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

GB/T 44050.1-2024

**Hydraulic fluid power - Determination of fluid-borne noise
characteristics of components and systems - Part 1:
Introduction**

(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 1 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:

This document is modified to adopt ISO 15086-1:2001 "Determination of noise characteristics of hydraulic transmission oils Part 1: General principles":

The technical differences between this document and ISO 15086-1:2001 and their reasons are as follows:

--- The scope of this document (see Chapter 1, Chapter 1 of ISO 15086-1:2001) has been changed to adapt to the technical conditions of my country;

--- ISO 5598 (see Chapter 3) has been replaced by the normative reference GB/T 17446 to adapt to my country's technical conditions and improve operability: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

--- "3:7~3:10, 3:12" (see Chapter 3 of ISO 15086-1:2001) has been deleted from the terms and definitions to comply with the Chinese version:

rule;

--- Changed formula (5) to formula (8) (see 5.3, 5:3 of ISO 15086-1:2001) to maintain

consistency with relevant standards;

--- Added some symbols (see Table 1) to comply with my country's writing rules:

The following editorial changes were made to this document:

--- The symbols in Chapter 4 are presented in the form of a table, and the units of the symbols are added;

--- Added piping examples (see Figure 3 and Figure 4);

--- Changed the symbols and units of the horizontal and vertical axes in Figures 1 and 2;

--- Corrected the editorial errors of ISO 15086-2:2000, adjusted the numbering of all formulas in order, and One reference;

---Removed references:

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 determine the sound velocity of oil in pipelines by measuring the pressure sensor installed in the pipeline:

Method for measuring the speed of sound in a closed oil in a pipeline:

--- Part 3: Measurement of hydraulic impedance: The purpose is to determine the hydraulic impedance of the hydraulic element by measuring the pressure sensor installed in the pipeline:

The method of measuring the impedance characteristics of the device:

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 used to describe the generation and propagation of oil noise in hydraulic systems:

It can best describe the physical behavior of the component and provide a suitable basis for measuring the characteristics of the component:

Determination of Noise Characteristics of Hydraulic Transmission Oil Part 1: General

1 Scope

This document provides a transfer matrix theory for determining the characteristics of hydraulic components and system oil noise, providing a basis for determining the characteristics of oil noise:

guide:

This document is applicable to the measurement of oil noise in the frequency range of 10Hz~3000Hz in the hydraulic transmission circuit under steady-state conditions:

2 Normative references

The contents of the following documents constitute the 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 17446 Fluid power systems and components vocabulary (GB/T 17446-2024, ISO 5598:2020, MOD)

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

The varying component of pressure in the hydraulic fluid caused by the interaction of flow fluctuation sources with the system:

A hydraulic device that generates flow fluctuations in a circuit, which results in pressure fluctuations, or generates pressure fluctuations in a circuit, which results in flow fluctuations:

element:

fundamentalfrequency the lowest frequency of pressure fluctuation (or flow fluctuation) analyzed theoretically or measured by an instrument:

Example 1:

The fundamental frequency of a hydraulic pump or hydraulic motor with a rotation speed of N (r/s) is N (Hz): For a hydraulic pump or motor with k displacement components, if there is no obvious measurement deviation, the fundamental frequency can also be taken as N (kHz):

Example 2:

The digital frequency analyzer defines the fundamental frequency based on the frequency of the first spectral line:

Harmonic

Sinusoidal components of pressure or flow fluctuations that occur at integer multiples of the fundamental frequency:

Note: Harmonics can be expressed in terms of amplitude and phase, or in terms of their real and imaginary parts: