



CJC[®] Offshore

Exploration & Production

Oil Filtration Systems for removal of particles, water and oil degradation products from hydraulic fluids, lube oils and diesel fuels



“ Clean Oil Helps You

- Avoid drilling downtime
- Increase equipment reliability ”





Clean Oil - for Your

CJC®

Your trusted, innovative partner supplying offshore oil filters for the offshore drilling market for more than 60 years.

Availability & Reliability

Clean oil helps you avoid drilling downtime due to breakdowns, thus increasing your equipment reliability!

CJC® A/S designs and manufactures oil filtration systems for hydraulic fluids, lube oils and diesel fuels.



Hydraulic
Cranes

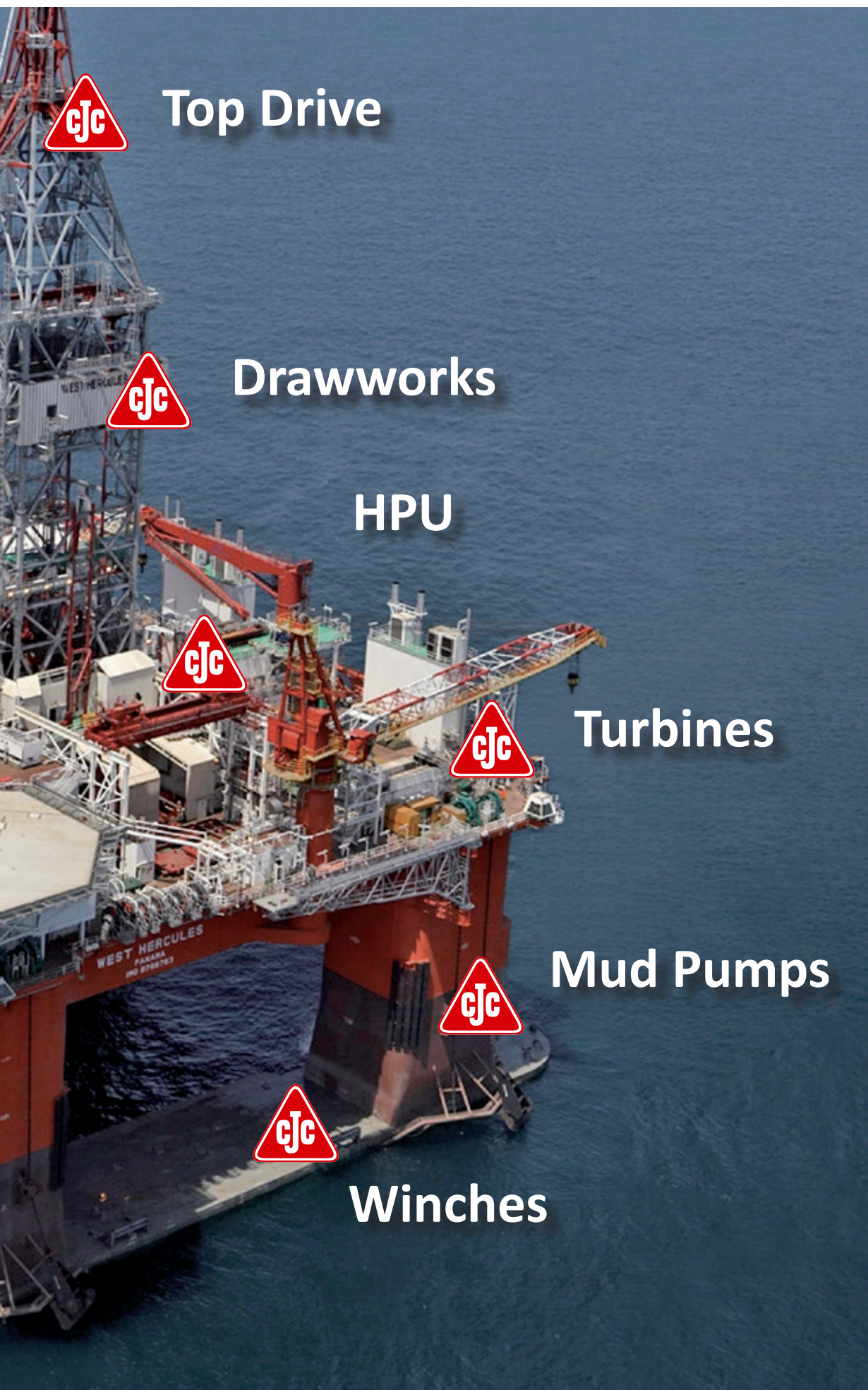
Diesel
Engines

Thrusters

BOP & Riser

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Offshore Applications



Rig & Drill Ship Types

- Drill Ships
- Drill Rigs / Semi Submersible
- Jack-up Rigs
- FPSO
- Production Platforms

