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

**GB/T 44050.3-2024**

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**Hydraulic fluid power - Determination of fluid-borne noise  
characteristics of components and systems - Part 3:  
Measurement of hydraulic impedance  
(English Translation)**

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## Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 3 of GB/T 44050 "Determination of noise characteristics of hydraulic transmission oils". GB/T 44050 has been published in Lower part.

--- Part 1: General;

--- Part 2: Measurement of sound velocity of oil in pipelines;

--- Part 3: Measurement of hydraulic impedance.

This document is modified to adopt ISO 15086-3:2022 "Determination of noise characteristics of hydraulic transmission oils - Part 3: Measurement of hydraulic impedance".

This document has the following structural adjustments compared to ISO 15086-3:2022.

---7.2, 7.2.1~7.2.3 correspond to 7.1.3, 7.1.3.1~7.1.3.3 in ISO 15086-3:2022 respectively;

---7.3, 7.3.1 and 7.3.2 correspond to 7.1.4, 7.1.4.1 and 7.1.4.2 in ISO 15086-3:2022 respectively.

The technical differences between this document and ISO 15086-3:2022 and their reasons are as follows.

--- ISO 5598 (see Chapter 3) has been replaced by the normative reference GB/T 17446 to adapt to my country's technical conditions and improve operability.

Sex;

--- Added "passive components" (see 3.8) and deleted "liquid acoustic energy" (see 3.8 of ISO 15086-3:2022) in the terms and definitions.

Comply with our country's standard writing rules;

--- ISO 1219-1 (see Chapter 4) has been replaced by the normative reference GB/T 786.1 to adapt to my country's technical conditions and improve the reliability of the product.

Operability;

--- Replaced ISO 15086-2:2000 with the normative reference GB/T 44050.2 (see 5.2.1, 5.2.2, 6.3.3, 6.4.2.4.1, 7.2.1 and 7.2.2) to adapt to my country's technical conditions and improve operability;

--- Changed the relevant requirements for "hydraulic noise generator" (see 6.3.2, 6.3.2 of ISO 15086-3:2022) to be consistent with other series of standards Quasi-coordinated;

--- Replaced ISO 15086-1:2001 (see 6.4.2.4.2, 7.2.3) with the normative reference GB/T 44050.1 to adapt to my country Technical conditions to improve operability;

--- Changed the relevant requirements of the test circuit in the measurement principle of the admittance matrix (see 7.1.2, 7.1.2 of ISO 15086-3:2022) to Adapt to my country's technical conditions and improve operability.

The following editorial changes were made to this document.

--- Replace "pulse generator" in this document with "hydraulic noise generator";

- In the Terms and Definitions, the examples in 3.4 were deleted;
- As and Bs and their definitions and units are added to Table 1, and the definitions of symbols  $Q_e \rightarrow 0$ ,  $Q_s \rightarrow 0$ ,  $Q_3 \rightarrow 0$ , and  $Z_e \rightarrow 0$  are deleted (0);
- Corrected the errors in the reference standards in the steady-state accuracy grades and dynamic accuracy grades in ISO 15086-3:2022;
- Deleted the notes in 6.2.1, 7.1.1 and Note 2 in Figure 2;
- Corrected some incorrect formulas in ISO 15086-3:2022 and adjusted the numbers of all formulas in order;
- Redraw all pictures in accordance with relevant national standards.

## Introduction

In hydraulic fluid power systems, power is transmitted and controlled by pressurized fluid in a closed circuit.

In the process of generating fluid power, fluid noise (flow fluctuation and pressure fluctuation) will be generated, which will lead to structure-borne noise and air noise.

The transmission of sound is affected by the impedance of the components in the hydraulic circuit.

GB/T 44050 aims to standardize the determination of noise characteristics of hydraulic components and system oils and consists of three parts.

--- Part 1: General. The purpose is to provide a transfer matrix theory for determining the noise characteristics of hydraulic components and system oils, Provides guidance for determining the characteristics of oil noise.

--- Part 2: Measurement of sound velocity of oil in pipelines. The purpose is to provide Method for determining the speed of sound in a confined fluid within a pipe.

--- Part 3: Measurement of hydraulic impedance. The purpose is to provide a method for determining the hydraulic impedance by measuring the pressure sensor installed in the pipeline.

The method of measuring the impedance characteristics of pressure elements.

At present, many methods have been developed to describe the generation and propagation of oil noise in hydraulic systems. Among them, the transfer matrix method can be well used.

The velocity of sound and impedance are the characteristics of hydraulic components.

Main parameters related to oil noise.

# Determination of Noise Characteristics of Hydraulic Transmission Oil Part 3: Measurement of hydraulic impedance

## 1 Scope

This document describes a method for determining the impedance characteristics of a hydraulic component by measuring the pressure fluctuations of the oil in the line.

This document is applicable to passive components operating under steady-state conditions, with a measurement frequency range of 10 Hz to 3000 Hz.

## 2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 786.1 Fluid power systems and components Graphical symbols and circuit diagrams Part 1: Graphical symbols (GB/T 786.1-2021, ISO 1219-1:2012, IDT) GB/T 17446 Fluid power systems and components vocabulary (GB/T 17446-2024, ISO 5598:2020, MOD) GB/T 44050.1 Determination of noise characteristics of hydraulic transmission oil Part 1: General principles (GB/T 44050.1-2024, ISO 15086-1:2001, MOD) GB/T 44050.2 Determination of noise characteristics of hydraulic transmission oil Part 2: Measurement of sound velocity of oil in pipelines (GB/T 44050.2-2024, ISO 15086-2:2000, MOD) ISO 80000-1 Quantities and units - Part 1: General

## 3 Terms and definitions

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

flow ripple

Changes in flow rate of hydraulic fluid.

pressure ripple

Variations in hydraulic fluid pressure caused by the interaction of flow fluctuation sources with the system.

A hydraulic system that produces flow fluctuations in a circuit, which results in pressure fluctuations, or produces pressure fluctuations in a circuit, which results in flow fluctuations.

element.

fundamentalfrequency the lowest frequency of pressure fluctuation (or flow fluctuation)