



*The First in Synthetics*®

# DUAL-GARD

## Oil Filtration System



## AMSOIL EA BY-PASS FILTERS

By-pass oil filtration features a secondary filter with the purpose of eliminating nearly all contaminants in engine oil. By-pass filters have high capacities and eliminate much smaller particles than full-flow filters, including soot. By-pass filters reduce engine wear and increase oil volume, but their high efficiencies mean they also have higher restriction and must be used in conjunction with a full-flow filter.

By-pass filters operate by filtering oil on a “partial-flow” basis. They draw approximately 10 percent of the oil pump’s capacity at any one time and trap the extremely small, wear-causing contaminants that full-flow filters can’t remove. By-pass filters have a high pressure differential, causing the oil to flow through them very slowly and allowing for the removal of smaller contaminants. It is called by-pass filtration because the oil flows from the by-pass filter back to the sump and by-passes the engine. This continual process will eventually make all of the oil analytically clean, reduces long-term wear and can extend drain intervals.

### Higher Efficiency

AMSOIL Ea By-Pass Filters (EaBP) provide higher filtering efficiency, soot removal and increased oil capacity due to their advanced media configuration. AMSOIL EaBP Filters have an efficiency of 98.7 percent at two microns.

### Longer Lasting

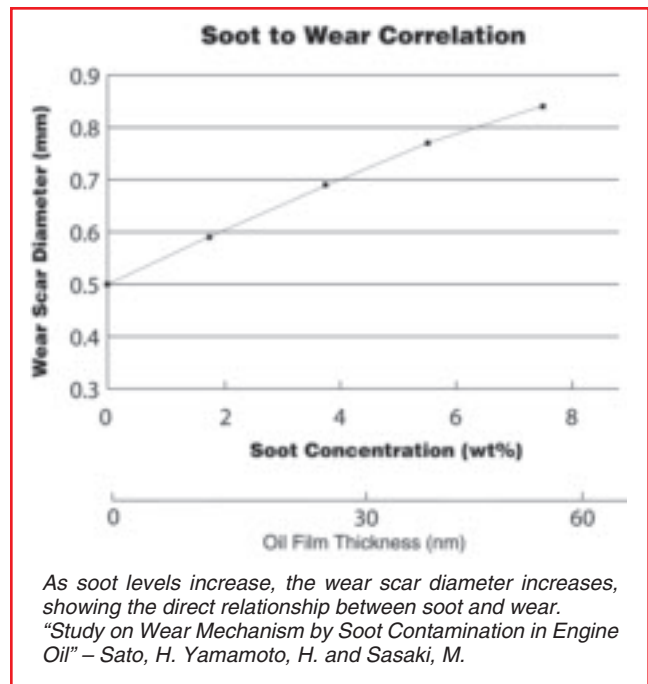
When used in conjunction with AMSOIL motor oil and an AMSOIL EaO or Donaldson Endurance™ filter, EaBP Filters should be changed every other full-flow filter change, not to exceed 60,000 miles. When used with other brands of motor oil or full-flow filters, EaBP Filters should be changed every other full-flow filter change. AMSOIL recommends using oil analysis when extending oil drain intervals.

### Increase Oil Capacity

The increased fluid system capacity and filtration life provides improved oil cooling and ensures that equipment constantly runs on clean oil. Engine efficiency is increased and engine life is extended significantly.

### Soot Removal

AMSOIL has designed a high-efficiency by-pass filter element that is also a soot removal device. AMSOIL Ea By-Pass Filters use a synthetic/cellulose sandwiched media. The inner layer of the element is composed of a highly efficient cellulose media covered with a full-synthetic media outer layer. These filters remove 39 percent of soot contaminants less than one micron. Soot removal efficiency can



increase approximately 10 to 14 percent when the EaBP Filter is used in conjunction with a standard full-flow filter, even higher in conjunction with Ea Oil Filters or Donaldson Endurance filters.

### The Dangers of Soot

The combustion process in diesel engines creates soot. After fuel is injected, combustion occurs with soot as a by-product of the process, and the combustion particulates become trapped on the exposed oil film. The rings wipe the particulates into the oil and the fine particulates aggregate, increasing levels of soot in the oil.

Oil with dispersant additives will generally keep soot in the range of 0.002 to 0.5 microns in suspension; detergent additives prevent the build-up of sludge and act as an acid neutralizer, keeping soot in the range of 0.5 to 1.5 microns in suspension. These anti-wear additives work by providing a sacrificial chemical-to-chemical barrier. As the amount of soot suspended in the oil increases, the performance of these additives decreases.

### Soot Causes Wear

As an oil’s soot dispersant additive levels increase, wear reducing additives become less effective. This creates a direct linear correlation between wear and soot concentration; the higher the concentration of soot, the higher the level of wear. Today’s oil manufacturers are extending oil life by holding higher concentrations of contaminants, including soot, in suspension in the oil. They are also increasing fuel economy by reducing oil viscosity and oil film thickness, therefore reducing the critical contaminant size. This further necessitates the use of by-pass filtration, especially in diesel engines.



# AMSOIL DUAL-GARD

*Versatility, Convenience, Superb Engine Protection and Safety*

## Versatility

Accommodates any two AMSOIL Ea By-Pass Filter elements; EaBP90, EaBP100 and EaBP110. Multiple sizes allow for mounting in various side engine compartments and account for different sump capacities.

## Convenience

Elements spin on and off for fast, neat filter changes.

## Protection

The layered synthetic/cellulose composite media by-pass filter has been shown to reduce piston ring and rod/main bearing wear.

