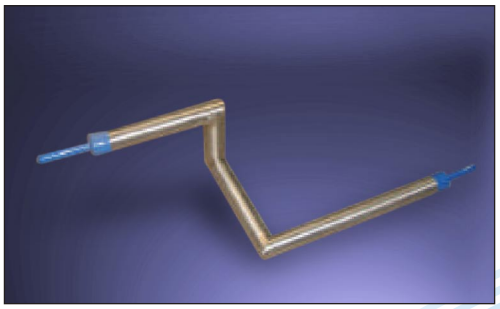
Vacuum Superinsulated Piping

Thames Cryogenics manufactures and installs Super Insulated Vacuum Lines (SIVL) suitable for most cryogenic applications. The piping consists of an inner stainless steel pipe which conveys the liquid nitrogen or other cryogen, and an outer stainless steel pipe which comprises the vacuum jacket, together with innovative components to ensure a high efficiency, high reliability system.



- High degree of insulation reduces nitrogen losses by evaporation by a factor of around 20 over conventionally lagged lines.
- Polished stainless steel outer pipe means no dirt traps in hygiene-critical areas.
- Low contact point spacers minimise heat conduction and ensure the inner pipe is held centrally within the outer.
- Long thermal path 're-entrants' seal each end of pre-made pre-evacuated sections minimising conductive heat inleak.
- Multiple layers of high reflectivity superinsulation minimise radiation heat inleak.
- High vacuum in the interspace prevents convective heat transfer.
- Cryosorption materials in the annulus ensure long term maintenance of static vacuum removing the need for expensive permanently-connected vacuum pumps.
- Outer pipe remains at ambient temperature providing excellent personnel protection against cold burns.
- Site welded joints allow dimensional adjustability.
- Independent vacuum in premade sections prevents total vacuum loss in case of damage.

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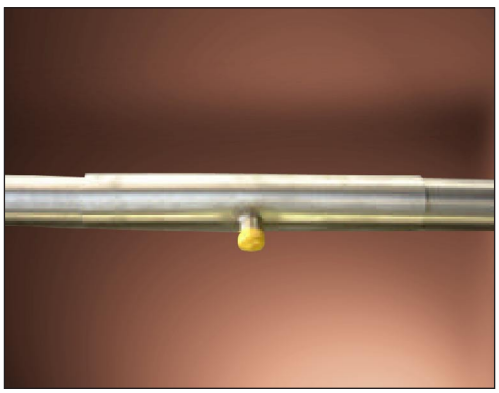
Vacuum Superinsulated Piping
Specifications

Nominal Pipe Size	Inner Pipe Diameter	Outer Pipe Diameter	Approximate Flow Rate (tonnes/hr)*
1/2" NB	18mm ID	76mm OD	0.75
1" NB	30mm ID	89mm OD	3
1.5" NB	45mm ID	102mm OD	9
2" NB	57mm ID	114mm OD	17
3" NB	85mm ID	168mm OD	50

* Based on an acceptable theoretical pressure drop along a 50 metre length



The line is made up of pre-made sections, each supplied fully evacuated, terminating in a long thermal path 're-entrant' end, to minimise conductive heat inleak. When the sections are installed, they are connected by means of site-welded, 'muff' joints. These joints are evacuated on site, to give a complete all-welded line, which is fully vacuum superinsulated for minimum evaporation loss.

The design of the joint allows considerable site-adjustment of dimensions, so that building tolerances etc. can be accommodated. Where necessary, (for example, where a use-point or tank position cannot be accurately defined during a site-survey,) even greater dimensional variation can be provided by completing and evacuating sections on site.

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