

This is a preview of "ISO/TR 10771-2:2008". [Click here to purchase the full version from the ANSI store.](#)

First edition
2008-12-01

Hydraulic fluid power — Fatigue pressure testing of metal pressure-containing envelopes —

Part 2: Rating methods

Transmissions hydrauliques — Essais de fatigue des enveloppes métalliques sous pression —

Partie 2: Méthodes de classement



Reference number
ISO/TR 10771-2:2008(E)

© ISO 2008

This is a preview of "ISO/TR 10771-2:2008". [Click here to purchase the full version from the ANSI store.](#)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO/TR 10771-2:2008". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	2
4 Selection of material factors.....	2
5 Determination of cyclic test pressure.....	2
6 Conduct of fatigue test.....	3
7 Rating by similarity.....	4
8 Rating declaration.....	4
9 Identification statement (reference to this part of ISO 10771)	4
Annex A (informative) Material factor database	5
A.1 Values of coefficient of variation, k_o , for commonly used metals	5
A.2 Procedures used to establish values of coefficient of variation, k_o , for the metals listed in Table A.1	5
Annex B (normative) Calculation of variability factor K_v	13
B.1 General.....	13
B.2 Method	13
Annex C (informative) Proposal for an acceleration factor.....	15
C.1 General.....	15
C.2 Extrapolating data to 10^7 cycles	15
C.3 Examples	19
Annex D (informative) Basis of fatigue pressure rating ^[9]	21
D.1 Basis of pressure rating.....	21
D.2 Statistical analysis theory.....	22
D.3 Fatigue distribution data.....	28
D.4 Data calculation example.....	33
D.5 Raw data points for sample problem.....	39
Bibliography	40

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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 10771-2 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 8, *Product testing*.

ISO/TR 10771 consists of the following parts, under the general title *Hydraulic fluid power — Fatigue pressure testing of metal pressure-containing envelopes*:

— *Part 1: Test method*

— *Part 2: Rating methods*

This is a preview of "ISO/TR 10771-2:2008". [Click here to purchase the full version from the ANSI store.](#)

Introduction

In hydraulic fluid power systems, power is transmitted and controlled under pressure within a closed circuit. It is important for the manufacturer and user of hydraulic components to have information on their global reliability because of the importance of the fatigue failure mode and the relationship with their functional safety and service life. This part of ISO 10771 provides a method for fatigue-testing in order to verify the rating of a pressure-containing envelope.

During operation, components in a system can be subjected to loads that arise from:

- internal pressure;
- external forces;
- inertia and gravitational effects;
- impact or shock;
- temperature changes or gradients.

The nature of these loads can vary from a single static application to continuously varying amplitudes, repetitive loadings and even shocks. It is important to know how well a component can withstand these loads, but this part of ISO 10771 addresses only the loads due to internal pressure.

There are several International Standards already in existence for pressure rating of individual components (e.g. for determining maximum allowable rated pressure) and this part of ISO 10771 is not intended to replace them. Instead, a method of fatigue verification is provided.

This part of ISO 10771 describes a universal verification test to give credibility to the many in-house and other methods of determining the pressure rating of the components. Credibility is based upon the fundamental nature of metal fatigue with its statistical treatment and a mathematical theory of statistical verification. Nevertheless, it is necessary to have design knowledge of the component and its representative specimens to maximize accuracy of the verification method. The use of this test method can reduce the risk of fatigue failure for a hydraulic component regardless of sample size.

In order to rate components in accordance with this part of ISO 10771, it is necessary to propose a rating for the component, select test specimens and select a test pressure. A fatigue test is then conducted in accordance with ISO 10771-1. If the test is successful, the proposed rating is verified for the family of components represented by the sample.

This part of ISO 10771 is based on ANSI/(NFPA) T 2.6.1, a standard which was developed and has been used in the United States for over 25 years and has been adopted for use in Japan as JSME S006-1985. If sufficient experience is gained in other parts of the world, and additional data on materials are obtained, this part of ISO 10771 might be re-drafted as an International Standard in the future.

It should be noted that the test factors in Annex A are based on material data obtained from sources originating in the USA. One of the objectives in issuing this part of ISO 10771 is to obtain material data from other countries. The test factors are based only on the material properties and not on any tolerances of the elements in the pressure-containing envelope.

Annex C describes a possible method for accelerating testing. The example shows how material property data can be used to determine an acceleration factor and shows that they have to be carefully chosen. Another objective of this part of ISO 10771 is to seek additional data as described in Annex C. Contributors are asked to submit any available data to the secretary of ISO TC 131/SC 8.