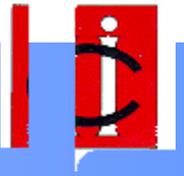


101 Common Foundry Problems

Michael Lister
Consarc Corporation
Rancocas, NJ

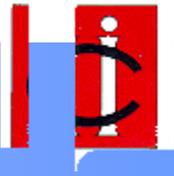
Some Areas We Will Cover



- POWER DELIVERY
- INDUCTION COILS
- REFRACTORY ISSUES
- WATER SYSTEMS
- VACUUM SYSTEMS
- HYDRAULIC SYSTEMS
- GROUND FAULT SYSTEMS



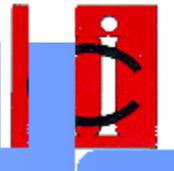
INDUCTION POWER CABLES



- **Potential Culprits**
 - **Age**
 - **Heat**
 - **Water Quality**
 - **Stress/Bending**
 - **Encounters With Sharp Edges**
 - **Wrong Sizing**

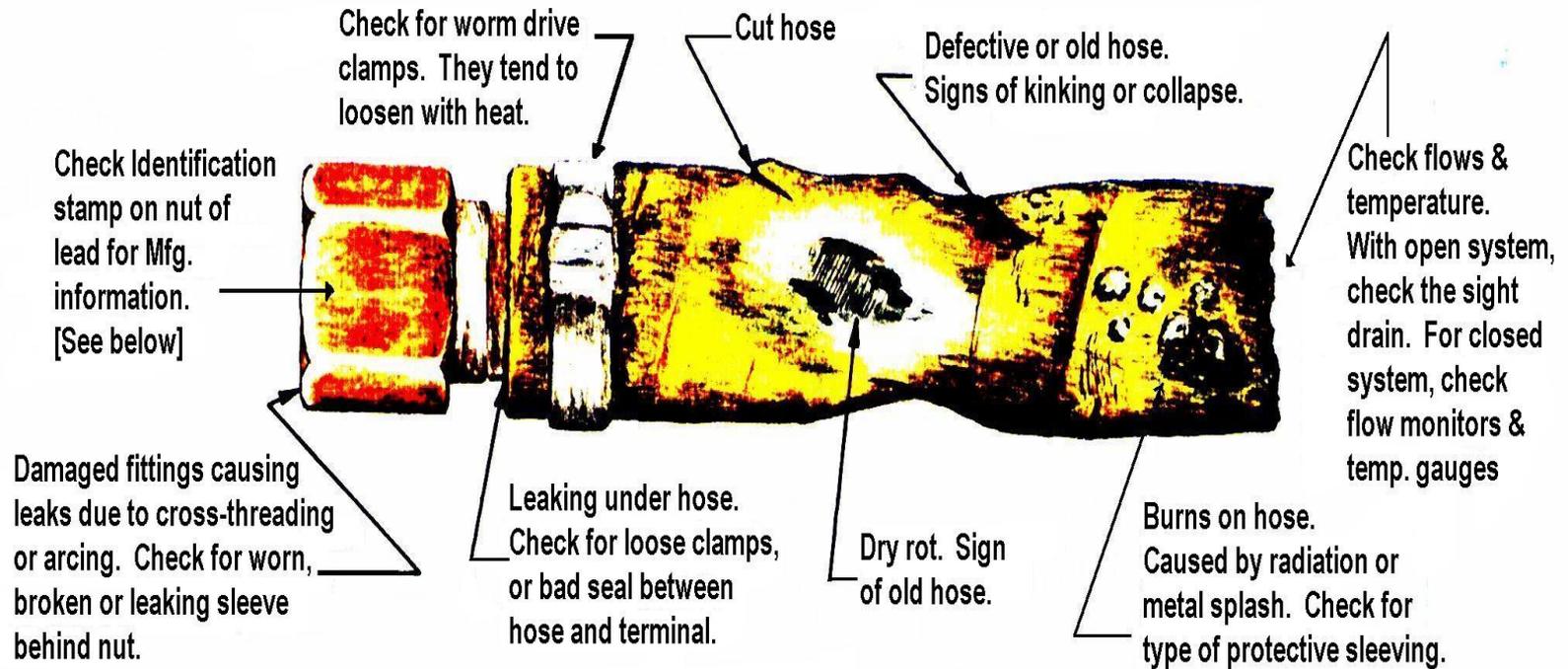


INDUCTION POWER CABLES

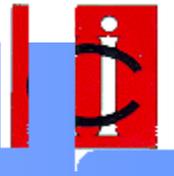


■ WHAT TO LOOK FOR

WATER-COOLED CABLE

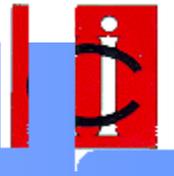


INDUCTION POWER CABLES

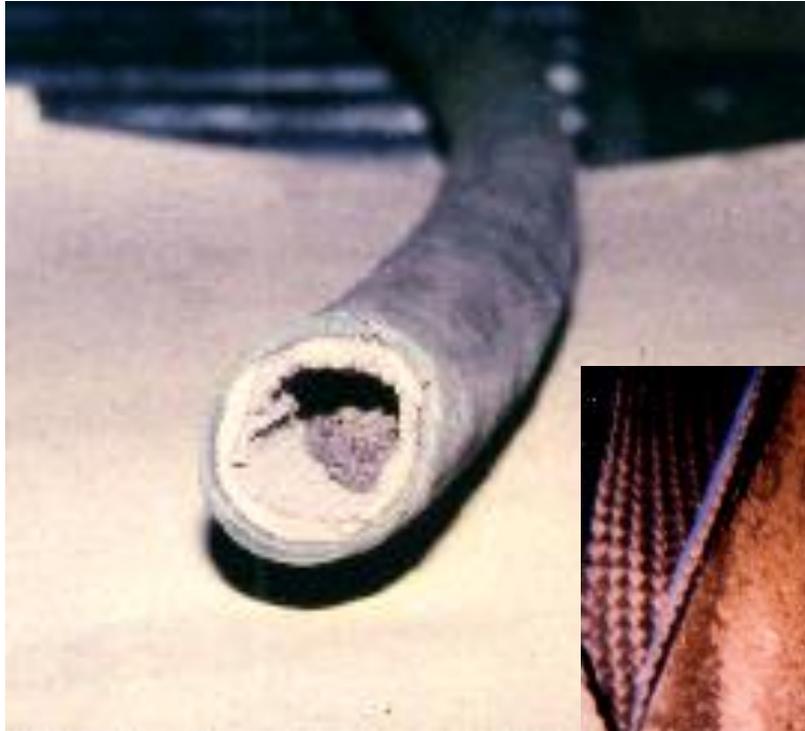
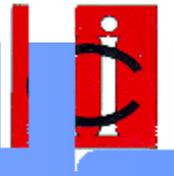


