INTERNATIONAL STANDARD

ISO 4409

Second edition
2007-04-01

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

Transmissions hydrauliques — Pompes, moteurs et variateurs volumétriques — Méthodes d'essai et de présentation des données de base du fonctionnement en régime permanent

Reference number
ISO 4409:2007(E)

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Published in Switzerland

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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 4409 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 4409:1986), 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. Pumps are components that convert rotary mechanical power into hydraulic fluid power. Motors are components that convert hydraulic fluid power into rotary mechanical power. Integral transmissions (hydraulic drive units) are a combination of one or more hydraulic pumps and motors and appropriate controls forming a component.

With very few exceptions, all hydraulic fluid power pumps and motors are of the positive-displacement type, i.e. they have internal sealing means that make them capable of maintaining a relatively constant ratio between rotational speed and fluid flow over wide pressure ranges. They generally use gears, vanes or pistons. Non-positive displacement components, such as centrifugal or turbine types, are seldom associated with hydraulic fluid power systems.

Pumps and motors are available either as “fixed-” or “variable-displacement” types. Fixed-displacement units have pre-selected internal geometries that maintain a relatively constant volume of liquid passing through the component per revolution of the component's shaft. Variable-displacement components have means for changing the internal geometries so that the volume of liquid passing through the component per revolution of the component's shaft can be changed.

This International Standard is intended to unify testing methods for hydraulic fluid power positive displacement hydraulic pumps, motors and integral transmissions to enable the performance of the different components to be compared.

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

1 Scope

This International Standard specifies methods for determining the performance and efficiency of hydraulic fluid power positive displacement pumps, motors and integral transmissions. It applies to components having continuously rotating shafts.

This International Standard specifies the requirements for test installations, test procedures under steady-state conditions and the presentation of test results.

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 31, *Quantities and units*

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

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

ISO 9110-1, *Hydraulic fluid power — Measurement techniques — Part 1: General measurement principles*

ISO 9110-2, *Hydraulic fluid power — Measurement techniques — Part 2: Measurement of average steady-state pressure in a closed conduit*

3 Terms and definitions

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

NOTE When there is no risk of ambiguity (i.e. when a test has been carried out on a pump or a motor), the superscripts “P,” “M” and “T” specifying that the quantity concerns, respectively, a pump, a motor or an integral transmission, can be omitted.

3.1
volume flow rate
q_V
volume of fluid crossing the transverse plane of a flow path per unit time