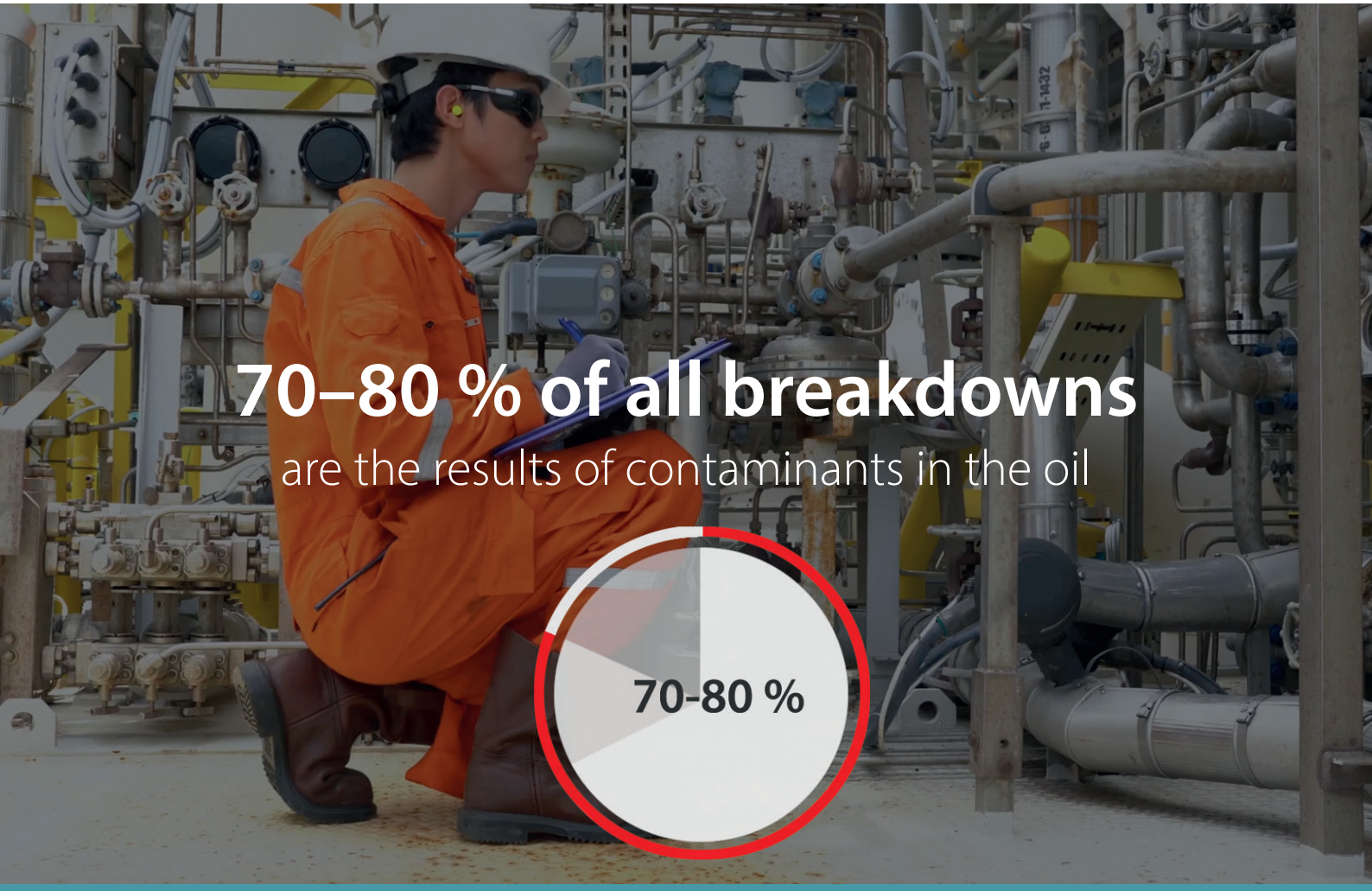
Oil and Fluid Care

Proactive maintenance due to the highest oil and fluid cleanliness



70–80 % of all breakdowns

are the results of contaminants in the oil

- Maximize oil change intervals
- Increase the machine reliability productivity and process stability
- Minimize maintenance costs and accelerate the return on Investment
- Protect the environment and resources

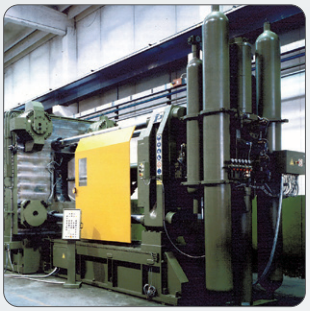
www.cjc.de

Applications

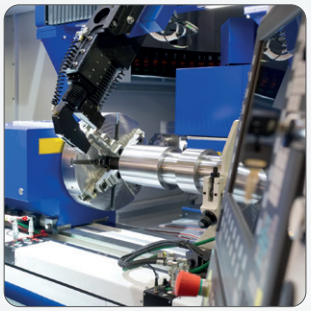
CJC® Oil Care Systems – THE solution for your application

Hydraulic oils & lube oils

Gear oils



HFC fluids



Machining oils & cooling lubricants

Engine oils & liquid fuels

Quenching oils

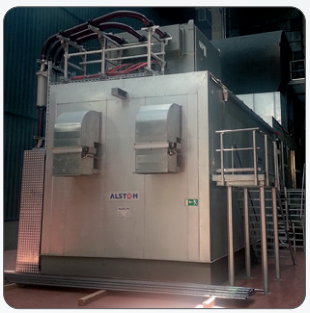
Karberg & Hennemann, your partner for oil and fluid care
– oil care is more than just filtration –

Applications

CJC® Oil Care Systems – THE solution for your application

Turbine oils & compressor oils

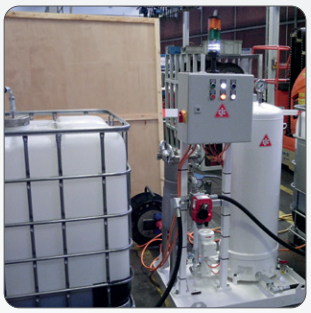
Insulating oils & tap changer oils



HFD fluids

Bio oils & environmentally friendly lubricants

Thermal oils



Stored oils, fuels & oil recovering

Trust the pioneers of offline filtration
– practical experiences for more than 70 years –