- Frayed Outer Layer
- Burn Spots
- Kinking

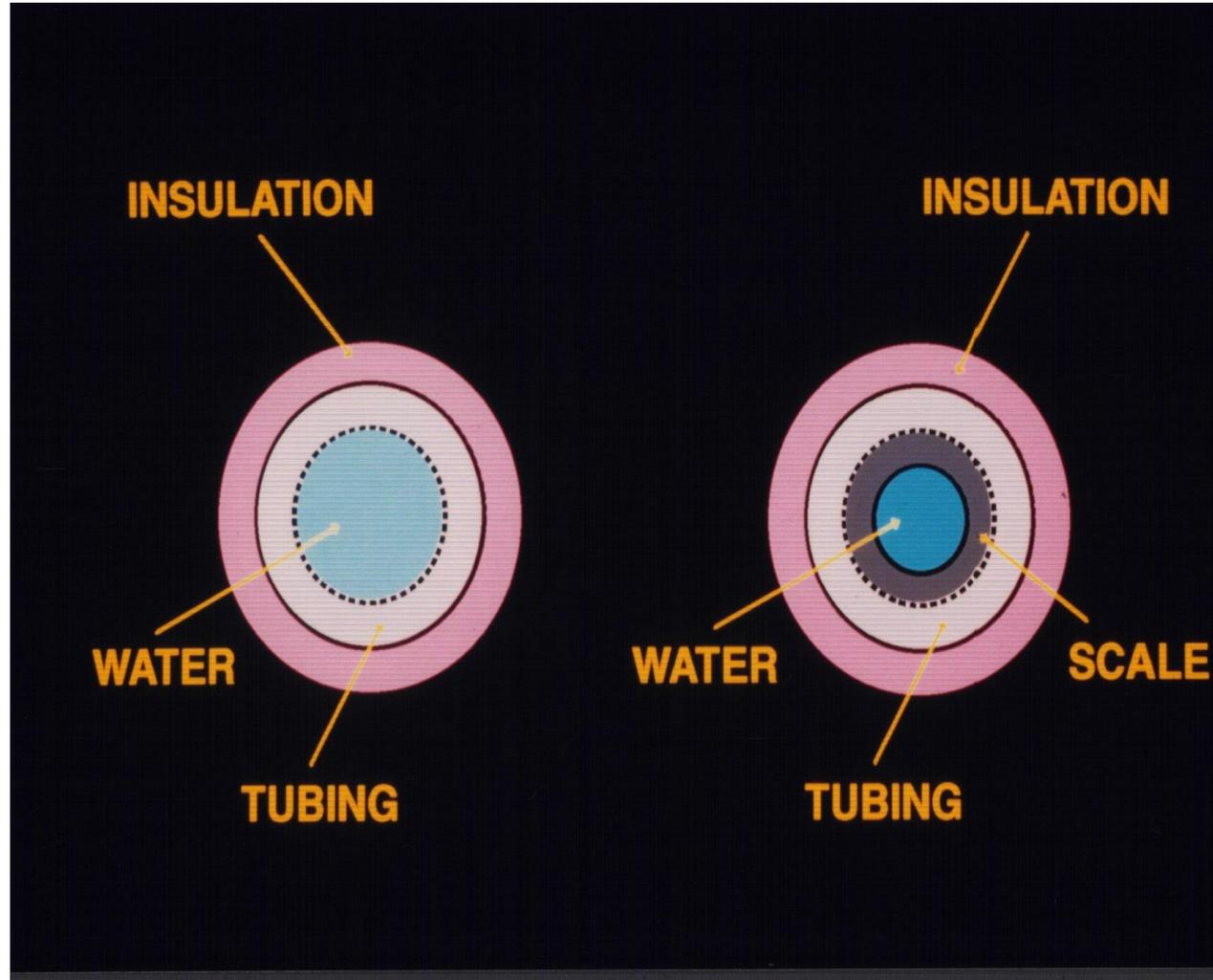
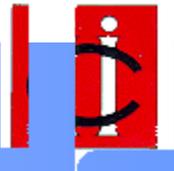
INDUCTION POWER CABLES



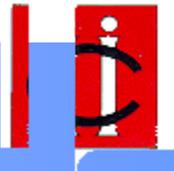
INDUCTION POWER CABLES



INDUCTION POWER CABLES



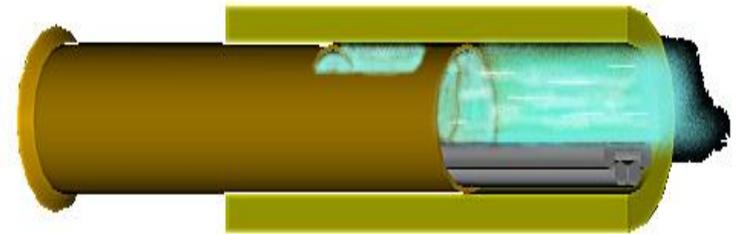
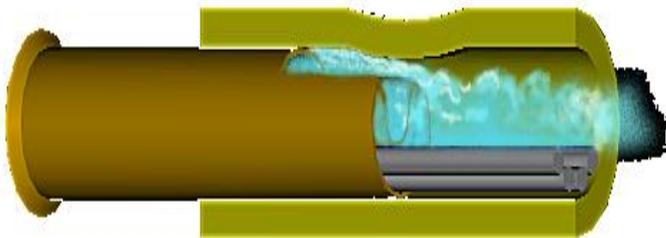
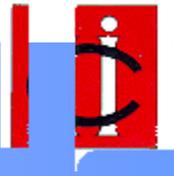
RANDOM SEGUE



