



CJC™ in The Mining Sector



Rough Environment - Smooth Filtration

Clean Oil - Bright Ideas





Mining Applications

Have Your

We all depend upon our machinery performing well
- and performance improves with clean oil

Crushers

*Lube oil,
hydraulic oil*

Extreme contamination of the oil systems with particles and water causes critical downtime and high replacement costs for these cost-intensive components.



Mills

*Lube oil,
gear oil*

Huge loads on bearings and gears lead to wear. Dirt and water ingress damage the system components. Depending on the process, increased temperatures can also accelerate the oil ageing.



Dump Trucks & Excavators

*Hydraulic oil, gear oil,
lube oil, diesel*

Changing operation conditions and rough environments entail dirt and condensate in the oil. Vibrations and impact load cause additional wear and abrasion.



Drilling Equipment

Hydraulic oil

Dirt and water in the oil systems cause wear, corrosion and erosion on pumps, cylinders and bearings. Oil degradation products result in malfunction of critical components.



Oil Systems Ever Experienced...?

Have Your Oil Systems ever Experienced...?

- Extreme dust ingress?
- Unforeseen breakdowns?
- Excessive wear on components?
- Frequent oil changes?

- All can be avoided by using CJC™ Offline Oil Filtration!

Truck Shop Service

Vehicle fleet, oil systems

With a specially designed mobile filtration unit, cleaning of the vehicles' oil systems can also be carried out during general and planned maintenance.



Conveyor Belts

Gear oil, hydraulic oil

In addition to the dirt ingress from the environment, gear and hydraulic oil systems in conveyor belts are contaminated with wear particles and oil degradation products.



Mineral Processing

Hydraulic oil

In every stage of mineral processing, maintenance of the fluid systems can enhance process stability and efficiency.



Storage Tanks

Lube oil, hydraulic oil and diesel

Oil and fuel are already contaminated with particles and condensate by transportation and transferring. During storage, diesel can additionally be polluted with microbes.



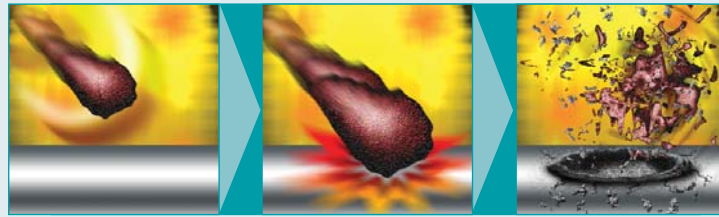


The Most Common Types of Wear

80% of all machinery repair and maintenance costs are related to contaminated oil

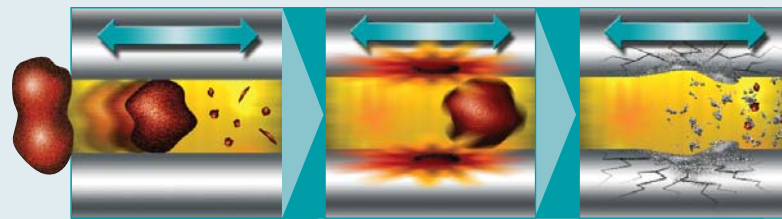
Oil care is a must, especially in dirty environments like mining applications, because up to 80% of all machinery repair and maintenance costs can be traced back to contaminated system oils and fluids. This has been substantiated by several independent analyses. The main cause is wear induced by contamination through solid particles, water, and oil degradation products, which are not retained effectively by most inline filters.

Particles



"Sandblasting"

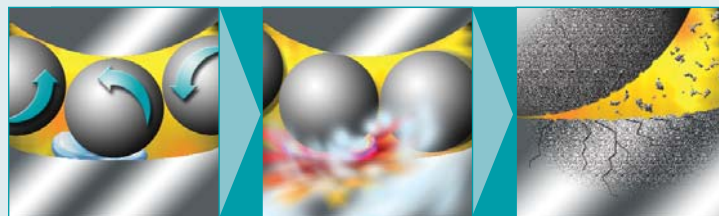
When particles are transported with the oil flow, the particles collide with metal parts, destroying the metal surface and forming new particles.



