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Hydraulic fluid power — Marking of performance characteristics on hydraulic filters

Transmissions hydrauliques — Marquage des caractéristiques de performance sur les filtres hydrauliques

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Contents

Page

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.

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 27407 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 6, *Contamination control*.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a fluid under pressure in a closed circuit. Filters demonstrating unique characteristics are used to protect the system by removing insoluble contaminants. Marking these characteristics on filters can help users identify and compare filters, making it easier to select one appropriate for an application.

Hydraulic fluid power — Marking of performance characteristics on hydraulic filters

1 Scope

This International Standard specifies a means of marking filters to communicate filter performance characteristics of interest to users. This marking can be used with either the standards referenced in this International Standard or with any standard that has been harmonized with any referenced standard. This International Standard applies to the marking of information only on the filter; the customer can request that the same information be specified on the product drawing or as part of the product packaging.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1219-1, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols for conventional use and data-processing applications*

ISO 2941, *Hydraulic fluid power — Filter elements — Verification of collapse/burst pressure rating*

ISO 3968, *Hydraulic fluid power — Filters — Evaluation of differential pressure versus flow characteristics*

ISO 5598, *Fluid power systems and products — Vocabulary*

ISO 16889, *Hydraulic fluid power — Filters — Multi-pass method for evaluating filtration performance of a filter element*

ANSI/(NFPA)T3.10.17-1995 (R2004), *Finite life hydraulic filter pressure/life rating — Method for verifying the fatigue life rating and the burst pressure rating of the pressure containing envelope of a spin-on hydraulic filter*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 apply.

4 Symbols, abbreviated terms and units

Table 1 lists characteristics and related symbols as well as definitions of the abbreviated terms used in Clauses 6 and 7 and the figures. SI units shall be used.

Table 1 — Definition of symbols, abbreviated terms and units

Characteristic	Abbreviated term or symbol	Explanation	Unit	Figure(s) where used
Test flow rate	q_V	—	L/min	1, 2, 3, 4
Terminal differential pressure	Δp_T	—	kPa (bar)[a]	1, 2
Average filtration ratio for particles larger than the stated particle size [x(c)]	$\overline{\beta}_{x(c)}$	Determined in accordance with ISO 16889	—	1, 2
Filter retained capacity to terminal differential pressure	C_R	Determined in accordance with ISO 16889	g	1, 2
Minimum filter element collapse/burst pressure	p_{cb}	Determined in accordance with ISO 2941	kPa or MPa (bar)	1, 3
Kinematic viscosity of the fluid	v	—	mm^2/s	1, 4
Differential pressure at rated flow	Δp	Determined in accordance with ISO 3968	kPa or MPa (bar)	1, 4
Minimum housing burst pressure	p_{Bmin}	Determined in accordance with ANSI/(NFPA)T3.10.17	kPa or MPa (bar)	1, 5
Minimum number of cycles at rated fatigue life	N_f	Determined in accordance with ANSI/(NFPA)T3.10.17	cycles	1, 5
Rated fatigue pressure	p_{fr}	Determined in accordance with ANSI/(NFPA)T3.10.17	kPa or MPa (bar)	1, 5

[a] 1 bar = 10^5 Pa = 100 kPa = 0,1 MPa; 1 Pa = 1 N/m^2.

5 Filtration characteristics communicated

5.1 Filter elements

The following characteristics of filter elements should be communicated between the manufacturer and user by means of a marking on the filter cartridge or, if this is not feasible, on a label attached to the cartridge or inserted in its protective bag:

a) test flow rate;

b) terminal differential pressure;

c) average filtration ratio for particles larger than the stated particle size;

d) filter retained capacity to terminal differential pressure;

e) minimum collapse/burst pressure;

f) differential pressure at rated flow.