Applications

- HPU
- Diesel engines
- Thrusters
- BOP & riser fluids
- Cranes
- Winches
- Gearboxes
- Drawworks
- Skidding systems
- Turbines
- Mud pumps
- Ram rig
- Pipe handling equipment
- Top drives
- Bilge water systems



Risk of Failure on Your

Know-how about oil filtration and oil contamination is a key competence at CJC®, sp

Risk of Failure

The design evolution of most oil systems continues to move towards even higher line pressures, greater sensitivity and reduced system oil capacity. This alone adds to operational stress, but also particle contamination adds greatly to component wear and thus risk of failure with lost production as a consequence.

Both hydraulic fluids, lube oil and fuel carry destructive solids, corrosive sediments and water to the various sensitive components of the system.

Oil contamination accounts for more than **80% of failure** in hydraulic systems.



Thrusters

Thrusters are a means of providing dynamic positioning or main propulsion to a drill vessel or semi-sub.

Problem

Water ingress as a result of seal leakage can result in premature bearing or gear failure, leading to loss of propulsion and position.

Solution

Removing the water and filtering the wear particles from the oil will help prevent failure of the propulsion unit and improve reliability, removing the risk of operating on reduced units in DP mode and loss of position over the well.



HPU

The Hydraulic Power Units are the main driving component of hydraulic systems such as Skidding Systems, Drill Floor Hydraulics and Winches.

Problem

Particulate and moisture from condensation can cause failure of the pumps, hydraulic motors and control valves, leading to delays in drilling operations.

Solution

These delays can be minimized by introducing an offline filter unit to the systems and improve oil condition, reliability and availability.



BOP & Riser Tensioner Fluids

The Blow Out Preventer contains a series of valves to seal, control and monitor oil and gas wells. The Riser Tensioners are used as a means of motion compensation on the slip joint, connecting the riser joints to the underside of the drill ship or semi-sub.

Problem

Operational failure of these systems is critical to the safe operation of the rig. Damage due to particulate in the water glycol systems will result in damage to the valves, cylinders and seals in the systems.

Solution

Keeping the operational fluids in good condition will prevent failure of the valves and cylinders.

Oil Field Equipment

Specific to a wide range of systems on offshore drilling rigs and production platforms



Top Drive

Provides torque and rotational movement of the drill string.

Problem

A build-up of dirt and moisture in the hydraulic oil can lead to failure of the pump, motors, and control valves in the system, resulting in loss of drilling time.

Solution

The installation of a CJC® HDU Fine Filter unit will remove the dirt and moisture build up in the oil and remove the risk of failure in the system.



Drawworks

The drawworks is the primary machinery for hoisting and lowering the drill string.

Problem

Failure of the hydraulics or gearbox will result in significant drilling down time.

Solution

Improving gearbox and hydraulic oil cleanliness, that will ensure the machine is able to run with minimal risk of failure.



Hydraulic Cranes

Hydraulic cranes are used for moving equipment around the rig and for loading equipment to the rig.

Problem

Dirt and condensation in the oil can cause wear and breakdown in the hydraulic components, causing delays to the drilling programme.

Solution

The addition of a CJC® HDU Fine Filter will improve reliability and availability of the cranes by removing the contamination from the oil.



Mud Pumps

Mud pumps are reciprocating piston pumps designed to circulate drilling fluid at high pressure down the well via the drill string.

Problem

Failure of the crankshaft or bearings can lead to critical downtime in the drilling program.

Solution

Removal of moisture and particulate using the CJC® HDU Fine Filter will prevent expensive breakdowns.

