SELECT TYPE OF HEATER(S)

The type of heater best suited for an application involves the dynamics of the process, space limitations, available electrical supply, cost, and appearance among other considerations. There could be several acceptable heaters for a single application. A water tank could be heated by direct immersion, clamped-on strip or tubular heaters, or even a band heater if the tank is cylindrical.

The following methods of installation are listed in the order of most effective transfer of heat from the element(s):

1. Immersed directly in liquids or gases
2. Inserted into drilled holes
3. Placed in milled slots or grooves
4. Mechanically clamped or wrapped around the surface
5. Spaced away, as a convective or radiant heat source

Most often the application will indicate the obvious selection.

Even though metal sheath heaters are quite durable, physical damage can occur. Protection, such as a shroud or guards might be necessary. In applying surface mounted heaters such as HD Strip Heaters or in some cases tubulars, intimate contact between the heater and the heated part is necessary to facilitate conductive heat transfer. This type of contact is also important in the installation of heaters in drilled holes and the strapping of band heaters to the mounting surface. Air gaps between the element and the heated part will result in higher sheath temperatures, and early failure.

Contamination can be said to be the leading cause of heater failure. Oils, plastics, vapors or other materials around the terminal areas will shorten heater life. Teflon, epoxy, ceramic-to-metal hermetic and other seals will often protect against contamination in some heater designs. Area atmospheric conditions may require complete terminal isolation from the environment by the use of NEMA IV or VII enclosures.

If lead wires are designed, continuous flexing or possible abrasion would call for armor cable or metal braided protection. Temperature and contaminants present also are deciding factors in the lead design and type chosen.

Further along in this section is a discussion on how the placement of heaters will improve heat distribution and heat patterns throughout a thermal system. At this point, the selection should emphasize what would be practical and efficient. Modifying the choice may become necessary in completing the design of the entire system.