

# Steam-heated drying cylinders fitted with dished ends

## OC 308/10 (REV 2)

### To

Factory Inspectors, Specialist Inspectors (Mech)

### Advice to users

This OC alerts inspectors to the potential for steam-heated cylinders fitted with dished ends to fail under pressure as a result of dangerous conditions not being detected because successive examinations did not include internal inspection. The information is presented in the form of an information document (ID) which may be copied and given to interested persons outside HSE. An explanatory diagram has been included as an appendix to the ID.

### Background

1 The Pressure Systems safety Regulations 2000 (PSSR) apply to steam-heated cylinders at any pressure. Consequently, they require a written scheme of examination and examination in accordance with that scheme.

2 The failure of a steam-heated drying cylinder in a laundry has been reported to HSE after one of its dished ends became detached.

3 Laundries are not the only users of such cylinders and it is possible that a number of other industries may be involved, eg rubber, textile finishing, paper, food. Hence the principles underlying the basic advice contained in the ID should also be used in advising users of steam-heated drying cylinders in other relevant industries.

4 In view of the widespread use of steam-heated drying cylinders in industry, organisations carrying out in-service inspections of these vessels have been made aware of the circumstances relating to the incident and of the importance of establishing the condition of the knuckle region, ie the circumferential weld between the dished end and the cylinder.

5 The incident has also been drawn to the attention of trade organisations representing the laundry industry to allow the advice to be passed on to their members.

### Action by inspectors

6 Inspectors should advise companies in line with the attached ID. Enforcement action should be considered against any company where a steam-heated drying cylinder is not being thoroughly examined (internally and externally) at the routine examination carried out under PSSR.

7 Further information can be obtained from Safety Unit 1.

### Cancellation of instructions

OC 308/10 (rev)

October 2011

## Steam-heated drying cylinders

### Advice to users

#### Introduction

1 This document contains internal guidance which has been made available to the public. The guidance is considered good practice but is not compulsory. You may find it useful in deciding what you need to do to comply with the law. However, the guidance may not be directly applicable in all circumstances and any queries should be directed to the appropriate enforcing authority.

#### Background

2 An employee in a laundry was seriously scalded in an incident in which the end of a steam-heated drying cylinder blew off under pressure.

3 The cylinder was one of 4, of unknown manufacture, and had been fabricated out of stainless steel with carbon steel inwardly dished ends, ie convex to pressure. It failed in the "knuckle" region of one of the ends due to thinning caused by a combination of corrosion and erosion when an internal part (a syphon tube) became detached with the result that condensate was not effectively removed from the bottom of the cylinder. "Knuckle region" is the term used to describe the circumferential weld between the dished end and the cylinder (see diagram given at the appendix).

4 The corrosion and erosion had not been detected during successive examinations of the cylinder due to the difficulty of visually inspecting the internal knuckle region. Access to the inside of the cylinder for inspection purposes can be via inspection openings designed in accordance with BS 470: 1984 *Specification for inspection, access and entry openings for pressure vessels*, or, through ports which serve other purposes when the cylinder is in service, eg through the opening remaining when the vacuum relief valve is removed.

5 The incident and its likely cause have been drawn to the attention of competent person (CP) organisations, who undertake vessel inspection in accordance with the Pressure Systems Safety Regulations 2000 (PSSR).

6 Companies operating plant which incorporates steam-heated cylinders are advised to take the following action:

(1) check that the plant is thoroughly examined and that a satisfactory internal condition for further use is confirmed at the examination carried out by a competent person under PSSR. If necessary, a cylinder should be modified to meet BS 470 or an equivalent standard specified by the competent person;

(2) agree the period of examination and the minimum allowable thickness with the CP;

(3) as part of the examination, the CP should confirm that the mechanical integrity of the cylinders is not impaired and that sufficient material thickness remains above the minimum allowable thickness; and

(4) the CP should also examine internal fittings and attachments and these should be replaced if necessary.

7 Where it appears that cylinders have been in service for a number of years without regular internal examination, it is recommended that they be assessed by a CP at the earliest opportunity to ensure that there has been no thinning beyond safe limits and that any internal parts remain intact and in working order.

8 In case of doubt it is recommended that the CP who carries out the regular examination is asked to advise.

9 HSE inspectors will be advising companies in line with information in this document and taking enforcement action if necessary.

October 2011

## Appendix

(para 3)

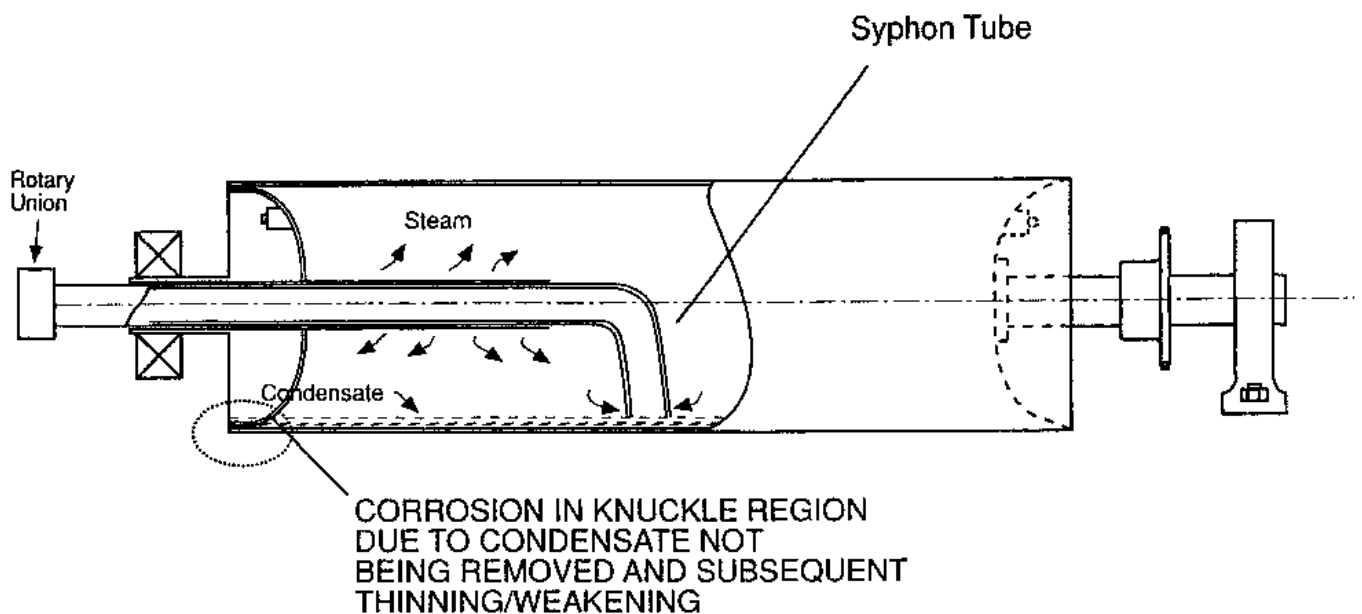


Diagram : Steam-heated drying cylinder