Advantages will
Reduce Maintenance Budget!

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Risk of Failure

Reduce your maintenance budget, avoid breakdowns and fewer oil changes
- install a CJC® Filter!



Mooring Winches

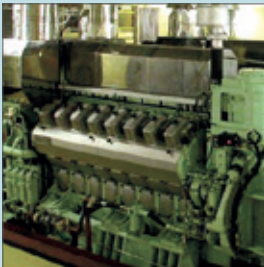
Mooring winches on semi subs are used for maintaining position over the well during the drilling programme. These can be electrically or hydraulically driven and using a gearbox system.

Problem

The gearboxes can suffer from condensation and particles and the hydraulic systems can suffer from a build up of contamination from particles. Failure of these systems during anchor deployment or retrieval will have a significant affect on the drilling programme.

Solution

Removing contamination from the gearbox and hydraulic systems will improve the reliability, preventing gear failure or breakdowns in the hydraulic system.



Diesel Engines

Providing power for the rig and as a drive for hydraulic systems in cranes.

Problem

Diesel

If diesel is not maintained clean and dry, it can result in bacterial sludge which can cause blocked in-line filters and also cause wear and corrosion in the fuel pumps and injectors.

Solution

Diesel

Using the CJC® PTU Filter Separator or HDU Fine Filter will help remove sludge, dirt and water from the fuel, reducing wear or preventing failure of components in the fuel system and improving engine operation reliability.

Lube Oil

A build-up of contamination from soot and wear particles in the lube oil can cause significant damage to bearings, pumps and liners, resulting in timely and costly overhauls and repairs.

Lube Oil

Removal of contamination with the CJC® HDU Fine Filter will not only reduce wear and maintenance requirements, but will extend lube oil change intervals, offering not only improved reliability but long term cost savings.



Turbines

Turbines provide power generation and compression on offshore platforms.

Problem

Particulate and varnish in the oil can accumulate in small, low flow passages within the lube oil and hydraulic control systems, resulting in sticking servo or proportional control valves and bearing failure. This can lead to costly turbine trips.

Solution

CJC® Filter Inserts are capable of offering a high degree of filtration for particulate removal and have the capability to remove varnish from the oil, resulting in improved reliability and minimizing the risk of unit trips.

Benefits in General

Clean oil helps you avoid loss of drilling time and increase equipment reliability

Your Benefits of Oil Maintenance

Good for you - good for the environment!

The cleanliness level achieved and maintained by offline filtration means that the predicted lifetime of machine components and oil is expected to be extended 2-10 times!



Financial Benefits

- Increased availability
- Reduced maintenance budget
- Fewer unplanned breakdowns and stops of production
- Enhanced operational precision
- Improved profitability

Less Maintenance

- Increased equipment reliability
- Less wear and increased lifetime of components and oil
- Longer lifetime of in-line filter inserts

Lower Energy Consumption

- Lubricating capabilities remain intact
- Reduced friction

Environmental Benefits

- Fewer oil changes
- Reduced top-up of oil
- Less waste oil - less use of natural resources
- Enhances "green" credibility

-all advantages will
Increase Your Profit!



Satisfied Customers

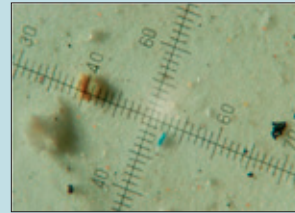
Reduced maintenance budget, fewer breakdowns, fewer oil changes



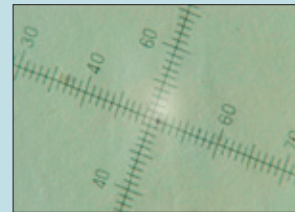
Noble Drilling Sedco Dubai Drilling Rig, Port Side Cranes



The drilling rig, "Jimmy Puckett", Noble Corporation



Oil sample - **BEFORE**
CJC® Filtration



Oil sample - **AFTER one week**
with CJC® Filtration

SYSTEM

Drilling Rig, Port Side Cranes

Crane type: National DNS 60

Oil type: Hydraulic oil, ISO VG68

Oil volume: 1,500 L

PROBLEM

Noble experienced problems with the operation of the port side cranes such as hydraulic motors and cylinders leaking. This was due to oil degradation (oxidation) and particles in the oil, causing expensive downtime on the cranes.

