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Hydraulik – Deplacementpumpar och motorer – Bestämning av erhållen kapacitet (ISO 8426:2008, IDT)

Hydraulic fluid power – Positive displacement pumps and motors – Determination of derived capacity (ISO 8426:2008, IDT)

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Den internationella standarden ISO 8426:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 8426:2008.

The International Standard ISO 8426:2008 has the status of a Swedish Standard. This document contains the official English version of ISO 8426:2008.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.
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Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

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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 8426 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 8, *Product testing*.

This second edition cancels and replaces the first edition (ISO 8426:1988), which has been technically revised.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit.

Two types of components of such systems are the positive displacement pump and motor. One of the key performance parameters of these components is derived capacity, which is the volume of fluid displaced per shaft revolution. This International Standard is intended to unify test methods for determining the derived capacity of hydraulic fluid power positive displacement pumps and motors so as to enable the performance of different components to be compared.

Hydraulic fluid power — Positive displacement pumps and motors — Determination of derived capacity

1 Scope

This International Standard specifies the methods of determining the derived capacity of hydraulic fluid power positive displacement pumps and motors under steady-state conditions and at defined, continuous shaft rotational frequencies.

Units can be tested as a positive displacement pump, with mechanical energy applied to the shaft and hydraulic energy obtained at the outlet fluid connection, or as a motor, with hydraulic energy supplied to the inlet fluid connection and mechanical energy obtained at the shaft.

NOTE Measurement accuracy is divided into three classes A, B and C, which are explained in Annex A.

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 3448, *Industrial liquid lubricants — ISO viscosity classification*

ISO 4409, *Hydraulic fluid power — Positive-displacement pumps, motors and integral transmissions — Methods of testing and presenting basic steady state performance*

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

ISO 6743-4, *Lubricants, industrial oils and related products (class L) — Classification — Part 4: Family H (Hydraulic systems)*

3 Terms and definitions

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

3.1
direction of rotation
direction of rotation as viewed looking at the shaft end

NOTE In cases where doubt exists, a sketch should be provided.

3.2
volume flow rate
volume of fluid crossing the transverse plane of a flow path per unit of time

3.3
derived capacity
volume of fluid displaced by a pump or motor per shaft revolution, calculated from measurements at different outlet pressures (for pumps) or inlet pressures (for motors) under specified test conditions

4 Symbols and units

The symbols and units used throughout this International Standard are shown in Table 1.

Table 1 — Symbols and units

Symbol	Description	Unit	Dimension [a]
d	Internal diameter of tube	m	L
n [b]	Rotational frequency (speed)	r/min	t^{-1}
p [b]	Pressure	MPa (bar) [c]	$mL^{-1}t^{-2}$
q_V [b]	Volume flow rate	l/min [d]	L^3t^{-1}
$q_{V,e}$ [b]	Effective flow rate	l/min	L^3t^{-1}
V_i [b]	Derived capacity	l/r	L^3
θ [b]	Temperature	°C	θ
v	Kinematic viscosity	m^2/s	L^2t^{-1}
ρ	Mass density	kg/m^3	mL^{-3}

[a] m = mass; L = length; t = time; θ = temperature.

[b] Letter symbol is used in accordance with ISO 4391.

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

[d] 1 l = 1 dm^3.

The graphic symbols used throughout this standard are in accordance with the requirements of ISO 1219-1.

5 Test installation

5.1 General

5.1.1 Pre-test condition

Before the test begins, the unit under test shall be run-in in accordance with the manufacturer's recommendation.

5.1.2 Installation

The test installation shall be designed to prevent air entrainment and precautions shall be taken to remove all free air from the system before beginning the test.

The unit under test shall be installed and operated in the test circuit (see 5.2) in accordance with the manufacturer's operating instructions. The inlet tube to the unit under test shall be straight, shall have a uniform bore and shall have dimensions consistent with the dimensions of the unit's inlet connection.

5.1.3 Test fluid cleanliness

The cleanliness of the test fluid shall be in accordance with the recommendation of the manufacturer of the unit under test. Filters of sufficient number and of an appropriate type shall be installed in the test circuit to provide the necessary test fluid cleanliness. Details of any filtration used in the test circuit shall be stated in the test report.

5.2 Test circuits

5.2.1 General

Figures 1, 2 and 3 illustrate the basic test circuits. These circuits do not incorporate all of the necessary safety devices. It is important that those responsible for carrying out the tests give consideration to safeguarding personnel and equipment.

5.2.2 Circuits for testing positive displacement pumps

Either an open-circuit test circuit in accordance with Figure 1 or a closed-circuit test circuit in accordance with Figure 2 shall be used.

If a pressurized inlet condition is required, a pressure control valve shall be provided in the inlet tube at a point not less than $10d$ from the pressure measuring point.