Grinding

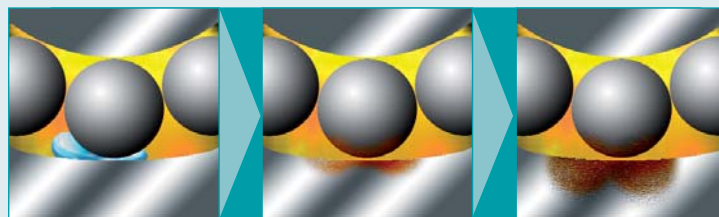
When clearance sized hard particles are wedged between movable metal parts, they destroy the metal surface further and can result in additional wear.

Water



Cavitation

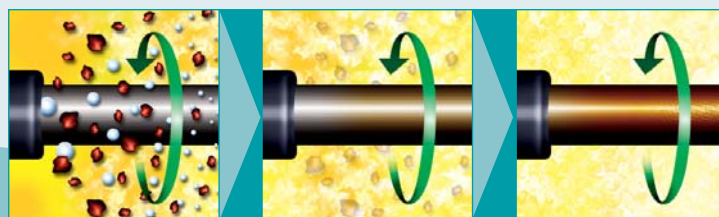
Cavitation occurs in areas where water is present and oil is compressed. The water implodes and blows particles off the metal surface, which then cracks.



Corrosion

Water or chemical contaminants in the oil cause rust or chemical reactions, which deteriorate the component surfaces.

Varnish/ resin



Oil Degradation

Oxygen, water and high temperatures lead to oil degradation which is the precursor of varnish/resin deposits. The result of these deposits is a "sandpaper-like" surface on machine parts.



One Filter - Three Solutions

CJC™ Offline Filters remove particles, absorb water and retain oil degradation products round-the-clock

CJC™ Offline Filters do not only remove solid particles and water. They also retain oil degradation products - "soft contaminants" - which are the precursors to the sticky varnish that deposits on metal surfaces. Varnish cannot be removed by traditional filtration, but with the CJC™ Filter Insert, it can.

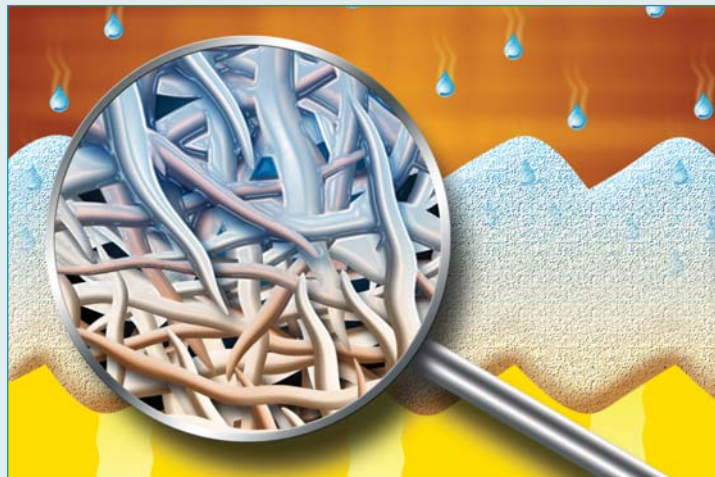
Particles



Removal of Particles

Particles down to 0.8 μm are retained in the unique CJC™ Filter Insert mass.

Water



Removal of Water

The CJC™ Filters can either absorb or separate the water according to oil system requirements.

Varnish/ resin



Removal of Degradation Products

Resin in the oil will be attracted to the polar fibres in the CJC™ Filter Inserts.