LÖSUNG

CJC® Fine Filter HDU 15/25 PV, 120 L/h with CJC® Filter Insert BG 15/25.

Dirt holding capacity 1.5 L of dirt and approx. 1 kg of varnish.

FINANCIAL BENEFITS

Since installing the filters, Noble has experienced no hydraulic failures on the cranes, meaning no downtime.

ENVIRONMENTAL BENEFITS

The lifetime of the oil has increased and the oil no longer needs to be changed. This results in cost savings for new oil and no costs for disposal of the used oil.

TEST

The first filter was installed on the port side crane, and a sample was taken before start-up of the filter and again one week after.

RESULTAT

The particle count was ISO 20/18/16 or equivalent of circulating more than 90 kgs of dirt a year through the system. After one week, this was reduced to **ISO 16/15/12** or equivalent of circulating 11 kgs of dirt a year.

Maersk Drilling, Norway

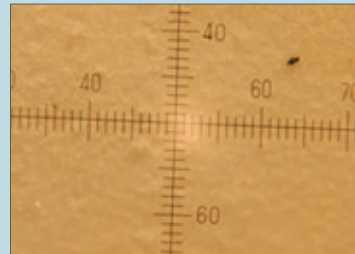
Drilling Rig, Gas Turbine Generator Sets



The drilling rig "Maersk Inspirer"

SYSTEM

Drilling Rig, Gas Turbines
Manufacturer: SOLAR TURBINES
Type: Titan 130
Oil type: Shell Turbo Oil T 32
Oil volume: 3,650 L
Filter type: 2 x CJC® HDU 27/54 PV



Oil sample, based on ISO Class 4407, manual counter: 12/11/6

PROBLEM

Maersk Drilling experienced high particle counts for the gas turbine lubricating oil, which were well above the max. limits for this type of equipment.

SOLUTION

The lubricating systems for the turbines were equipped with 2 x CJC® Fine Filters, HDU 27/54 PV to clean the oil. However, the first oil samples exceeded the limits.

OIL ANALYSIS

CJC® A/S and Maersk Drilling started a technical cooperation, as this result did not seem valid. CJC® suggested to try another analysis method.

A second set of oil samples were taken and sent to another oil laboratory, showing a totally different and much lower particle count. The two sets of samples were analysed using two different methods; the ISO 4406, which is an automatic particle count and the ISO 4407 using a manual count under a microscope.

RESULT

The conclusion was that the automatic particle count ISO 4406 gave significantly higher amounts of particles 19/17/13, as this method not only counts particles, but also water and air bubbles as particles. The microscope ISO 4407 gave precise measurements and resulted in an ISO class 12/11/6.

TECHNICAL COOPERATION

Due to the technical cooperation and knowledge sharing between Maersk Drilling and CJC®, the problem was resolved by switching from one analysis method (ISO 4460) to another (ISO 4407).

RELIABILITY

Condition based monitoring and selection of the correct analysis method is important to obtain precise measurements. Reliable and safe operation of the equipment is of highest priority to avoid unforeseen problems and costly breakdowns, affecting the drilling operation.

ENVIRONMENTAL BENEFITS

From an environmental point of view, the increased oil lifetime results in less oil changes. The oil is reused and the cost and carbon footprint is minimized.



Satisfied Customers

Reduced maintenance budget, fewer breakdowns, fewer oil changes

Seadrill

Seadrill, Norway

Drilling Rig, Thrusters & Cranes



The offshore drilling rig "West Venture"

SYSTEM

8 Rolls Royce Thrusters.

Oil type: Shell Omala 150

PROBLEM

Two of the thrusters suffered from heavy water ingress
- water content was measured to about 2,000 ppm.

SOLUTION

As part of a preventive oil maintenance program two CJC® PTU2 27/27 PV Filter Separators with CJC® Filter Inserts BLAT 27/27 were installed. The demand for keeping particle and water contents at low levels very soon led to the installation of further filter separators on the remaining six thrusters.

In addition to this, two CJC® Fine Filters HDU 27/27 P with CJC® Filter Inserts B 27/27 were installed on the rig cranes.

