

# Kleenoil Bypass Filter Cartridges



## Kleenoil Bypass Filter Systems



**Description:** The **Kleenoil Bypass Filter Cartridge** is made of densely wound pure coniferous long fiber wood pulp paper. It is held together in a material casing and comes in specified sizes for use in the appropriate filtration units as shown in the specification table below.

**Action of the cartridge:** The filtration cartridge acts both by absorption and by adsorption in a continuous recycling process. The long fibers of the paper attract the water formed either through the combustion process or by condensation and absorb it like a sponge, at the same time rejecting the large oil molecules which are forced to pass between the tight windings of the cartridge. As the oil passes through the cartridge, minute carbon, wear metals, and silicon particles are extracted from the oil by adhering to the many surfaces of the filter - a process known as adsorption. Thus the cartridge, by removing water inhibits the production of acids which both degrade the oil and cause excessive wear. The simultaneous removal of minute contaminants as they occur enables the oil life to be extended within its original operating specification.

The **Kleenoil Bypass Filter Cartridge** will remove particles down to 3 micron (relative) and totally remove water. The principle for filtering particulate matter is 'liquid liquid chromatography' which is in effect allowing a fluid to drain down a surface which will progressively arrest particles. This is achieved by having the tissue rolled on a core. Oil is passed up the core of a paper roll where it collects in a cavity between the lid of the filter housing and the paper roll. It is then forced down between the layers of the tissue where particles are adsorbed within the matrix created by millions of cellulose fibers which form the tissue layer. The principle for filtering water is capillary absorption into the

hollow vegetable fiber of the cellulose tissue. The molecular structure of the oil is too large to be absorbed 'capillary action' into the fibers, however the water is absorbed into the fiber and separates from the oil.

The construction of the **Kleenoil Bypass Filter Cartridge** is cellulose tissue, (paper) and we seek to always obtain a long fiber tissue which has not been previously processed. Short fibers will absorb the water, but the pressure of flowing oil will cause the water to be released back into the oil. A long fiber will have the ends crushed by the pressure of flow and a small portion of water will be permanently retained in each fiber. Water retention is approximately 2.2 liters per kilo of tissue.

Most papers are made with a large amount of re-pulped material, and as a general rule the fiber length is approximately halved each time it is re-pulped. The shortened fiber will not retain a significant amount of water, and tends to collapse into a re-pulped state when water is introduced. To be able to retain a large amount of very small particles the winding of the cellulose roll must be extremely precise. Normal paper converters operate at high speed and the motion is not particularly smooth.

To make an efficient filter the winding must reflect a constant and even tension, yet not be so tight that oil will not freely flow. Re-pulped tissue with shorter fibers will not have the tensile strength to permit the tension without breaking.

To conclude, the cellulose tissue used to manufacture a **Kleenoil Bypass Filter Cartridge** must be from 'virgin coniferous' or other long fiber wood. It must have no element of 'broke' (re-pulped material). There must be no chemicals such as optical bleach present, which could alter the features of other chemicals added to the oil being cleaned, There must be a constant slow wind to give the optimum density and tension of the material.

Any proprietary tissue would be unlikely to produce a filter which would meet the established specification of filtration to below 3 microns and total water removal within five passes.

**Important Note:** While the **Kleenoil Bypass Filter System** is extracting the water and the contaminant, it is continuously safeguarding the desirable elements compounded within the actual oil in use. These typically include, dependent upon use, dispersants, detergents, oxidation and rust inhibitors, metal de-activators, pour-point depressants, viscosity improvers, lubricity agents, fungicidal, anti-foaming and gelling additives. These additives are held in suspension and their levels can be critical if the oil is to maintain its beneficial qualities.

**Oil Flow Rate:** Output levels are dependent on viscosity, temperature, degree of contamination, and oil pressure.  
Guide – For SAE 15w/40 oil @ 70 c/ 60 psi/ 4.2Kcm-0.44gcm/ 2.01mp to 0.65gpm/ 3.01mp

**Operating Temperatures:** Within operating specifications of engine, gear and hydraulic oils.

Filtration Level: Particulate contamination in accordance with BS 5540 part 4: 1981 and ISO/DIS 4406. ISO equivalent to NAS 1638 class 6. (Hydraulic oil specification)

Kleenoil Filter Cartridges Specifications Table								
	KC16		KC50		KC65		KC85	
Code Number	Unit	Cartridge	Unit	Cartridge	Unit	Cartridge	Unit	Cartridge
Code Number	KU16	KF16	KU50	KF50	KU65	KF65	KU85	KF85
Engine Sump Capacity	Up to 16 Quarts		Up to 50 Quarts		Up to 65 Quarts		Up to 85 Quarts	
Hydraulic Tank Capacity	Up to 60 Gallons		Up to 200 Gallons		Up to 300 Gallons		Up to 400 Gallons	
Water Retention <0.05%	0.07 Gallons		0.12 Gallons		0.20 Gallons		0.26 Gallons	
Height	6.25 inches	4.13 inches	6.50 inches	3.83 inches	6.25 inches	4.13 inches	6.63 inches	4.13 inches
Diameter	4.63 inches	4.13 inches	7.25 inches	5.75 inches	9.50 inches	7.25 inches	10.00 inches	7.75 inches
Weight (Cartridges+/- 5%)	7.1 ounces		1 lb 4.3 ounces		1 lb 5.7 ounces		1 lb 12.5 ounces	