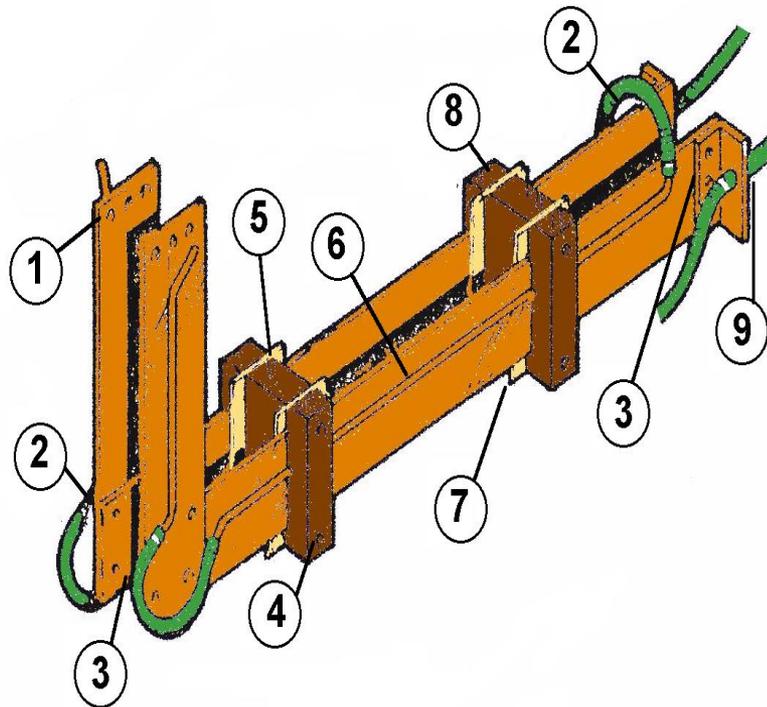
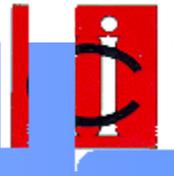
- THE NUMBER ONE CAUSE OF CATASTROPHIC FAILURES IN (VACUUM) FURNACE EQUIPMENT



INDUCTION POWER CABLES

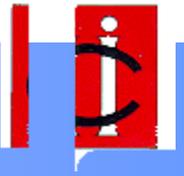


POWER TRANSMISSION SYSTEM

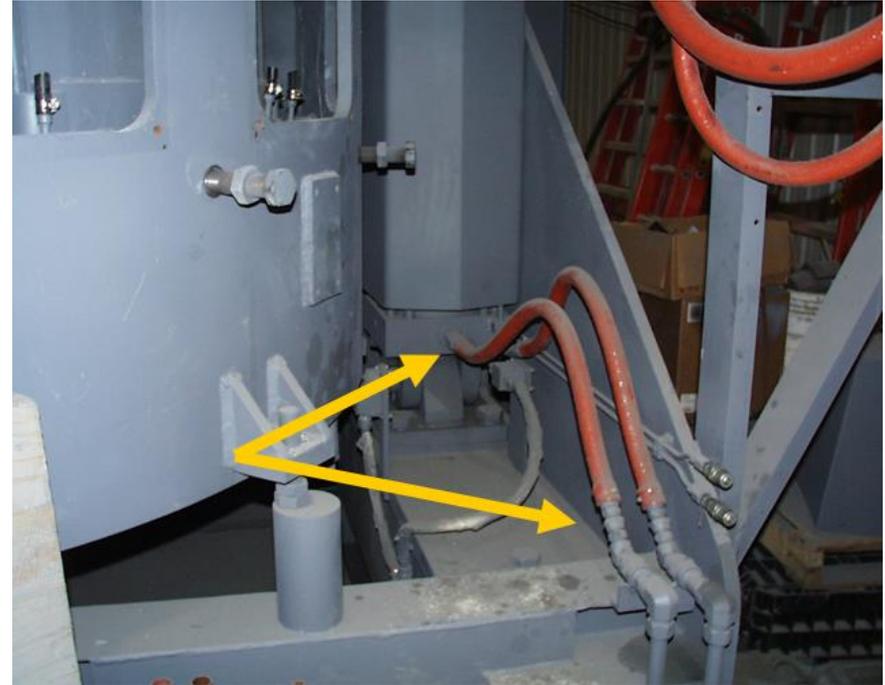


- **Connection Hardware Properly Torqued and Not Missing**
- **Visual Inspection of Insulators – Thermal Damage**
- **Hose Clamps**
- **W.C. Tubing – Braze material**
- **In Trench**
- **Bus Clamps – Charring**
- **Hot Spots!**