RESULT

Already after a short period of filter separator operation, the oil cleanliness had improved considerably. The average water content in the thruster oils is now maintained within a range from 400 to 600 ppm.

CUSTOMER STATEMENT

Mr. Jan Egil Sandnes and Mr. Peter Jørgensen, Technical Managers on board the "West Venture" state that they are very satisfied with the installations of CJC® Filters on both cranes and thrusters.

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Other Satisfied Customers

BW Offshore • KCA Deutag • Diamont Offshore • Enasco •
Maersk Drilling • Mermaid Offshore • Nobel Drilling • Nor
Pacific Drilling • Petro Bas • PetroVietman •
Stena Drilling • Sub Sea 7 • Technip O

CROSCO Drilling, Croatia

Drilling Rig, Cranes



The drilling rig "Zagreb 1"

CROSCO was founded in 1996. It is an integrated onshore and offshore drilling and well services contractor working worldwide. Member of the National Oil Company, INA.

SYSTEM

Drilling Rig ZAGREB 1

System: 2 Patriot Kingpost Cranes

Model: 200, Series 198

Oil type: Hydraulic oil in open loop circuit

Oil volume: 2 x 2,000 L

Crane power: Main Hook SWL 50 T
Aux. Hook SWL 10 T

PROBLEM

Preventative maintenance carried out on the hydraulic systems for the cranes highlighted the presence of moisture in the oil systems, with a potential for premature component failure.

SOLUTION

2 CJC® Fine Filters HDU 27/27:

Crosco completely renovated the hydraulic systems and installed the filter units on the cranes as a preventative measure.

1 CJC® Fine Filter HDU 27/27:

Crosco is using this filter as a portable system for general use on the drilling rig.

Mr. Dragutin Žabjačan, Head of engine department:

Since the installation of CJC® Fine Filters, the 2 cranes have worked fine, removing moisture in the oil down to a very low level for hydraulic systems (below 100 ppm). The investment in CJC® Fine Filters should be very cost-effective!

Customers Worldwide:

Enbridge • Fred. Olsen • Frontier Drilling • Hercules Offshore •
Person Services • Ocean Rig • Oddfjell Drilling • Odebrecht •
Saipem • Sedco Forex • Seadrill • Statoil •
Offshore • Transocean • Vantage Drilling

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Your Challenge

80% of all breakdowns in oil systems are related to contamination of the oil
- avoid expenses on repairs and oil changes

In-line filters alone do not keep the oil system clean

Contamination of an oil system leads to various problems which can result in machine downtime, frequent repairs of equipment and reduced oil lifetime. All of which means inefficient production and unnecessary expenses spent on repair and oil change.



