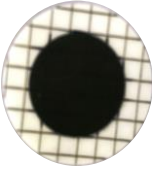
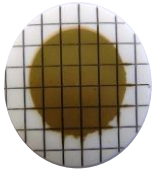
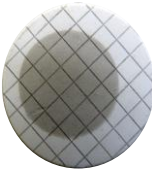
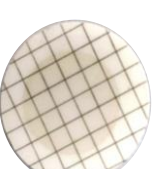
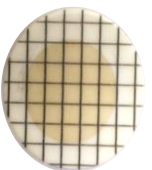
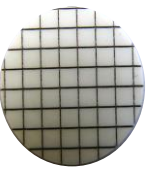


Gravimetric patch test examples using 0.8µ x 25mm diameter membrane patches.

This involves drawing a quantity of oil through a 0.8µm membrane. This detects more contaminants than the ISO 4406 or NAS 1638 methods, including oil oxidation products which are responsible for varnish formation.

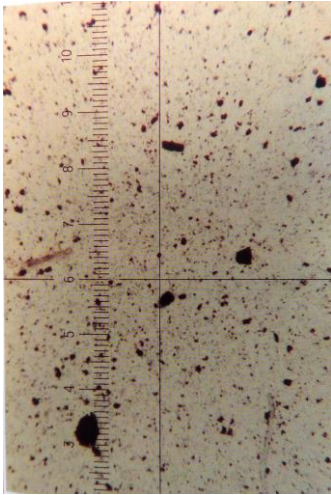
This reference chart provides a simple comparison test for field checks of the condition of hydraulic fluids.

<b>Conventional Hydraulics Patch Test Examples</b>		<p><b>&gt;10mg /100ml of oil contamination</b> An example of high contamination level that is critical to hydraulic equipment. <b>Warning Level- Extreme</b></p>
		<p><b>&gt;4mg /100ml of oil contamination</b> An example of high contamination level that requires immediate cleaning or filtering. <b>Warning Level- Bad</b></p>
		<p><b>&gt;2mg /100ml of oil contamination</b> An example of contamination level that could benefit from cleaning or filtering. <b>Warning Level- Marginal</b></p>
		<p><b>&lt;1mg /100ml of oil contamination</b> An example of oil contamination level to which the oil has to be cleaned or filtered. <b>Warning Level- Good</b></p>
<b>Servo Valve Controls</b>		<p><b>&gt;2mg /100ml of oil contamination</b> An example of high contamination level that requires immediate cleaning or filtering. <b>Warning Level- Bad</b></p>
		<p><b>0.5mg /100ml of oil contamination</b> An example of oil contamination level to which the oil has to be cleaned or filtered. <b>Warning Level- Good</b></p>

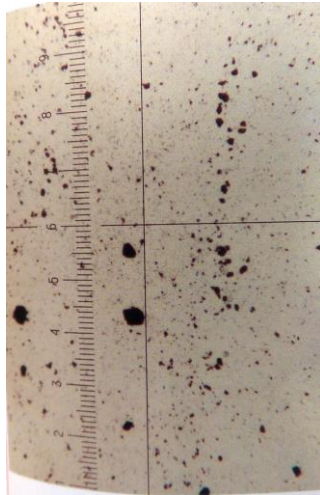
For reference, the grid lines in the membrane patches are approx. 100µ wide

Recommended Oil Cleanliness Level		NAS Grade	ISO Code	Condition
Application	Oil Cleanliness required in accordance with ISO 4406	4	15/13/10	Good
		5	16/14/11	Good
Systems with high dirt sensitivity and high availability requirements such as servo valve technology	< 18/13/10	6	17/15/12	Good
		7	18/16/13	Acceptable
Systems with proportional valves and pressure >160 bar	< 19/14/11	8	19/17/14	Marginal
		9	20/18/15	Bad
Vane pumps, piston pumps, piston engines	< 18/16/13	10	21/19/16	Bad
		11	22/20/17	Extreme
Modern industrial hydraulic systems, directional valves, pressure valves	< 20/16/13	12	23/21/18	Extreme
		Contamination levels mg / 100 ml oil		Condition
Industrial hydraulic systems with large tolerances and low dirt sensitivity	< 21/17/14	<1.5 mg / 100 ml oil		Good
		>2- <4 mg /100 ml oil		Warning
		>4-<6 mg / 100 ml oil		Bad
		>6 mg / 100 ml oil		Extreme

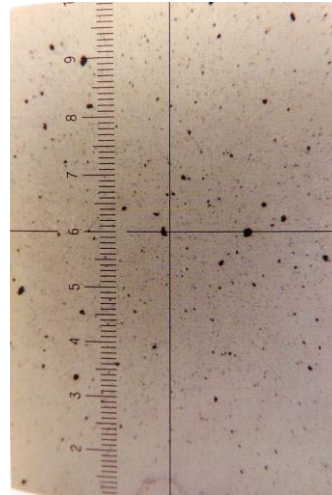
Reference Comparison Charts ISO / NAS Grades & Particle Identification guides. 100 x magnification.  
 Use these guides to estimate the ISO / NAS contamination grades of the oil samples.