FURNACES – Daily Checks

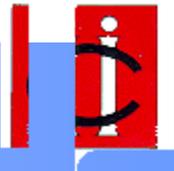


Ensure that the leads move freely without rubbing or abrasion

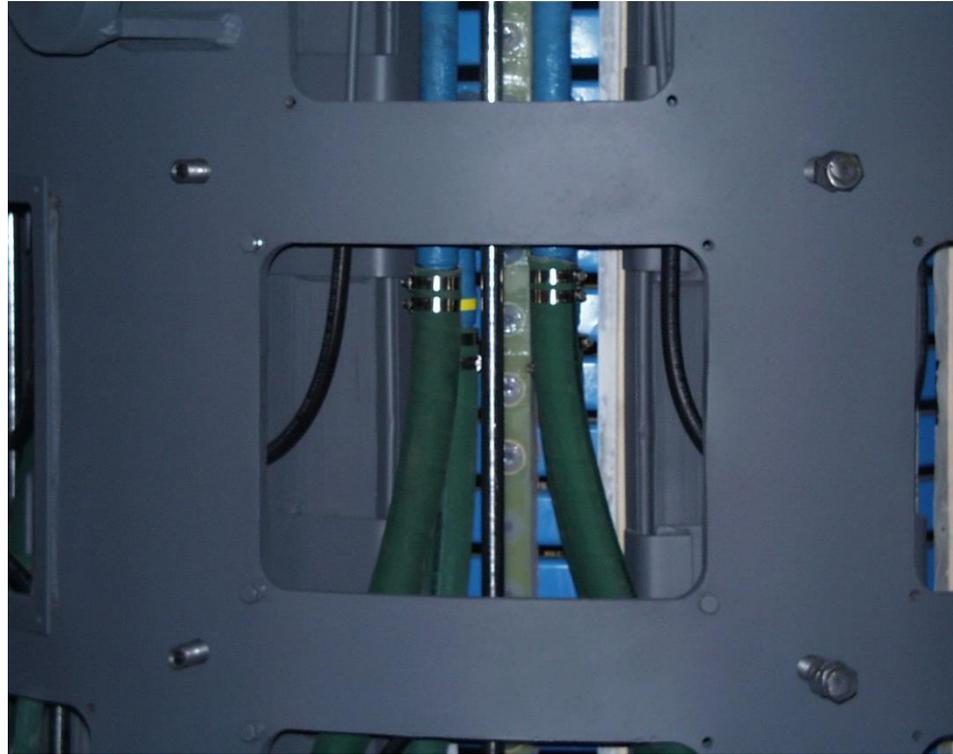


Visual inspection of all hydraulic cylinders and connections for leaks

FURNACE MONTHLY MAINTENANCE



FURNACE MONTHLY MAINTENANCE



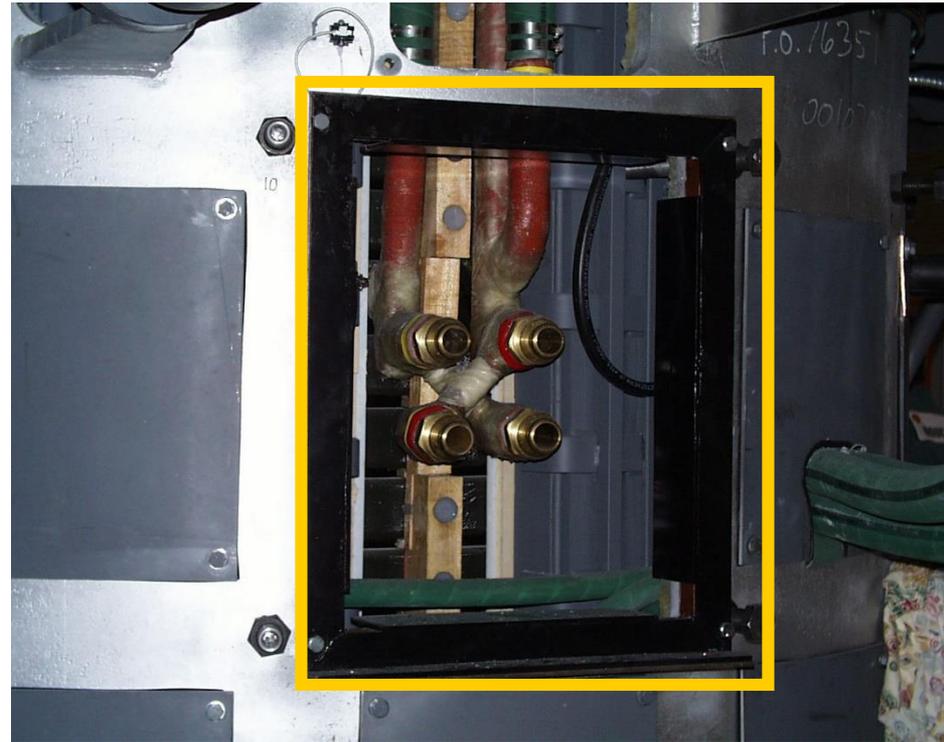
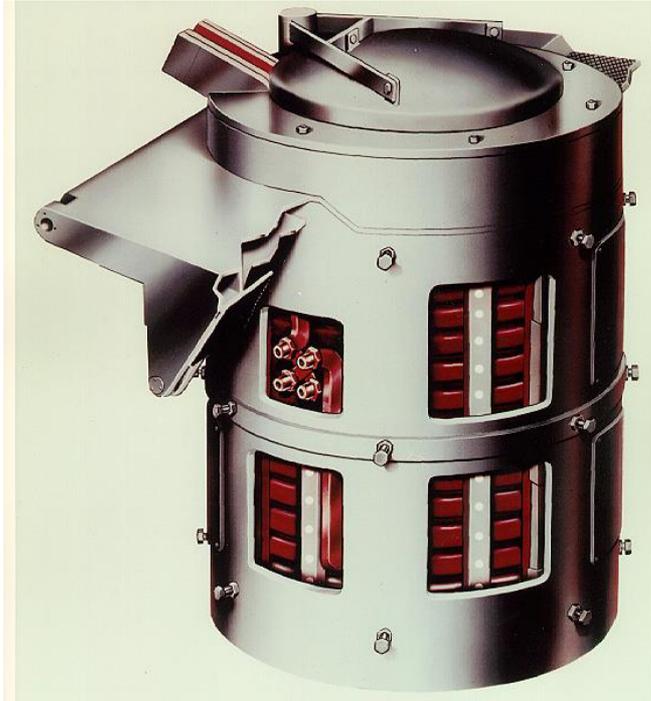
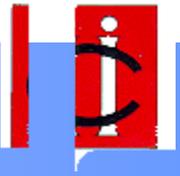
Remove furnace inspection covers and check tightness on all hose clamps.

