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

GB/T 37163-2026

Replacing GB/T 37163-2018

**Hydraulic fluid power - Contamination analysis - Determination
of the particulate contamination level of a liquid sample by
automatic particle counting using the light-extinction principle**

液压传动 污染分析 采用遮光原理的自动颗粒计数法测定液样颗粒污染度

(English Translation)

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Foreword

This document conforms to GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting is scheduled.

This document replaces GB/T 37163-2018 "Automatic Particle Counting Method Based on Light-Shielding Principle for Determination of Particle Contamination in Liquid Samples in Hydraulic Transmission".

Compared with GB/T 37163-2018, the main technical changes in the standard are as follows, apart from structural adjustments and editorial modifications.

--The monitoring scope has been expanded to include "stockpiled oil in drums" (see Chapter 1);

--The term and definition of "automatic particle counter" have been added (see 3.7), and the term and definition of "agglomeration" have been removed (see 2018 edition).

--The requirements for the use of sampling bottles have been changed (see 4.7, 2018

version of 4.7).

--The requirements for using the diluent have been changed (see 5.1, 2018 version 5.1).

--The requirement that "the diluent should not affect particle count" has been removed (see 5.3 in the 2018 version).

--The permissible range for relative humidity has been changed (see 6.1.4, 2018 version of 6.1.4).

--The requirement to use clean isopropanol and other similar solvents as cleaning solvents has been removed [see 6.2.1b of the 2018 edition];

--Inspection requirements for glass products have been added (see 6.2.2);

--The usage requirements for the automatic particle counter have been changed (see 6.4.1, 2018 version of 6.4.1).

--The provision to "test the cleanliness of the particle counting system by analyzing a certain volume of diluent" has been removed (see 2018 version).

(6.4.5)

--The procedure for handling excessive liquid sample volume has been changed [see 6.5.2, 6.5.2.1e in the 2018 version];

--A new method for measuring the relative water content of liquid samples has been added [see 6.5.4.1b)];

--The liquid sample pretreatment process has been changed (see 7.2.3.3, 2018 version of 7.2.3.3).

--The requirements for validating liquid samples have been changed (see 7.3.4, 2018 version of 7.3.4).

--Added a step to calculate the actual number of particles (see 7.3.5);

--The presentation of data processing for liquid sample dilution and validity verification has been changed (see 7.3.7, 7.3.8, and 7.3.5 in the 2018 version).

7.3.6);

--Added operating procedures when the measurement results do not exceed the overlap error limit (see 7.3.9);

--The test report has been amended (see Chapter 8, Chapter 8 of the 2018 edition).

This document is equivalent to ISO 11500:2022 "Hydraulic transmission - Automatic particle counting method based on the principle of light shielding for the determination of particulate matter in liquid samples".

The following minimal editorial changes have been made to this document.

--To align with existing standards, the standard title has been changed to "Automatic Particle Counting Based on the Principle of Light Blocking for Pollution Analysis in Hydraulic Transmission Systems".

"Method for Determining Particulate Contamination in Liquid Samples";

--The way the flowchart's start and end points are represented has been changed (see Figure 1 and Figure 2);

--Added the liquids that can be used as diluents. "YH-10, YH-12, and 15 aviation hydraulic oils" (see Appendix B);

--Use GB/T 14039, which is cited in an informative manner, instead of ISO 4406 (see Appendix D).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Hydraulics and Pneumatics (SAC/TC 3).

Introduction

In hydraulic systems, power is transmitted and controlled via pressurized fluid within a closed circuit. This fluid serves as both a lubricant and a...

Medium for power transmission.

The presence of solid particulate contaminants in liquids not only reduces the lubricating performance of hydraulic fluids but also leads to component wear.

The degree of particulate pollution is directly related to the performance and reliability of the system, so it must be controlled within the allowable range of the system.

When measuring contamination levels, the accuracy of particle counting is related to the particle contamination testing process, requiring strict control over this process.

Standard format.

Using an automatic particle counter correctly can reduce measurement errors and improve the reproducibility of measurement results.

The hydraulic transmission contamination analysis employs the principle of light shielding.

Determination of particulate contamination in liquid samples by automated particle counting method

1 Scope

This document establishes the operating procedure for determining the particle contamination level of transparent, homogeneous, single-phase liquid samples using an automated particle counter based on the principle of light shielding.

The methods described in this document are applicable to monitoring particulate contamination levels in liquid samples in the following scenarios.

- a) Hydraulic system;
- b) Rinsing process;
- c) Auxiliary equipment and test benches;
- d) Stockpiled bottled oil.

Note: The measuring personnel need to ensure that the particles in the original liquid sample or the diluted liquid sample are uniformly suspended in order to reduce the overlap error.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are listed below.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

ISO 3722 Determination and control of purification methods for hydraulic power fluid sampling containers sample containers-Qualifying and controlling cleaning methods) ISO 4406 Hydraulic fluid power-Fluids-Method for solid particulate contamination level designation coding the level of contamination by solid particles) Note. GB/T 14039-2026 Code method for solid particulate pollution level analysis of hydraulic transmission (ISO 4406:2021, IDT) ISO 5598 Fluid power systems and components - Vocabulary Note. GB/T 17446-2024 Vocabulary of Fluid Transmission Systems and Components (ISO 5598:2020, MOD) ISO 11171 Calibration of automatic hydraulic fluid power particle counter matic particle counters for liquids) Note. GB/T 18854-2015 Calibration of hydraulically driven automatic particle counters (ISO 11171:2010, MOD) ASTM E694-18 Standard specification for laboratory glass volumetric instruments (ric apparatus)

3 Terms and Definitions

The terms and definitions defined in ISO 5598 and ISO 11171, as well as the following terms and definitions, apply to this document.