Particles, Water and Oil Degradation

70–80 % of all breakdowns in hydraulic and lubrication systems are the results of contaminated system fluids

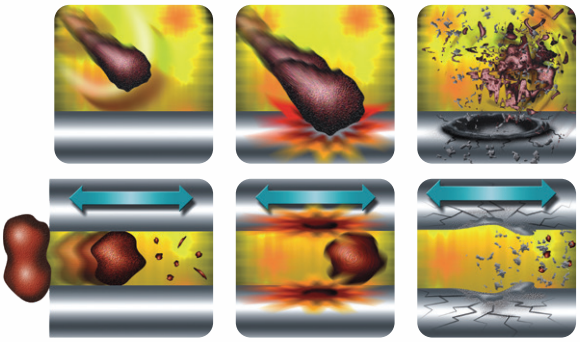
Grooving through abrasion (pump)

Particles

Particle contamination of the oil can only be reduced, not avoided. The contaminants enter the system from the environment (e.g. through venting, oil refilling or repairs), but they are also generated inside the system (abrasion). Every particle in the system can create more contamination (sandblasting effect).

Erosion
Tiny particles in a high-velocity oil flow contact metal surfaces and edges, breaking off more particles (sandblasting effect).

Abrasion
Hard particles jammed between moving parts destroy the surfaces (abrasive wear).



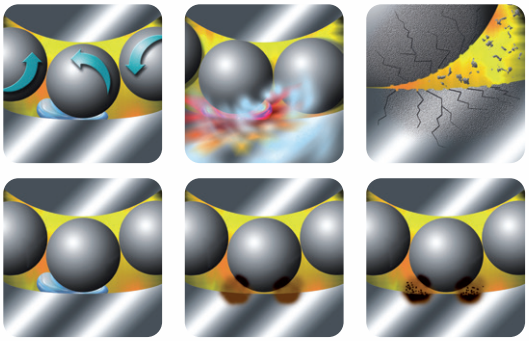
Corrosion (shaft)

Water

It is challenging to avoid water contamination in the oil. Humid air enters the system via air vents and is absorbed by the oil. Varying temperatures enhance this process. Cooling water leakages and similar water ingress are also typical sources of oil contamination.

Cavitation
Water droplets in the oil evaporate under high pressure, implode and rip particles off the metal surfaces.

Corrosion
Water and chemical contaminants in the oil cause corrosion, rust and chemical reactions deteriorating the component surfaces.



Varnish (valve)

Oil degradation/ageing (varnish, sludge, acids)

Degradation products resulting from oil ageing occur in both lubrication and hydraulic systems. The process is mainly influenced by oxidation (oxygen), hydrolysis (water) and pyrolysis (thermal decay at high temperatures). In most cases, all of these three factors combined have an impact. The degradation of products leads to sludge and/or resin-like deposits. Additionally, acidification of the fluid occurs during the oil degradation process.

Oil degradation products
The resin-like degradation products are deposited on the metal surfaces and form a sticky layer to which particles adhere. The created sandpaper effect accelerates wear and tear.

Only clean oil is able to dissolve already deposited residues and to hold them in suspension until they are also filtered out.

Cellulose – The Ideal Filter Material

CJC® Depth Filter Inserts simultaneously remove particles, water and oil degradation products

Particles

Solid particles are permanently retained between the cellulose fibres. 75 % of the insert volume forms a structure of cavities. Each insert has a filtration degree of 3 µm absolute and 1 µm nominal. Especially developed CJC® Fine Filter Inserts offer a filtration degree in the submicron range.

Water

Cellulose fibres absorb water by capillary attraction. Even if only a few ppm of water is in the oil, the fibres dry the oil.

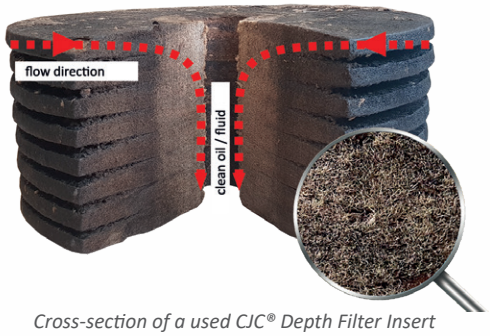
Oil degradation/ageing

Oxidation products, resins, varnish and sludge residues deposit permanently, with a combination of adsorption and absorption, on the polar sites of the cellulose fibres.

Depth filtration – high dirt holding capacity for long filter lifetime

CJC® Fine Filter Inserts are depth filters, i. e. compared to surface filters, contaminants are retained in the depth of the filter material. The whole volume of the insert is made of finely ramified fibres that offer an outer surface and, in addition, an inner surface — from 120 to 150 m² per gram. That enables the extremely high dirt holding capacity – the higher, the longer the lifetime of the filter inserts. CJC® Fine Filter Inserts are particularly efficient because the contact time between fluid and filter material is extended.

Cross-section of a new CJC® Depth Filter Insert



Cross-section of a used CJC® Depth Filter Insert

Fact is, our dirt holding capacity is the market leader.

For each application a suitable solution

Each CJC® Depth Filter Insert is optimized for its specific application regarding design and formulation.