## By-Pass Safety

A metering orifice inside the mount controls oil flow so that it never draws more than 10 percent of the oil pump's capacity.

At an engine speed of 45 mph, the AMSOIL DUAL-GARD By-Pass Filtration System cleans all of the oil in the system every 5 to 10 minutes, depending on engine RPM, sump size and oil pump ratio.

## The DUAL-GARD Mounting Kit

The BMK22 contains a mount, mounting hardware, a restrictor orifice and two  $\frac{7}{8}$ "-14 to  $\frac{1}{4}$ " J.I.C. fittings. Complete installation instructions are included along with an additional parts list of plumbing hose and fittings available separately from AMSOIL. Spin-on filter elements, available in three sizes, should be purchased separately in pairs based on sump size or available room in the engine compartment.

The following is merely a guide, since the larger the element used, the less frequently it will need to be changed.

For a crankcase sump of 15 to 18 quarts use two EaBP90 filter elements.

For a crankcase sump of 15 to 30 quarts use two EaBP100 filter elements.

For a crankcase sump of 15 to 42 quarts use two EaBP110 filter elements.

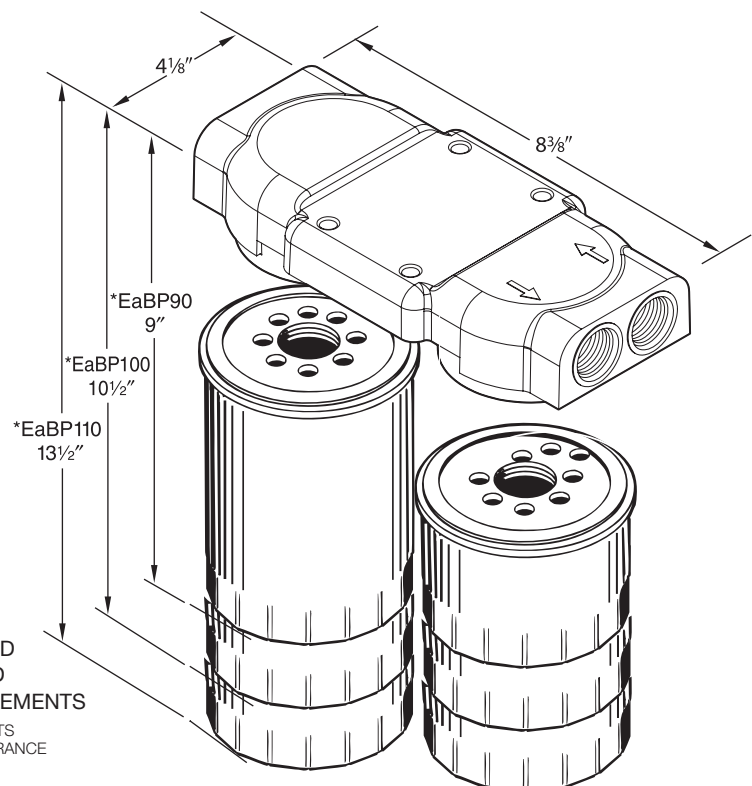
AMSOIL By-Pass Filters last twice as long as full-flow engine filters, so change the by-pass filters only half as often.

For additional information contact AMSOIL Technical Services at (715) 399-TECH, or go to the Contact Us section at [www.amsoil.com](http://www.amsoil.com).



## Other Applications

- STATIONARY ENGINES
- LARGE COMPRESSORS
- ELECTRIC GENERATORS
- CONSTRUCTION PIGGY-BACKS
- FILTER-PUMP CARTS
- MARINE, FORESTRY, MINING
- AGRICULTURE & IRRIGATION



# AMSOIL SPIN-ON BY-PASS FILTERS

## The Benefits

### 1. Reduce Wear

AMSOIL Ea By-Pass Oil Filters with exclusive two-stage pleated and layered cellulose/full-synthetic media has an efficiency rating of 98.7 percent at two microns. Keeping oil analytically clean like this means reduced maintenance and increased engine life.

### 2. Improve Performance

Clean oil lubricates and cools better by reducing friction more efficiently. Piston rings also seal better, which reduces dilution of the oil by fuel, reduces oil consumption and increases compression. All of these benefits improve fuel economy and equipment reliability – saving you time and money.

### 3. Superior Construction

The superior construction of AMSOIL EaBP Filters provides better sealing and increased longevity along with superior corrosion resistance. AMSOIL EaBP Filters have a marine powder coated exterior; and their zinc-dichromate base plates increase rust protection. EaBP Filters have a nitrile HNBR gasket and an orange silicone anti-drain valve.

### 4. Extend Oil Drain Intervals

By cleaning oil continuously and completely, AMSOIL Ea By-Pass Filters not only help increase engine life, but they also increase the life of the lubricant itself. Because additives in clean oil are not wasted breaking up dirt and sludge, or controlling combustion by-products, they last substantially longer. Also, the additional filter and hoses enlarge the oil volume of the system. When topped off with additional oil, the system contains more additives and more cooling capacity. Ultra-fine filtration means lubricants do their job better, longer and need fewer changes.\*

### 5. Reduce Waste

AMSOIL Ea By-Pass Filters save you time and money, and they save the environment from being exposed to higher levels of pollution from combustion and waste-oil. More efficient combustion decreases exhaust emissions and reduces fuel consumption. Fewer oil changes mean less waste oil and fewer waste materials to be disposed of by a fleet/plant manager.

\*Change oil on the basis of lab analysis, not by mileage.



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