LARON PHOENIX COMPLETES ADDITIONAL IMPROVEMENTS TO ITS 9-FOOT VACUUM PRESSURE IMPREGNATION (VPI) SYSTEM

Laron Phoenix shop celebrates the completion of upgrades and additional improvements to its 9-foot Vacuum Pressure Impregnation (VPI) System for high-voltage equipment. The upgrades and improvements ensure Laron increases reliability and maximizes performance of the windings systems of high-voltage motors, generators, and other electrical equipment.

The project included implementation of touchscreen-driven PLC controls for automated cycle processing, digital pressure and temperature monitoring, and the installation of an all new storage vessel with excellent temperature controls and automated maintenance profiles. The improvements allow best-in-class control of the vacuum and pressure cycles plus resin maintenance that is critical to ensuring a robust insulation system in electrical equipment rewinds. Along with the improvements, Laron continues the use of Class H rated, 100% solids epoxy varnish to provide superior electrical, mechanical, and chemical resistance for VPI winding systems.

WHAT IS VACUUM/PRESSURE IMPREGNATION (VPI)?

In electrical systems, resins aid the electrical capabilities of the winding insulation materials while providing a strong structural bond between the conductors of the windings. Residual moisture and air pockets within a winding system provide a location for partial discharge, also known as corona, to build and eat away at insulation materials from the inside out, effectively reducing the life of a motor and leading to premature and expensive repairs.

The VPI system and process removes moisture and air voids by first applying a vacuum down to 1-2 Torr (near the vacuum of space) to remove all moisture and air pockets from the winding insulation, introducing resin under vacuum, and finally applying high pressures to push the resin deep into pockets and crevices of the winding insulation materials. A superior VPI process must have strong control of timing, pressures, and temperatures along with the use of high-quality insulation materials. These equipment improvements, coupled with the highly experienced personnel at Laron, allow us to deliver superior reliability and increased performance in repairs for our customers.
THE VACUUM PRESSURE IMPREGNATION PROCESS

1. Equipment Introduced
   • The process item (motor, generator, etc. winding systems) is first pre-heated to increase resin penetration.
   • After pre-heat, the process item is placed into the VPI process vessel.

2. Dry Vacuum Stage
   • With safety systems engaged and the lid secured, the pressure in the VPI vessel is reduced from ambient pressures down to near the vacuum of space, 1-2 Torr. This stage is known as the Dry Vacuum Stage.
   • Proper timing is important to ensure all moisture and air voids are removed from the winding insulation materials.

3. Wet Vacuum Stage
   • While still under vacuum, resin is introduced into the VPI vessel and soaks into the process item. Temperature and timing play a key role.
   • Care must be taken to ensure resin only makes contact with the appropriate surfaces of the process item. Flexible items, such as the main power leads, must be protected. Personnel training is paramount.

4. Pressure Stage
   • At the right time interval, vacuum is broken with dry air and the VPI vessel is pressurized to push the resin deep into the winding materials.
   • Control of timing is important to ensure maximum resin penetration.

5. Equipment removed and Baked
   • After completion of the vacuum and pressure stages, the part is removed and baked. This solidifies the resins to their maximum structural properties, thus ensuring reliable electrical and mechanical performance.
THE BENEFITS OF A LARON VPI

In traditional impregnation, varnishes can lose up to 50% of their volume in the curing process. The reduced volume leads to air pockets and gaps, making it more susceptible to damage and wear. The vacuum used in a VPI creates a more solid structure that can withstand:

- Leaks
- Cracks
- Corrosion
- Moisture

VPI also accommodates longer insulation life and greater heat dissipation. Vacuum pressure impregnation is a more cost-effective solution as it extends the lifetime of products while saving energy.

WHY CHOOSE LARON FOR VPI SERVICES?

Laron has the largest VPI system in Arizona and Nevada and is a leader in providing comprehensive repair and refurbishment services for electromechanical equipment, including motors, pumps, and generators. We serve mining, power, heavy industries, and municipalities throughout the Arizona and Nevada regions. Our technical staff is trained to properly provide vacuum pressure impregnation services, ensuring reliability each step of the process, and we are dedicated to finding efficient solutions that will save energy and reduce downtime and costs.

Laron is the only service company the Arizona and Nevada electromechanical sales and service industry to be both EASA® Accredited and SKF ® Accredited.

Contact Laron if you have any questions or would like to schedule an appointment to review all of our electrical rotating apparatus repair capabilities.

(800) 248-3430