- Mineral oils and synthetic pressure fluids and lubricants up to ISO VG 460 / 40 °C, also biodegradable oils
- Aqueous oils and fluids, e. g. HFC fluids and cooling lubricants
- Oils and fluids with extremely high dirt ingress, e. g. quenching and thermal oils
- Oils and fluids with high potential to generate acids, e.g. HFD fluids, gas engine oils
- Oils and fluids with high water content that must be minimized in a short time, e. g. insulating oils
- Oils and fluids with high potential to generate acids or high water content and simultaneous contamination with particles and oil degradation products

Unique efficiency, performance and capacity
– nature in perfection, free of plastic and metals –

Offline Oil Care

Independent of the machine's operation for the highest possible oil cleanliness

Inline filtration in comparison with offline filtration

Bypass filter (inline)

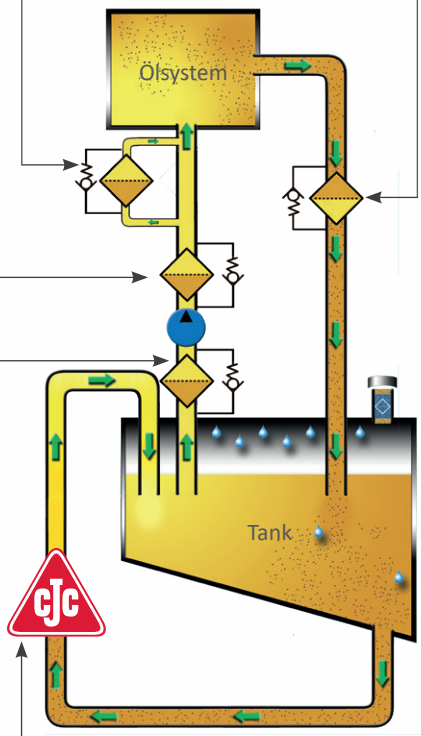
- Only a part of the inline fluid flow is filtered
- Dependent on the operation of the machine

Pressure filter (inline)

- Housings and filter elements are expensive, because they have to be designed for max. system pressure
- High energy costs (the higher the filtration degree, the higher the costs)
- High operation pressures and high flow rates lead to an extreme load (material fatigue, damage of the pore structure)
- Release of already filtered particles due to highly fluctuating pressure surges
- Short contact time between fluid and filter material due to the high flow rate
- Low dirt holding capacity
- Frequent filter replacements
- Dependent on the operation of the machine
- Only solid particles are filtered out, no protection against cavitation, corrosion and oil degradation

Suction filter (inline)

- Only protection against small solid particles
- No protection against cavitation, corrosion, oil ageing and wear caused by fine particles
- Oil is drawn from the surface; contaminants in the oil sump are not captured
- Big filter sizes are necessary
- Dependent on the operation of the machine



Return filter (inline)

- Big filter sizes in some cases are necessary because the return flow rate is often larger than the pump flow rate
- Short contact time between fluid and filter material due to the high flow rate
- Dependent on the operation of the machine
- Only solid particles are filtered out; no protection against cavitation, corrosion and oil degradation

Offline filter

- Particles, water and oil degradation products are simultaneously reduced to a minimum
- Fine filtration to a range of < 1 µm (submicron range)
- Continuous fine filtration (24/7), independent of the operation of the machine
- Oil is drawn from the lowest point of the system tank, meaning the highly-contaminated oil in the bottom of the tank (sediments) is filtered too – the clean oil is returned to the tank close to the suction point of the main system pump
- The pump of the filter enables an application-specific adjustment of the pump flow
- Efficient fine and depth filtration due to the long contact time between filter material and fluid
- For filter replacement, it is not necessary to stop the machine
- No high pressures, flow rates or pressure surges and the related problems
- Extremely high dirt holding capacity and long lifetime of the filter elements

Fact is, that the highest possible oil cleanliness can only be ensured by continuous offline fine filtration – in conjunction with the inline filter.

Easy installation:
The oil is drawn and returned to the system tank.

Your Advantages

A CJC® Oil Care system is a small investment with large effects –
good for your machine and the environment!

Increase machine reliability, productivity and process stability

- Avoid 70 up to 80 % of all breakdowns
- Minimize wear on machine and engine components
- Ensure well-functioning valves and quick machine start
- Provide efficient coolers and constant cooling performance

Accelerate due to high savings, the return on investment

- Achieve approx. 60 % lower maintenance costs:
  - Up to 10 times longer lifetime for oils and components
  - Minimize time- and cost-intensive cleanings (tank, cooler) and system flushings
  - Replace inline filters less frequently

Reduce energy consumption

- Less frictional loss
- Ensure constant and efficient cooling performance
- Less pressure build-up by system pump is necessary because the filter elements of pressure filters saturate much slower

Protect the environment and resources

- Dispose less waste oil and improve the CO_2 footprint
  - 1,000 Litres less waste oil for thermal disposal means 2.6 tons less CO_2 emissions
- Save oil and spare parts and protect so resources
- Use filter material made of 100 % natural fibres – 0 % plastic, 0 % metals
  - CJC® Fine Filter Inserts comply with the circular economy law

Profit from the easy operation and short amortisation time

- Operation without human resources and nearly maintenance-free
- Replace filter inserts independent from machine or engine operation
- Low energy consumption
- > 75 % of the installed CJC® Oil Care Systems have a payback time of less than one year of operation

Save time and costs
in accordance with the environment and resources.

CJC® Oil Care Systems

Installation sizes and modular build-up

CJC® Fine Filter Systems

Applied for the following contaminants:

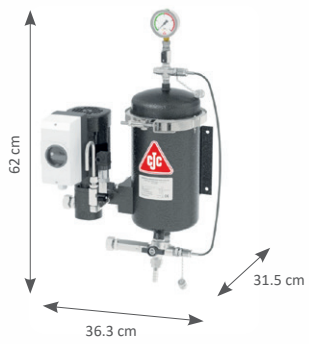
- Particles
- Water
- Oil degradation products *(varnish, resins, sludge)*
- Acid compounds

Standard design

[Subject to technical changes]

Size	Dirt holding capacity	Water holding capacitiy
15/25	≈ 1.1 kg	> 0.5 l
27/27	up to 20 kg	> 1.2 l
27/54	up to 40 kg	> 2.4 l
27/81	up to 60 kg	> 3.6 l
27/108	up to 80 kg	> 4.8 l
38/100	up to 85 kg	> 7.2 l
427/108	up to 160 kg	> 19.2 l
727/108	up to 280 kg	> 33.6 l

