What Is A Micron?

DIPACO DIESEL PARTS U S A

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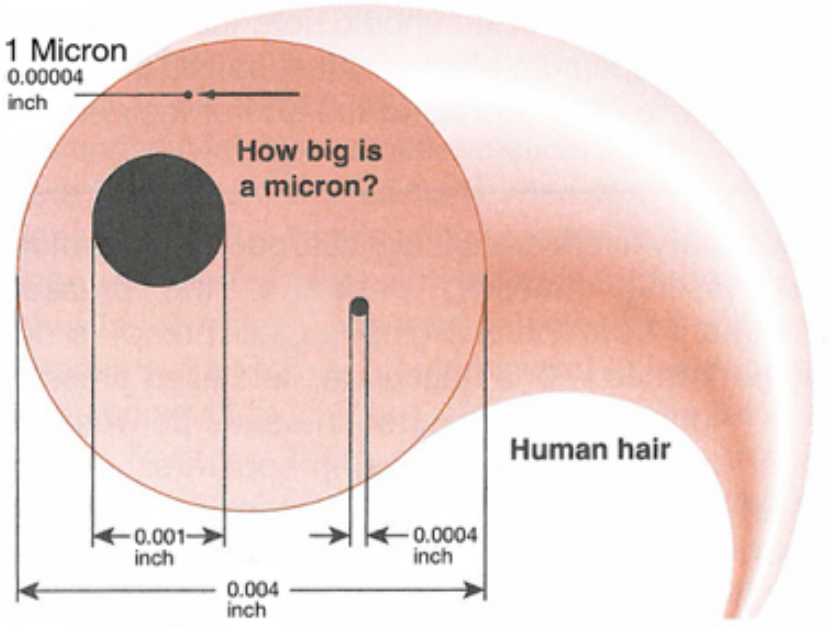
Just what is a micron and why is it important in discussions of diesel fuel systems?

A micron (µm) is one-millionth of a meter. A more useable definition is, a micron is one-thousandth (0.001) of a millimeter (mm). For us who still think in inches a millimeter is 0.03937" and a micron is about 40 millionths of an inch. The average diameter of a human hair is 100µm or 0.004".

The smallest particle size we can see is around 30-40 microns. Common rail high-pressure (HP) pumps and injectors have clearances of 2-3µm and orifices as small as 120µm. Fuel filters for common rail applications have ratings of 3-5µm.



The number one cause of failures on common rail HP pumps and injectors is from contamination in the fuel. Failures of common rail HP pumps and injectors have occurred on initial cranking, engine start up, or on the test drive from contamination entering the fuel system.

Older mechanical fuel systems had larger clearances and operated at much lower injection pressures. They could tolerate larger sizes of particulate contaminates before pump and injector damage would occur. Common rail systems with their tighter tolerances, small orifices, and much higher injection pressures will not tolerate contamination. On a common rail engine the idle rail pressure is around 5,000-7,000 psi (345-485 bar). This is higher than the maximum injection pressure on most of the mechanical systems. Automotive common rail maximum rail pressures reach 29,725 psi (2050 bar).

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GENERAL FUEL SYSTEM SERVICE TIPS

1. Check the fuel system and fuel for contamination. Metal particles from a failing HP pump or in the HP lines and rail will go straight to the injectors resulting in premature failures. If contamination is present the complete system must be cleaned from the fuel tank to the injectors.
2. Clean the exterior of the fuel system before removal of any components.
3. Plug open lines and connections to prevent entry of contaminants.
4. Work “clean” during the installation of replacement fuel system parts.
5. Replace all fuel filters.
6. Verify the fuel filter has the right micron rating and do not fill it with fuel prior to installation.