

## (B) CLEANLINESS

Oil contamination is the main cause of failure and malfunction in hydraulic systems and can also result in loss efficiency, excessive component wear. However, using adequate cleanliness to guarantee reliability and extend all the system's hydraulic components life.

## ISO 4406

ISO 4406 defines the contamination level with 3 scale numbers that relate with the number of particles of average dimension equal or greater than 4 μm, 6μm, 14μm in 1ml of fluid.

## NAS 1638

NAS 1638 is determined by counting the total particles of different size ranges contained in 100ml of fluid.

Please following the recommended cleanliness level :

Type of system Type of valve	Recommended Cleanliness Level		Recommended Level for Extended Product life	
	ISO 4406	NAS 1638	ISO 4406	NAS 1638
<ul style="list-style-type: none"> <li>⊙ Proportional valves</li> <li>⊙ High pressure greater than 350 bar</li> <li>⊙ Very high frequency cycle application</li> </ul>	16/14/11	5	15/13/10	4
<ul style="list-style-type: none"> <li>⊙ Operating pressure greater than 300 bar</li> <li>⊙ High frequency cycle application</li> <li>⊙ Poppet type (low leakage valve)</li> <li>⊙ Electrohydraulic cartridge valves</li> </ul>	18/16/13	7	16/14/11	5
<ul style="list-style-type: none"> <li>⊙ Operating pressure less than 300 bar</li> <li>⊙ Systems/Components with moderate dirt tolerance</li> </ul>	19/17/14	8	17/15/12	6
<ul style="list-style-type: none"> <li>⊙ Operating pressure less than 140 bar</li> <li>⊙ Low duty cycle applications</li> <li>⊙ Systems/Components with good dirt tolerance</li> </ul>	21/19/16	10	19/17/14	8

※ Recommendations : If you are unsure the condition of oil contamination, please install high pressure filter (10 μm) at manifold (inlet) that can smoothly operate for most cartridge valves.