Design size 15/25



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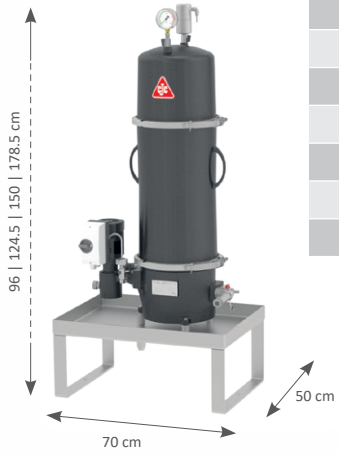

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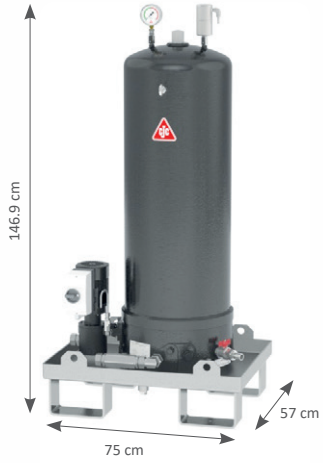

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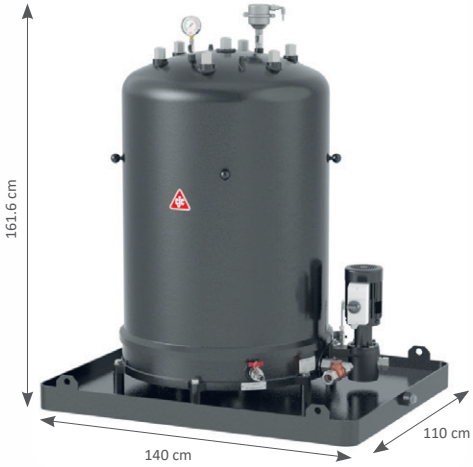


Fluid volume, viscosity, type and amount of dirt ingress,
operating temperature and other parameters influence the dimensioning.

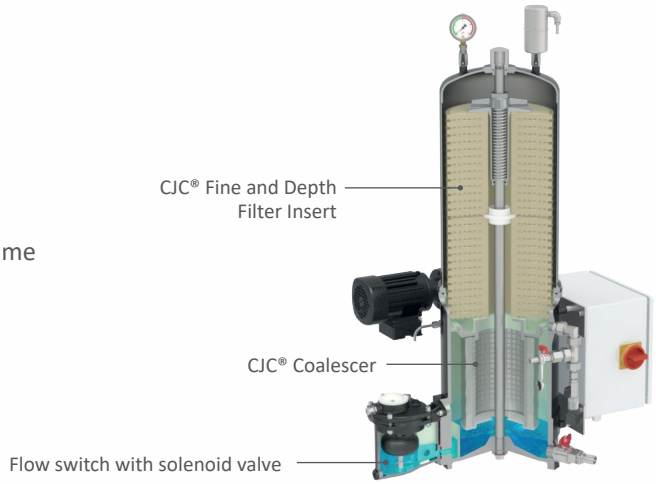
Further CJC® Oil Care Systems

Especially for oils and fluids with very high content of free or dissolved water

CJC® Filter Separators

Applied for the following contaminants:
- Free water
- Particles
- Oil degradation products *(varnish, resins, sludge)*

Ideal for:
- Mineral oils and synthetic fluids with a good demulsification time (< 20 minutes)



CJC® Desorbers

Applied for the following contaminants:
- Free, emulsified and dissolved water

CJC® Desorber removes H_2O solely. Optional a CJC® Fine Filter can be installed to remove particles and oil degradation products.

Ideal for:
- Mineral oils and synthetic fluids with a poor demulsification time (> 20 minutes)
- Emulsions with a water content up to 70 % (= 700,000 ppm)
- Independent from air content in the oil and viscosity
  - applicable up to ISO VG 1000 @ 40 °C
- Doesn't effect the additive package

CJC® Condition Monitoring Systems

Oil sensors and particle counters deliver exact real-time oil and filter condition data. Individually configurable: oil sensors, data transfer and options for automated data interpretation and machine's condition evaluation.

Ideal for:
- Predictive maintenance for plannable and calculable maintenance
- Professional oil analysis programs and condition-based oil changes
- Gapless documentation of oil cleanliness classes required by manufacturers

CJC® Oil Care Systems are individually adjusted to your fluid system and guarantee the highest oil and fluid cleanliness classes.

Particle Content and Oil Cleanliness

Analyse and evaluate oils

Classification according to ISO 4406 (International Organization for Standardization)

The ISO 4406/1999 method for coding the level of contamination of solid particles is a classification system that converts the numbers of counted particles into an ISO class (oil cleanliness level). According to ISO 4407, counts at 5 and 15 µm from the manual particle counting are equivalent to the counts at 6 and 14 µm when using an automatic particle counter calibrated in accordance with ISO 11171.

Amount of particles > specified size		
more than	up to	ISO Code
8,000,000	16,000,000	24
4,000,000	8,000,000	23
2,000,000	4,000,000	22
1,000,000	2,000,000	21
500,000	1,000,000	20
250,000	500,000	19
130,000	250,000	18
64,000	130,000	17
32,000	64,000	16
16,000	32,000	15
8,000	16,000	14
4,000	8,000	13
2,000	4,000	12
1,000	2,000	11
500	1,000	10
250	500	9
130	250	8
64	130	7

(Extract from the currently valid ISO 4406 standard.)

Automatic particle count

From a 100 ml sample of the fluid to be examined, the number of particles > 4 µm, > 6 µm and > 14 µm is determined. The number of particles is then categorized in class codes, indicating the oil cleanliness level.

Example – ISO Code 19/17/14

(typical for new oil):

250,000 up to 500,000 particles ≥ 4 µm,
64,000 up to 130,000 particles ≥ 6 µm and
8,000 up to 16,000 particles ≥ 14 µm
are contained in 100 ml of the tested oil.

