

JIS

JAPANESE INDUSTRIAL STANDARD

Filters for Oil Hydraulic Use

JIS B 8356 —1981

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Filters for Oil Hydraulic Use

B 8356-1981

1. Scope

This Japanese Industrial Standard specifies the filters which filter hydraulic oil of common petroleum with filter element media, hereinafter referred to as the "filters", to be used for oil hydraulic systems of machines, excluding those to be used for specific purposes such as aircraft and the like.

Remark: The units and numerical values given in { } in this standard are in accordance with the International System of Units (SI), and are appended for reference.

The conversion rate to the unit given in { } in this standard is as follows: $1 \text{ kgf/cm}^2 \div 0.1 \text{ MPa}$

2. Definitions

The principal terms used in this standard are as defined below, in addition to JIS B 0118.

Applicable Standards:

JIS B 0118-Glossary of Terms for Oil Hydraulics

JIS B 0202-Parallel Pipe Threads

JIS B 0203-Taper Pipe Threads

JIS B 0207-Metric Fine Screw Threads

JIS B 1002-Dimensions of Width Across Flats

JIS B 2291-210 kgf/cm² Slip-on Welding Pipe Flanges for Hydraulic Use

JIS K 2204-Gas Oil

JIS K 2213-Turbine Oils

JIS K 2215-Internal Combustion Engine Oils

- (1) filter element A component consist of a filter element medium (for example, filter paper, wire cloth, wound, sintered metal, etc.) which perform filtration and a part which supports it.
- (2) rated flow The greatest rate (l/min) of flow among those which satisfies the performance of a filter.
- (3) rated pressure The greatest inlet pressure [kgf/cm^2 { MPa }] among those which enable a filter to work.
- (4) pressure drop A pressure difference [kgf/cm^2 or mmHg { MPa }] between the inlet and outlet of a filter.
- (5) filtration particle size A nominal value (μm) of particle size indicating size of contaminants which are to be removed by a filter when hydraulic oil passes through the filter.

3. Types and Notations

3.1 Types The filter shall be classified into two, reservoir type ⁽¹⁾ and line type ⁽²⁾, and the subclassification of the reservoir type filters and the line type filters shall be as given in Table 1 and in Table 2, respectively.

Notes ⁽¹⁾ The reservoir type filters shall be those to be used on suction depression side of pumps, which include those with casing.

⁽²⁾ The line type filters shall be those other than the reservoir type filters.

Table 1. Reservoir Type Filters

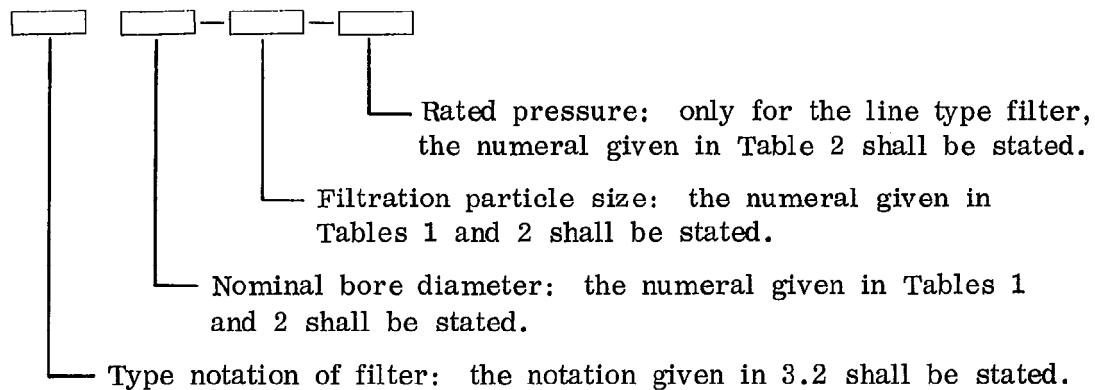
Nominal bore diameter	Rated flow l/min	Filtration particle size μm
15	18	44, 74, 105, 149
20	36	
25	63	
32	125	
40	200	
50	315	
65	500	

