



CGA C-30—2022

(Formerly TB-30)

GUIDELINE FOR MANAGEMENT OF EMBRITTLEMENT DURING EVACUATION OF ANNULAR SPACE OF DOT-4L AND TC-4LM LIQUID CYLINDERS

FIRST EDITION

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Cylinder Specifications Committee

NOTE—Technical changes from TB-30—2016 are underlined.

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1 Introduction

A repair facility received a liquid cylinder in nitrogen service with the outer vessel safety device activated, which indicates the likelihood of an internal leak. Examination of the inner vessel demonstrated brittle failure of both the inner top and inner bottom heads and degradation of the insulation materials. Metallurgical investigation confirmed sensitization leading to embrittlement of the failed areas consistent with overheating of the inner vessel during a previous repair.

2 Scope

This publication is intended for cylinder manufacturers and repair facilities performing vacuum maintenance on DOT-4L and TC-4LM liquid cylinders while heating the inner vessel.

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Publication terminology

3.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May

Indicates that the procedure is optional.

3.1.4 Will

Is used only to indicate the future, not a degree of requirement.

3.1.5 Can

Indicates a possibility or ability.

3.2 Technical definitions

3.2.1 Annular space

Volumetric space between the inner vessel and outer jacket that contains insulation materials and is evacuated to lessen heat flux.

3.2.2 Embrittlement

Condition wherein various steels can become brittle and crack such as following sensitization.

3.2.3 Sensitization

Precipitation of chromium carbides at grain boundaries in a stainless steel causing the material to be susceptible to intergranular corrosion.

3.2.4 Vacuum

Process of creating a subatmospheric pressure in the annular space by mechanical means.