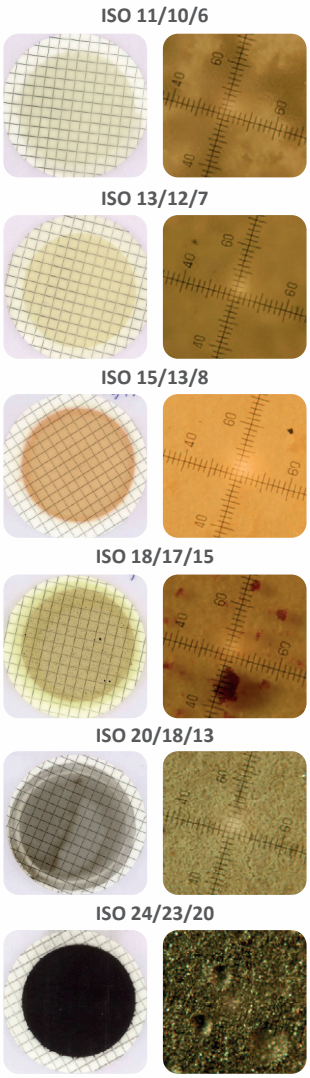
Microscopic analysis

Only the quantity of particles ≥ 5 µm and ≥ 15 µm is determined.

Example – ISO Code 17/14

(typical for new oil):

64,000 up to 130,000 particles ≥ 5 µm and
8,000 up to 16,000 particles ≥ 15 µm
are contained in 100 ml of the tested oil.



Photos of test membranes of various contamination degrees

Categorizing cleanliness levels

Depending on the application, specified oil cleanliness levels for oil systems (ISO 4406) are recommended. The adjacent table shows these minimum requirements in an overview.

(Source: Noria Corporation)

The service life of hydraulic and lubrication system components varies distinctly according to the cleanliness level (ISO 4406).

22 / 20 / 17	19 / 17 / 14	17 / 15 / 12	16 / 14 / 11	14 / 12 / 10
heavily contaminated	medium contaminated e. g. new oil*	lightly contaminated	clean	very clean
not useable in oil systems	low and medium pressure systems	hydraulic and lubrication systems	servo and high pressure systems	all oil systems
50 % of service life	75 % of service life	100 % of service life	150 % of service life	200 % of service life

) Up to **0.05 % of insolubles are permissible in new oil. (DIN 51 524, Part 2)*

New oil often does not correspond with the cleanliness level required by manufacturers for hydraulic and lube oil systems.

Water Content and Varnish-Potential

Analyse and evaluate oils

Karl-Fischer-Titration

With Karl-Fischer-Titration, it is possible to determine the water content in oils. The basis for water determination is the reaction of iodine with water in a dissolution. Two different methods exist:

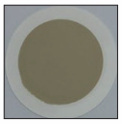
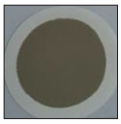
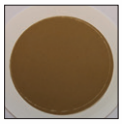
Volumetry:
This method detects larger amounts of water in oil. The measuring ranges from 0.01 % up to 100 % water in oil.

Coulometry:
This method detects the most minor amounts of water in oils. The measuring ranges from 0.001 % up to 5 % water in oil.

Hydraulic oil samples with various water content.
From left: 0.01 % – 0.03 % – 0.06 % – 0.1 % – 0.2 % – 2 % water in oil

MPC-Test (Membrane Patch Colourimetry)

50 ml of the oil to be tested and 50 ml of filtered heptane are mixed and vacuum-filtered through the test membrane. The colourimetric analysis is conducted after the subsequent drying of the membrane. The spectral sensor analyzes the residuals on the membrane. The deposits absorb or reflect the light entirely or partially. The differences between sent and reflected light and the colour intensity in the respective spectral range allow an MPC value to be calculated. The higher the MPC value, the heavier the colour change on the membrane and the greater the potential of the oil to generate deposits.

0–10	11–25	26– 80
Recommended	**Monitor**	**Critical**
Very low content of soft contaminants in the oil	The critical value for the formation of deposits is achieved soon. Values above are indicators for varnish formation	Extremely high amount of soft contaminants in the oil. The higher the MPC value, the higher the content. Deposits (Varnish) are formed and increase until deposits are in the whole oil system and on the components. Oil changes and system flushings are necessary if no offline filter is installed to remove the soft contaminants and deposits.
 *MPC value 4*	 *MPC value 19*	 *MPC value 30*  *MPC value 40*  *MPC value 55*  *MPC value 60*

Further important analysis options:

- Viscosity determination
- Acid content: Detection of neutralization number or base number
- Element analysis
- Particle Quantifier index

Read more
in our booklet "Clean oil guide".

Maximum protection for components and maximum return on investment only if contaminants in the oil are sustainably reduced to a minimum.

Hydraulic Oil – Best Practices

Minimize downtime and failures, reduce maintenance costs and prolong oil lifetime

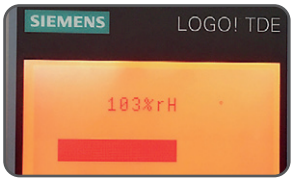
Machining centre, hydrostatic systems

100 up to 3,000 litres of hydraulic oil (mineral oil, synthetic fluids)

- Due to leakages in sealings and components, water with small percentage of cooling lubricant ingress in the lubrication oil system of the hydrostatic system.
- As soon as the water content reaches a specific limit the hydraulic oil becomes semi-fluid, filters clog, and the machine fails.
- Oil systems have to be drained, flushed and re-filled with new oil frequently.

Advantages for the operator after oil drying and care with CJC®

- Oil drying during machine operation
- High saving potential as regular drains, flushings and re-fillings are be omitted
- Increased machine reliability and productivity
- Optimized wear protection for sensitive hydro components
- Drastic savings in accordance to waste oil and CO_2 emissions
- CJC® Oil Care System has been amortized after only two uses



Before – at 15:00 pm the CJC® Desorber starts

Within only 17.5 hours at 8:30 am the oil was dried

Waldrich Cay 3,000 Litres HLPD 46	Before	With CJC®	Savings
Disposal of waste oil	9,000 litres	-	9,000 litres + > 23 tons CO_2
Flushing and re-filling	9,000 litres	-	≈ 13,140 EUR
Expenditure	2 persons, 8 hours	-	≈ 960 EUR
Machine breakdowns			≈ 1,100 EUR
Savings in this case			**> 15,200 EUR**

