

CHART

真空绝热管道系统解决方案

Vacuum-Insulated Pipe System Solutions

www.chart-ind.com.cn

World Leader in Cryogenic Solutions

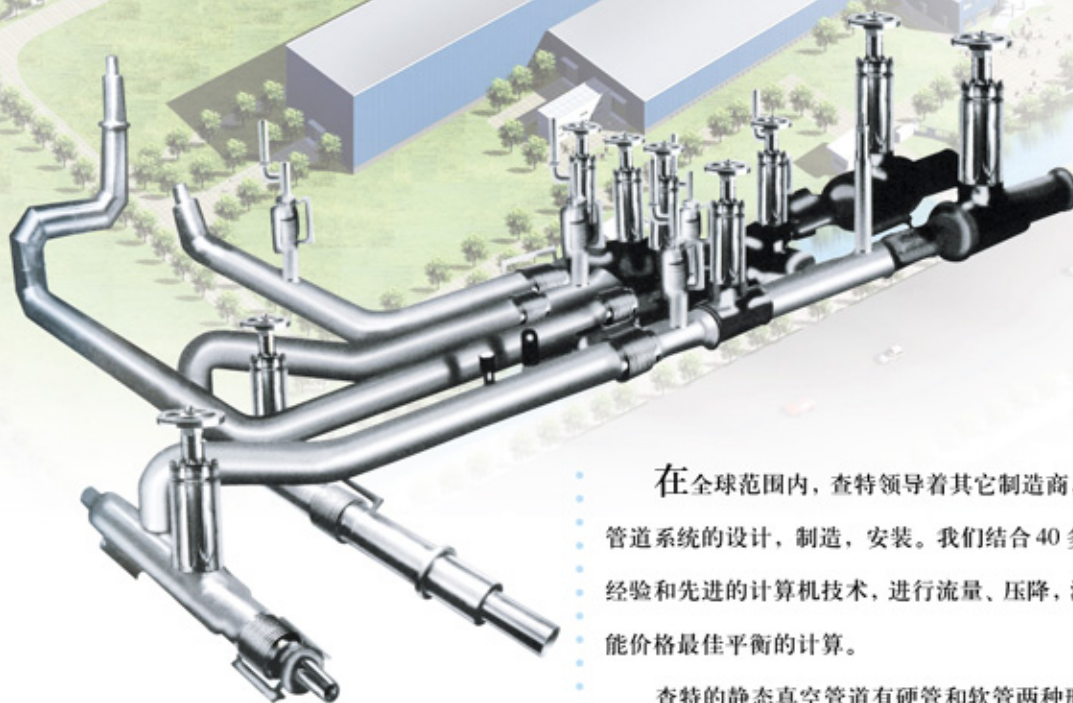


Innovation. Experience. Performance.™

Chart leads all other manufacturers in the number of cryogenic piping systems engineered, fabricated, and installed in the world. We combine real work experience with computer analysis flow rate, pressure drop, phase quality, and the best balance between performance and economy.

Chart's static vacuum insulated pipe is offered in rigid and flexible styles with inner line diameters ranging from 1/4" through 14". All stainless steel construction, TIG welding, mass spectrometer leak checking, and extensive vacuum retention testing ensure reliable, maintenance-free service. Chart will also engineer and manufacture special piping systems for specific customer applications.

We stock a wide selection of cryogenic components and accessories, many of which have set industry standards. Our inventory includes bayonet couplings, valves, filter housings, phase separators, vacuum seal-off valves, and a special line of bayonets and valves designed for liquid helium service. For unique applications, Chart will build custom cryogenic components.



VIP Manufacturing 真空绝热管道制造

在全球范围内，查特领导着其它制造商，从事真空绝热管道系统的设计，制造，安装。我们结合 40 多年的实际工程经验和先进的计算机技术，进行流量、压降，液体质量，及性能价格最佳平衡的计算。

查特的静态真空管道有硬管和软管两种形式，内管直径从 1/4" 到 14"。全部采用不锈钢，钨极氩弧焊，氦质谱检漏，及长时间真空保持试验，保证系统的可靠性，以及免维护。查特可以为有特殊需求的客户定制特殊结构形式的真空绝热管道系统。

我们备有常用的深冷设备备件，其中部分是行业标准产品。我们的库存包括接插件，阀门，过滤器外壳，相分离器，真空阀，以及液氮专用的接插件和阀门等等。对于个别特殊要求，查特可以为客户特别制作备件。

Stainless Inner-internal Bellow Pipe

- ▶ No contraction of the outer jacket
- ▶ No convoluted flex hose required
- ▶ Very corrosion-resistant material
- ▶ Bayonet or field weld connectors
- ▶ MAWP: 150 psig