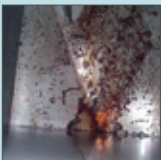
Abrasion on gear



Pitting on bearing



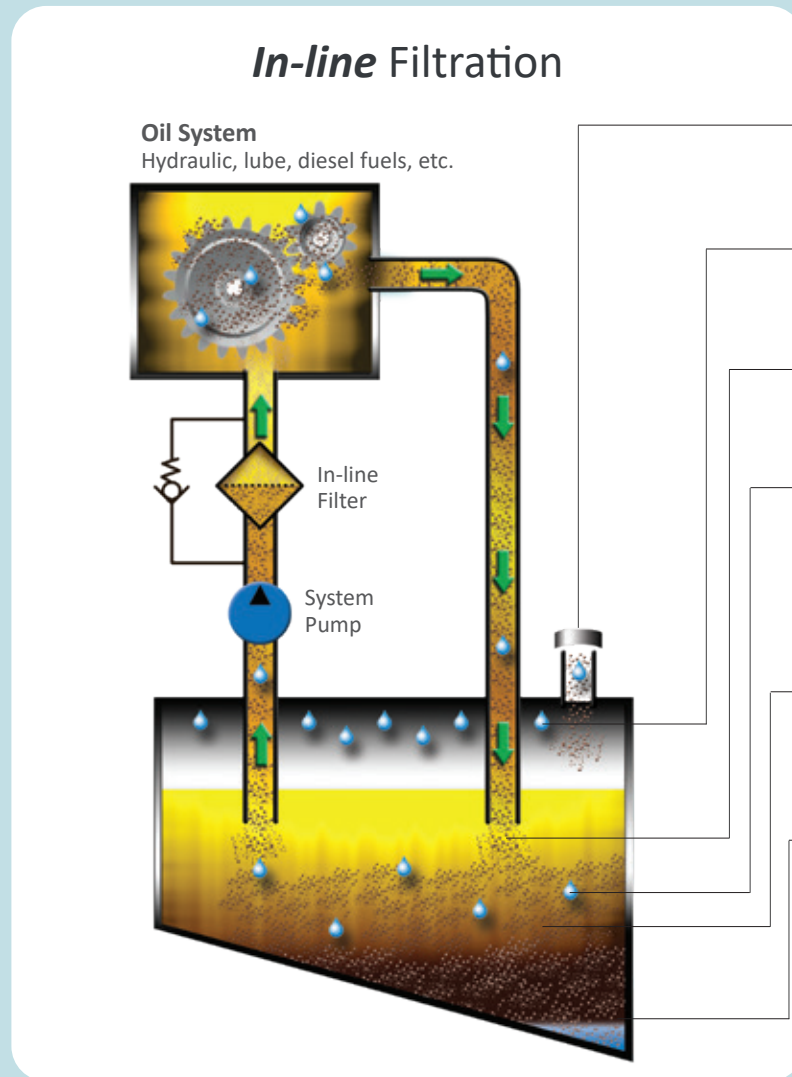
Varnish on valve



Sludge in tank



Water & bacteria in diesel oil



Contamination:

Air Vent

Particles and water ingress through the air vent and worn seals.

Internal Environment

Water condensates in the oil reservoir.

Oil Reservoir

Contamination is returned to the oil reservoir from the system.

Oil Degradation

Wear metals, water and high oil temperature act as catalysts and lead to oil degradation. The result is dirty oil, acid, sludge and varnish formation.

Rust/Corrosion

Water causes formation of rust particles which separate out at the bottom of the reservoir.

Bottom Sediment

Water settles at the bottom of the oil reservoir resulting in bacteria growth, sludge and oil degradation. Wear particles act as catalysts to speed up the varnish formation.

The most common type of contamination sources



Removal of Particles

Particles down to 0.8 µm are retained in the filter mass



Absorption of Water

The cellulose fibres in the filter mass absorb the water



Adsorption of Oxidation

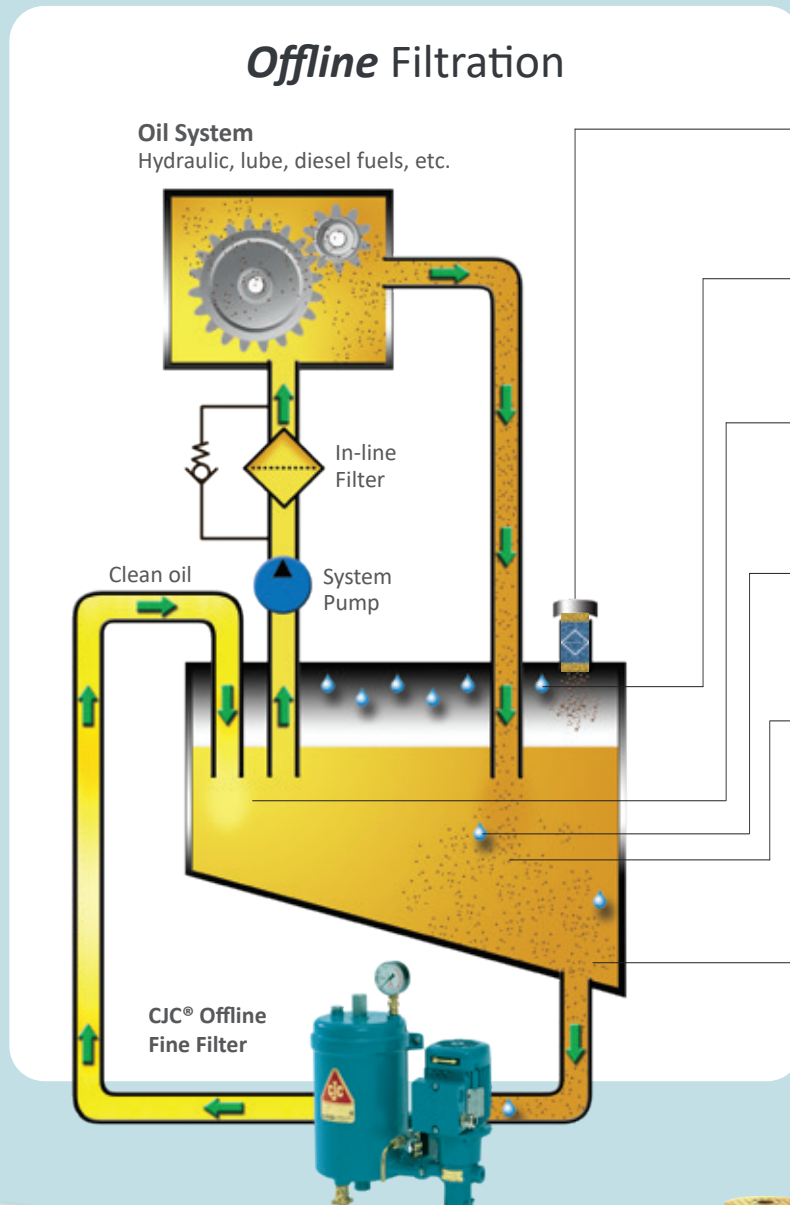
Sludge/varnish in the oil is attracted to the polar sites of the filter mass and are retained there