WARNING



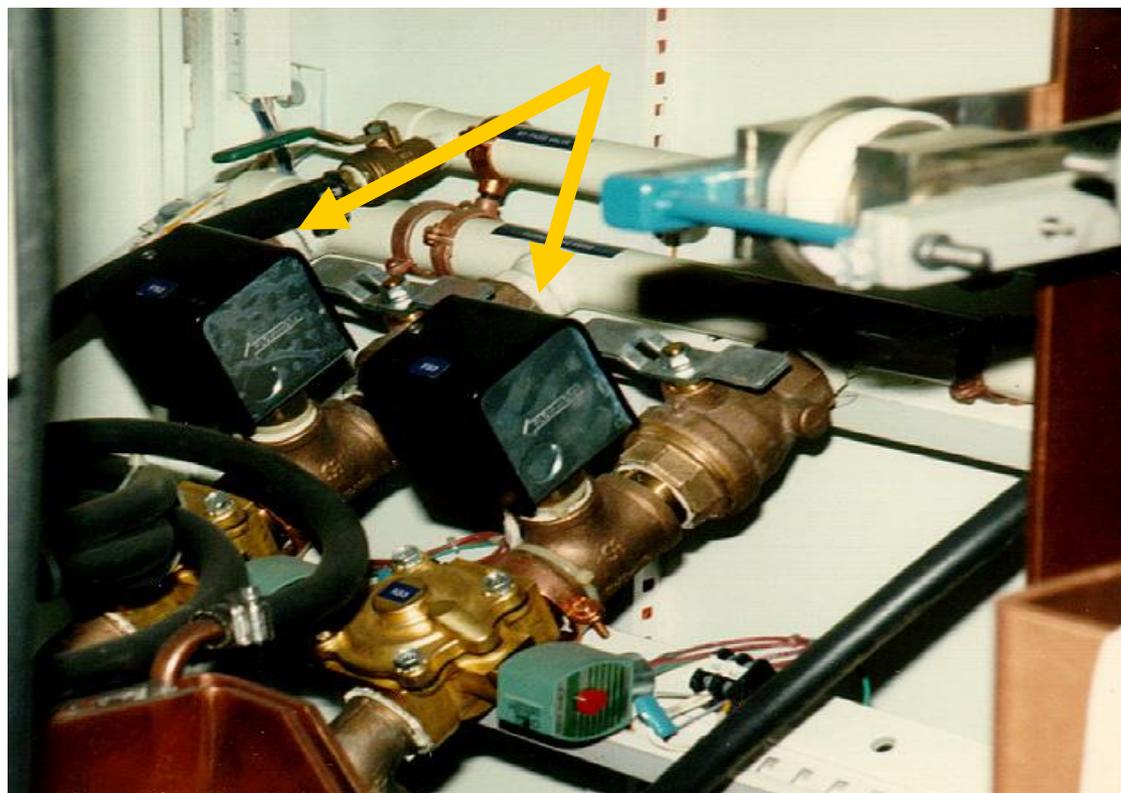
Ensure power is off and cannot be turned on while working on furnace coils.

FURNACE MONTHLY MAINTENANCE

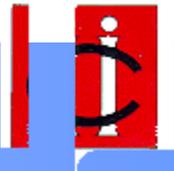


Inspect coil supports for signs of burning. Wire brush and spray with electrical insulating paint any areas that are burnt.