If it is necessary to increase the inlet pressure to the unit under test, this may be accomplished by providing

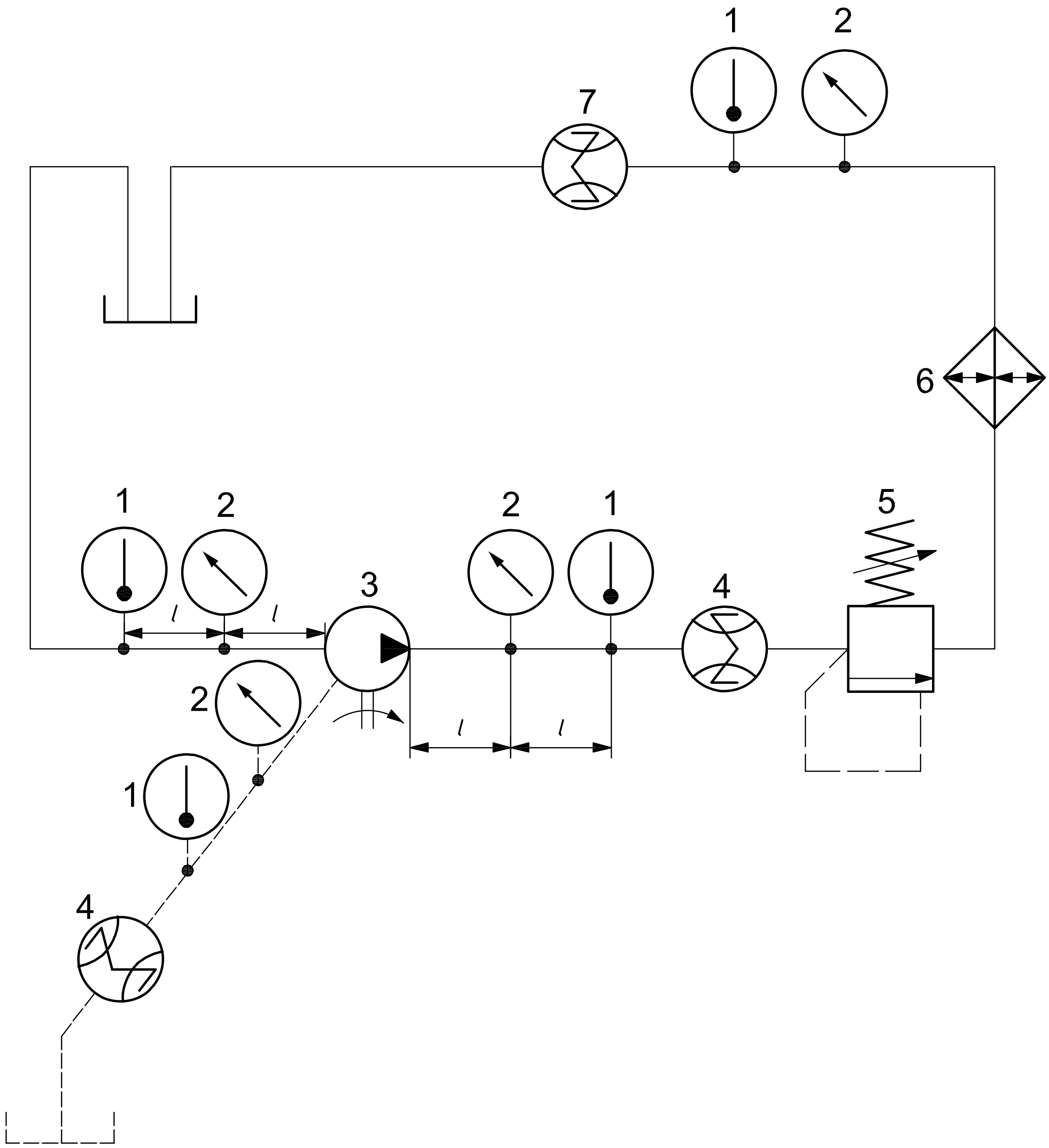
a) a boost pump and a pressure-relief valve capable of maintaining the pressure at the inlet of the unit under test at the desired pressure;

   NOTE When a closed test circuit (see Figure 2) is used, unless a higher flow rate is required for cooling purposes, it is necessary that the boost pump supply a flow rate slightly in excess of the total flow-rate losses of the circuit.

b) a means other than a boost pump (e.g. an air-loaded tank or pressurized reservoir); if these are used, precautions shall be taken to minimize the effects of entrained or dissolved air in the test circuit.

5.2.3 Circuit for testing positive displacement motors

A test circuit incorporating a controlled flow source similar to that shown in Figure 3 shall be used.



