

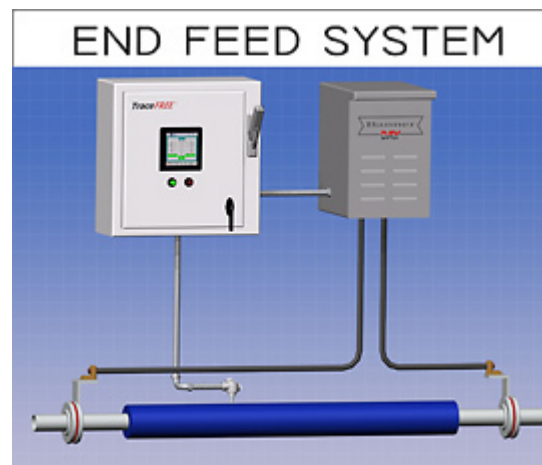


Impedance Pipe Heating and Conductive Fluids

Previous articles have focused on specific applications for impedance pipe heating. One addressed a common use of electric impedance pipe heating for the maintenance of shortening temperature in a food manufacturing plant (See Impedance Heating System Application). The other application demonstrated the versatility of impedance pipe heating as it was designed to connect to different sizes and lengths of pipe on a specially engineered trailer for use unloading asphalt in a shipyard. (See IPH System Solves Application Challenge)

Now we would like to address a less conventional use and challenge you to step out of the box and think about transporting an electrically conductive material, for example potassium and sodium salts. These liquids are electrically conductive and you quickly will ask yourself – how can impedance be used in this application? Well it can and is done. So, what are the fluids you are currently handling and heating? Are any of these fluids electrically conductive? What are your challenges heating these fluids?

TraceFREE™ impedance pipe could be the answer. In previous articles we offered two system configuration methods End Feed and Center Tap.

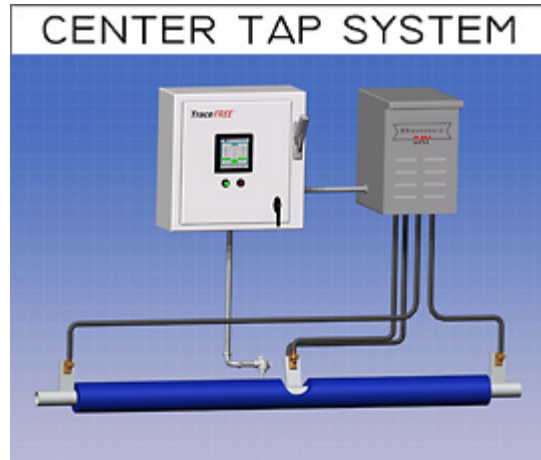


The **TraceFREE™ end feed system** is the most common and is often used with piping systems that have multiple branches and drops. Excellent for low- and mid-range temperatures, an end feed system is simpler to install than the other system configuration, the center feed system.

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The Center Tap System



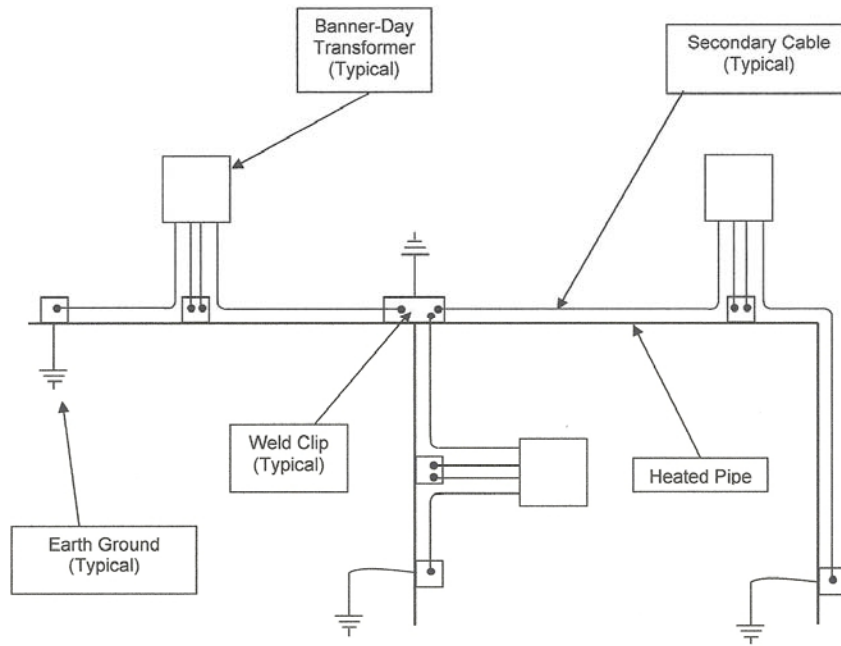
The **TraceFREE™ center tap system** is typically used for longer pipe system runs, frequently without branch lines, and is well suited for mid-range and high temperature applications. It does not require use of dielectric insulated pipe joints because a center tap system is electrically grounded at each end. Said another way, the potential between the X2 cable connection on the end of the pipe and earth ground is zero. It is this characteristic that allows impedance to be applied to a piping system carrying an electrically conductive fluid.

Electrically conductive fluids, such as liquid lead and sodium, are heated effectively with impedance pipe heating. Recall, impedance systems utilize the characteristics of electric current flowing through a pipe to create heat. Using a center tap system limits the path of the current flow to the X2 cable connections on the pipe. While most of the current flow occurs towards the surface of the pipe to which voltage is applied, higher temperature systems can have measureable current flow on the opposite surface. By grounding the X2 connections of a center tap system the current flow is limited to the impedance system's boundary established by the locations of the X2 cable connections. As you can see the better choice for use with electrically conductive fluids is the center tap system. Why? Because it is grounded at the system's boundaries.

Consider the following pipe heating application where an electrically conductive fluid is being transported through a piping system utilizing multiple branch drops. For this application it was specified that the number of flanged joints be limited due to the hazardous nature of the fluid in the system. Shown below is a schematic diagram of the piping system with the center tap impedance systems applied to it.

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Three (3) Center Tap Electric Impedance Heating Systems

Notice how the application of three center tap impedance systems eliminates the need for any dielectric flange joints in the piping system. At the same time all of the benefits of impedance heating are realized:

- Even heating with no hot spots
- High reliability
- Minimal operator and maintenance resources

It is easy to see why the center tap impedance heating systems were viewed as the best solution for this challenging pipe heating application.

In another similar application for liquid sodium and potassium, a chemical company was increasingly frustrated with failures of their heat trace cable and subsequent need to remove the insulation, repair the cable and replace the insulation. In addition to the cost of time and dollars for repairs, the unpredictable failures resulted in the pipes freezing compounding the situation. The final resolution was to replace the heat trace cable with a center tap electric pipe heating system as described above. This change virtually eliminated the maintenance and more importantly, heated the conductive fluid to the required 450°F consistently and eliminated the concern with process disruption from freezing pipes.

In closing, whether you are heating electrically conductive fluids, temperature sensitive products, impedance heating is an effective and reliable pipe heating solution. To learn more about how **TraceFREE™** impedance pipe heating can help you visit www.banner-day.com.

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