内置膨胀节不锈钢真空管

- ▶ 外管不收缩
- ▶ 无需缠绕软管
- ▶ 材料抗腐蚀性强
- ▶ 接插联接或现场焊接
- ▶ 最大允许工作压力 150psi



Stainless Inner-external Bellows Pipe

- ▶ Easy to repair or replace
- ▶ Very corrosion-resistant material
- ▶ Bayonet or field weld connectors
- ▶ MAWP: 350 psig or more

外置膨胀节不锈钢真空管

- ▶ 方便维修和更换
- ▶ 材料抗腐蚀性强
- ▶ 接插联接或现场焊接
- ▶ 最大允许工作压力 350 psig 或更高

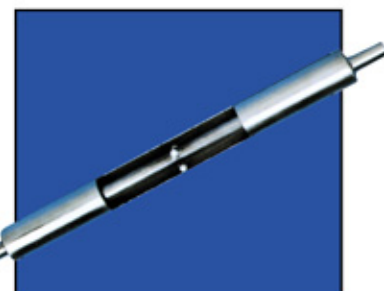


Invar Internal Pipe

- ▶ No bellows or convoluted flex hose
- ▶ Design simplicity and long-term integrity
- ▶ No extra weld fatigue
- ▶ Less stress and less damage during shipments and installation

内置殷瓦钢(不变钢)管

- ▶ 无需膨胀节或缠绕软管
- ▶ 设计简单, 长期保持完整性
- ▶ 无额外焊接疲劳
- ▶ 运输和安装过程中很少出现应力及损坏。



Python Pipe

PYTHON 真空管道

- ▶ Chart's Python pipe is vacuum-insulated pipe manufactured in pre-determined lengths.
- ▶ Sections are joined together in the field and insulated with foam joints.
- ▶ Python has many of the advantages of VIP such as:

Smaller outer diameter	Nearly as efficient	外径小	同等效率
Lower cost	Shorter lead-time	成本低	交货时间短
Easier to re-use	Suitable for high pressure	可以再利用	承受压力高
- ▶ 查特的 PYTHON 管是按预定长度生产的真空绝热管道。
- ▶ 各部分间用泡沫保温接头现场连接。
- ▶ Python 管拥有比 VIP 更多的优点



真空绝热低温阀

- ▶ 低热漏率，液体损耗极少，无霜
- ▶ 性能可靠，保持长期操作灵活性
- ▶ 有T型和Y型，分别适用于水平和垂直管道

Vacuum Jacketed Valve

- ▶ High thermal efficiency, minimizing liquid loss, frost-free
- ▶ Reliable, easy to operate
- ▶ T & Y models for horizontal and vertical applications



真空绝热软管

- ▶ 较好的柔性，方便与设备的连接
- ▶ 外表面不结露，不结霜
- ▶ 低漏热率，液体损耗非常少
- ▶ 最大允许工作压力为 350psi

Cryogenic Flex Hose

- ▶ High flexibility, easy to connect to equipment
- ▶ No water or fog outside
- ▶ High thermal efficiency, minimize liquid loss
- ▶ MAWP: 350 psi



接插式连接件

- ▶ 无需现场焊接
- ▶ 安装与拆除非常方便，仅需极少人工成本
- ▶ 密封性能优良，漏热率极低

Bayonet

- ▶ Eliminate on site welding
- ▶ Easy to install on-site, very limited labor cost
- ▶ High thermal efficiency, minimizing product loss



自动排气阀

- ▶ 自动排除管道内气体，保证液体液相质量
- ▶ 多种结构形式，可适合不同的场合。
- ▶ 安装方便，直接与真空管道插接

Cryovent

- ▶ Automatically releases gas from the pipe, ensuring the liquid phase quality
- ▶ Various models for different applications
- ▶ Easy to connect into system with bayonet



安全阀及支架

- ▶ 自动释放管道内过高压力
- ▶ 任何形成液体封闭处必须安装（如两个阀门之间）

Relief Valves & Risers

- ▶ Automatically releases overly-high pressure in pipe
- ▶ Relief valves are required in any spot where liquid can be trapped (between any two valves)

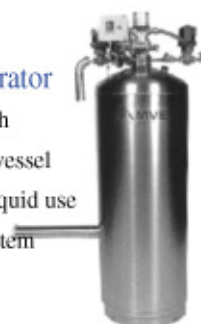


调压式相分离器

- ▶ 可使单个普通贮罐同时提供高压气体和低压液体
- ▶ 更精确地控制对输出液体的压力
- ▶ 比两个贮罐的系统成本低
- ▶ 液体最高压力为 50psi
- ▶ 流量最高为 56 升 / 分钟

Adjustable Pressure Phase Separator

- ▶ Allows low pressure liquid and high pressure gas from a single storage vessel
- ▶ More precise pressure control on liquid use
- ▶ Lower cost than two bulk tanks system
- ▶ Operates up to 50 psig
- ▶ Flow rate: 15 GPM max



Vacuum-Insulated Pipe Systems Solutions

真空绝热管道系统解决方案

ONE System

ONE Company

ONE Call

Chart is the only "One Stop" source for liquid and gaseous nitrogen applications.

