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

GB/T 21540-2022

Replacing GB/T 21540-2008

**Hydraulic fluid power - On-line automatic particle-counting
systems for liquids - Methods of calibration and validation**

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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 of Standardization Documents" drafted.

This document replaces GB/T 21540-2008 "Method for Calibration and Verification of Online Automatic Particle Counting System for Hydraulic Transmission Fluids", and

Compared with GB/T 21540-2008, in addition to structural adjustment and editorial changes, the main technical changes are as follows.

- Changed the description of the scope (see Chapter 1, Chapter 1 of the.2008 edition);
- Deleted the operator's requirements (see Chapter 5 of the.2008 edition);
- Changed the algorithm of "calibration limit" (see 9.2, 9.15 of the.2008 edition);
- Changed the algorithm of "allowable deviation between particle counters (sensors)" (see 10.10, 9.17 of the.2008 edition);
- Deleted Figure 2 in Chapter 10 (see Chapter 10 of the.2008 edition).

This document is modified to adopt ISO 11943.2018 "Methods for Calibration and Verification of Hydraulic Transmission Online Liquid Automatic Particle Counting Systems".

The technical differences between this document and ISO 11943.2018 and their reasons are as follows.

- Replaced ISO 5598 (see Chapter 3) with the normatively cited GB/T 17446 to adapt to my country's technical conditions and increase the operability action;
- Replaced ISO 11171 with the normatively cited GB/T 18854 (see Chapter 3, Chapter 4,

5.2, 7.1, 7.2), the currently valid

The degree of consistency between GB/T 18854-2015 and ISO 11171:2010 is modified to adapt to the technical conditions of our country,

increase operability;

--- Replaced ISO 12103-1:1997 (see 5.3) with the normatively cited GB/T 28957.1, the currently valid GB/T 28957.1-

The degree of consistency between 2012 and ISO 12103-1:1997 is modified to adapt to our country's technical conditions and increase operability;

--- Replaced ISO 16889 (see 5.4, 5.5) with the normatively cited GB/T 18853, the currently valid GB/T 18853-2015

The degree of consistency with ISO 16889:2008 is modified to adapt to our country's technical conditions and increase operability;

--- Deleted the reference to ISO 4021 (see 5.5 of ISO 11943:2018), and added the reference to GB/T 17489 (see 5.5) to suit the

According to the technical conditions of our country, increase the operability;

--- Deleted "Table 4" in 10.10 of ISO 11943:2018, the table is inconsistent with the requirements of "Formula (4)", and the required indicators are not completely.

The following editorial changes have been made to this document.

--- Deleted "Note" in 5.3;

--- Deleted "Note" in 7.1;

--- Changed the "Note" in 8.9, in which the description of the international joint verification was added;

--- Deleted "Note" in 10.1;

--- Changed the "Note" in 10.10, simplifying the description that the allowable deviation has been verified by the international joint;

--- Modified and edited the description of A.2.8, and deleted the description of "the traditional tubular heat exchanger with oil flowing through the cooling pipe";

--- Deleted "Appendix B" and "Appendix C" in ISO 11943:2018.

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

In a hydraulic system, power is transmitted and controlled by means of pressurized fluid in a closed circuit. This fluid is both a lubricant and a power transmission delivery medium.

Contamination control of liquid media is required for reliable system performance. For the characterization and determination of particulate contaminants in liquid media

Quantitative determination requires accuracy in sampling and in determining the size and distribution of particulate contaminants.

The use of liquid automated particle counters is a viable method for determining the size and distribution of particulate contaminants in liquids. The accuracy of the instrument itself It is determined by calibration using standard materials or calibration suspensions.

Using an online liquid automated particle counter eliminates the need for sampling vessels, improves detection accuracy, and provides faster particle count information.

interest. A major application of the online particle counting system is to evaluate the filtration of hydraulic filter elements in the multiple pass test specified in GB/T 18853 efficiency. Depending on the type of filter being tested and the capabilities of the liquid APC used, the liquid sample may need to be diluted before flowing through the sensor.

This document is for the verification of calibrated suspension preparation equipment, the verification of online particle counting systems with or without dilution loops, and the

Guidelines were established for online calibration of bulk automated particle counters. This document gives the matching of two or more liquid automatic particle counters

procedures, which will improve the accuracy of filtration efficiency tests, for example, the test results in GB/T 18853.

Hydraulic Transmission Online Liquid Automatic Particle Counting System

Calibration and Verification Methods

1 Scope

This document specifies calibration and validation methods for online liquid automated particle counting systems.

This document is suitable for the following purposes.

--- for the verification of liquid automatic particle counter calibration suspension preparation equipment;

--- Carry out on-line calibration of liquid automatic particle counter;

--- Matching of two or more online liquid automatic particle counters, for example, for two associated online liquid automatic particle counters

Particles of a given size are counted;

--- Validate the online particle counting system with or without dilution, for example, determine the number of filters specified in GB/T 18853

Filtration efficiency of hydraulic filters in the second pass test.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations

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

GB/T 17446 Vocabulary of Fluid Transmission Systems and Components (GB/T 17446-2012, ISO 5598.2008, IDT)

GB/T 17489 Hydraulic particle pollution analysis Extracting liquid samples from working system pipelines

GB/T 18853 Multiple-pass method for evaluating the filtration performance of filter elements for hydraulic transmission filters (GB/T 18853-2015,

ISO 16889.2008, MOD)

Calibration of GB/T 18854 Hydraulic Transmission Liquid Automatic Particle Counter (GB/T 18854-2015, ISO 11171.2010,

MOD)

GB/T 28957.1 Road Vehicles Test Dust for Filter Evaluation Part 1.Silica Test Dust

(GB/T 28957.1-2012, ISO 12103-1.1997, MOD)

ISO 80000-1 Dimensions and Units Part 1.General (Quantitiesandunits-Part 1.General)

3 Terms and Definitions

Terms and definitions defined in GB/T 17446 and GB/T 18854 apply to this document.

4 units of measure

This document uses the International System of Units in accordance with ISO 80000-1.