Head of maintenance: *„I am all around satisfied with the investment. The oil is dried very quickly without machine downtime. Therefore, we can continue the production, have time to find the cause for the water ingress, save oil changes, reduce the waste oil disposal and protect the oil quality."*

4 hydraulic presses (800–1,200 t),

2 x 3,000 litres, 2 x 6,000 litres, hydraulic oil ISO VG 46

- The hydraulic oil in all four presses was heavily loaded:
  - particle content: 23/19/15 up to 25/20/12 (ISO 4406)
  - varnish-potential: very high, MPC value: 59 up to 78
- Increased wear due to abrasive particles and sticky, varnish-like deposits on system components and in the tank
- Hydraulic oil is insufficient for sensitive components

Advantages for the operator after fine filtration and care with CJC®

- Oil cleanliness drastically improved within a short time:
  - particle content: Ø 16/14/10 (ISO 4406)
  - varnish-potential: very low, MPC value < 10
- Oil changes and system flushings on all four presses avoided – oil persistently clean also after further 12 months in use.
- Optimized protection for the pumps, valves and cylinders against wear and varnish deposits
- Optimized protection for the oil against premature additive depletion and accelerated oil ageing/oxidation

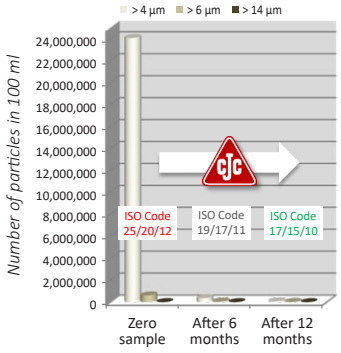
Savings – economical and ecological:

- > 18,000 litres of waste and new oil for 19,260 EUR
- > 86 tons less CO_2 emissions

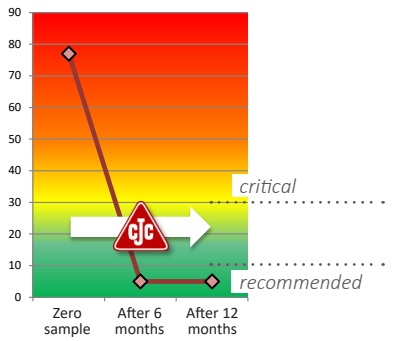
only due to the avoided oil changes (4 presses)

CO_2 ≈ 4.8 kg per 1 Litre of oil

Particle content according to ISO 4406



Varnish-potential – MPC value



Hundreds of application studies from different industries verify the success of CJC®!

Lube Oil – Best Practices

Reduce costs by fine filtration instead of oil changes and simultaneously optimize protection against wear

Cement mill, fixed and floating bearing

700 Litres of lubrication oil Mobil Gear 600 XP 320

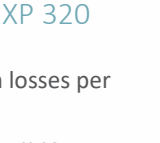
- 4 pumps have to be changed per year – production losses per unscheduled breakdown: 800 tons
- High maintenance expenditure and costs for new pumps (personnel and spare parts: 5,652 EUR/year)

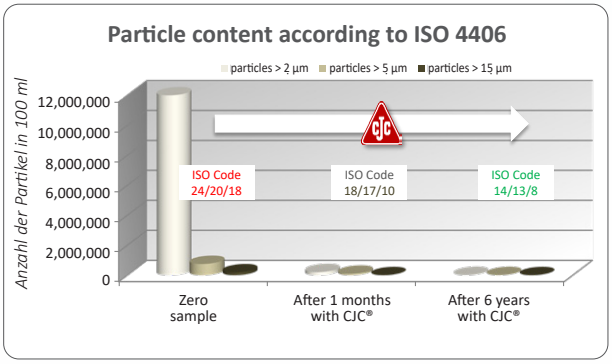
Advantages for the operator after fine filtration and care with CJC®

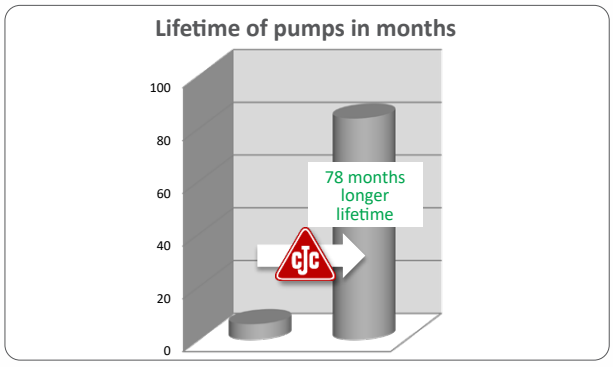
- Lifetime of pumps prolonged from 6 months to > 7 years
- Improved mill's reliability, availability and productivity
- Significant fewer production losses because of fewer unscheduled breakdowns

Savings – economical and ecological:

- > 42,000 EUR saved in 7.5 years only due to the longer lifetime of the pumps
- > 700 litres of oil and > 3.3 tons of CO_2 emissions saved per avoided oil change







Biogas engine MAN 2842, 300 kW

60 Litres of gas engine oil Mobil Pegasus 710

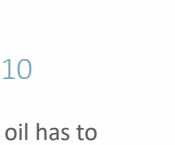
- Every 450 to 550 running hours (RHs), the engine oil has to be changed.
- Viscosity, acid number (TAN), oxidation and nitration values deteriorate quickly

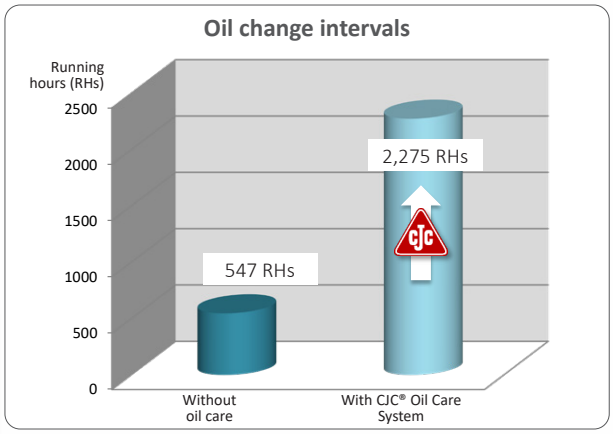
Advantages for the operator after fine filtration and care with CJC®

