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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 38206.1-2019

Methods to assess the reliability of pneumatic components -- Part 1: General procedures

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Foreword

GB/T 38206 "Pneumatic component reliability assessment method" is divided into five parts.

--- Part 1. General procedures;

--- Part 2. Reversing valve;

---Part 3. Cylinders with piston rods;

--- Part 4. Pressure regulating valve;

--- Part 5. Check valves, shuttle valves, dual pressure valves (and valves), one-way throttle valves and quick-discharge valves.

This part is the first part of GB/T 38206.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This section uses the redrafting method to modify the use of ISO .19973-1.2015 "Pneumatic Transmission Components Reliability Test Evaluation Part 1

Points. General Procedures.

The technical differences between this part and ISO .19973-1.2015 and their reasons are as follows.

---About the normative reference documents, this part has made technical adjustments to adapt to China's technical conditions, adjustments

The situation is reflected in Chapter 2, "Regulatory Citations", and the specific adjustments are as follows.

* Replace IEC 60050-191 with GB/T 2900.13 equivalent to the international standard (see Chapter 3);

* Replace ISO 3534-1 with GB/T 3358.1 equivalent to the international standard (see

Chapter 3);

* Replace ISO 5598 with GB/T 17446, which is equivalent to the international standard (see Chapter 3).

--- Modified some terms and definitions (see 3.2, 3.5, 3.7, 3.8, and 3.11).

This section also made the following editorial changes.

--- Change the standard name to "Pneumatic Components Reliability Assessment Method Part 1. General Procedures";

--- Change the name of the quantity to the sign of the quantity [see formula (A.3), formula (A.5)].

This part was proposed by the China Machinery Industry Federation.

This part is under the jurisdiction of the National Hydraulic and Pneumatic Standardization Technical Committee (SAC/TC3).

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Introduction

In pneumatic systems, energy is transferred and controlled through compressed air in the circuit. The pneumatic system consists of a variety of components, which are machines and equipment.

An important part of the preparation. Highly reliable machines and equipment are an important guarantee for efficient and economical production.

Therefore, it is necessary for the producer to understand the reliability of the pneumatic components in the equipment. Through the test to grasp the reliability characteristics of the components, the producer

Ability to build system models and make decisions on service intervals, spare parts inventory, and product optimization.

There are three main stages in determining the reliability of components.

a) preliminary design analysis. finite element analysis (FEA), failure mode and consequence analysis (FMEA);

b) laboratory testing and reliability model establishment. physical mechanism of failure, reliability prediction, prenatal evaluation;

c) On-site data collection. maintenance report, quality analysis report.

It is used at every stage of the component's life. Preliminary design analysis facilitates identification of possible failure modes and eliminates failures

Factors or reduce the impact of failure on reliability. At the sample stage, reliability tests are performed in the laboratory and initial reliability is determined. Throughout

Reliability testing of components is required in the production process. In the component application phase, field failure data can be collected.

For specific component test procedures and other matters, see Part 2 to Part 5 of GB/T 38206.

Pneumatic component reliability assessment method

Part 1. General procedure

1 Scope

This part of GB/T 38206 specifies the general procedures, general test conditions, calculation methods, and numbers used to evaluate the reliability of pneumatic components.

According to the evaluation method and the preparation requirements of the test report. These procedures and methods are independent of the type of component and the design itself.

Note 1. The service life of components is affected by many variables, so statistical analysis is needed to illustrate the test results.

This section applies to the first failure of pneumatic components without maintenance.

Note 2. Refer to Appendix A for the treatment method when the first time the abnormal value occurs.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 2900.13 Electrotechnical terminology credibility and service quality (GB/T 2900.13-2008, IEC 60050-191.1990,

IDT)

GB/T 3358.1 Statistical terms and symbols Part 1. General statistical terms and terms used for probability (GB/T 3358.1-

2009, ISO 3534-1.2006, IDT)

GB/T 17446 fluid drive system and component vocabulary (GB/T 17446-2012, ISO 5598.2008, IDT)

ISO 6358 (all parts) Pneumatic transmission Determination of flow characteristics of components using compressible fluids (Pneumaticfluidpow-

er-Determinationofflow-ratecharacteristicsofcomponentsusingcompressiblefluids)

ISO 80000-1 quantities and units Part 1. General (Quantitiesandunits-Part 1. General)

3 Terms and definitions

The following terms and definitions as defined in GB/T 2900.13, GB/T 3358.1 and GB/T 17446 apply to this document. For the sake of

For use, some terms and definitions in GB/T 2900.13 and GB/T 3358.1 are repeated below.

3.1

Mutation failure catastrophicfailure

The product is completely unable to complete the sudden failure of all required functions.

[GB/T 2900.13-2008, definition 191-04-12]

3.2

Confidence confidencelevel

It reflects the proportion of the true value of the parameter in the large number of repeated random samples under the same conditions.

Note. A note on this term and definition is given in GB/T 3358.1.

3.3

Confidence limit confidencelimit

The bounds of the two-sided confidence interval, or the bounds of the one-sided confidence interval.

Note. A note on this term and definition is given in GB/T 3358.1.