MORE MONTHLY MAINTENANCE



POWER SUPPLY MAINTENANCE



WARNING

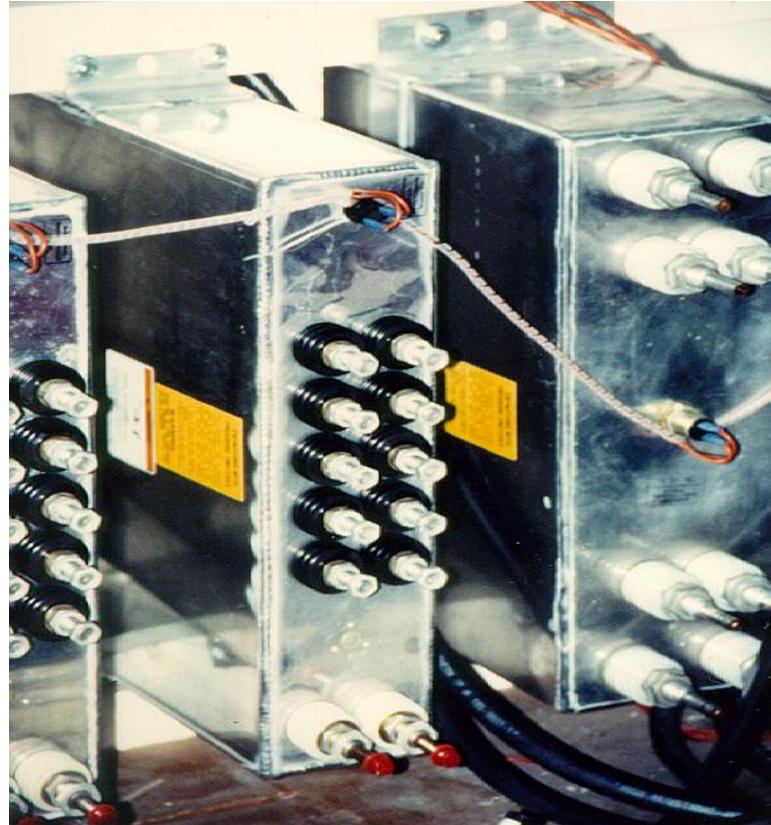


POWER SUPPLY MAINTENANCE



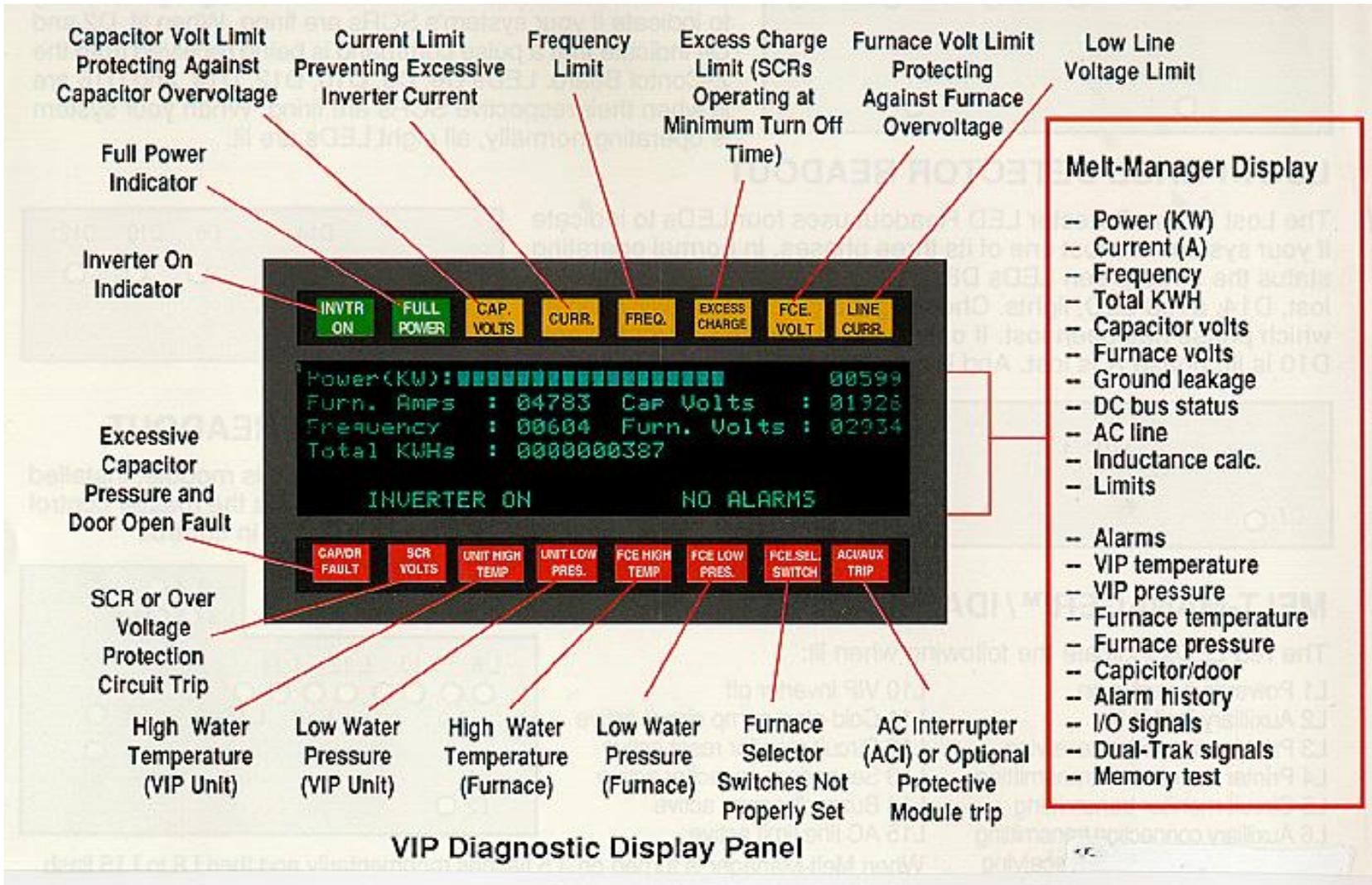
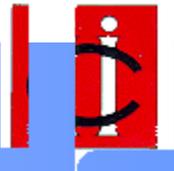
Visual check unit for signs of overheating in bus and wire.

POWER SUPPLY MAINTENANCE

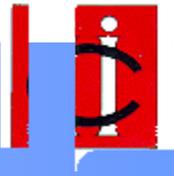


Visual check capacitors for oil leaks.

POWER SUPPLY MAINTENANCE



POWER SUPPLY MAINTENANCE



Check operation of ground detector circuit.

Ground detector circuit must always be operational for equipment and personnel safety.



POWER SUPPLY MAINTENANCE

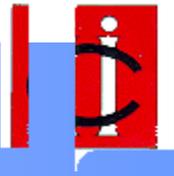
- **Check the quality of the water system**
 - **Conductivity**
 - **Water level**
 - **Deionizer Cartridge**

- **Vacuum Cabinet**
- **Vacuum Remote Consoles**

- **Check Torque of bolts and all buss connections**

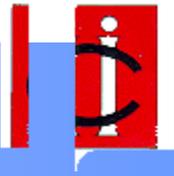
- **Check Tightness of all wire connections**

MAINTENANCE GUIDELINES



- **No Conductive Hose**
- **Hose Clamps – All Stainless Steel**
- **Do Not Substitute Ferrous Hardware**
- **All interlocks must be in working order**

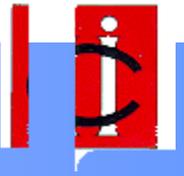
Refractory/Furnace Issues



- **Customer Called Complaining About Poor Coils from Vendor**
- **Reported MTBF – 2 weeks – failure always in coil grout**
- **Always in Top Turns**
- **Investigated – found melting 25 lbs. in 100 lb. crucible**
- **Thermal Stresses**