Table 2. Line Type Filters

Rated pressure kgf/cm ² {MPa}	Nominal bore diameter	Rated flow l/min	Filtration particle size μm
16 {1.6}	10	8	5, 10, 20, 44
	15	18	
	20	36	
	25	63	
	32	125	10, 20, 44
	40	200	
	50	315	
40 {4.0} 80 {8.0} 160 {16.0}	10	8	5, 10, 20, 44
	15	18	
	20	36	
	25	63	
	32	125	10, 20, 44
	40	200	20, 44
250 {25.0}	10	8	5, 10, 20, 44
	15	18	
	20	36	
	25	63	

3.2 Type Notations The notation of the reservoir type filters without casing shall be FT, the reservoir type filters with casing FS, and the line type filters FL.

3.3 Marking Notation The marking notation shall be made as follows:



Example: FT 15-44 (for the reservoir type filter without casing)
 FS 32-149 (for the reservoir type filter with casing)
 FL 25-20-160 (for the line type filter)

4. Performance

4.1 Fabrication Integrity of Filter Element When a filter element is subjected to the test in accordance with the specification of 9.4, no evidence of a persistent stream of bubbles shall be found.

4.2 Axial Strength of Filter Element When a filter element is subjected to the test in accordance with the specification of 9.5, no damage shall be found in the filter element medium, end plates and internal cylinder.

4.3 Withstand Pressure Strength of Filter Element When a filter element is subjected to the test in accordance with the specification of 9.6, it shall withstand the pressure difference of Table 3, and no damage shall be found in the filter element medium, end plate and outlet side end plate and internal cylinder.

Table 3

Type	Pressure difference kgf/cm ² { MPa }
Reservoir type	1.5 { 0.15 }
Line type	6 { 0.6 }

4.4 Fatigue Strength of Filter Element When a filter element for the line type filter is subjected to the test in accordance with the specification of 9.7, no damage shall be found in the filter element medium, end plates and internal cylinder.

4.5 Fluid Leakage When a line type filter is subjected to the fluid pressure in accordance with the specification of 9.8, no abnormality such as leakage of fluid and the like shall be found in each part.

4.6 Airtightness When a reservoir type filter with casing is subjected to the test in accordance with the specification of 9.9, its airtightness shall be such that no change in pressure of 2 mmHg {0.00027 MPa} or more takes place.

4.7 Pressure Drop When a filter is subjected to the test in accordance with the specification of 9.10, its pressure drop shall show the value not more than that given in Table 4.

Table 4

Type	Rated pressure kgf/cm ² {MPa}	Pressure drop
Reservoir type	—	80 mmHg {0.011 MPa}
Line type	16 {1.6}	0.6 kgf/cm ² {0.06 MPa}
	40 {4.0}, 80 {8.0}	1.0 kgf/cm ² {0.10 MPa}
	160 {16.0}, 250 {25.0}	1 % of rated pressure

4.8 Operation of Safety Valve The safety valve of the line type filter is subjected to the test in accordance with the specification of 9.11, and its operation shall meet the following requirements:

- (1) When tested in accordance with 9.11 (1), the safety valve shall not cause malfunction.
- (2) When tested in accordance with 9.11 (2), the leakage under the inlet pressure of 2.5 kgf/cm² {0.25 MPa} shall show the value not more than that given in Table 5. However, for a filter of which rated pressure is 16 kgf/cm² {1.6 MPa}, the value under the inlet pressure of 1.0 kgf/cm² {0.10 MPa} shall be taken as leakage.

Table 5

Filtration particle size μm	Leakage ml/min
5	20
10 or over	40

- (3) When tested in accordance with 9.11 (3), a pressure difference at the time when the leakage comes to not less than 100 ml/min shall be considered as opening pressure, and the opening pressure and the pressure difference at the rated flow shall be the value given in Table 6.
- (4) When tested in accordance with 9.11 (4), a pressure difference at the time when the leakage comes to not more than the value given in Table 5 shall be considered as closing pressure, and this shall show the value given in Table 6.