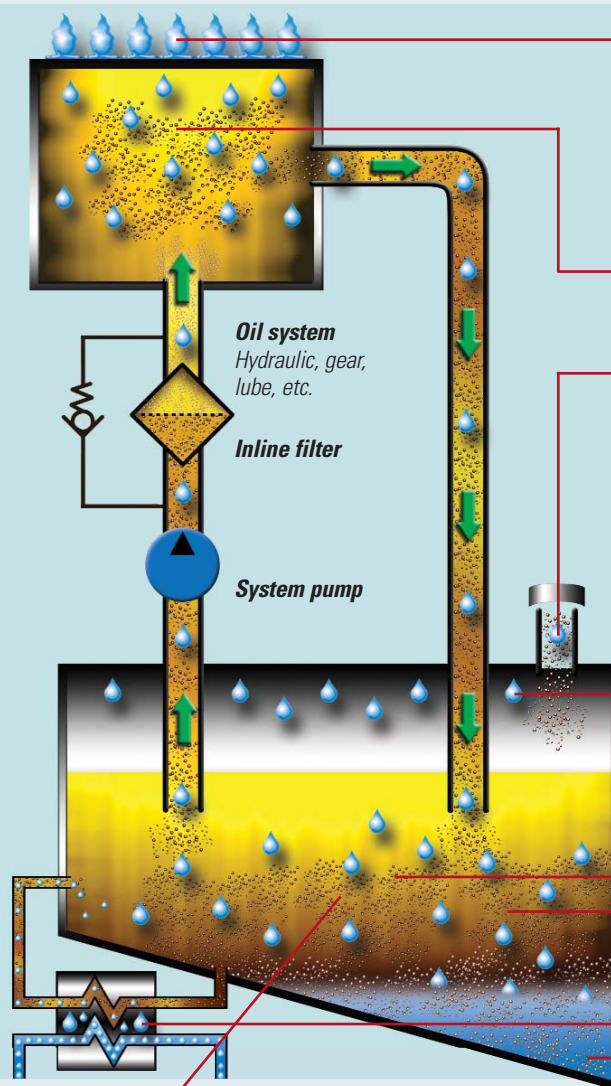
Traditional Inline Filtration

In most applications the inline filter alone, cannot keep an oil system clean

Inline filters are usually of very compact design but must still cope with high flow rates. This affects their minimum pore size, and consequently, the optimum oil cleanliness can rarely be achieved. Oil degradation products, water and microparticles will accumulate in the oil.

Inline Filtration

Principle drawing of inline filtration



Contamination Sources:

External Environment

Water from the external environment enters the system via the elements, high-pressure water blasting, washing etc.

Wear & Tear Particles

Wear particles are generated inside the oil system.

Air Vent

Particles and water ingress through the air vent.

Internal Environment

Water condensation in the oil reservoir, due to temperature variations.

Acid Produced by Oxidation

High temperature + contaminated oil = acid and resin.

Rust/Corrosion

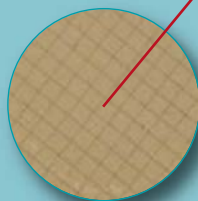
Water initiates the formation of rust particles which are very hard and abrasive particles.

Cooler Leaking Water

A leaking cooler results in water ingress to the oil reservoir.

Varnish/Resin

Oil degradation products, microparticles and water are accumulated in the bottom of the oil reservoir.