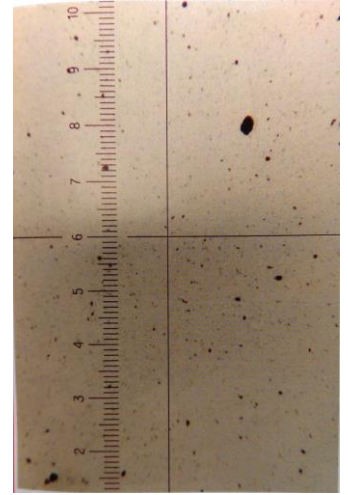
ISO 23/21/18 NAS 12



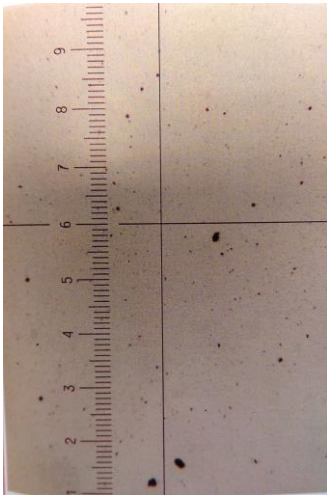
ISO 22/20/17 NAS 11



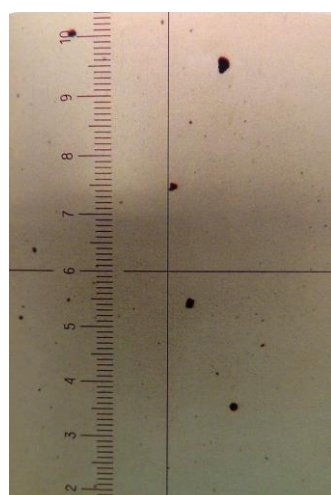
ISO 21/29/16 NAS 10



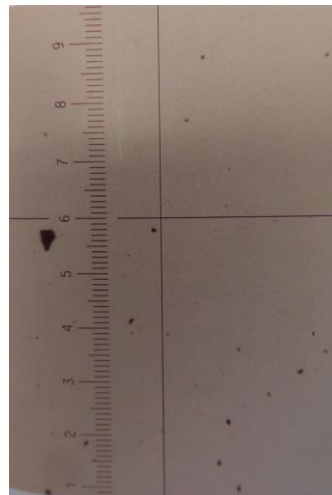
ISO 20/18/15 NAS 9



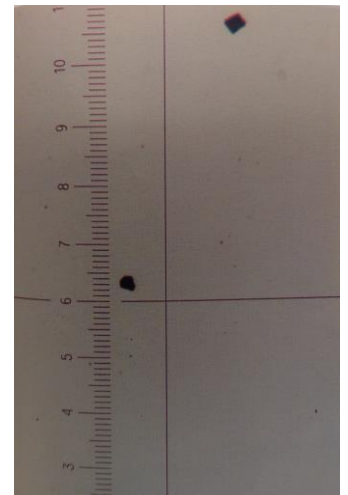
ISO 19/17/14 NAS 8



ISO 18/16/13 NAS 7

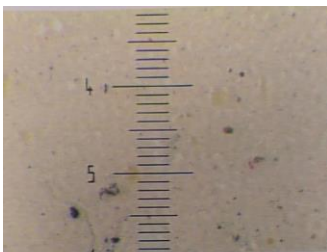


ISO 17/15/12 NAS 6



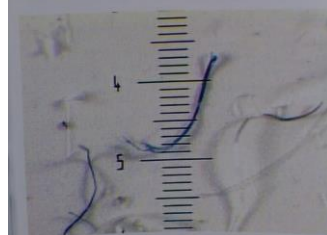
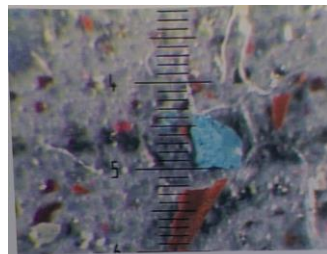
ISO 16/14/11 NAS 5

Gel residue



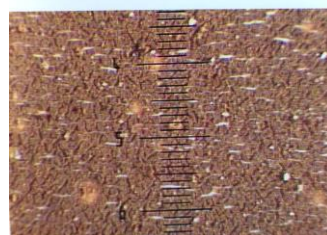
Silicates

Coloured particles



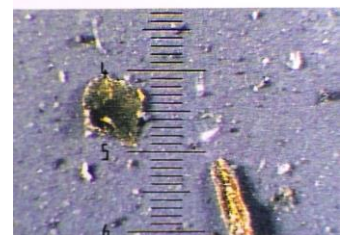
Fibres

Rust & white particles



Oil ageing Products

Metal Swarf



Bronze, brass & copper