



Fortress Metal Detectors



SYSTEM INSTALLATION GUIDE PIPELINE METAL DETECTOR

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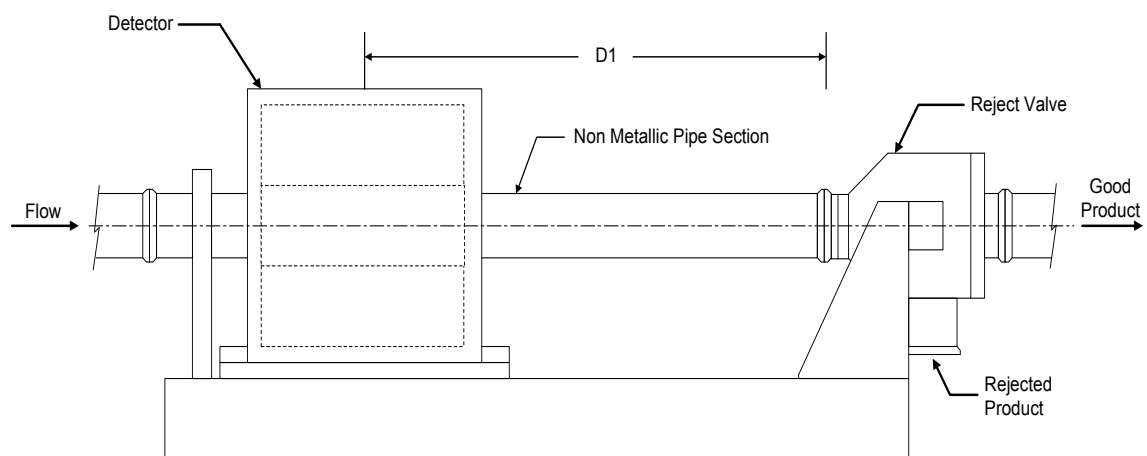
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SYSTEM INSTALLATION GUIDE

Pipeline Metal Detector

The pipeline application involves the installation of a non-metallic pipe section around which a metal detector inspects products travelling through the pipe. This type of application should be considered where the extra sensitivity capability of a relatively small aperture outweighs the benefit of final package inspection. This is especially true if the final packaging material contains metal, such as a canning line.

Pipe System Drawing



A pipeline inspection system is ideally suited to inspecting liquid, slurries or paste products that can be pumped through a pipe. Typical pipe products would include:

- sauces
- dairy products
- meat slurries
- juices etc.

Design Issues

The following critical factors must be known when designing a successful pipeline detection system:

- Pipe I.D.
 - Pipe clamp connection style (tri-clamp, I-line etc)
 - Product flow rate (GMP)
 - Product viscosity
 - Product temperature range
 - Product pressure
 - Expected cleanup procedures (wash down, pipe pig, etc.)
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Determine System Length

The product speed in the pipe will determine the position of the reject valve relative to the detector. Since the valve has a minimum divert response time, the distance between the valve and the detector must be increased directly proportional to the product speed and valve response time. Product speed can be estimated given the flow rate in gallons or liters per minute. Due to laminar flow characteristics of liquids in a pipe, an appropriate safety margin must be added to the speed calculation, and the system must be rigorously tested at full production rates to ensure the valve can respond in time.

For example, given a system using a 2" pipe with a maximum flow rate of 80 gpm. The average speed of the product will be 10 feet/second. Given the response time for a 2" valve is 0.25 seconds, the valve must be at least 2.5 feet from the detector. To allow for laminar effects a 3' spacing is recommended.

SELECTING THE VALVE STYLE

The choice of valve will be influenced by the product temperature and viscosity. Some valves are best suited for low viscosity products such as juices, etc. If the pipe clean out procedure includes the use of a "pig" flushed down the pipe, the valve chosen must have a straight through non-restrictive design.

SELECTING THE NON-METALLIC PIPE

The choice of the pipe will be influenced by the style of pipe connection required, the product temperature and especially the pipe pressure expected. Care must be taken to design the installation so that the plastic pipe will not be loaded in any way by the incoming stainless steel piping.

Testing

One of the not so obvious drawbacks with a pipe detector system is that it is very difficult to test. However, if testing access and recovery is designed into the system, then testing can be done quickly and reliably. It is important to recognize that the testing procedure must confirm the detectors' performance as well as the response of the reject valve.

To achieve this, the design must incorporate:

- Test Access Port
An access port to introduce a test sample (plastic ball with metal sample imbedded) must be provided upstream of the detector system. The test port location should allow the sample to travel at normal speed through the detector system.
- Test Sample Safety Retrieval Gates
A safety catch gate should be inserted into the normal product flow after the valve "good" product output when testing is carried out, so that the test sample can be safely recovered if the detector fails to detect the sample, or the valve fails to react properly. It is also recommended that a similar catch gate be used on the reject output to ease the recovery of the test sample when it is rejected.

In a good design, the test gates can be quickly inserted into the product flow during a test, and removed from the flow afterwards.

Automatic Testing

As with Gravity applications, the biggest draw back of manual testing is that it is impossible to predict where the test piece will be relative to the aperture of the detector, and for the same reason test results will be inconsistent. For this reason an Automatic Test system can offer advantages.

Detectors capable of automatic testing can be used to perform short interval testing of the detector and valve reaction without any operator involvement. The use of an automatic reject response check system is also recommended. This involves having a valve position switch feed a confirmation signal back to the detector which can then monitor the response time of the reject device during any reject occurrence.