Millipore membrane
Sample taken **before**
installation of offline
filtration



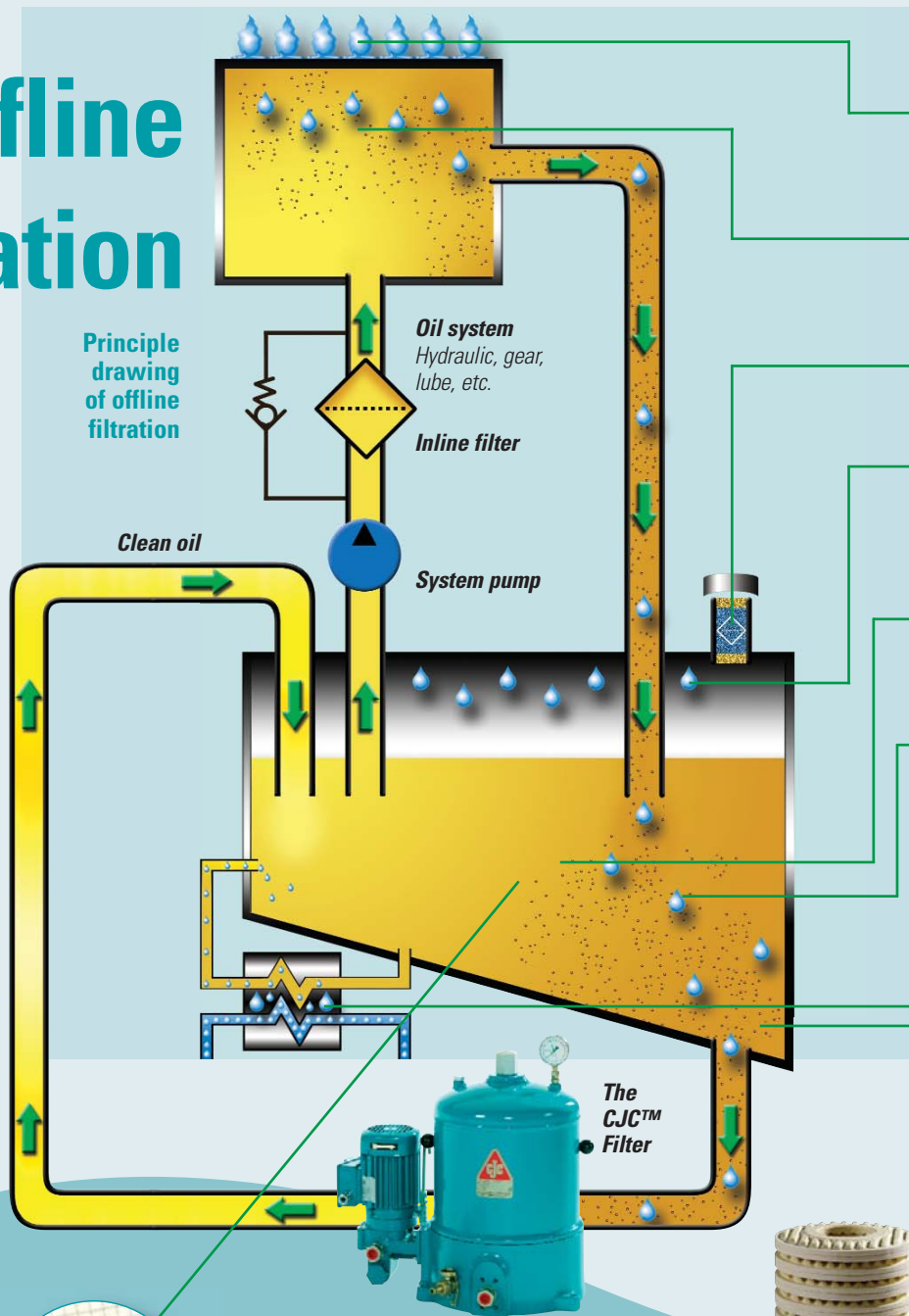
The CJC™ Offline Solution

Round-the-clock removal of particles, water, and oil degradation products all in the same operation

CJC™ Offline Filters are easy to install and the depth filter insert has a very large dirt holding capacity. CJC™ Filters have low operation costs and are almost maintenance free. All CJC™ Fine Filter Inserts have a 3 µm absolute filtration ratio and will remove particles, water, and oil degradation products, all in the same operation.

Offline Filtration

Principle drawing of offline filtration



Contamination Sources are now under Control:

External Environment

Water ingress from the environment is continuously removed from the system with CJC™ Filters.

Wear & Tear Particles

Wear and tear particles are still being created, but are removed by the CJC™ Filter.

Air Vent

Contamination can be reduced by adding an airborne silica gel filter.

Internal Environment

Water still condensates in the oil reservoir, but with the CJC™ Filters installed, the water is removed before it reaches the oil system.

Acid Produced by Oxidation

The risk of developing acids and oxidation by-products has been considerably reduced.

Rust/Corrosion

Contamination is still being created but is removed by the CJC™ Filter.

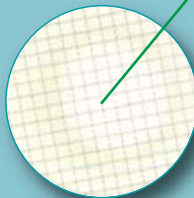
Cooler Leaking Water

The leaking cooler can be repaired at scheduled overhauls as the CJC™ Filters continuously remove water in large volumes.

