

Determination of hydraulic fluid power motor characteristics —

Part 2: Method for startability

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machinery and Components Standards Policy Committee (MCE/-) to Technical Committee MCE/18, upon which the following bodies were represented:

- Advanced Manufacturing Technology Research Institute
- Association of British Mining Equipment Companies
- Bath University Library
- British Compressed Air Society
- British Fluid Power Association
- British Hydromechanics Research Association
- British Steel Industry
- British Telecommunications plc
- Department of Trade and Industry (National Engineering Laboratory)
- Electricity Supply Industry in England and Wales
- Federation of Manufacturers of Construction Equipment and Cranes
- Health and Safety Executive
- Institution of Mechanical Engineers
- Ministry of Defence

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Railways Board
- Society of Motor Manufacturers and Traders Limited

This British Standard, having been prepared under the direction of the Machinery and Components Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 28 February 1990

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National foreword

This Part of BS 7275 has been prepared under the direction of the Machinery and Components Standards Policy Committee and is one of a series of methods of test to determine the characteristics of hydraulic fluid power motors. It is identical with ISO 4392-2:1989 “*Hydraulic fluid power — Determination of characteristics of motors — Part 2: Startability*”, published by the International Organization for Standardization (ISO).

The other Part of BS 7275 is BS 7275-1: *Method at constant low speed and at constant pressure*, implementing ISO 4392-1:1989. Further Parts are under consideration.

Cross-references

International Standard	Corresponding British Standard
ISO 1219:1976	BS 2917:1977 <i>Specification for graphical symbols used on diagrams for fluid power systems and components</i> (Identical)
ISO 3448:1975	BS 4231:1982 <i>Classification for viscosity grades of industrial liquid lubricants</i> (Identical)

The Technical Committee has reviewed the provisions of ISO 4391 and ISO 5598, to which reference is made in the text, and have decided that they are acceptable for use in conjunction with this British Standard.

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, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This part of ISO 4392 specifies two test methods for determining the startability of rotary hydraulic motors. It describes two comparable methods of measurement, namely the constant torque method (see clause 6) and the constant pressure method (see clause 7). Since the results obtained by these two methods are equivalent no preference is given to either.

The accuracy of measurement is divided into three classes A, B and C, which are explained in Annex B.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4392. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4392 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3448:1975, *Industrial liquid lubricants — ISO viscosity classification*.

ISO 4391:1983, *Hydraulic fluid power — Pumps, motors and integral transmissions — Parameter definitions and letter symbols*.

ISO 5598:1985, *Fluid power systems and components — Vocabulary*.

3 Definitions

For the purposes of this part of ISO 4392, the definitions given in ISO 4391 and ISO 5598, and the following definitions, apply.

3.1

startability

the ability of a hydraulic motor to start against a stated load

3.2

start at constant torque

that point at which there is an abrupt change in the slope of the angular displacement versus pressure characteristic, when the angular displacement of the motor shaft is measured between the motor and the load

3.3

start at constant pressure

that point at which there is an abrupt change in the slope of the angular displacement versus pressure torque characteristic, when the angular displacement of the motor shaft is measured between the motor and the load

4 Symbols

4.1 The physical quantity letter symbols and their suffixes used in this part of ISO 4392 are fully explained either in ISO 4391 or Annex A and are given in Table 1.

Table 1 — Symbols and units

Quantity	Symbol	Dimension ^a	SI unit ^b
Pressure, differential pressure	$p, \Delta p$	$ML^{-1}T^{-2}$	Pa
Torque	T	ML^2T^{-2}	N m
Instantaneous displacement	v	L^3	m^3
Time	t	T	s
Swept volume	V	L^3	m^3

^a M = mass; L = length; T = time.
^b The practical units which may be used for the presentation of results are given in Annex C.

4.2 The graphical symbols used in Figure 1 are in accordance with ISO 1219.

5 Test installation

5.1 Hydraulic test circuit

5.1.1 An appropriate hydraulic test circuit similar to that shown in Figure 1 shall be used.

NOTE 1 Although Figure 1 illustrates a basic circuit to test a unidirectional motor, a similar, symmetrical, but suitably modified, circuit is acceptable for testing bidirectional motors.

NOTE 2 An additional booster pump circuit may be necessary when testing piston-type motors.

NOTE 3 The basic circuit shown in Figure 1 does not incorporate all the safety devices necessary to protect against damage in the event of component failure. It is important that those responsible for carrying out the tests give due consideration to safeguarding both staff and equipment.

5.1.2 A fluid conditioning circuit shall be installed which provides the filtration necessary to protect the test motor and the other circuit components, and which will maintain the fluid temperature at the motor inlet at either 50 °C or 80 °C to within ± 2 °C.

5.1.3 The hydraulic ports of the test motor shall be connected to the hydraulic circuit in such a manner that the motor shaft rotation will oppose the torque loading device.

5.1.4 The maximum test pressure shall not exceed that recommended by the motor manufacturer.

5.2 Instrumentation

Measuring instruments shall be selected and installed which provide systematic errors which are consistent with the chosen class of measurement accuracy (see Annex B).