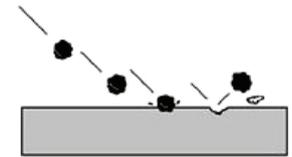


Solid Particles

Solid particles multiply continuously in hydraulic systems.

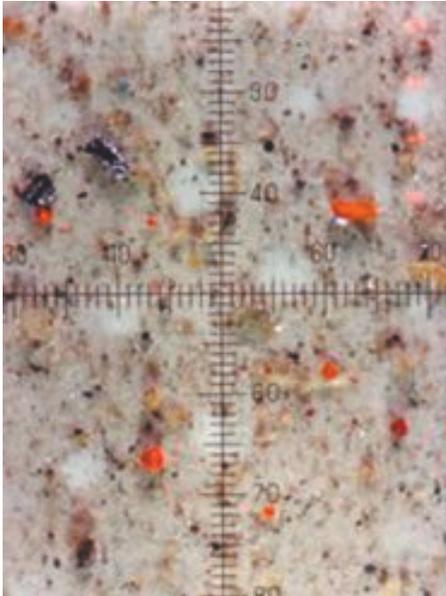
These particles flow through the hydraulic system under high pressure and at high speed and **sandblast** its components (pumps, valves, seals and cylinders).

Particularly **the tiniest particles** which are either equal in size or smaller than the critical dynamic clearances ($<5\mu$) are **the most dangerous**. They have the ability to overcome the tightest tolerances and cause damage to one or both surfaces.



Control pumps and servo-valves have **critical clearances** of 1-10 μ and, as a result, are highly sensitive to fine dirt particles. It is, therefore, not surprising that most manufacturers of this type of component state in their literature that the purity of the oil used must have a purity grade better than NAS 6 or ISO 15/12, in order to avoid downtime and thus ensure a long life span.

A pump with a flow rate of 52G.P.M. (200l/min.) and contaminated oil (NAS 12 or ISO 21/18) has to pump **more than 3,000 kg of dirt particles per annum**. This same pump with a clean oil (NAS 4 or ISO 12/9) only needs to process 6 kg.



SITUATION 1

Oil Contamination: NAS 12
3,100 Kg of Dirt Passes
Through The Pump Every Year

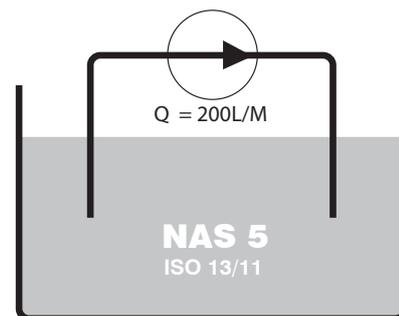
Expected Pump Life: **2 Years**



SITUATION 2

Oil Contamination: NAS 5
6 Kg of Dirt Passes
Through The Pump Every Year

Expected Pump Life: **14 Years**



In addition, metals are a highly active **catalyst** and accelerate the **oxidation process** of oil. This oxidation process is neutralised by antioxidation additives which are present in new oil. Through a process of polymerisation they adhere to the metallic particles and thus prevent direct contact between oil on one hand, and metal on the other. However, new metallic particles require constant neutralising, which means that the additives are slowly being depleted. Small metallic particles play an important part in this process as they represent such an enormous surface area (the smaller the particles, the greater their surface per unit of volume).



Consequence:

the higher the pollution, the faster **acid** develops in the oil and the faster the oil loses all its physical and chemical properties.

A change of oil is then the only solution.

“No system has ever failed... because the oil was too clean!”