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In the quest for more energy-efficient operations, every little bit helps.

As companies demand more energy efficiency from their systems, valve heating could be a real consideration. One area where energy losses can occur is on long pipe runs and their intersections such as T-fittings and valves. On an individual basis, energy losses around valves might seem minuscule. But, when an application has multiple valves in a system, such losses can quickly add up. Since it is a given that some losses will occur in heating systems, it makes sense to use heaters with insulation to maintain temperature.

Problem overview

Valve heating is critical to many processes. Markets and applications such as petrochemical, freeze protection, metal casting, pulp and paper processes and transportation are just a sampling of the many areas that have valve heating needs. Moreover, these markets seem to be without boundaries. For example, hundreds of feet below the earth's surface, an arctic mining operation might utilize flow valves that must withstand up to 5000 pounds of pressure per square inch while operating at a constant temperature. On the other hand, an instrumentation valve, which is a key component in an aerospace application, must be able to handle extreme swings in temperature. These applications require quality heating devices to maintain temperature, thus reducing the chance of failure. The heat produced from the heaters may be necessary to reduce viscosity of the medium as it flows through the valve. If the heater fails, it can cause serious damage, halt the process or compromise safety. Additionally, agency

requirements such as, UL®, CSA, CE, or RoHS might be necessary.

As varied as the industrial marketplace needing valves is, so too are the many valve geometries being utilized. While valve shapes and sizes—*along with application requirements and pricing*—are unique, the basic functions of valves are quite similar. In general a valve is a pass-through device regulating flow. It can be made of lightweight aluminum and incorporate a measurement device with an actuator for an oil pump line or be as simple as a polymer ball valve for an irrigation system.

Understanding process needs

It is best to take an application's heating needs into account in the early stages of the system design phase. Too often, though, system heat is an afterthought and the design engineer or field technician has to scramble for a solution. Fortunately, there are many heater types to choose from when it comes to valve heating.

Heaters can be applied by wrapping them around the valve. They also can be integrated as part of the assembly at the time of the initial design. Choosing the appropriate heater for the valve is as important as choosing the appropriate valve for the application. Such a task means understanding the marketplace with respect to heater offering. There are several heating options that warrant a more in-depth review before selection.

Picking the correct solution

If placing heat close to the medium is important, a cast-in heater is an excellent option. Depending on the size of the valve, heaters such as FIREROD® cartridge, cable or WATROD tubular heating elements can be utilized by placing them in direct contact with the valve body or used in open air near the valve. In smaller geometries, when space is critical, cable or cartridge heaters are excellent options. If casting the heater as part of the valve is not an option, drilling holes and utilizing a cartridge insertion heater is another good option.

Opportunities exist in the aftermarket for heating valves. Creating a heated enclosure or "hotbox" around the valve and utilizing a tubular heating element, silicone rubber heater or small, finned strip heater are excellent supplemental heater options. The heater enclosure helps contain the heat while protecting the electrical connections from the elements of weather—*and the use of insulation in the enclosure is a great energy saver.*
These heaters also are good choices when heating manifold valve assemblies.

In particular, some applications utilizing manifold valves might require easy-to-install, blanket-type heaters in direct contact with the part. Blanket heaters can be designed with holes and notches to accommodate the obstructions. These heaters offer the operator easy access to handles or instrumentation without significant disassembly. As a bonus— *including energy-saving benefits* —these heaters can be shipped from the factory with an insulation backing. This reduces field service time by not having to add additional insulation.

Some valve heating applications require good controllability as a result of temperature limitations of the medium. In addition, temperature sensitive parts such as O-rings must not exceed melting temperatures. Incorporating a sensor (such as a thermocouple or RTD) as part of the heater solution can save headaches down the road. These sensors work in concert with the control system and keep the heater from over-temping, and therefore prevent the system from overheating.

Watlow's wide variety of silicone rubber and flexible heaters with insulation and jackets utilize an easily removable design for hard-to-reach valves. This foam-in-place technology enables heating of complex geometric shapes.

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