

Gas cylinders — Refillable seamless steel — Performance tests —

Part 1: Philosophy, background and conclusions

ICS 23.020.30

National foreword

This British Standard reproduces verbatim ISO/TR 12391-1:2001 and implements it as the UK national standard.

The UK participation in its preparation was entrusted by Technical Committee PVE/3, Gas containers, to Subcommittee PVE/3/3, Gas containers — Design, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to v, a blank page, pages 1 to 13 and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 17 January 2002

© BSI 17 January 2002

ISBN 0 580 38050 5

Amendments issued since publication

Amd. No.	Date	Comments

**Gas cylinders — Refillable seamless
steel — Performance tests —**

**Part 1:
Philosophy, background and conclusions**

*Bouteilles à gaz — Rechargeables en acier sans soudure — Essais de
performance —*

Partie 1: Philosophie, historique et conclusions



Reference number
ISO/TR 12391-1:2001(E)

Contents		Page
Foreword.....		iv
Introduction		v
1	Scope	1
2	References	1
3	Terms and definitions	1
4	Symbols and abbreviations	2
5	Background.....	2
6	Considerations of fracture performance.....	6
7	Flawed cylinder burst test procedure.....	8
8	Considerations of fatigue cycle test.....	8
9	Discussion of test data	9
Bibliography		12

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this part of ISO/TR 12391 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 12391-1 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 3, *Cylinder design*.

ISO/TR 12391 consists of the following parts, under the general title *Gas cylinders — Refillable seamless steel — Performance tests*:

- *Part 1: Philosophy, background and conclusions*
- *Part 2: Fracture performance tests — Monotonic burst tests*
- *Part 3: Fracture performance tests — Cyclical burst tests*
- *Part 4: Flawed cylinder cycle test*

Introduction

Gas cylinders as specified in ISO 9809-1 have been constructed of steel with a maximum tensile strength of less than 1 100 MPa. With the technical changes in steel-making using a two-stage process, referred to as ladle metallurgy or secondary refining, significant improvement in mechanical properties have been achieved. These improved mechanical properties provide the opportunity of producing gas cylinders with higher tensile strength, which achieve a lower ratio of steel to gas weight. The major concern in using steels of higher tensile strength with correspondingly higher design wall stress is safety throughout the life of the gas cylinder.

When ISO/TC 58/SC 3 began drafting ISO 9809-2, Working Group 14 was formed to study the need for additional controls for the manufacture of steel gas cylinders having a tensile strength greater than 1 100 MPa.

This part of ISO/TR 12391 presents the philosophy and background information developed by WG 14 to study the problems inherent with steel of higher tensile strength. It also states the conclusions of WG 14, which were included in ISO 9809-2.