

# **Five simple and cost effective practices to improve daily vacuum furnace performance.**

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1. Keep the hot zone clean from all contamination and debris. Clean hot zone periodically with an industrial vacuum cleaner. Tie all bolts and nuts in the hot zone, and replace broken ceramics. If the resistance between heating elements and ground drops below 15 ohms, it is time to clean up the cycle and check the condition of the ceramics.
2. Keep the furnace under vacuum conditions during idle times. A rough vacuum -- 50 to 100 microns (0.05 to 0.1 Torr) -- should be sufficient.
3. Keep cooling water at 3°C to 5°C (6° to 9°F) above ambient temperature to avoid moisture condensation inside of the vessel. Stop water flow to vessel and door jackets when furnace reaches below 90° F (32°C)
4. Place parts uniformly on the fixture to avoid the bigger parts overshadowing the smaller parts. Keep proper spacing between the parts. The lower the pressure, the more spacing between the parts and more uniform load. Keep minimum spacing of 7 mm between parts horizontally and 40 mm vertically including 12 to 15 mm grid high.
5. The main chamber O-ring, more than any other component, is likely to be damaged by exposure to the plant environment and during parts loading/unloading. Silicone O-rings are most popular material for door O-rings. Check O-Ring for flat spots. O-Ring can be squashed 25% to 50% of the original cross section without any stress on the O-ring material and losing their elastic property. Any rust or dirt on the O-ring should be removed with emery cloth, followed by wiping with clean acetone on a lint-free cloth. A very light coating of high-vacuum silicone grease should then be applied.