Table 6

Unit: kgf/cm^2 { MPa }

Rated pressure	Opening pressure	Closing pressure	Pressure difference at rated flow
16 {1.6}	1.5 ± 0.3 { 0.15 ± 0.03 }	1.0 {0.10} min.	3.5 {0.35} max.
40 {4.0}, 80 {8.0}, 160 {16.0}	3.5 ± 0.5 { 0.35 ± 0.05 }	2.0 {0.20} min.	4.8 {0.48} max.
250 {25.0}	3.5 ± 0.5 { 0.35 ± 0.05 }	2.5 {0.25} min.	4.8 {0.48} max.

4.9 Filtration Particle Size The filtration particle size, when subjected in accordance with 9.12, shall not exceed the values given in Tables 1 and 2.

5. Construction and Dimensions

5.1 Construction The construction of the filters shall be as specified below.

- (1) The filter element shall generally be so constructed that the hydraulic oil flows from outside to inside.

- (2) Nominal bore sizes of inlet and outlet of the reservoir type filter with casing and line type filter shall be the same in size.
- (3) The inlet and outlet of the line type filter shall generally position on the same axis.
- (4) The reservoir type filter with casing and line type filter shall be so constructed that the inspection and replacement of the element can be made without detaching the coupling and without disturbing fitting.
- (5) The line type filter shall provide a safety valve which works when the pressure difference between the inlet and outlet exceeds the specified value.
- (6) The filter equipped with a loading indicator of the filter element shall be free from leakage from its attaching portion and shall be so constructed as to prevent it from intrusion of dust.

5.2 Dimensions It is recommended that each part of the filter has the dimensions specified below.

- (1) The pleat-width dimension of the filter element to be subjected to pleating shall conform to Attached Table 1.
- (2) Dimensions of the reservoir type filter shall conform to Attached Table 2.
- (3) The outside diameter and the dimension between the both end plates of the line type filter element shall conform to Attached Table 3.
- (4) Outside diameters of the reservoir type filter with casing and line type filter shall conform to Attached Table 4, and attaching dimensions to Attached Table 5.

5.3 Couplings with Pipe The couplings with pipe shall be of screwed type or flanged type, and shall conform to Table 7.

Table 7

Nominal bore diameter	Designation of screw threads ⁽³⁾		Designation of flange
10	PT $\frac{3}{8}$	PF $\frac{3}{8}$	—
15	PT $\frac{1}{2}$	PF $\frac{1}{2}$	15
20	PT $\frac{3}{4}$	PF $\frac{3}{4}$	20
25	PT 1	PF 1	25
32	PT $1\frac{1}{4}$	PF $1\frac{1}{4}$	32
40	PT $1\frac{1}{2}$	PF $1\frac{1}{2}$	40
50	PT 2	PF 2	50
65	PT $2\frac{1}{2}$	PF $2\frac{1}{2}$	65

Note ⁽³⁾ If the leakage prevention is perfect, PF may also be used.

Remarks 1. Screw threads of the screwed type couplings shall be in accordance with JIS B 0202 or JIS B 0203.

2. Mating flanges of the flanged type couplings used shall be SSB of JIS B 2291.

5.4 Interchangeability Principal parts of the filters of the same type ⁽⁴⁾ shall have interchangeability.

Note ⁽⁴⁾ The "same type" mentioned here means the same design by the same manufacturer.

6. Shapes and Names of Principal Parts

The names of principal parts of the filters shall be as given in Attached Fig. 1 with an example of the shape for reservoir type filters without casing, in Attached Fig. 2 with an example of the shape for reservoir type filters with casing, and in Attached Fig. 3 with an example of the shape for line type filters.

7. Appearance

The appearance of the filter shall be as specified below.

- (1) Each part of the filter shall be free from any defects harmful to use, such as flaws, cracks, blow holes, flashes and other.
- (2) The outside of the filter shall be subjected to rust prevention by coating or by other means. The parts made of corrosion resistant materials need not such rust prevention.