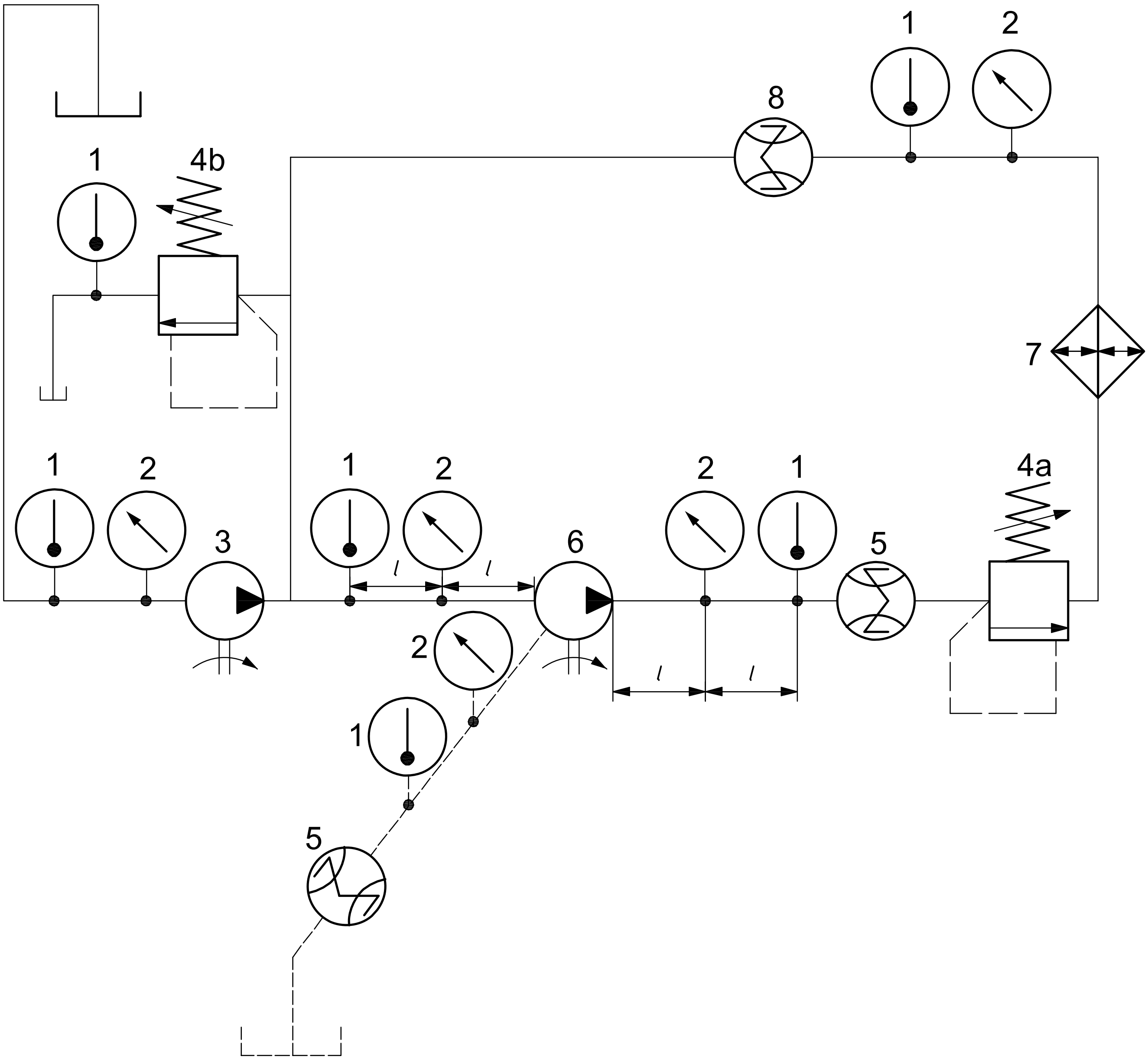
Key

1 temperature-measuring device
2 pressure-measuring device
3 unit under test
4 integrating flow meter
5 pressure control valve
6 temperature controller
7 integrating flow meter (alternative position)

NOTE 1 See 6.6 for the location of pressure and temperature measuring points.

NOTE 2 The part of the circuit shown with dashed lines is used only if the unit under test requires a casing drain.

Figure 1 — Open-circuit test circuit for pumps



Key

1 temperature-measuring device

2 pressure-measuring device

3 boost pump

4 pressure control valve (4a and 4b)

5 integrating flow meter

6 unit under test

7 temperature controller

8 integrating flow meter (alternative position)

NOTE 1 See 6.6 for the location of pressure and temperature measuring points.

NOTE 2 The part of the circuit shown with dashed lines is used only if the unit under test requires a casing drain.

Figure 2 — Closed-circuit test circuit for pumps