Varnish/Resin

Oil degradation products and micro particles have now practically disappeared from the bottom of the oil reservoir.

Clean oil is returned to the oil reservoir



Millipore membrane
Sample taken **after**
installation of offline
filtration

CJC™
Filter Insert
before use



CJC™
Filter Insert
after use



Rough Environment - Smooth Filtration

Each application performs specific tasks - as do CJC™ Offline Filters in order to ensure high oil cleanliness

The most effective and economical way to maintain oil in the many systems found in mines, is to use CJC™ Filters. Equipment reliability and lifetime can be dramatically increased by introducing an offline oil filtration system.

Crushers

The key equipment for effective production in a mine are the Primary, Secondary and Tertiary Crushers.

They operate under extreme environmental conditions which can lead to badly contaminated system ISO cleanliness levels as high as 27/25.

The recommended level should be 16/14 (100 times lower) if the crushers are to operate reliably and efficiently.

Seal failures cause water and particle contamination and oil degradation.

The combination of all contaminants results in wear of system parts and component failure. These failures lead to unscheduled stoppages and unbudgeted replacement of parts. This is particularly relevant for sensitive components such as bushings, socket liners and bevel gears.

Most importantly, the effect of contaminated oil is down-time and lost production.



CJC™ PTU3 27/81



CJC™ HDU 2x27/108

Mills

Mills in mines operate under extremely rough environmental conditions leading to very contaminated oil that results in high ISO classes. The recommended ISO cleanliness level of the oil is 19/16/13, if the mills are to work reliably and effectively, and thereby add to a profitable production. Typically, the CJC™ Fine Filters, Filter Separators, and Desorbers are installed on the lube oil systems containing 400 - 10,000 L of oil.

The lube oil system is most often contaminated by oil degradation products, silica dust, and water. The result of this contamination can be extremely expensive repair and downtime. The most sensitive components are bearings and bronze bushings found in the system.

The most important effect of contaminated oil is lost production.



CJC™ HDU 27/54



CJC™ HDU 27/108

CJC™ Offline Filters for Mining Applications

Dump Trucks & Excavators

Earth moving equipment operates under extreme operating conditions. The exposure to extreme weather, a dusty environment and high vibration can severely stress the sensitive system components.

The particle contamination in the oil is often very high. Problems also occur with moisture due to frequent start/stops. Furthermore, the harsh operation conditions cause oil degradation, leading to reliability issues and lost production.

By installing CJC™ Filters these problems will be reduced to a minimum. Sensitive components such as hydraulic pumps, motors, transmission gears, steering systems and injector pumps will operate more efficiently and for longer hours, thus increasing reliability and equipment lifetime.

For all systems, it is possible to reduce oil changes and maintenance costs, thereby achieving fast pay back on investment.



CJC™ HDU 15/25



CJC™ HD HDU 15/25
Heavy Duty Filter



CJC™ HDU 27/27

Storage Tanks

Oil delivered to storage tanks is generally contaminated with particles, water and sludge. Oil cleanliness levels of ISO 23/21/19 are common.

Installation of a CJC™ Offline Filtration System will clean the oil in the tanks to the cleanliness level required by the machine manufacturers (trucks, dozers, excavators). The recommended ISO cleanliness level is 19/16/13, which enhances the performance of the machinery immediately.

The above mentioned is also applicable to diesel oil storage, where the diesel bugs (microbial contamination) are a major problem.

The key to reliable machinery and effective production is clean oil and diesel.



CJC™ PTU3 2x27/108



CJC™ HDU 427/108



CJC™ Series of Solutions

All CJC™ Series are of uncomplicated design, easy to install and almost maintenance free

Using CJC™ Offline Filters will have a positive effect on your maintenance budget as well as increase your productivity and reduce your energy consumption - all advantages in terms of total economy!

HDU Series



CJC™ HDU Series

The CJC™ Fine Filters remove particles, water, and oil degradation products from hydraulic and lubricating oils and have flow rates from 45 to 20,000 L/h.

