

# Fuel Contamination Control



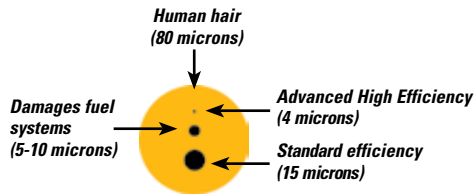
## Contamination Control Enhances Performance

Contamination control is increasingly important for maximizing performance and service life in fuel systems. Some Cat® fuel systems exceed pressures of 30,000 psi in order to deliver more horsepower, better fuel economy and fewer emissions. This means tolerances between parts may be as small as five microns. These tolerances and injection pressures make fuel systems more vulnerable to wear and abrasion.

- **Injector Nozzles**—Contaminants move quickly in high-pressure systems, causing damage, eroding orifices and resulting in incomplete atomization of fuel and overfueling. This harms performance and fuel economy. Contaminants also result in hard starts and increased emissions. Larger contaminants can actually clog orifices.
- **Injector Plungers and Barrels**—Abrasive particles cause wear between an injector's plunger and barrel. Contaminants scuff metal surfaces, causing metal-to-metal contact and eventual injector seizure.
- **Control Valves**—Contaminants damage valves that control fuel pressures, eroding mating parts of the valves. This excessive wear causes leaks and eventual loss of engine power.

**CATERPILLAR®**

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Typical Engine Application	Advanced High Efficiency 4 Micron(c) Absolute Part Number
3126B, 3176 3176B, 3176C 3196, 3304 3304B, 3306 3306B, 3406 3406B, 3406C 3406E, 3408E 3412D, 3412E 3456 (C9, C10, C11, C12, C13, C15)	1R-0749
3508, 3508B 3508C, 3512 3512B, 3516 3516B, 3524B	1R-0755 (Spin On) 1R-0766 (Cartridge)*
3114, 3116 3208, 3304 3304B, 3306 3306B, 3306C	1R-0750
3114, 3116 3126, 3126E C7, C9	1R-0751
3116, 3126	1R-0753
3126B, 3456B 3456E, C9 C10, C12	1R-0762
3606, 3608 3612, 3616 3618	1R-0766 (Cartridge)*

\*Gen Sets/Industrial  
Refer to your Operation and Maintenance Manual to find the correct part number for your application. Most applications require that an Advanced High Efficiency filter be used.

## Size of Contamination

A particle 6-10 microns across can cause injector and other fuel system damage. A micron is one-millionth of a meter. To give you an idea of how small that is, an average human hair is 80 microns in diameter. Tolerances in Cat fuel injectors are 1/20th the diameter of a human hair. It's easy to understand how even small contaminants can damage today's fuel systems.

## Sources of Contamination

- **In the Fuel**—Contaminants can enter during storage or transportation of fuel. A reliable supplier, filtered dispensing and periodic sampling and testing assures consistent quality.
- **During Operation**—Airborne particles can be drawn into your fuel tank through the vent tube. A fuel tank vent can ingest dust when it is not properly sealed.
- **External**—Contamination can enter during maintenance and service, even when changing filters.

## Filtering Contamination

The precision components in today's fuel systems require specially designed fuel filters.

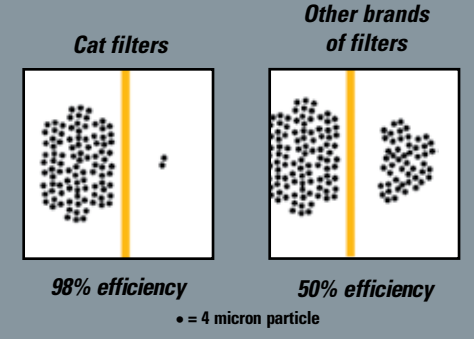
Cat Advanced High Efficiency Fuel Filters use exclusively designed filtration media to remove more than 98% of particles, four microns in size and larger. Cat Advanced High Efficiency Fuel Filters feature:

- spiral roving and acrylic beads to maintain pleat stability and spacing to better trap and hold contaminants
- non-metallic center tube for strength and to prevent metal contamination

## Measuring Contamination

Contamination is measured by counting particles and reported by comparing those results to an International Standards Organization (ISO) code. This ISO standard refers to the number of particles in three different size categories contained in a one-milliliter sample. The first number refers to the number of particles that are greater than 4 microns, the second number refers to particles that are greater than 6 microns, and the third number refers to particles that are greater than 14 microns.

An ISO level of 18/15/13 would mean that a one-milliliter sample of fuel contains ISO Code 18 or between 1300-2500 particles greater than 4 microns, ISO Code 15 or between 160-320 particles greater than 6 microns, and ISO Code 13 or between 40-80 particles greater than 14 microns. If the contamination level is allowed to rise one ISO Code, the amount of particles for that size will double.



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