Refractory/Furnace Issues



- **Improperly Installed Monolithic Lining**

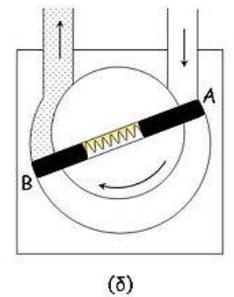
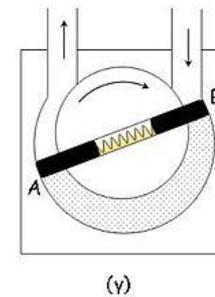
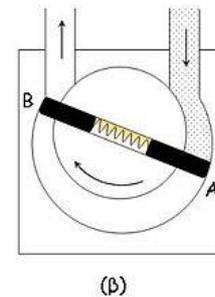
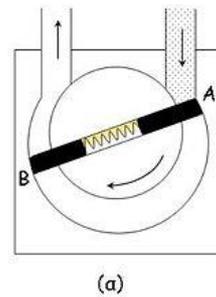
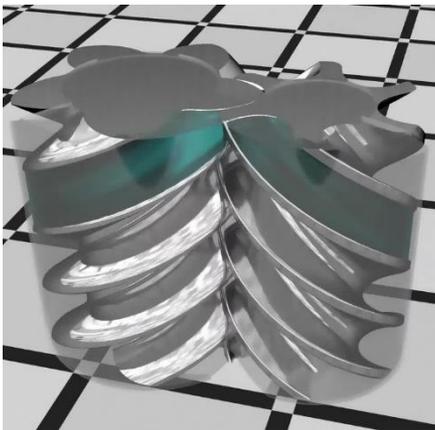
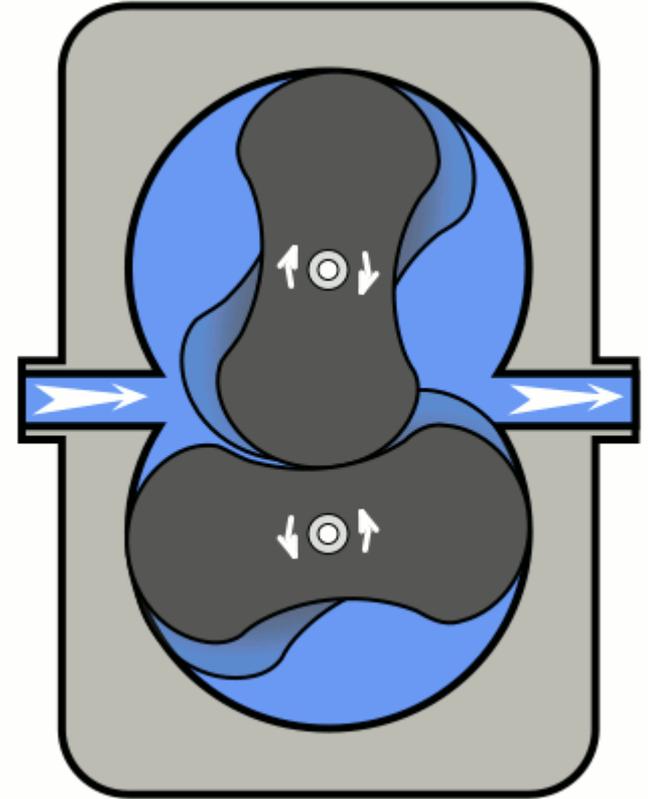
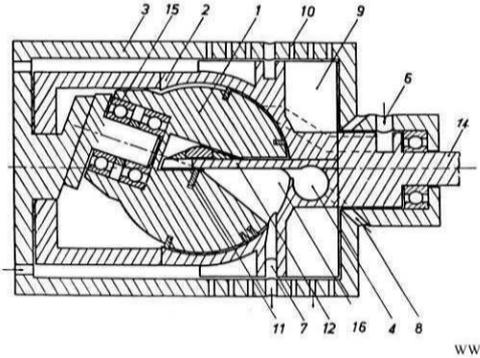
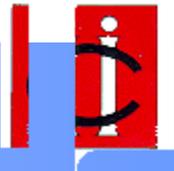


WATER SYSTEMS

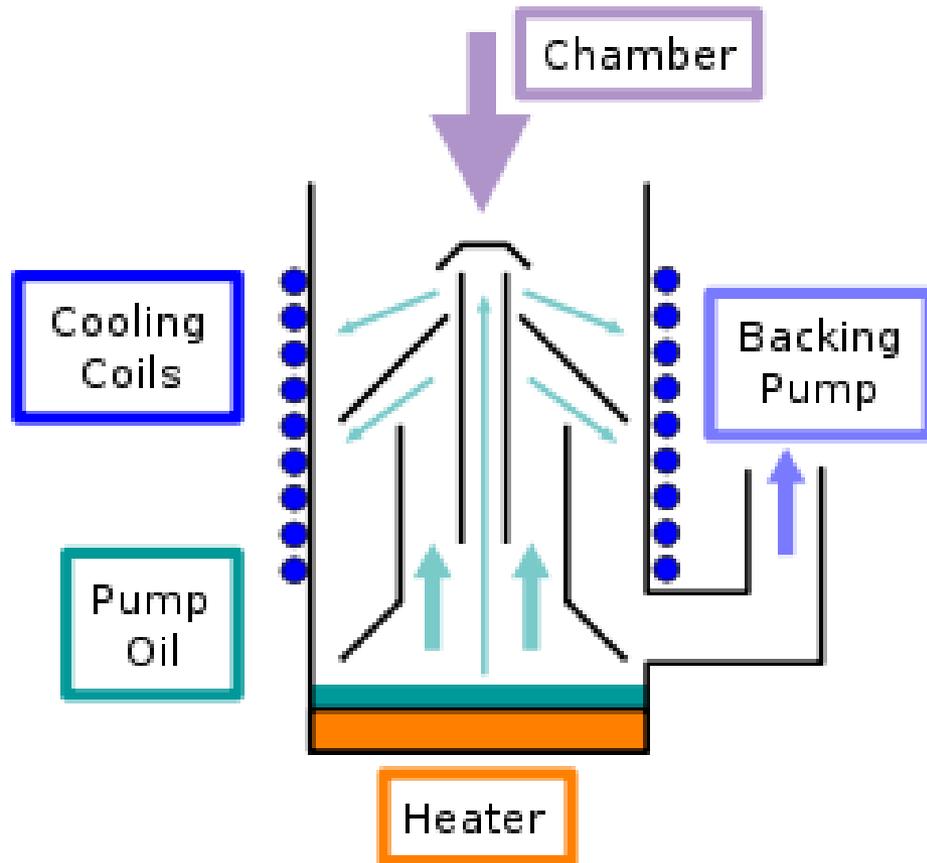
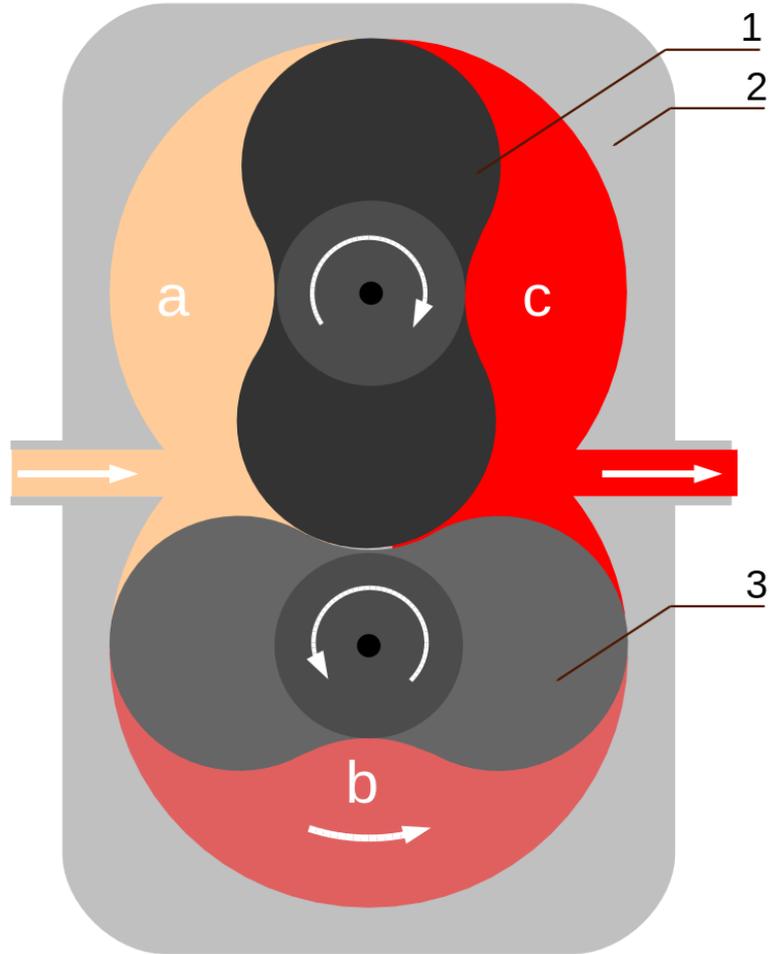
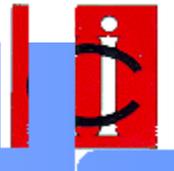


