



## Do you have to improve your oil filtration performance?

Check the recommended cleanliness codes and set your targets.

\* ISO 4406 for particles 4 $\mu$ , 6 $\mu$  and 14 $\mu$

\* NAS 1638

Check your systems oil contamination!	Pressure < 140 bar		Pressure < 200 bar		Pressure > 200 bar	
	ISO 4406	NAS 1638	ISO 4406	NAS 1638	ISO 4406	NAS 1638
<b>PUMPS</b>						
Fixed Gear Pump	20/18/15	10	19/17/15	9	-	-
Fixed Piston Pump	19/17/14	9	18/16/13	8	17/15/12	7
Fixed Vane Pump	20/18/15	10	19/17/14	9	18/16/13	8
Variable Piston Pump	18/16/13	8	17/15/13	7	16/14/12	6
Variable Vane Pump	18/16/13	8	17/15/13	7	-	-
<b>VALVES</b>						
Cartridge	20/18/15	10	20/18/15	10	19/17/14	9
Check Valve	20/18/15	10	19/17/14	9	18/16/13	8
Directional (solenoid)	19/17/14	9	18/16/13	8	17/15/12	7
Flow Control Valve (modulating)	19/17/14	9	18/16/13	8	17/15/12	7
Proportional Cartridge Valve	17/15/12	7	17/15/12	7	16/14/11	6
Proportional Directional Valve	17/15/12	7	17/15/12	7	16/14/11	6
Proportional Flow Control Valve	17/15/12	7	17/15/12	7	16/14/11	6
Proportional Pressure Control	17/15/12	7	17/15/12	7	16/14/11	6
SERVO VALVE	16/14/11	6	16/14/11	6	15/13/10	5
<b>TEST STANDS, Hydrostatic TRANSMISSIONS</b>						
Test Stands	15/13/10	5	15/13/10	5	15/13/10	5
Hydrostatic Transmissions	17/15/13	7	16/14/11	6	16/14/11	6
<b>ACTUATORS</b>						
Cylinders	17/15/12	7	16/14/11	6	15/13/10	5
Vane Motors	20/18/15	10	19/17/14	9	18/16/13	8
Axial Piston Motors	19/17/14	9	18/16/13	8	17/15/12	7
Gear Motors	20/18/14	10	19/17/13	9	18/16/13	8
Radial Piston Motors	20/18/14	10	19/17/14	9	18/16/13	8
<b>BEARINGS</b>						
Ball Bearings	15/13/10	5	-	-	-	-
Gearbox, industrial	17/16/13	7	-	-	-	-
Journal Bearings (high speed)	17/16/13	7	-	-	-	-
Journal Bearings low speed)	18/16/14	8	-	-	-	-
Roller Bearings	16/14/11	6	-	-	-	-

Particle contamination in oil is specified from particle count. Two basic standards, the ISO and NAS systems, are commonly used as contamination reference. The following tables gives some rough guidelines of common practice for setting targets of cleanliness levels in different systems. These guidelines are minimum fluid cleanliness levels required for an acceptable lifetime of equipment and components.

**Set the target:** the first step in identifying a target cleanliness code for a system is to identify the most sensitive component on an individual system. If the component is critical to safety or overall system reliability, *the target code should be set one value lower!*