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Hydraulic fluid power - Fatigue pressure testing of metal pressure-containing envelopes - Rating methods

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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 is modified to adopt ISO /T R10771-2.2008 "Fatigue Pressure Test of Hydraulic Transmission Metal Pressure Housing Part 2.Evaluation

Price Method", the document type was changed from ISO technical report to my country's national standardization guiding technical document.

The technical differences between this document and ISO /T R10771-2.2008 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 improve operability.

action;

--- Replaced ISO 10771-1.2002 (see Chapter 3, 6.2, 6.3) with the normatively cited GB/T 19934.1 to adapt to my country's

Technical conditions, improve operability;

--- Added the expression "acceleration coefficient" (see 5.7) to adapt to the technical conditions of our country.

The following editorial changes have been made to this document.

--- Change the standard name to "Evaluation Method for Fatigue Pressure Test of Hydraulic Transmission Metal Pressure-bearing Shell";

--- Added Appendix E (informative) "Experimental Verification Example".

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 the hydraulic transmission system, the power is transmitted and controlled by the pressurized fluid in the circuit. due to fatigue failure modes associated with hydraulic components

The safety function of the hydraulic components is closely related to the working life, so for the manufacturers and users of hydraulic components, it is obvious to master the reliability data of hydraulic components.

very important. This document provides a method for validating fatigue pressure evaluations of hydraulic component pressure housings.

During operation, components within the system may be subjected to loads from.

--- Internal pressure;

---external force;

--- the effects of inertia and gravity;

--- shock and vibration;

--- Temperature changes or temperature gradients.

The nature of these loads can range from a single static force to continuously varying amplitudes, repetitive loading, and vibration. Find out if the component can withstand

These loads are important, but this document only deals with loads caused by internal pressure.

This document provides a general verification method for improving component stress evaluation for the various stress evaluation methods employed by manufacturers.

reliability. The verification method is based on the statistical analysis and statistical verification theory of metal fatigue. In order to improve the accuracy of this verification method, we have

It is necessary to combine the design structure principles of each type of component and its typical test sample. Regardless of the size of the sample, this verification method can reduce the hydraulic element

risk of fatigue failure.

To verify the rated fatigue pressure of the components according to this document, the rated fatigue pressure of the components should be preliminarily set, the test samples should be selected and the

Test pressure; then carry out fatigue pressure test according to GB/T 19934.1.If the sample test is successful, it indicates the fatigue of this type of hydraulic components

The stress evaluation was validated.

Fatigue Pressure of Hydraulic Transmission Metal Pressure-bearing Housing

Test evaluation method

1 Scope

This document gives the fatigue pressure evaluation of metal pressure-bearing housings of hydraulic components under continuous stable and periodic internal pressure loads.

price method.

This document applies only to fabrication of metal, operation at temperatures that do not produce creep and low temperature embrittlement, stress induced only by pressure, not

There are hydraulic element pressure housings that have reduced strength due to corrosion or other chemical effects. The pressure housing may include gaskets, seals and

Other non-metallic parts, but these parts are not used as part of the pressure-bearing housing of the tested hydraulic components (see GB/T 19934.1).

This document does not apply to piping components (i.e. fittings, hoses, rigid pipes) specified in ISO 4413.Fatigue testing for piping components

See GB/T 26143, ISO 6803 and ISO 6605 for methods.

This document presents a general method for fatigue pressure evaluation of metallic pressure-bearing housings for hydraulic components. In addition, EN14359 for storage

Specific methods and test requirements are described in Fatigue Pressure Evaluation of Energy Equipment.

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 19934.1 Fatigue Pressure Test of Hydraulic Transmission Metal Pressure Housing

Part 1.Test Methods (GB/T 19934.1-

2021, ISO 10771-1.2015, IDT)

3 Terms and Definitions

The terms and definitions defined in GB/T 17446, GB/T 19934.1 and the following apply to this document.

3.1

rated fatigue pressure

During the rated life cycle, the randomly selected pressure-bearing shell is verified to be the highest pressure without failure with a given probability.

3.2

assurance level assurancelevel

The probability that the fatigue strength of a randomly selected sample is higher than the rated fatigue stress.

3.3

verificationlevel verificationlevel

The probability that the fatigue strength of a randomly selected sample is not lower than the cyclic test pressure.

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