- 76 % longer oil lifetime
- Oil condition values are after 2,275 RHs better than previously without CJC® Oil Care System after only 450–550 RHs
- Only after 2,275 RHs the limit in accordance to oxidation is reached and makes an oil change necessary

Savings – economical and ecological:

- > 1,900 EUR,
- > 660 litres of oil and
- > 3.1 tons of CO_2 emissions per year saved, only due to the longer oil change intervals





	Before	Test with CJC®
Oil lifetime, *hours*	547	2,275
Viscosity 40°C, *cSt*	167	161
TAN, *mg KOH/g*	5.08	4.20
Oxidation, *abs/cm*	27	29
Nitration, *abs/cm*	27	10
IpH	4.40	5.37

Viscosity of new oil: 128 cSt @ 40°C
Oxidation rate, max. = 30 (according to Mobil Oil)

Independent for which oil system in the industrial or mining sector, in power plants or in wind turbines – CJC® offers the optimum oil care system.

Gear Oil – Best Practices

Avoid unnecessary oil changes and thus, protect resources and the environment

Cement mill

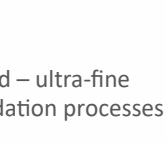
2,000 Litres gear oil Shell Omala F320

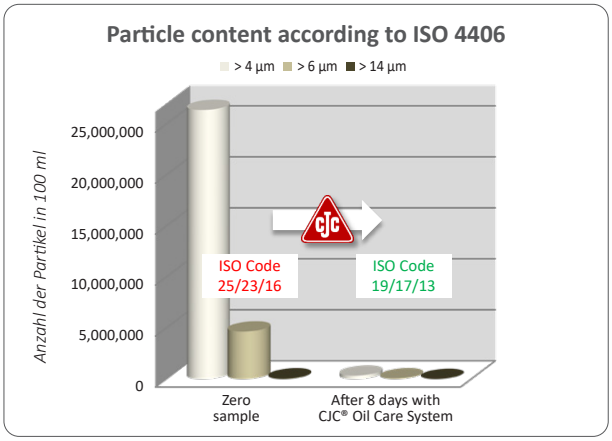
- The gear oil was heavily contaminated and oxidated – ultra-fine dust particles, metal particles, water and oil degradation processes impact the oil.
- When such extremely contaminated oils are used the lifetime of components are reduced by 50 %. *(Source: Noria Corp.)*

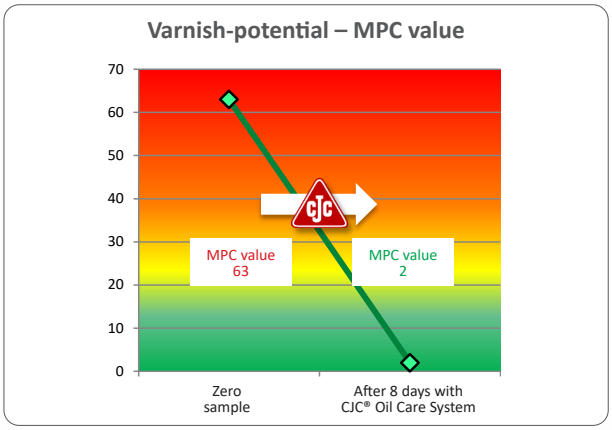
Advantages for the operator after fine filtration and care with CJC®

- Oil cleanliness comparable with new oil, significant improved wear protection
- MPC value persistently reduced < 5, oil degradation products and oxidation residues removed, deposits on the componentes and in the tank are avoided
- Water content reduced from 251 ppm to 49 ppm – dry gear oil is the best protection against cavitation, corrosion and foam
- Clean oil is able to dissolve the deposited varnish from surfaces and components and can so clean the whole oil system from varnish

Savings – economical and ecological:
- > 2,000 litres of waste oil and
- > 9.6 tons of CO_2 emissions saved only due to the avoided oil change





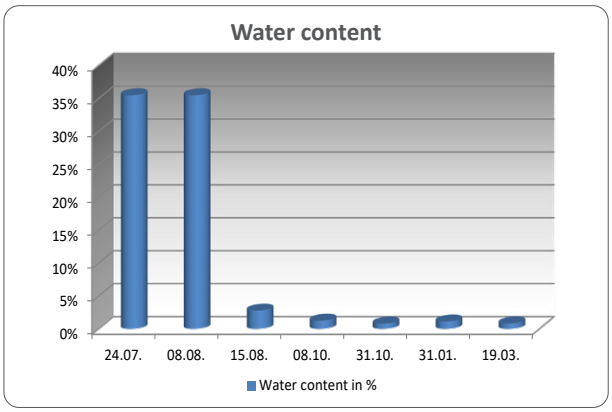


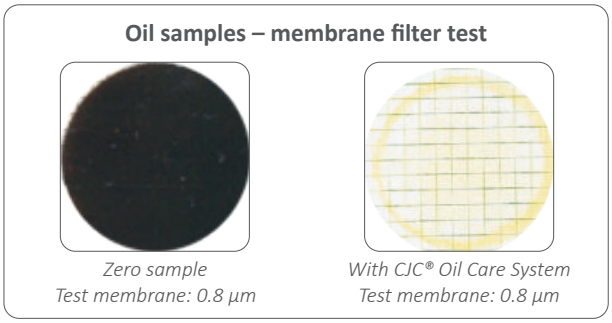
Gear, warm rolling mill, steel plant

- Gearbox breakdowns, high component wear and short oil lifetime caused by an enormous amount of dirt and water in the oil
- Water content: ≈ 35.5 %
- Water accelerates oil degradation, and therefore the oil was not only contaminated with solid particles, but also with reaction products caused by the oil degradation.

Advantages for the operator after fine filtration and care with CJC®

- Since the installation of the CJC® Oil-Care System, no oil-related breakdowns and production downtime occurred.
- Spare part and maintenance costs significantly reduced.
- Water content reduced to 0.01 %.
- After fine filtration particle content measurable – oil cleanliness 18/15 (ISO 4407) achieved.
- Simultaneously, the number of soft contaminants reduced immensely (compare membrane colours).





