**Controlled Atmosphere Furnaces – Retort Furnaces**

A retort furnace is a furnace wherein a closed vessel of metal or ceramic is utilized in a batch process. Retorts allow accurate and efficient control of the work space atmosphere and provide low atmosphere usage due to the closed nature of the system.

A retort is generally placed over or around the product and separates the product and process space from the system insulation and heat source.

Retorts can be fixed mounted in Front Loading Box Furnaces with gasketed doors, Pit Furnaces with a flange at the top, or moveable in Bell Furnaces that are lowered over a fixed base, or Bells permanently mounted inside the heating chamber of a Bottom Loading Furnace.

For smaller parts, Retort Furnaces provide superior process control for heat treatment of metal products to 1300°C/2400°F in inert and reducing atmospheres.

In the aerospace industry, large format retorts allow the fabrication of macro-scale carbon composite assemblies and the processing of large scale titanium aircraft parts.

**Furnaces with stationary, horizontal, round retorts**

Rapid heating and/or cooling of a retort will fatigue and age the alloy; therefore, leaving the retort stationary within this type of furnace during cooling helps to prolong life of the retort. Considering that for a hydrogen atmosphere furnace, one must have gas inlet and outlet tubes connected to the retort, having a stationary retort and atmosphere connections simplifies safety as well as furnace operation.

**Furnaces with removable, horizontal, square or round retorts**

The retort may be round or square at the customer’s choice. For lighter weight loads within the retort and where more rapid cooling of the retort load is highly desirable, this concept of a removable retort can be more ideal. This design is not recommended for Waukesha, however, because rapid cooling is likely to warp the plates on which you are sintering your bronze powder.

**Large-volume bottom loading furnaces with vertical retorts**

The retort that is lifted off the car after it rolls out from beneath the atmosphere furnace is ideal for large geometry loads and where rather precise temperature uniformity top to bottom is desired. For this furnace, the retort may either be left within the furnace all during cooling (or at any temperature if alloy fatigue is not a concern.)
Small to medium volume furnaces with stationary retorts
While the most expensive atmospheric processing furnace, it is capable of the very best temperature uniformity within the retort and allows for the very safest operation. This is one of the two types of furnaces proposed to Waukesha. Again, while it is the most expensive, it is the one furnace construction that will—without a doubt—achieve the very best temperature uniformity in situations that must reach maybe +/- 8°C depending on the desired heating and cooling cycle time.

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AMS 2750E Specifications