查特是唯一能为液态和气态氮气应用提供"一站式"服务的供应商

From development and design to installation and start-up you can trust Chart to deliver a reliable, turn-key vacuum-insulated piping system that will consume the smallest amount of liquid nitrogen, resulting in significant cost savings.

不管是从项目的初期方案，还是到设计、安装、调试，您都可以信赖查特提供的"交钥匙"工程-可靠的真空绝热管道系统：液氮损耗降至最低，大幅降低运行成本。



Biological Freezers

Freezing biological samples is a critical application which requires ultimate reliability of liquid nitrogen supply with automatic filling, minimal losses and less fogging.

生物冷冻室

冷冻生物样本是一个非常重要的应用场合，需要一个稳定、可靠，能自动充液，最少损耗，很少结霜的液氮连续供应系统。

Test Chambers

Ultra-cold liquid nitrogen provides extreme stress levels to increase the reliability of today's electronic equipment.

热效应实验室

超深冷的液氮提供极好的收缩水平，以提高当今电子设备的可靠性。

Food Freezers

Chart's superior insulation technology delivers liquid nitrogen with more cooling capacity, using less nitrogen per pound of product frozen.

食品冷冻

查特超级绝热技术提供的液氮，可提供更多冷量，使单位冷冻食品消耗的液氮更少。

Packaging Injectors

Use liquid nitrogen to create positive pressure for a robust container and displace oxygen for a longer shelf life. A reliable supply of liquid nitrogen keeps your equipment at peak efficiency.

食品包装充氮

在坚固的容器里，液氮形成正压，在食品密封包装中置换出氧气，使食品的货架时间延长。可靠的液氮供应系统可使您的设备一直保持高效率的工作。

Chart VIP Service Procedure

Chart has an advanced VIP manufacturing line and a professional team, including engineering and installation.

Generally, the following steps will be conducted in a VIP project.

1. Provide a system solution and quotation, according to customer's application requirements and facilities.
2. Engineering design is developed after the contract is signed.
3. Confirm the design by visiting the site.
4. Fabricate and test VIP in workshop
5. On-site installation and testing.
6. After the sale, monitor and support the customer's application.

查特真空绝热管道服务流程

查特拥有先进专业的真空绝热管道生产线, 和一支富有经验的工程设计和安装队伍。

通常, 完成一个真空绝热管道的项目包括:

1. 根据客户的系统使用要求和现场条件, 提供完善的系统方案设计并报价。
2. 合同确认后, 进行工程设计。
3. 到客户现场进行设计审核。
4. 工厂内进行真空绝热管道制作和检测。
5. 客户现场安装及调试。
6. 客户使用情况跟踪及后续服务。



VIP & Foam Insulated Pipe Comparison

真空管道和泡沫保温管道的比较

Chart Vacuum-Insulated Pipe 查特真空绝热管道	Foam Insulated Pipe 泡沫保温管道
Excellent thermal performance (about 10 times better than foam) 卓越的绝热性能 (比泡沫保温高10倍左右)	Poor-moderate thermal performance 较差的绝热性能
Stainless steel outer jacket is not affected by moisture from ambient air 不锈钢外壳可防止空气中水分的渗入	As moisture leaks past the cover, it soaks into the foam making it even less efficient. Eventually the foam needs to be replaced! 水分会从外封渗透进入, 并浸湿泡沫, 使其绝热性能更差, 最终不得不更换
Smaller outer jacket means less space required for the installation and less cost for wall penetrations and pipe supports 较小的外径意味着仅需较小的安装空间, 较小的穿墙和管道支架成本	Foam insulated pipe requires significantly larger OD for the insulation, requiring more space and higher cost of installation (wall penetrations and supports) 安装泡沫绝热管道需要很大的外径, 更大的空间, 更多的成本 (穿墙和支架)
Will not condense moisture on outer jacket 外壳不会结露	Over time will condense moisture on outer jacket and ultimately may grow mold 时间一长外壳就会结露, 并最终固化成型
Stainless steel outer jacket for durability and aesthetics 不锈钢外壳既耐用, 又美观	Outer jacket and foam is easily damaged 外壳和泡沫非常容易损坏
Extremely low maintenance 极少的维护	Foam insulation should be stripped off and re-applied to keep its efficiency 泡沫绝热材料必须定期更换以保证绝热性能
End use system is much more efficient for customer, providing higher quality liquid and reducing losses 终端用户系统效率更高, 提供高质量的液体并减少损耗	Higher heat leak means higher cost of operation 较高的热泄漏意味着较高的运行成本

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