CJC™ Filter Inserts before use and after use, showing the large dirt holding capacity.



PTU Series



CJC™ PTU Series

The CJC™ Filter Separators combine depth filtration with water separation and are used for water contaminated diesel, hydraulic and lubricating oils.

The CJC™ PTU Series continuously removes water from oil in large volumes.



Clean Oil - Bright Ideas

Optimal Oil Performance With CJC™ Offline Filters

Desorber Series



CJC™ Desorbers

The CJC™ Desorbers provide solutions for removal of water in mineral, synthetic and high viscosity oils.

The Desorbers remove water even from stable emulsions and from oils with a density above 1.



Filter Inserts



The CJC™ Filter Insert System

The unique modular build-up of the CJC™ Filter Inserts means that a CJC™ Filter can be sized to fit any applications and requirements.

Furthermore, they can be equipped with a neutralizing media for removal of acids from oil.



CASES

Cases and Statements from Our Customers in Mining



Problem solving and preventive maintenance are keywords in the mining industry

Kumba Iron Ore's Sishen Mine

Application:
Crushers



A CJC™
Filter Separator
installed on one
of the crushers at
Kumba Iron Ore's
Sishen Mine in the
Northern Cape,
South Africa

Senior tribologist at Anglo American, Mr. Dave J. Gamble:

"The CJC™ Filter will give benefits such as reduced downtime for maintenance, greatly reduced wear and consequent failures, increased availability, utilisation, and production. Together this results in extended oil lifetime"

Problem

Significant ingress of contaminated particles into the lube oil system through a water flow seal under the crusher head, also causing significant water ingress into the lube oil system. The particle and water contamination of the oil in turn significantly contributed to component wear and subsequently large volumes of metallic particles being suspended in the lube oil as a result.

Solution

A CJC™ Filter Separator was installed with 4 x CJC™ Filter Inserts, capable of retaining up to 16 kg of particles.

The CJC™ Filter removed 13 L of water in the first 24 hours, continuing to remove water for another 2 weeks. Within 3 months, the ISO level was brought down from 24/22 to an astounding 16/11.

The installation of the CJC™ Filter provided numerous benefits in wear reduction. Replacement of bronze bushings for each crusher alone costs around EUR 35,000, and are replaced up to twice a year. A reduction of 50% in wear reduces the cost by EUR 35,000 per crusher - and Kumba Iron Ore's Sishen Mine has 19 of these machines in their production.

**Savings of
EUR 35,000
per crusher!**

Clean Oil - Bright Ideas

Downtime no longer undermines Operational Liability

Disputada de Las Condes CMD

Application:
Ball Mill SAG



SAG Mill,
Disputada de
Las Condes CMD,
Mining Company,
Chile

Mr. Fernando Cavassa C,
Grinding Maintenance Chief - CMD L.B.

"The equipment was installed just to clean the oil periodically. However, due to the outstanding results, it has been installed to operate continuously."

Problem

The main lubricating system of 6,000 litres of oil was highly contaminated with pulp (ore-silica-water). The contamination caused numerous production stoppages.

Solution

A CJC™ Fine Filter with a dirt holding capacity of 8 kg was installed. The oil was passed through the filter only once. After seeing the instant visual improvements of the oil, CMD authorised payment for two additional CJC™ Filters.

After 5 days, the oil and storage tank was clean, avoiding any production stoppages, costing in the region of USD 90,000 per stop.

CMD's investment costs including spares were USD 10,000.

Minera El Tesoro

Application:
Storage Tanks



CJC™ Filters
installed in
Minera El Tesoro,
Chile

ESSO Chile

"Benefits of a filter system maintaining clean oil can be seen in the extended life time of mechanical components of earth moving equipment. This is partially due to the substantial reduction of particles greater than 6 micron".

Problem

The Minera El Tesoro has four tanks for storage of new oil, with a capacity of 10,000 litres each. Every 15 days, the tanks are topped-up with 5,000 litres of new oil. When the oil arrives in trucks it is highly contaminated from the transportation process. Caterpillar and other manufacturers of earth moving equipment recommend a cleanliness level of ISO 19/16/13, with the purpose of maintaining reliability and economical operation of their equipment, i.e. drilling machines, dumpers etc.