At www.cjc.de, you will find convincing references.

Other Oils and Fluids

Improve processes and increase productivity

Storage tank, gas turbine

10,000 m³ Diesel

- Three times per year, the gas turbine is operated with diesel for 3–5 days to ensure independent operation when shortages in the gas supply are realized
- The with water and particles heavily loaded diesel was not suitable for use in a gas turbine.

Advantages for the operator after fine filtration and care with CJC®

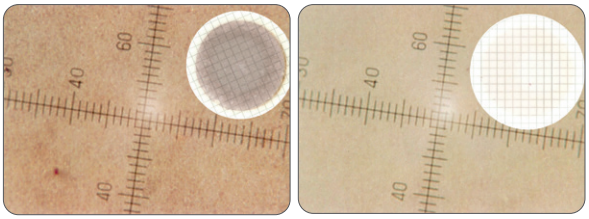
- The diesel is persistently dry and clean because of the continuous care (24/7). So the operation of the gas turbine is ensured in an emergency when the gas supply is interrupted.
- 1,500 Litres of water separated with the first filter pass
- 40 % particles > 2 µm removed with the first filter pass
- Sodium and potassium content reduced
- Microorganisms and bio sludge in the tank minimized

Savings – economical and ecological:

- 10,000 m³ diesel saved and re-treated

CO_2 ≈ 4.8 kg per 1 Litre of oil

Oil samples – membrane filter test



Zero sample
Water content: 702 ppm
Cleanliness class: 15/14/11

After the first filter pass
Water content: 71 ppm
Cleanliness class: 15/13/10

Zero sample *After the first filter pass*

Machining centre, cooling lubricant system

Machining oil: Zeller + Gmelin Multicut Basic 20 Extra

- After the machining process, the oil is heavily contaminated with particles and water (1,000–8,000 ppm water content).
- The water is emulsified in the oil (appearance milky and cloudy)
- 2–4 IBC tanks of machining oil are collected per month which must be disposed of cost-intensively

Advantages for the operator after fine filtration and care with CJC®

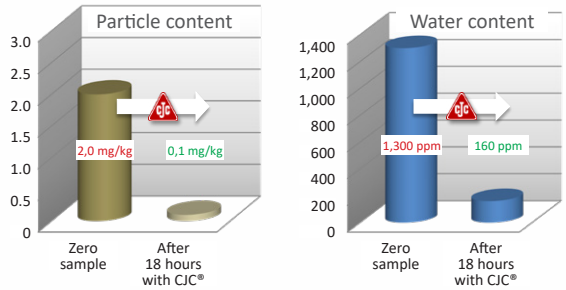
- The machining oil was dried and cleaned within 18 hours at the IBC tanks (appearance clear and translucent)
- The oil can be recovered entirely on-site (to close the cycle of materials for environmental certificates)
- 24–48 IBC tanks were recovered per year – depending on utilization of production capacity

Savings – economical and ecological:

- 30 % less oil consumption per year
- ≈ 19,200–38,400 litres less waste oil per year
- ≈ 92–184 tons less CO_2 emissions per year

CO_2 ≈ 4.8 kg per 1 Litre of oil

Development with CJC® Cooling Lubricant Filter



Oil samples
left: zero sample, right: with CJC® Cooling Lubricant Filter

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.

Contact us! Mail or call us:

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filtration@cjc.de

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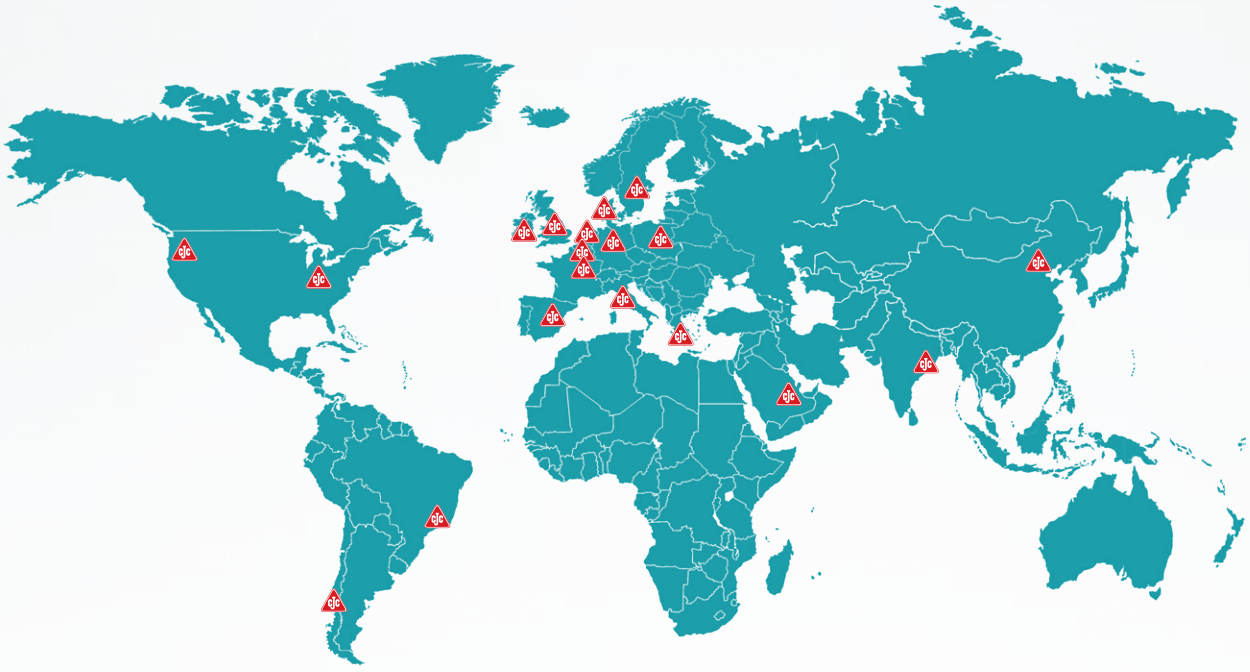

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