



Equipment Winterization Techniques

Instrumentation Solutions for Extreme Environmental Conditions



ENGINEERING YOUR SUCCESS.

Extreme Environmental Conditions

Special winterization measures need to be adopted to adequately protect control and measurement equipment, to ensure continued plant safety and reliability.



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The dramatic drop in oil prices over the past few months has, if anything, further focused attention on equipment winterization: with a number of future projects put on hold, many companies are now looking to improve the efficiency and reliability of existing plant. Parker brand products such as A-Lok fittings and tubing have proven their reliability over the years in low temperature environmental conditions. However, due to ambient temperature differences, customers pay more attention to the special materials and solutions that are necessary to avoid corrosion issues and loss of equipment.

The need for efficient equipment winterization is not limited to greenfield sites. Heat loss due to poor insulation is also often an

issue at existing plants, resulting in unnecessarily high energy usage and additional operating costs. Many of the refineries in Eastern Europe, for example, were constructed 50-60 years ago in the times of the Soviet Union, and are now outdated and require upgrading.

Nearly all process plants have some outdoor instrumentation. The winterization measures that will be needed depend on a number of factors, such as the location of the plant, the worst-case environmental conditions and the type of heating (electrical or steam) that is employed. Parker offers a complete range of winterization products – including special manifolds, heaters, insulated enclosures and heat traced tubes – that enable instrumentation engineers to implement the optimum solution for every type of application.

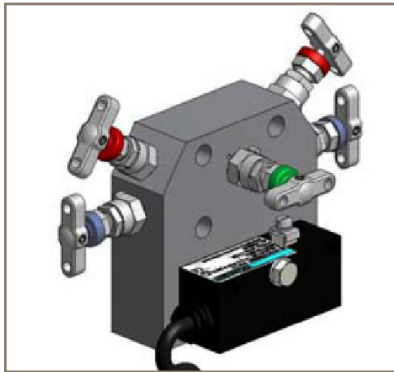
In recent years, the number of large-scale oil and gas processing plants sited in remote locations such as the Arctic regions has increased significantly.

As well as exceptionally low temperatures, the extreme environmental conditions in such areas include snow, ice and high wind speeds, often with moving sea ice. The complexity and risks of operating in these arduous conditions is considerable. Outdoor instrumentation is a case in point; special winterization measures need to be adopted to adequately protect control and measurement equipment, to



Manifolds With Contact Heater

Parker's instrumentation manifolds are available in special versions that are designed specifically for base or rear mounting inside protective enclosures.



This five-valve base-mounting manifold provides sufficient space for a block heater

These manifolds offer unrestricted access to process/vent connections and eliminate

internal tubing connections to minimise potential leak points. They also provide adequate free surface area for attaching a contact block heater.

A contact block heater dissipates heat by conduction (which is much more efficient than convection) and needs to be mounted on the flat surface of a conducting material, such as metal. One bolt is generally sufficient to attach the heater. Parker's base and rear mounting manifolds accept steam tracing blocks or electrical heater blocks and conduct sufficient heat to prevent freezing or to maintain

the process temperature of the contained fluid or gas media. These types of manifolds also help to conduct heat to the instrumentation, as well as to the process and vent connections.

Material for sealing rings

One point worth mentioning concerns the type of material used for sealing rings. There is a potential threat with grafoil seals between the manifold and transmitter. This appears to be due to the risk of seal material expansion caused by frozen liquid, which may lead to a break of the seal.

Protective Enclosures



Specifying an enclosure for field-based instrumentation is not a trivial task – the enclosure must have a robust structural integrity and a long service life – preferably with little or no maintenance requirements of its own.

The costs of maintaining some types of outdoor enclosures and the fitted components, especially

in remote or difficult-to-access locations, can be considerable. Even greater effort is needed when the environmental conditions are challenging, such as when protection is required against extreme cold, frost and condensation.

Insulation makes a big difference to enclosure performance. To maintain the same internal temperature, insulated enclosures typically require just one-sixth of the heating power of uninsulated enclosures. If components need to be protected against low temperatures, a contact heater is an ideal means of keeping the enclosure warm and it is more cost-effective than other forms of heating. Parker offers a comprehensive range of steam tracing and electrical models, to

best suit the application.

The main criteria of any enclosure designed to protect instrumentation from severe cold is its thermal conductivity – the higher the conductivity, the greater the heat loss to the external ambient. The bigger the difference between internal and external temperatures, the higher the running costs, mitigated only by the thermal insulation qualities of the enclosure.

Parker has a vast experience of providing the fully fitted enclosure with the pre-installed components that is more reliable and easy to assemble in proper manufacturing plant conditions rather than on site in a cold environment. Optimal thermal insulation saves a lot of energy.

Prefabricated Tube Bundles

Used to prevent viscous materials from freezing, to avoid gas condensation and to maintain process temperatures in applications such as instrument sampling and impulse lines.



Tube bundles comprise one or more process tubes, steam or electric tracing, insulation and a jacket.

The system needs to be connected safely to transmit fluids and

gases, to keep a process warm or above dew point and to protect personnel from hot pipes/tubes, as well as to protect tubes against corrosion. For this purpose, heat traced tube bundles are typically used for manifold and relief valves, and pre-insulated tubing is used for large pipe tracing and condensation return lines/systems. The insulation is usually designed for extremely cold environments and can typically withstand cryogenic temperatures down to -180°C .

The main criteria that instrumentation engineers need

to consider before specifying the insulation are the distance that the fluid or gas needs to be transmitted, the ambient and fluid temperatures and the outside diameter and material of the tubing. In the case of electrical tracing, the operating voltage of the heating cable is also an important consideration.

Parker's product range includes pre-insulated tubes and prefabricated versions of all the main categories of heat traced tube bundles, with a choice of different types of tube jacket materials to best suit the application.

One Stop Shop

Parker has the expertise and product breadth to help at every stage of equipment winterization, from one-off items through to complete parts kits or fully assembled systems.



Although corrosion seems a minor threat in cold conditions, one needs to consider temperature gradients: a number of fields (e.g., Kashagan in Kazakhstan) feature extreme cold winters (minus 50°C) and extremely hot summers (up to 40°C). At Parker we provide products manufactured from corrosion resistant alloys (e.g., 6Mo, 625) in addition to standard

stainless steel materials, and have gained wide experience of producing non-standard solutions. One such solution is Shell TAMAP 2 start valves that can operate over a temperature range of minus 50°C to plus 150°C , which is a key advantage compared to standard valves that have certain temperature limits.

