 times more effective than conventional foam insulated copper in preventing heat leak to the inner line, and vacuum lasts for more than 10 years in the field/process operation.



INDUS Vacuum and Cryogenic Systems, Mumbai manufactures Vacuum Jacketed Pipe to satisfy our customers' specifications and specific needs. INDUS Vacuum and Cryogenic Systems designs and fabricates both rigid and flexible VJ Pipe for liquid nitrogen, oxygen, liquefied natural gas, carbon dioxide, argon, and helium. Inner pipe sizes range from 1/2" to 2" and larger for rigid pipe, and 1/2" to 2" for flexible.

Typical Attributes For our Vacuum Jacketed System...

- Bayonet couplings for ease of installation
- Field welded couplings for lower heat inleak and material costs
- Internal gas traps prevent frosting of standing end connections when not in use.
- System relief valve for line safety (if located indoors, it must be piped to exterior)
- Vacuum Jacketed Flexible Pipe for use with vibrating equipment or minimizing alignment problems

Vacuum Insulation:

INDUS Vacuum and Cryogenic Systems, Mumbai uses alternating layers of fiberglass paper and metal foil wrapped around the inner line, and gettering material to maintain long term vacuum integrity. Vacuum integrity is assured by the use of a helium leak detection sensitivity of $<10^{-9}$ mbar.lit/sec on all welds. The vacuum is sealed at 2 microns or less. With the use of non-conductive spacers for the inner line, the Vacuum Jacketed Pipe effectively discourages conduction, convection, and radiation heat transfer.

Sizing Guide:

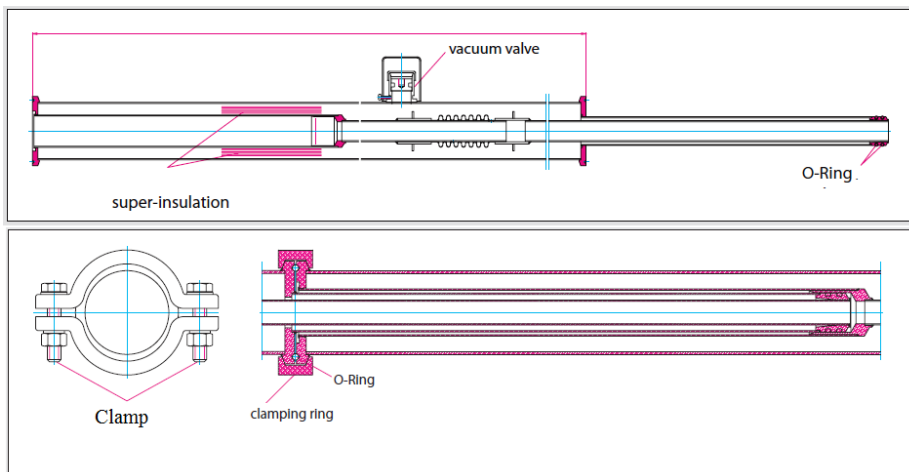
Inner Pipe Size/SS304	Jacket Pipe Size/SS 304	Total Weight	Cooldown (Kg of LN2/m)	Heat Leak (Watt/m)
1/2" SCH 40 21.3 mm OD	3" SCH 5 88.9 mm OD	5.7 kg/m	(0.40)	(0.31)
1" SCH 40 33.4 mm OD	4" SCH 5 114 mm OD	8.3 kg/m	(0.64)	(0.43)
1 1/2" SCH 40 48.3 mm OD	4" SCH 5 114 mm OD	9.9 kg/m	(0.95)	(0.54)
2" SCH 40 60.3 mm OD	5" SCH 5 141 mm OD	15 kg/m	(1.19)	(0.72)

For lengths of jacketed pipe over 5 meters in length, it is necessary to divide the pipe into individual spool sections. INDUS Vacuum and Cryogenic Systems, Mumbai offers two options: a bayonet joint (Johnston Coupling) or a field joint coupling.

For another type of connection, INDUS Vacuum and Cryogenic Systems offer Vacuum insulated or Foam insulated field joint coupling. The assembly consists of an outer sleeve that is attached to the VJ Pipe spools on either side to keep intact.

