



Maintenance and Your Impedance System

By Patrick S. Morris

Most heating systems used today have some form of recommended maintenance schedule. Whether it is a complex series of steps that must be done at specific intervals, or simply occasional checking of certain parts, all maintenance schedules have the same basic purpose: Keep the system running. The same is true for an impedance heating system. Impedance heating systems very often become that item in every plant that just works. People know that something is heating their pipes, but they don't always remember what. While this is a great endorsement for impedance, the systems do require occasional maintenance attention to avoid potential downtime.

Maintenance for an impedance system can be grouped into three categories:

- Cable and Connections
- Isolation
- Transformer and Control Panel

Cable and Connections:

The first category we will look at is Cable and Connections. The cable running from the transformer and all of the connections at the pipe can be considered the arteries of an impedance system. Just like arteries, the cabling of an impedance system carries the life blood of the heater: electric current. If the current is reduced, the pipe does not heat as intended. Reduce the current enough, and the heating stops. To ensure this doesn't happen, the cables and connections need to be periodically checked for wear and loosening. As a cable connection loosens, typically due to long periods of heat cycling, its resistance increases. This increase in resistance reduces the system current, and impacts heating efficiency. By checking the cable connection points two or three weeks after the system is first run, and then every six months after that, any loosening connections can be identified and tightened before they become a detriment to the system. Concurrently, the cables of the system should be checked for damage or wear. A damaged cable can cause problems. A partially cut cable becomes an electric current bottleneck, reducing the system efficiency, while a cable with missing insulation becomes a ground fault risk. Repairing or replacing a worn or damaged cable is an excellent way to help ensure your impedance system maintains its design performance.

Banner-Day

1840 NORTH MICHIGAN AVENUE - SAGINAW, MI 48602

WWW.BANNER-DAY.COM • PHONE: 877.837.0584 • FAX: 989.755.1309

Isolation:

The next category to check is the isolation. If the connections and cables are the arteries of a system, then isolation is the skin. Proper isolation will keep all of the electric current in the system's pipe line, saving energy and ensuring that the pipe will heat exactly as designed. Poor isolation will result in ground fault issues, loss of current, and much reduced system efficiency. When an impedance system is initially commissioned, care is taken to ensure the pipe line is properly isolated. Proper isolation means that the system is completely isolated from any ground. The critical points to check are the system ends, branch lines, and supports. Depending on the system design, the isolation at the ends can be either isolation flanges or specially grounded lug connections. Branch line isolation uses a combination of isolation flanges and jumper cables. System support isolation includes any hangers, fixed supports, and thermal insulation. When special grounds are used for isolation, the ground cable connection lug must be checked to ensure it is tightened to the proper torque. When isolation flanges are used, and this includes branch lines, the bolt isolation and gaskets should be checked for cracking or wear. Any isolation deficiencies observed, should be replaced as soon as possible to forestall any future problem. The pipe supports should also be checked to ensure they are still sound and properly isolated from ground. When hanging from outside the pipe's insulation, the pipe line should be checked to see if any of the insulation support shields are missing or have shifted and begun wearing into the insulation. Both of these are potential sources of system ground faults. With fixed supports, isolation material between the pipe and support should be checked for shifting or wear, and repositioned or replaced as necessary. All isolation checks should be performed on a maximum six month interval. With the system's isolation checked, only the transformer and control panel remain.

Transformer and Control Panel:

The transformer and control panel are the simplest of the checks, and can be performed on an annual basis. The transformer has several items to be inspected. First, the general operation of the transformer should be confirmed. This can be accomplished with a simple multimeter. The operator would measure the primary and secondary voltages of the system, as well as the primary and secondary currents. These readings should be documented and kept in a log so that each set of readings can be compared to previous values, and any deviations can be identified. A change in voltage or amperage levels can indicate wear and the possible need to replace a system component. Second, the transformer should be cleaned of any dust build up and a visual inspection conducted. Excessive dust build up acts as an insulator, reducing the transformers ability to shed heat and can result in excessive wear on the transformer. Visually, inspect and check for any signs of discoloration of the transformer, which can be an indication of overheating, and pending premature failure. Finally for the transformer, all internal lug connections should be checked and tightened to the proper torque if needed. The control panel follows the transformer inspection with simple dust removal and visual inspection of parts. With the transformer and control panel inspections done, the system maintenance checks would be complete.

Banner-Day

1840 NORTH MICHIGAN AVENUE - SAGINAW, MI 48602
WWW.BANNER-DAY.COM • PHONE: 877.837.0584 • FAX: 989.755.1309

The maintenance items listed here do take a small amount of time, but provide a much larger return on down time saved. By taking a few hours every six months, issues can be found and remedied while they are still small and before any downtime is required. Left unchecked, these same issues can grow in to failures, requiring many hours of downtime for diagnosis and repair, especially if needed repair parts are not directly on hand. The old adage “An ounce of prevention is worth a pound of cure” is exactly correct: spend a little time now on preventative maintenance, or a lot of time and money later on repair.

Copyright © Banner-Day Division of Banner Engineering & Sales, Inc. All rights reserved.

Banner-Day

1840 NORTH MICHIGAN AVENUE - SAGINAW, MI 48602

WWW.BANNER-DAY.COM • PHONE: 877.837.0584 • FAX: 989.755.1309