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# NASA TECH BRIEF



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## Antechamber Facilitates Loading and Unloading of Vacuum Furnace

An antechamber has been designed to facilitate the use of a furnace in which materials are heat treated in a high vacuum ( $10^{-6}$  torr) or in a gas atmosphere. This antechamber offers the following advantages:

- (1) The furnace can be loaded and unloaded in a vacuum or gas atmosphere without exposing the materials or the furnace interior to air.
- (2) Sensitive materials are protected from air contamination during transfer to the furnace from a preceding operation.
- (3) Toxic materials can be transferred into or out of the furnace without exposing operators to contamination hazards.
- (4) The operating time of the furnace is increased because it can remain in use while the next specimen is prepared in the antechamber.

The antechamber is provided with a high vacuum pumping system, a means for backfilling with a selected gas, an access door, glove ports to permit handling of specimens and opening of protective containers, and a motor driven platform equipped with a sealing device to isolate the furnace from the antechamber. This platform is used to transfer materials between the antechamber and furnace.

The material to be treated in the furnace is placed on the motor driven platform, which is located in the antechamber. Following this step, the antechamber ports are closed and the desired vacuum is drawn.

Then the antechamber is backfilled with an inert gas and the material can be prepared as required by manipulation through the glove ports. The material on the platform is then raised from the antechamber into the furnace, which contains the same gas atmosphere (or vacuum) as the antechamber. When the platform is raised, it forms part of the furnace enclosure. An O-ring is utilized to seal the furnace and the antechamber from each other. The essential steps are reversed to transfer the material from the furnace to the antechamber.

### Notes:

1. The antechamber may also be used with other types of chambers, such as hot presses, freeze driers, and chemical reactors, in which materials must be processed in different atmospheres.
2. Technical details may be obtained from:  
Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
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### Patent status:

No patent action is contemplated by NASA.

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Category 02