

## **FILTERABILITY**

**Filterability** of a fluid can be defined as its ability to pass through a filter without giving rise to undue pressure drop or a Process under which the Test Fluid is filtered under specified conditions through a 0.8 µm mean pore diameter membrane installed inside membrane holder and the time for the specified filtrate volumes are recorded. Data obtained is extrapolated as per requirements to design System.

Filterability is a dimensionless number, expressed as a percentage which is the ratio between two filtration rates. It is calculated from ratios of the Filtration rate near the start of filtration to the filtration rate at specified higher filtered volumes. The result of the test is average of three determined values. Hence, we can conclude that filterability is a user-driven requirement aimed at enhancing operating efficiency and reducing costs.

**Process also acts as a Test method for customers to check their Process Fluid performance along with its combination with the Filter in use in the Final Filtration stage. Also analyzes the problems to be avoided during processing.**

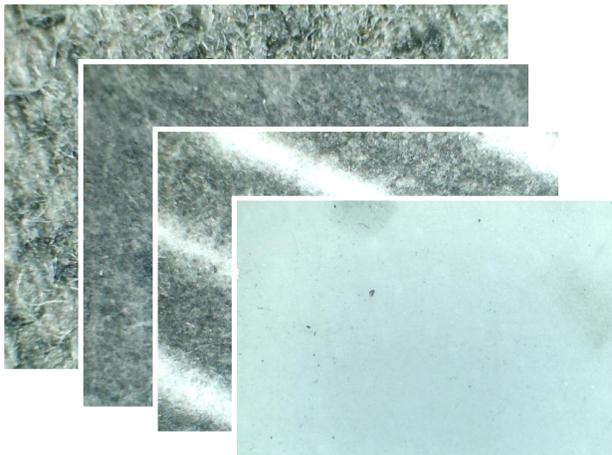
The fluid in a hydraulic system acts as a lubricant, and to minimize the wear of the components, it is important to reduce the concentration of contaminant particles present in it. This is particularly necessary when the performance of the system depends on the maintenance of small clearances and orifices. Removal of these contaminants is carried out by the use of filters and the ability of a hydraulic fluid to pass through fine filters, without plugging them, is called its filterability.

The Stage II determination is based on the ratio between the initial flow rate of fluid through the test membrane and the rate at the end of the test. It is considered that this part of the procedure is a more severe test, and is more sensitive to the presence of gels and fine silts in the oil. Silts and gels may be present in an oil when it is produced, or could be formed as an oil ages, especially when hot. An oil with good Stage II filterability would be unlikely to give filtration problems even in the most extreme conditions, and with fine (less than 5 µm) filtration present. It would thus be suitable for use in more critical hydraulic and lubrication systems.

The National Aerospace Standard [NAS] 1638 was developed in 1960s helps to control the contamination level of Hydraulic fluid within hydraulic components. NAS 1638, whose latest version is SAE 4059, became a standard not only for the Aerospace industry but also throughout many other industries as well. NAS 1638 and ISO 4406 both focus on the methods for calculating particle counts or solid contamination levels within a fluid.

NAS 1638 represents the counts of particles in five size groups:

- 5 to 15 microns per 100 milliliters (mL)
- 15 to 25 microns per 100 mL
- 25 to 50 microns per 100 mL
- 50 to 100 microns per 100 mL
- >100 microns per 100 mL



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- ISO 4406 utilizes a new calibration method for automatic particle counters (APCs). This method reports particle counts in three code numbers with each number correlating to the count of particles larger than 4, 6 and 14 microns.

ISO 4406:1999 represents the counts of particles in three size groups:

- >4 microns per 1 mL
- >6 microns per 1 mL
- >14 microns per 1 mL

From these five groups of particle sizes and a basic particle size distribution, NAS 1638 reports the results in 14 distinct classes of particle counts numbered 00, 0 and 1 through 12, with 00 being the cleanest and 12 being the dirtiest.

Class	Maximum Particles/100mL in Specified Size Range (µm)				
	5-15	15-25	25-50	50-100	>100
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1,000	178	32	6	1
3	2,000	356	63	11	2
4	4,000	712	126	22	4
5	8,000	1,425	253	45	8
6	16,000	2,850	506	90	16
7	32,000	5,700	1,012	180	32
8	64,000	11,400	2,025	360	64
9	128,000	22,800	4,050	720	128
10	256,000	45,600	8,100	1,440	256
11	512,000	91,200	16,200	2,880	512
12	1,024,000	182,400	32,400	5,760	1,024

### ***NAS 1638 Contamination Classification System***

The most recent update to the standard includes the following: "Inactive for new designs after May 30, 2001, refer AS4059C," [put in place to overcome some insufficiencies with NAS 1638 related to the proper direction of the method application] and "This standard should not be used with automatic particle counting."