Our Solution

Cut 2/3 of your oil maintenance costs
by avoiding production stop or breakdowns on your drilling equipment!

One Filter - 3 Solutions

CJC® Filter Inserts have a 3 µm absolute filtration ratio and will remove particles, water and oil degradation products in one and the same operation. The CJC® Filter Insert has a very large dirt holding capacity. The CJC® products are almost maintenance free and have a very low cost of operation.



Contamination
now under control:

Air Vent
Contamination can be reduced by adding an air breather filter that eliminates particles and moisture.

Internal Environment
Water still condensates in the oil reservoir, but with the CJC® Fine Filter it will be absorbed.

Oil Reservoir
Clean oil from the CJC® Fine Filter is returned to the oil reservoir - ready to be used in the system.

Oil Degradation
The risk of developing acids and oxidation by-products has been considerably decreased.

Rust/Corrosion
Contamination is still being created but now continuously removed by the CJC® Filter Insert.

Bottom Sediment
Water and particles no longer settle. No more bacteria or varnish.



Dirty and clean
CJC® Filter Inserts

The CJC® Filter Insert System

The modular build-up of the CJC® Filter Inserts means that a CJC® Fine Filter can be designed to fit any applications and requirements



Insert
15/12

Insert
15/25

Insert
27/27

Insert
2x27/27
(27/54)

Insert
3x27/27
(27/81)

Insert
4x27/27
(27/108)

Insert
4x4x27/27
(427/108)



Our Products

CJC® Filters - simple, effective and low maintenance
- will guarantee your success!

Advantages to your economy

Using CJC® Offline Filters will have a positive effect on your maintenance budget as well as increase your productivity and reduce your energy consumption.

ATEX Explosion Proof

CJC® Oil Filters can be supplied as ATEX units for installation in explosive atmospheres. We are able to supply equipment for installation in Zone 1 and 2, gas group IIB and IIC.

The individual layout of the filter units is based on the actual zone classification where the filter unit will be installed.

Various voltages are available upon request.



CJC® HDU Series

The CJC® Fine Filter removes particles, water and oxidation by-products for hydraulic fluids and lubricating oils.



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 remove water from oil in large volumes.



CJC® Desorbers

The CJC® Desorbers provide solutions for desorption of water in mineral, synthetic and high viscosity oils. The Desorbers remove water from even stable emulsions and in oils with a density above 1.



CJC® Blue Baleen System

The CJC® Blue Baleen System absorbs oil from bilge water effluent and is capable of reducing the oil content to a value less than 5 ppm. This ensures that environmental performance, objectives and targets are met.

Enhance “green” credibility”

Install a CJC® Filter

- less waste oil - less use of natural resources

CO₂ Reduction

At CJC® we have during the past 5 years worked intensively to reduce our carbon footprint and with great success, as we have managed to **reduce our CO₂ emissions by 50%**.