- **Many Older Flow Switches Have No Displays**
- **Flow Switches May Not Read Physical Values**
- **Flow Switches Are Vulnerable**
- **May Be Bypassed/Adjusted**
- **Water Quality Is King**
- **Closed Loop Water Systems**
- **Chambers – Hot Spots**

VACUUM



VACUUM



HYDRAULICS



- Hoses & Fittings
- Common Failures
 - Abrasion & Routing
 - Compatibility For Application
 - Fluid Selection
 - Improper Assembly
 - Cleaned and Flushed



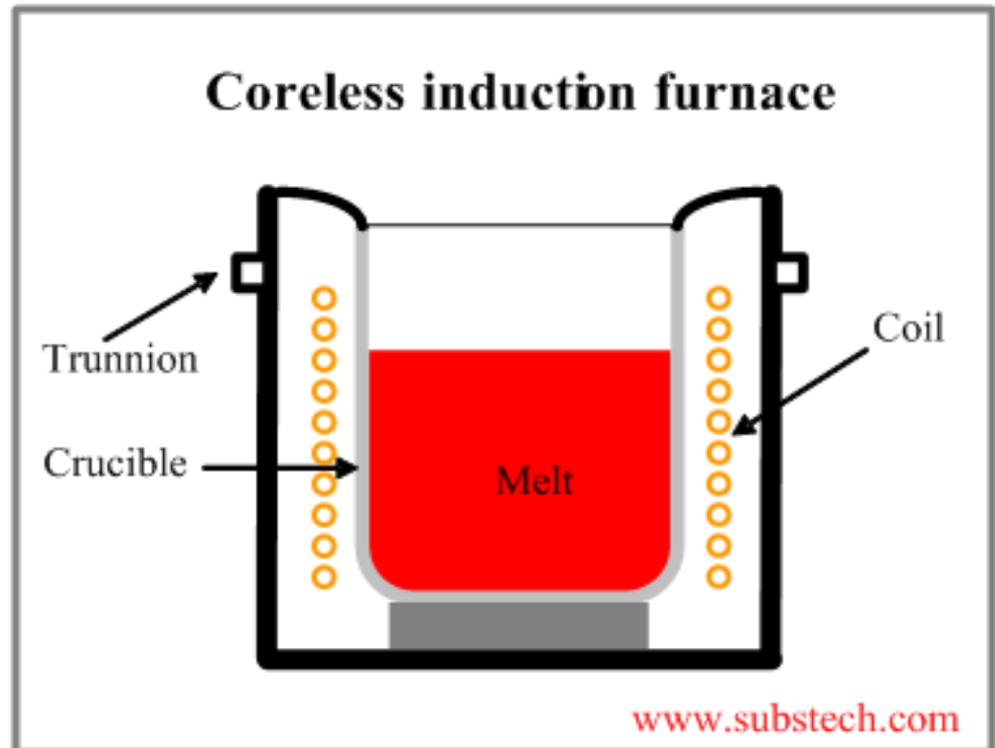
GROUND FAULT/MMLD



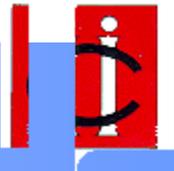
Systems Designed To Prevent Catastrophic Failure

Required by NFPA

Larger Units Need MMLD



Conclusions



- **Training is #1 Factor**
- **Knowing What and How To Maintain Equipment**
- **Water is vital to vacuum pumps, leads, coils, heat transfer,**
- **Vacuum is still a mystery to many**
- **Arcing is a huge problem**
- **Logs, SOPs are key ingredients to maintaining systems**



THANK YOU