Solution

A CJC™ Fine Filter was installed on each tank, operating with a filtration of 3 µm absolute and 0.8 µm nominal. Each CJC™ Filter Insert has a dirt holding capacity of 4 kg and a water absorption capacity of 2 litres. The CJC™ Fine Filters absorb resin, and oil degradation products as well.

Talvivaara Mine

Application:
Atlas Copco Drill Rig



E. Hartikainen Oy,
Talvivaara Mine,
Finland

Mr. Ari-Pekka Jormanainen,
Project Manager, E. Hartikainen Oy

"We have used CJC™ Offline Filters for many years. We now have 20-30 Filters in operation. We take oil samples after installation of a filter and follow up with random samples - and the oil is always very clean."

Problem

General repair needs, erosion in pumps and cylinders. Frequent oil changes and downtime.

Solution

After installation of CJC™ Offline Filters, the benefits of improved cleanliness levels are a noticeable reduction in repairs and reduced erosion of pumps and cylinders. As a result, the expense of oil changes and service intervals is reduced.

The filter inserts are generally changed twice a year, at the same time as when other service is needed. The pressure gauge on the filter makes it easy to supervise the dirt holding capacity.

The CJC™ Filters do not need any service other than, the change of the filter inserts.



Clean Oil - Bright Ideas

Clean Oil



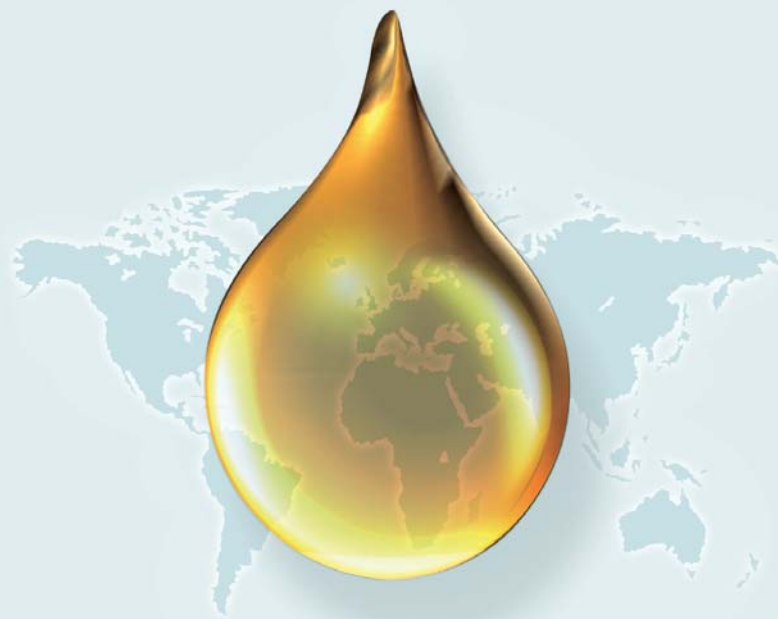
At C.C.JENSEN, our mission is unmistakable - CO₂ emissions must be reduced to help the global environment.

The company contributes to this goal through the development of **BRIGHT IDEAS** and by making them accessible to the rest of the world.

We are fully aware of the importance of **CLEAN OIL**, both for the environment and the economy. Offering our customers **CLEAN OIL** is the aim of all initiatives and development programmes within the company.

C.C.JENSEN is respected as a company that offers values such as quality, traditions, reliability, credibility and stability. C.C.JENSEN is actively working together with customers, promoting "green" solutions to benefit the global environment.

At C.C.JENSEN, we are firmly committed to assisting in the global goal to reduce emissions, and this is why we believe that **CLEAN OIL - BRIGHT IDEAS** makes sense.



Clean Oil - Bright Ideas

- Bright Ideas



*CJC™ Filter Inserts
are made of 100%
organic material*





C.C.JENSEN All Over the World

The CJC™ Offline Filters are distributed by our own international sales organisations and designated distributors



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