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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 17491-2023

**Hydraulic fluid power-Pumps, motors-Methods of testing
steady-state performance**

液压传动 泵、马达 稳态性能的试验方法

(English Translation)

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Foreword

This Standard was drafted in accordance with the rules specified in GB/T 1.1-2009.

This Standard replaces GB/T 17491-1998 "Hydraulic pumps, motors and integral transmissions - Measurement of steady-state performance". As compared with GB/T 17491-1998, the main technical changes are as follows.

- ADD the integral transmission test circuit;
- DELATE the test curves of hydraulic pumps, motors and integral transmission.

Using re-drafting method, this Standard modifies and adopts ISO 4409.2007 "Hydraulic fluid power - Positive capacity pumps, motors and integral transmissions - Methods of testing and presenting basic steady state performance" (English version).

The technical differences between this Standard and ISO 4409.2007 AND their causes are as follows.

- In normative references, this Standard has made adjustments with technical differences to adapt to China's technical conditions. The adjustments are mainly reflected in Chapter 2 "Normative references". The specific adjustments are as follows.
- USE GB 3102 (all parts) which equivalently adopts international standard to replace ISO 31 (all parts) (see 4).
- USE GB/T 786.1 which equivalently adopts international standard to replace ISO 1219-1 (see 4).
- USE GB/T 17446 which equivalently adopts international standard to replace ISO 5598 (see 3).
- USE GB/T 17485 which equivalently adopts international standard to replace ISO 4391 (see 4).
- USE JB/T 7033 which adopts international standard through modification to replace ISO 9110-1 (see 5.1.1).
- CORRECT the unit error of "Rotational frequency" in Table 1 of international standard.

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

1 Scope

This Standard specifies the measurement method for the steady state performance and efficiency of positive capacity pumps, motors and integral transmissions for the purposes of hydraulic transmission, as well as, under steady state conditions, the expression of the test apparatus, the test program requirements and test results.

This Standard applies to the positive capacity hydraulic pumps, motors and integral transmissions.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this Standard.

GB/T 786.1 Fluid power systems and components - Graphic symbols and circuit diagrams - Part 1. Graphic symbols for conventional use and data-processing applications (GB/T 786.1-2009, ISO 1219-1:2006, IDT)

GB 3102 (all parts), Quantities and units [GB 3102-1993, eqv ISO 31:1992 (all parts)]

GB/T 17446 Fluid power systems and components - Vocabulary (GB/T 17446-1998, idt ISO 5598:1985)

GB/T 17485 Hydraulic fluid power - Pumps, motors and integral transmissions - Parameter definitions and letter symbols (GB/T 17485-1998, idt ISO 4391:1983)

JB/T 7033 Hydraulic fluid power - General measurement principles (JB/T 7033-2007, ISO 9110-1:1990, MOD)

ISO 9110-2 Hydraulic fluid power - Measurement techniques - Part 2. Measurement of average steady state pressure in a closed conduit

3 Terms and definitions

The terms and definitions as defined in GB/T 17446 as well as the followings apply to this document.

NOTE: When it is no risk of ambiguity, the subscripts P, M and T used to distinguish pumps, motors or integral transmissions can be omitted.

3.1

Volume flow rate q_V

It refers to the volume of fluid flowing through the channel's cross section in unit time.

3.2

Drainage flow rate q_{Vd}

It refers to the volume flow rate from the component casing.

3.3

Pump effective outlet flow rate

It refers to, at the temperature of $\theta_{2,e}$ and pressure of $p_{2,e}$, the actual flow rate measured at the pump outlet.

NOTE: If the flow rate is measured at other locations than the pump outlet, then at the temperature of θ and pressure of p , the measured flow rate shall be corrected by the equation (1), so as to obtain the effective outlet flow values.

3.4

Motor effective inlet flow rate

It refers to, at the temperature of $\theta_{1,e}$ and pressure of $p_{1,e}$, the actual flow rate measured at the motor inlet.

3.14

Pump overall efficiency

It refers to the ratio between the power obtained and the input mechanical power when the liquid passes through pump.

3.15

Pump volumetric efficiency

It refers to, under specified conditions, the ratio between the pump actual output flow rate and the product of derived capacity V_i and shaft speed.

3.16

Motor overall efficiency

It refers to the ratio between the motor output mechanical power and the input hydraulic power.

3.17

Motor volumetric efficiency