5.2 Spin-on filters

The following characteristics of spin-on filters should be communicated between the manufacturer and user by means of a marking on the filter:

a) test flow rate;

b) terminal differential pressure;

c) average filtration ratio for particles larger than the stated particle size;

d) filter retained capacity to terminal differential pressure;

e) minimum collapse/burst pressure;

f) filter installation procedure;

g) filter housing pressure limits, including

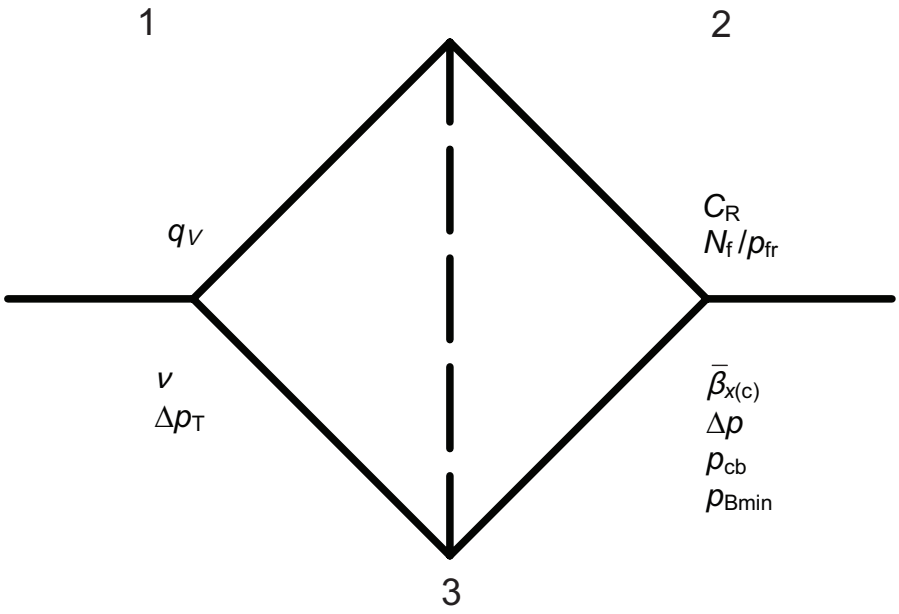
   1) minimum housing burst pressure of the spin-on container,

   2) minimum number of cycles at rated fatigue life,

   3) fatigue test cycle pressure range.

6 General layout of filter marking symbols

The marking symbol shown in Figure 1 details the position of the filtration characteristics for inclusion. In general, the filter test parameters (flow rate, terminal differential pressure, test fluid viscosity) are shown at the inlet (left) side of the symbol. The characteristics determined by testing (retained capacity, average beta ratio, minimum collapse/burst pressure, differential pressure at rated flow, rated burst pressure and rated fatigue pressure) shall be shown at the outlet (right) side of the symbol. If the specific parameter or characteristic is being used on a specific symbol, the locations identified in Figure 1 shall be used. The graphical elements in Figure 1 are in accordance with ISO 1219-1.



Key

1 test parameters
2 characteristics determined by testing
3 number of relevant document

Figure 1 — General layout of filter marking symbols

7 Marking of filtration characteristics

7.1 General

Filters may be marked with one or more of the marking symbols described in 7.2 through 7.5. The size of the symbols shall be large enough to be easily read, yet small enough that they can be placed on the filter or on a separate document to be provided with the filter. See Annex A for examples of markings.

7.2 Characteristics determined by multi-pass testing

Marking of characteristics determined by multi-pass testing in accordance with ISO 16889 should conform to Figure 2. The following characteristics should be included:

a) test flow rate;

b) terminal differential pressure;

c) filter retained capacity to terminal differential pressure;

d) average filtration ratio for particles larger than the stated particle size.

