

## How Dirt Levels Affect Hydraulic System Performance

**Did you know** that by controlling the level of contaminants (dirt) to acceptable levels you can eliminate as high as 75% of the potential causes of system failure? That is extremely important when you consider high equipment costs and our dependence on today's sophisticated and complex hydraulic fluid power systems.

**The reason** dirt plays a large role in system inefficiency is simple. In reality, dirt is minute abrasive "gravel" which travels through a system and internally deteriorates and destroys sensitive hydraulic components, causing reduced efficiency and, eventually, system failure.

### Here's How:

- **Surface Scoring** -produced when abrasive particles flow across contact surfaces of hydraulic seals.
- **Clearance Honing**-from dirt flowing through spaces between moving parts, creating greater clearances and destroying critical tolerances.
- **Fluid Degradation**-fine metallic particles act as a catalyst promoting the chemical breakdown of your fluid.

If not properly controlled, the presence of dirt can initiate one or more of the following undesirable conditions:

- **Internal Leakage**-or slippage, lowering the efficiency of pumps, motors and cylinders, wasting power and increasing heat. Valves cannot control flow and pressure accurately.
- **Corrosion**-damage to delicate component parts from fluid degradation.
- **Sticking Parts**- causing erratic or intermittent component operation.

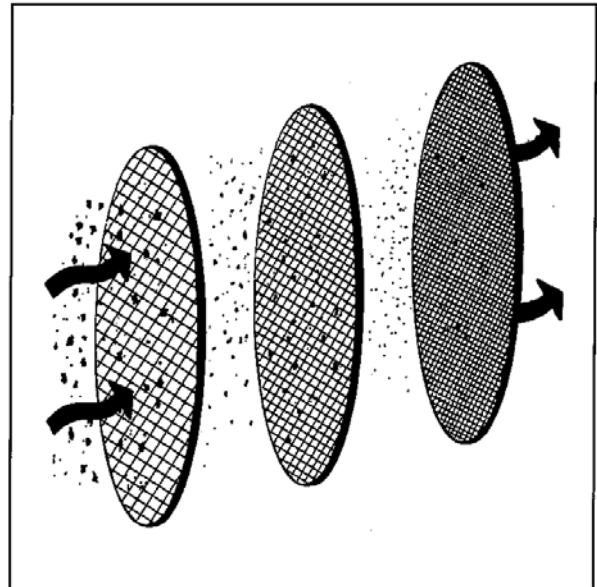
### It's a Fact That:

- **Dirt levels affect system performance**
- **Filters control dirt levels**

**And**, unless measures are taken to remove certain amounts of particles in hydraulic fluid, the dirt level will continue to rise until a component--and the entire system--fails.

**The Cures**, in this case, are filters. Quality filters

designed and built by experts in the fluid power industry--Schroeder Industries. That's why we urge you to rely on us for those tough filtration problems. We're hydraulic specialists in the filter business, and our sales engineers are equipped to handle all hydraulic filtration problems with the latest test equipment, fluid power technology and the right filter for system.



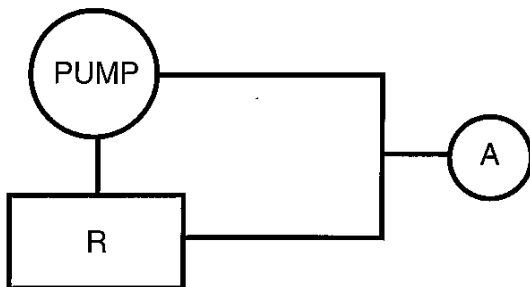
### What Do We Know About This Enemy?

The dirt particles that cause trouble in a hydraulic are extremely small. Typically, 98% of hydraulic fluid is composed of particles so small that we can't see them without magnification. Fluid samples from operating systems show us that as the size of a particle decreases, its quantity increases. In other words, the smaller the particles, the more there are in a given volume of fluid. Filters are the only available means of controlling the over-all level when such small particles are involved. But, before we can begin to eliminate hazardous dirt levels and contaminants, it is first necessary to understand their source.

## How Dirt Gets Into A Closed System:

Since hydraulic systems are closed, and the same fluid is continually recirculated, you may wonder how dirt gets in. As an aid to understanding this basic problem, let's examine some of the most common sources of contaminants that contribute to higher levels of dirt in fluid power systems,

- **Built-In Dirt**- Specifically, core sand, weld spatter, metal chips, lint and abrasive dust are all considered built in contaminants. Also, the initial fluid charge within the system--before the equipment is even turned on--will contain a certain amount of fine particles.
- **Introduced Contaminants**- These are particles that enter through seals, fluid-filter tubes and breather caps, or when the system is open for component repair or replacement. Here, too, if fluid is added to replenish the reservoir supply. It will contain particle contaminants which are introduced to the system.
- **Wear Particles**- Wear from system components also contributes to the presence of contamination. Friction of moving parts gradually produces small particles of metal and sealing materials, continuously adding to the particle count in the fluid.
- **Fluid Breakdown**--When chemical reactions occur within the fluid itself, the result is usually the formation of sludge and acids. Although not generally abrasive, sludge is a source of resinous coatings on moving parts, slowing movement and clogging passages. Acid, however, can pit and corrode vital internal parts



Illustrated above is a simplified hydraulic circuit, which can be used to explain the effects of dirt can have on a system. Initially, the 2,000psi pumped produced a flow of 20 gpm measured at port A. But, due to high contamination levels from improper filtration, the pump now produces only 10 gpm. The pump may still function at the same pressure, but because of degradation, it operates 50% less efficiently excessive heat and other troubles will soon follow

**Remember**, to maintain longer system life and higher performance, the optimum cleanliness level must be maintained.

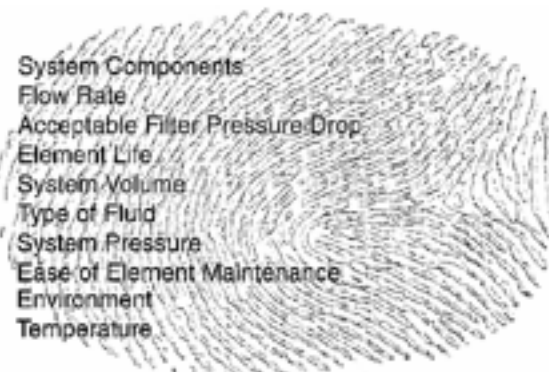
## Don't Overdo It:

Schroeder believes that there is an optimum level of cleanliness in all hydraulic systems--a level where increased filtration does not significantly reduce component wear. Keep economics in mind. You don't want to overdo it, but you don't want to under filter either. Determine the acceptable dirt level, choose the right filter combination and maintain the level of dirt below the limit.

Ask us. With application engineers and experienced distributors, Schroeder can recommend the best filtration for the requirements to reduce downtime and extend equipment life.

## How To Select Filters.

Individual filtration needs are as unique as fingerprints. Many factors must be considered before the selection can be made, such as:



If you're unsure about proper filter selection, feel free to contact us or any of our authorized distributors for assistance.