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		June 2012
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	COMMISSIONING PUMP START UP STRAINERS (PROJECT STANDARDS AND SPECIFICATIONS)	

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1.0 PURPOSE

This document provides information on the different types of temporary startup strainers and their use.

2.0 SCOPE

This document applies to temporary strainers used for the protection of pumps during startup and initial operations.

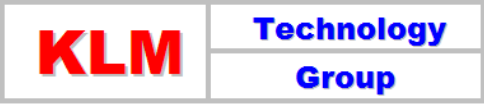
3.0 DEFINITIONS

Startup strainers are protective devices temporarily installed in pump suction piping to prevent dirt, pipe scale, weld beads, spatter, or any foreign material from entering the pump. This pump protection is particularly important for multistage pumps in order to protect close clearances or running fits from foreign material.

4.0 TYPES OF STRAINERS

4.1 Conical Strainers

There are two basic flow paths through any type of in-line conical strainer, whether small apex, large apex (basket), or full pointed-cone type. One is with water flow to the fine mesh screen inside the cone (Figures 1 and 2) and the other is with water flow against the outside of the cone (Figure 3). The first flow pattern is preferred for most installations since, by its nature, debris is collected within the strainer, making inspection and removal of the strainer simpler, and weighing and analysis of the debris more accurate. Conical strainers are effective for startup applications, as well as most service requiring infrequent cleanout.

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4.1.1 Small Apex Strainers

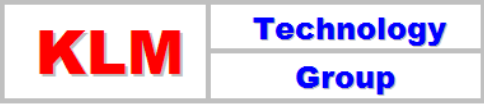
Small apex strainers (Figure 1) are the most effective and practical type for most applications. This type of strainer provides almost the largest amount of free strainer-to-pipe cross-sectional area and, when a removable spool piece is provided, it is relatively easy to install, clean, and reinstall.

4.1.2 Large Apex (Basket Type) Strainers

Basket strainers (Figure 2) may be used wherever the available space limits the use of a small apex strainer, or wherever only a single perforated plate or mesh is required due to larger allowable particles in the process fluid. Basket strainers are the same as small apex strainers except that most of the cone has been removed (approximately 40 percent or more) and the bottom of the basket has a flat screen, a perforated plate, or a combination of the two. These are used for flow to the inside of the basket. This strainer has the advantage of a larger internal volume for retained solids which allows lower pressure drops over time and subsequently longer allowable time between cleanouts.

4.1.3 Pointed Apex (Conical) Strainers

An alternative to the small apex strainer is the pointed apex strainer (Figure 3) used with water flow to the outside of the cone. This type has the fine mesh screen on the outside with a coarser mesh or perforated plate on the inside of the cone acting as a strengthening member. The outside-to-inside flow pattern is an advantage in that plugging of the strainer starts with the outside and fills toward the center. This leaves the center of the pipe as the last water path, promoting better fluid dynamics.

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Use of this type of strainer, however, tends to postpone the inevitable strainer cleaning. Accordingly, the use of outside-to-inside flow patterns is limited to the following:

- a. When there is insufficient room downstream for the cone
- b. For the boiler feed pump, reactor feed pumps, or the condensate booster pump (low pressure boiler feed pump) suction lines to ensure good center pipe flow conditions

4.2 Condensate Pump Inlet Strainers

4.2.1 In-Line Basket Strainers

Condensate pump in-line basket type strainers can be used for condensate pump protection when a considerable amount of debris is expected over a long flush period and ready access for screen cleaning is essential. A typical commercially available strainer is shown in Figure 4. It should be noted that this design is significantly expensive compared to the single basket strainer, but, when routine strainer cleaning is necessary, the added cost is easily justified.

Basket strainers of this type are located as close to the condensate pumps as practical, usually between the suction isolation valve and the pump suction flange, and usually in place of the project engineering designed startup strainer spool piece.

After the system has been flushed and cleaned, a conical strainer can be used in the startup strainer spool piece for continued pump protection during the remainder of the startup program.

Differential pressure indication should be mounted on the strainer, as close to the strainer as possible, and oriented to allow for frequent monitoring by operating personnel.