A. Bayonet Connections/ Johnston Couplings

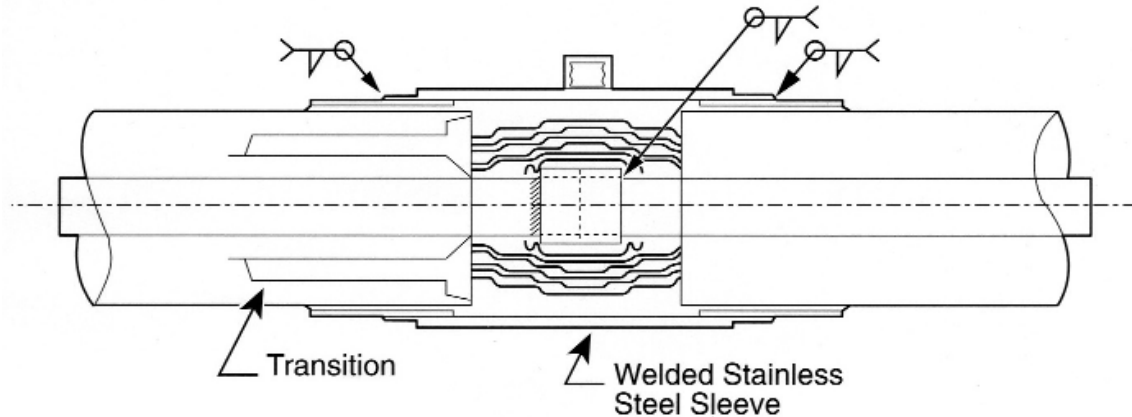
Bayonet is a mechanical connection between two sections of Vacuum Jacketed Pipe that eliminates the need for any welded connections. The bayonet is a low heat inleak device with Telescoping male and female components. Due to a close tolerance design, INDUS Vacuum and Cryogenic Systems, Mumbai “low profile” bayonets utilize a metal to metal in-line seal with a Teflon (PTFE) O-ring placed between the flanges. These combine to make a reliable heavy duty cryogenic seal between the two VJP sections, and simultaneously preserve the low heat inleak of the system.



B. Field Joint Couplings

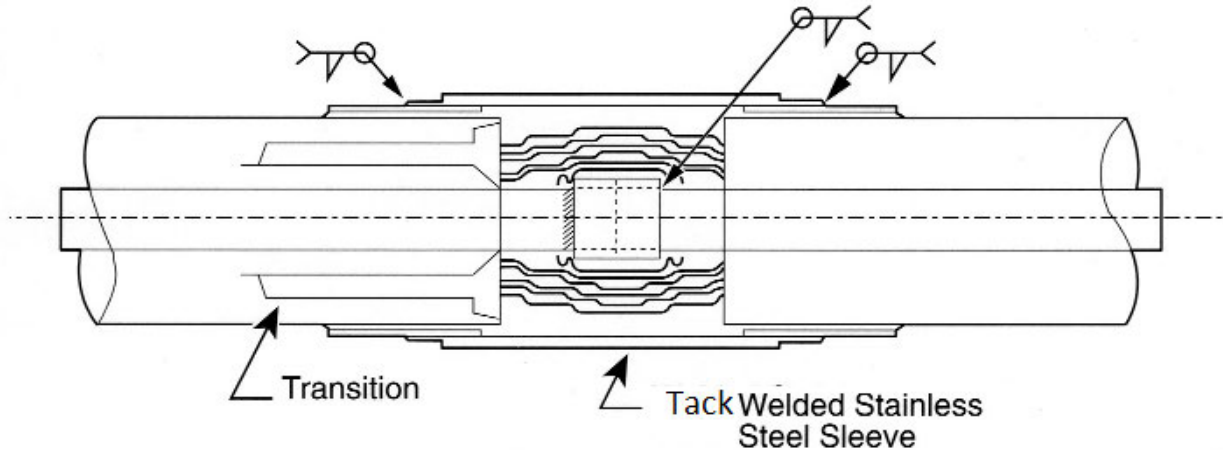
1. Vacuum insulated field welded joint.

Field joint couplings are vacuum insulated field welded connections between two sections of Vacuum Jacketed Pipe. They have a long heat leak transition between the outer jacket and the inner pipeline to reduce the heat input into the system. After the weld is made, the joint is insulated and a coupling is moved into place over the section. The coupling is then field welded to the collars on the ends of the two piping spools. This coupling is then evacuated to a low vacuum to insure a low heat leak.



2. Perlite Box or Foam insulated field welded joint.

Field joint couplings are Perlite Box or Foam insulated field welded connections between two sections of Vacuum Jacketed Pipe. They have a long heat leak transition between the outer jacket and the inner pipeline to reduce the heat input into the system. After the weld is made, the joint is insulated and a cover is moved into place over the section.



For more information please contact us.

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