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

GB/T 20080-2017

Replacing GB/T 20080-2006

General specification for hydraulic filter elements

液压滤芯技术条件

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1 Scope

China's national general specification for hydraulic filter elements. It specifies the general technical conditions for filter elements together with the requirements for testing, inspection, marking, packaging and storage, and it applies to elements using hydraulic oil as the working medium. Contamination is what destroys hydraulic systems. The clearances in a servo valve, a piston pump or a proportional valve are a few micrometres, and particles of that size erode the surfaces that form them, so the cleanliness of the fluid determines the life of every expensive component in the circuit. The filter element is what maintains that cleanliness, and it is the cheapest part of the system - which is why it is also the part most often substituted with something that looks the same and is not. This standard exists to make the difference measurable. It classifies elements and sets the requirements on the properties that matter: the filtration ratio, which states how efficiently the element removes particles of a given size and is determined by the multipass test rather than by any nominal rating; the dirt holding capacity, which decides how long the element lasts before the bypass opens; the differential pressure against flow characteristic; the collapse and burst pressure rating, since an element that collapses under a cold start pressure surge discharges everything it has collected straight into the system; the fabrication integrity and bubble point, which detect a hole in the medium or a failed seam; the compatibility of the materials with the fluid; the resistance to flow fatigue, since flow in a hydraulic system pulses; and the end load rating. Each is referred to its own test standard, so a claimed performance can be checked rather than believed. Issued on 12 May 2017 and in force

since 1 December 2017, it replaces GB/T 20080-2006.

This Standard specifies the general technical conditions for hydraulic filter elements (hereinafter referred to as filter elements), as well as the requirements for testing, inspection, marking, packaging and storage. This Standard applies to filter elements that use hydraulic oil as the working medium.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 1184-1996, Geometrical tolerancing -- Geometrical tolerance for features without individual tolerance indications

GB/T 1800.2-2009, Geometrical product specifications (GPS) -- Limits and fits -- Part

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 17446 as well as the followings apply.

3.1 filter element rated flow The flow rate that a clean filter element can pass under the specified oil kinematic viscosity (generally 32 mm²/s) and specified pressure drop.

3.2 filter element pressure drop When oil passes through the filter element, a pressure difference between the upstream and downstream of the filter element.

3.3 filter element characteristics of pressure drop versus flow Characteristic curve of filter element pressure drop versus flow rate.

3.4 filtration ratio The ratio of the number of pollutant particles larger than a given size x (c) per unit volume of oil upstream and downstream of the filter element is expressed as $\beta_{x(c)}$. It is calculated using the following formula. Where, N_u - The number of particles larger than x (c) microns contained in the unit volume of oil upstream of the filter element; N_d - The number of particles larger than x (c) microns contained in the unit volume of oil downstream of the filter element.

4 Classification

4.1 Classification by installation location.

- a) Suction filter. a filter element installed in the oil suction port or oil suction filter in the oil tank;
- b) Return filter. a filter element installed in the oil return port or oil return filter in the oil tank;

- c) Pressure line filter. a filter element installed in the pressure line filter;
- d) Other filter elements. filter elements with comprehensive performance, such as suction and return filter elements.

4.2 Classification by filter material used.

- a) Glass fiber filter element. the filter material is glass fiber filter material;
- b) Paper filter element. the filter material is plant fiber filter paper;
- c) Metal mesh filter element. the filter material is metal wire mesh;
- d) Other filter elements. including chemical fiber filter element, metal fiber felt filter element, sintered powder filter element, polymer material filter element, etc.

5.1 Performance parameters

5.1.1 Filtration ratio The filtration ratio of the filter element shall comply with the requirements of the product technical documents. The particle size [$\mu\text{m(c)}$] corresponding to the filtration ratio shall be selected from 4, 6, 10, 14, 20, and 25.

5.1.2 Dirt holding capacity At the filter element rated flow, the dirt holding capacity shall comply with the provisions of the product technical documents.

5.1.3 Structural integrity The initial bubbling point of the filter element shall comply with the requirements of the product technical documentation.

5.1.4 Material and liquid compatibility The filter element material shall comply with the relevant material standards or technical documents and be compatible with the working medium.

5.1.5 Pressure drop and flow characteristics The filter element characteristics of pressure drop versus flow shall comply with the requirements of the product technical documents.

5.2.2 The surface of the metal parts of the filter element shall be rust-proof. The surface plating (coating) layer shall be complete, dense and beautiful.

5.2.3 The end caps shall be free of burrs, flash and weld nodules. The welds shall be firm and smooth. The end caps shall not be permanently deformed, cracked or damaged during installation and use.

5.2.4 The frame shall be free of burrs, flash and weld nodules. The rough surface shall face away from the filter material.

5.2.5 The seals shall not have obvious damage to ensure no oil leakage during installation and use.

5.2.6 The cleanliness level of the production environment shall meet the product production process requirements. The filter element shall be packaged in a plastic bag. It shall be kept

clean and dry during transportation and storage.

5.2.7 Defects in filter materials can be repaired with resin or other materials that do not affect the appearance quality. The repair area shall not exceed 5% of the filter area.

5.2.8 The folds of cylindrical pleated filter elements shall be parallel to the central axis. The wave spacing shall be uniform. The number of folds shall comply with the requirements of the product drawings and special technical documents. The allowable deviation of the number of folds is $\pm 4\%$.

5.2.9 The height dimension deviation of the filter element shall comply with the requirements of the shaft limit deviation js16 in GB/T 1800.2-2009.

5.2.10 The verticality deviation of the center line of the filter element to the end face shall comply with the L-level requirements in GB/T 1184-1996.

6 Test requirements

6.1 Filter element filtration ratio test It shall be carried out in accordance with the provisions of GB/T 18853.

6.2 Filter element dirt holding capacity test It shall be carried out in accordance with the provisions of GB/T 18853.

6.3 Filter element structural integrity test It shall be carried out in accordance with the provisions of GB/T 14041.1.

6.4 Compatibility test between filter element material and liquid It shall be carried out in accordance with the provisions of GB/T 14041.2.

6.5 Filter element pressure drop flow characteristics test It shall be carried out in accordance with the provisions of GB/T 17486.

6.6 Filter element structural strength test It shall be carried out in accordance with the provisions of GB/T 14041.3 and GB/T 14041.4.

6.7 Filter element flow fatigue characteristics test It shall be carried out in accordance with the provisions of GB/T 17488.

6.8 Clean filter element pressure drop test

6.8.1 The test device shall comply with the requirements of GB/T 17486.

6.8.2 Select a suitable filter housing. Adjust the test flow rate. Pass the filter housing at the rated flow rate of the filter element. Record the corresponding pressure drop.

6.8.3 Install the clean filter element in the filter housing. Adjust the test flow rate. Pass the filter at the rated flow rate of the filter element. Record the corresponding pressure drop.