Some D-Type Boilers were found to have potentially dangerous cracks in welds

Purpose
This Alert advises operators of D-Type water-tube boilers of 2 – 4.5 MW capacity to urgently check for the presence of cracks in welds of these particular boilers. The cracks could cause a failure of the boiler resulting in a serious risk to safety. D-Type boilers of this size are commonly used in hospitals, food processing and manufacturing industries.

The problem
Three D-Type boilers were recently examined and substantial cracks were found in the welds between the drum shell and both dished ends of all three steam drums. The cracks in the circumferential weld run in the transverse (drum axial) direction and extend across the entire weld width and into the surrounding metal (see Figures 1 and 2). The depth of the cracks has not been established. However, in two boilers, cracks are believed to be of substantial depth.

![Figure 1: General location of cracks](image1.jpg)  ![Figure 2: Cracks in the steam drum to dish end weld](image2.jpg)

Substantial cracks were also found in the toe of the circumferential weld of the water-level chamber standpipe to the drum shell. Cracks of this type could lead to rupture of pressure components, possibly resulting in death or serious injuries and substantial damage to property.

The particular boilers were manufactured in the late 1970s by an interstate company.

Recommendations
Operators of D-Type boilers should conduct an inspection of the weld areas in the steam drum of these boilers in particular, as soon as possible. It is recommended that Non-destructive Testing (NDT) methods be used to examine the welds for any signs of cracking. In the case of any cracks being detected, further NDT examination may need to be carried out to determine the extent of the damage. Structural integrity of the boiler would subsequently need to be established by a competent person, prior to the boiler being put back into service, unless the affected areas are repaired/restored to the original design requirements.

**Legal responsibilities under the Occupational Health and Safety Act**

The Occupational Health and Safety (Plant) Regulations 1995 place duties on employers to ensure that plant is, amongst other things, inspected and maintained to eliminate the risks associated with its use, or that the risks are reduced so far as is practicable.

Regulation 702 in particular provides that, when new or additional information about hazards relating to plant or associated systems of work becomes available (including the publishing of this Alert), an employer must ensure that all hazards associated with the use of the plant and the systems of work associated with the plant are identified.

Although the reasons for these cracks are not known, cracks in boilers could be caused by the operating regime (cold starts – frequency and temperature gradient during start-ups, inadequate water quality – corrosion control and fouling, etc.). Employers should adhere to manufacturer's (or supplier's) recommendations and request further information if there are any changes to be made to the use of the plant.

When inspecting boilers, the Australian Standard AS/NZS 3788 - 2001: *Pressure equipment - In-service inspection* should be used for guidance. This Standard stipulates that the respective areas should be examined for deposits, scale, erosion, corrosion and any cracks.

AS/NZS 3788 provides guidance on the assessment and repair of defects. The Australian Standard AS 4037 - 1999: *Pressure equipment - Examination and testing* also provides guidance on non-destructive examination methods of welded joints, acceptance criteria, etc. to those concerned with non-destructive examination of pressure equipment.

**Further information**

**Code of Practice**

**Code of Practice for Plant - July 1995.**

Codes of practice can be viewed and downloaded from the WorkSafe Victoria web site [www.workcover.vic.gov.au](http://www.workcover.vic.gov.au). Hard copies are available by emailing WorkSafe publications at [publications@workcover.vic.gov.au](mailto:publications@workcover.vic.gov.au) or by phoning 9641 1333. They can also be obtained from Information Victoria - see contact details below.

**Acts & Regulations**

**Occupational Health and Safety Act 1985**

**Occupational Health and Safety (Plant) Regulations 1995**


**Standards Australia**

AS 2593 - 2001: *Boilers - Unattended and limited attendance*

AS/NZS 3788 - 2001: *Pressure equipment - In-service inspection*

AS 1228 - 1997: *Pressure equipment - Boilers*
The guidance on legal responsibilities in this Alert is not intended to be a comprehensive evaluation of all of the duties which may apply under the Occupational Health and Safety Act given the subject matter of this document.

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