

GUIDANCE

IN-SERVICE INSPECTION PROCEDURES

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SITUATION:

Many pressure vessels, particularly in the pharmaceutical or food industry, have a sealed stainless steel casing fitted over the vessel insulation. This is important for hygiene reasons as they can be readily cleaned down and there are no crevices or other areas where contamination could collect. Failures have occurred where leaks from pressure vessels have caused pressure to build up within the casing. As this is not designed to withstand any pressure it is liable to fail and could split or eject parts of the casing.

A typical incident is illustrated below. This resulted in the release of steam from a jacketed vessel operating at a pressure of approximately 2 bar. Injury to production personnel was narrowly avoided. The vessel was manufactured from stainless steel and constructed in accordance with PD5500. It also complied with the requirements of the Pressure Equipment Directive.

The nozzle feeding steam to the jacket failed within the insulation space, causing it to become pressurised. The casing had no provision for venting and the pressure rose to the extent that it could no longer withstand the stress and ruptured along a longitudinal seam weld, releasing steam across the operator's platform.

This unit was supplied with steam at a maximum pressure of 3.0 bar so the casing failed at a pressure less than this.





Guidance

Unless the casing is designed as a pressure vessel in its own right the vessel design codes do not generally include requirements for their design and the likelihood of pressurisation is not addressed unless the manufacturer specifically takes this into account. For equipment supplied under the Pressure Equipment Directive the manufacturer is required to carry out a hazard assessment and then take appropriate steps to eliminate any hazard, apply protective measures or provide warning information. The instructions for use should be checked to see if the hazard of pressurisation of the casing has been addressed. Where this is not included, or for existing plant, possible precautions could be:

- Fit a vent to the casing. (This is not usually permitted where a sealed casing is specified).
- Fit a pressure warning device within the casing.
- Design the casing with a weak seam which would fail in a safe manner if under minimal pressure.
- Fit a low pressure bursting disc into the casing.

If none of these precautions are practical the owner/user may consider it necessary to restrict access to the vessel whilst it is under pressure.