We have invested in our own wind turbine, installed solar power cells for production of electricity and reduced our consumption of oil using alternative energy in our production processes.

At CJC®, our mission is unmistakable - CO₂ emissions must be reduced to help the global environment!

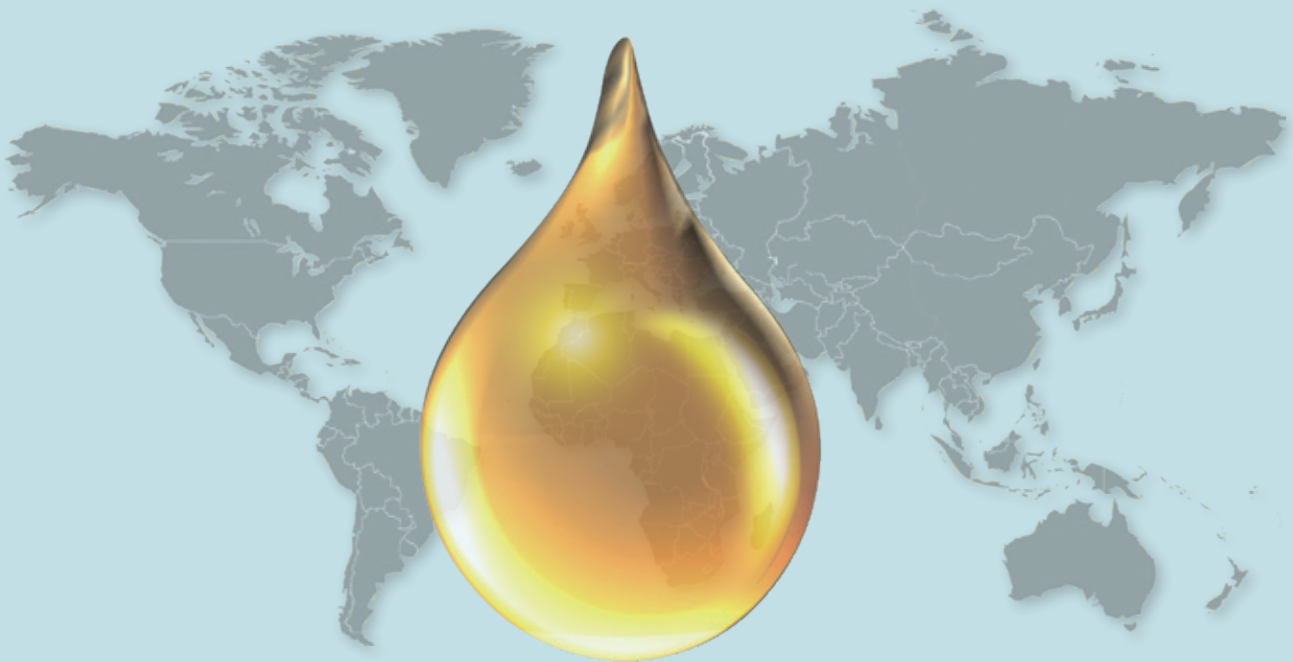
Clean Oil - Bright Ideas

We would like to help our customers to be greener by installing CJC® Oil Filtration Systems, providing you with **CLEAN OIL - BRIGHT IDEAS**.

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.

CJC® is respected as a company that offers values such as innovation, quality, traditions, reliability, credibility and stability. CJC® is actively working together with customers, promoting “green” solutions to benefit the global environment.

At CJC®, we are firmly committed to assisting in the global target to reduce emissions. Therefore, we believe that **CLEAN OIL - BRIGHT IDEAS** make sense.



CJC® A/S CO₂ Emission
- reduced by 50%

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The Synonym for Oil Care

Proactive Maintenance



Consulting

We offer you oil care systems that are optimally adapted to your machine or engine.



Evaluation

Using your machine data, you will recognize that the investment is more than worthwhile.



Service

You can expect a personal, regional contact person who will also visit you on-site.



Challenges

We also check complex cases for filterability and offer cost-effective solutions.

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Certified according to
DIN EN ISO 9001
Quality Management Systems

