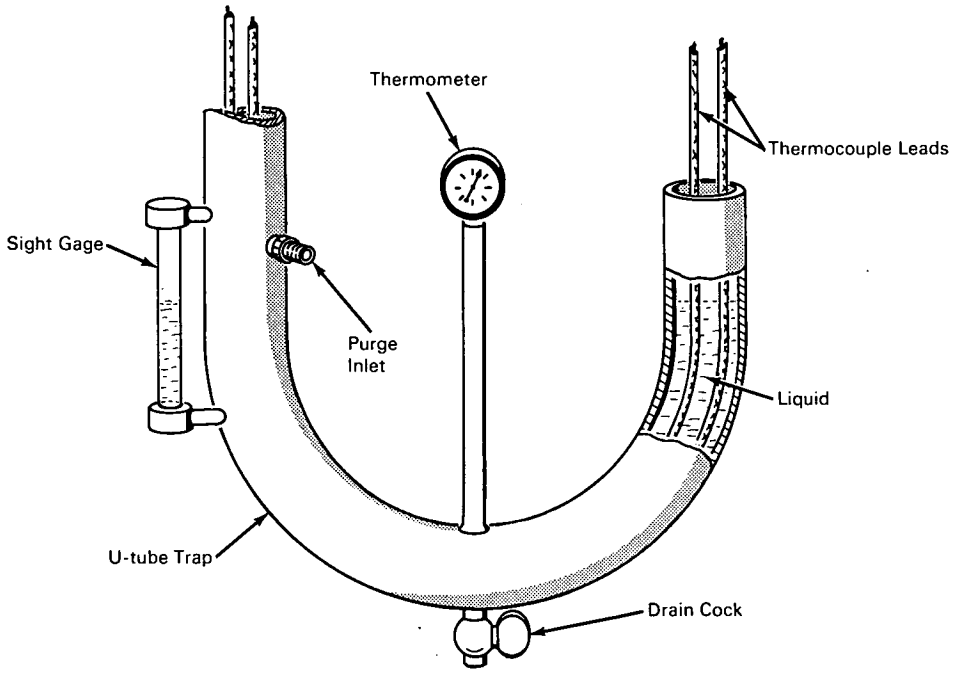
NASA TECH BRIEF

Liquid Trap Seals Thermocouple Leads



The problem:

To seal thermocouple leads coming out of a brazing retort, that operates with a controlled atmosphere, so that air cannot enter the retort and hydrogen cannot escape. Present methods of packing the junctions with ceramics and cements are time consuming and subject to failure at high temperature.

The solution:

A liquid trap fastened to a duct that is welded to the retort. Thermocouple leads are led out through the duct and trap, with the fluid forming a gastight seal between atmosphere and retort.

How it's done:

A duct is introduced into the gastight retort and permanently welded in place. A trap, in the form of a U-tube, is connected to the end of the duct and leads from the thermocouple within the retort are strung through the duct and U-tube to an instrument panel. The U-tube is partially filled with a low-volatility fluid, thus isolating the retort interior from the atmosphere. The trap is cooled by a purge gas in order to prevent boiloff of the fluid during high-temperature operation. A sight gage and thermometer aid in monitoring the trap conditions and a drain cock at the base

(continued overleaf)

of the U-tube permits removal and storage of the fluid after operation.

Following operation, the thermocouple leads can be severed at the retort duct and pulled through the open end of the trap.

Notes:

1. This seal is useful only in applications where the pressure differential between retort and atmosphere is negligible.
2. This development is in conceptual stage only, and as of date of publication of this Tech Brief, neither a model nor prototype has been constructed.

Patent status:

No patent action is contemplated by NASA.

Source: Emil P. Ruppé
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