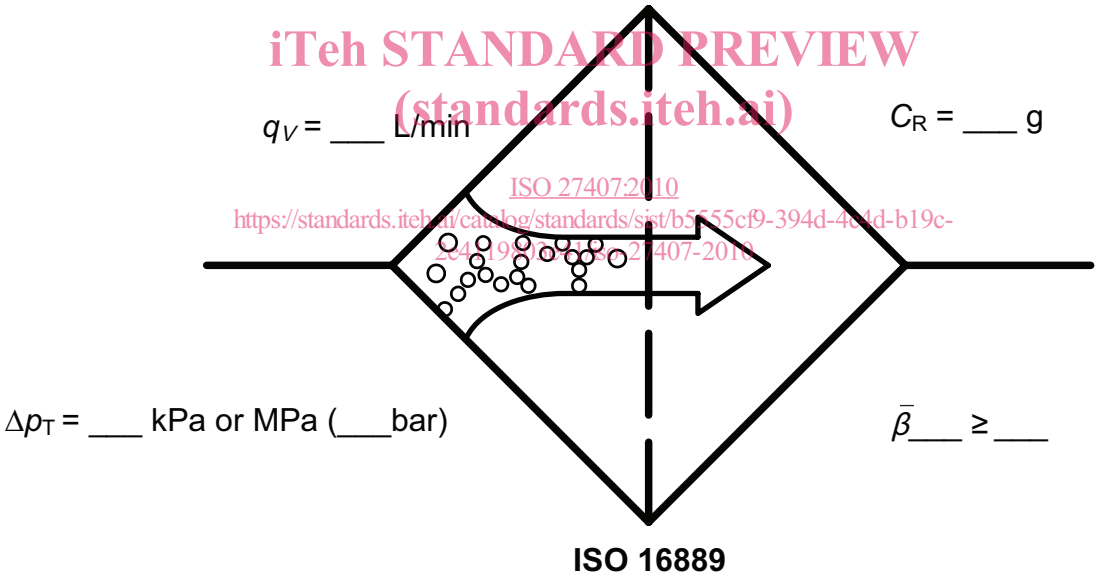


Figure 2 — Marking to communicate average filtration ratio and filter retained capacity to terminal differential pressure

7.3 Characteristics determined by collapse/burst pressure testing

Marking of characteristics determined by collapse/burst pressure testing in accordance with ISO 2941 should conform to Figure 3. The following characteristics should be included:

a) test flow rate;

b) minimum collapse/burst pressure of the element.

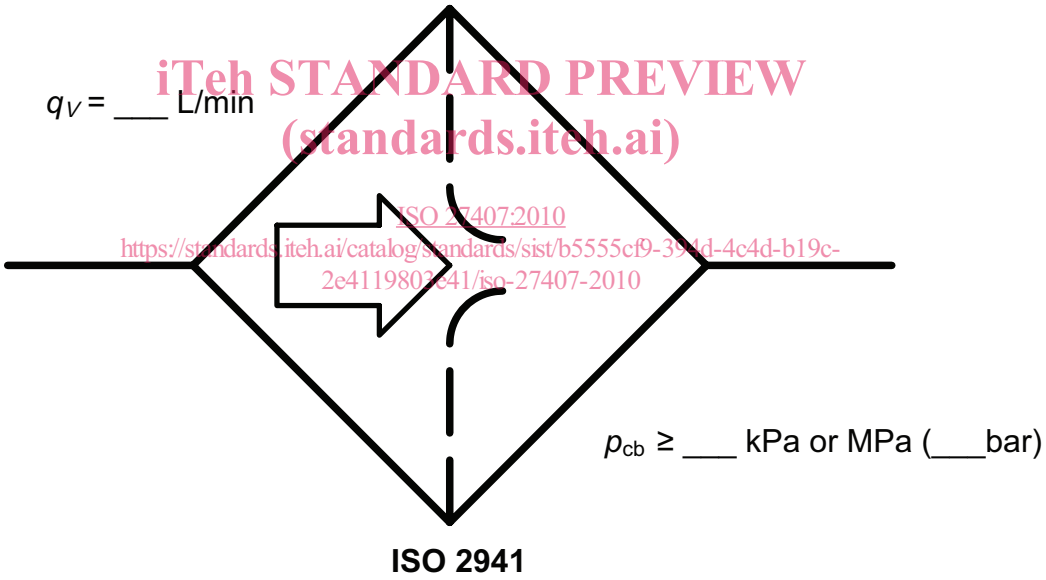


Figure 3 — Marking to communicate collapse/burst pressure characteristics