# INTERNATIONAL STANDARD

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### Hydraulic fluid power — Positivedisplacement 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



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### Foreword

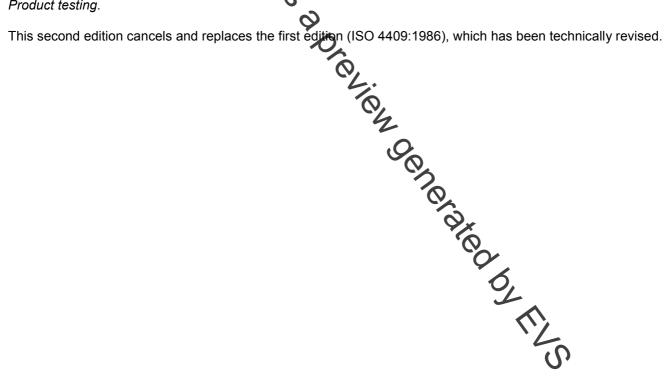
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ISO 4409 was prepared by Technical Committee ISO/TC 131, Fluid power systems, Subcommittee SC 8, Product testing.



#### 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 fulf flow over wide pressure ranges. They generally use gears, vanes or pistons. Nonpositive 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 opfy testing methods for hydraulic fluid power positive displacement

This International Standard is intended to only 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.

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### 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 steadystate 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 pplications

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 — Party. General measurement principles

ISO 9110-2, Hydraulic fluid power — Measurement techniques — Prt 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