

Date: 9 October 2000

To: All Hoffman Specialty Representatives

From: John Spuller, Product Line Manager

Subject: Fixed Orifice traps and Condensate Removal

Representatives have raised questions about fixed orifice traps and their relationship to conventional traps. There are many types of traps on the market designed for specific applications. The use of a fixed orifice trap does not meet the requirements for most applications, particularly for heating systems.

When selecting which steam trap to use, it is necessary to review the system operating cycle. The first demand on any trap is to allow air to be vented quickly so the steam can flow into the heating equipment. As steam starts to enter the system there will be a period of heavy condensate load as the steam comes in contact with cold surfaces. After the air has been vented and the system and heating equipment warmed, the condensate load will be reduced.

Conventional steam traps are normally selected with a safety factor of 1.5 to 2 times the normal running load to handle the start up demands. Sizing the fixed orifice in a fixed orifice trap leads to compromises:

- Sizing the fixed orifice for normal running load will not allow proper air venting and condensate drainage during start up.
- If the orifice is sized for start up, it will be oversized and will allow live steam to pass during normal running conditions.
- A compromise is often made and the orifice will be oversized by approximately 25% for the normal running load.

Fixed orifice traps often have a very small orifice (many are as small as .020 inch diameter) that can easily get plugged and require maintenance. Many of you have had experience with components that have small orifices or passages and the problems that dirt can cause. In addition, oxides too fine to be removed by strainers can build up, gradually plugging or reducing the size of the small orifice. A fine mesh screen is required which also requires additional maintenance.

The use of a fixed orifice trap for modulating loads can create even greater problems. Modulating loads produce a wide range of condensate loads. A fixed orifice trap must be sized for the highest condensate load to prevent water hammer that can damage the heat exchanger causing expensive maintenance. A fixed orifice trap sized for the highest condensate load will be too large for light load conditions.

We have heard of several applications using fixed orifices where the condensate pumps and vacuum pumps are destroyed by cavitation in a short time. Customers don't want to face the prospect of buying a new pump needlessly.

A fixed orifice trap will save energy in a system where the conventional traps have failed due to poor maintenance. But properly maintaining steam traps in the system provides the best value to your customers and produces the best heating. It also saves energy and prevents damage to the condensate and vacuum return pumps.