CJC™ Fine Filter Technology

Oil and Fuel Care On Board

suited for:

- *Hydraulic Oil*
- *Gear Oil*
- *Lube Oil*
- *Leak Oil*
- *Gas Oil, MDO*

Clean Oil - Bright Ideas

Karberg & Hennemann

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

On-Board Applications

Maintenance at sea saves downtime in harbour

On-board repair and servicing hydraulic components at sea is costly and time consuming. These costs can be reduced considerably through continuous oil care. A CJC Fine Filter system removes generated dirt, water and varnish from the oil in on-board hydraulic systems, gears and lube oil circuits - and a CJC Filter operates continuously and virtually maintenance free.

Oil care from stem to stern

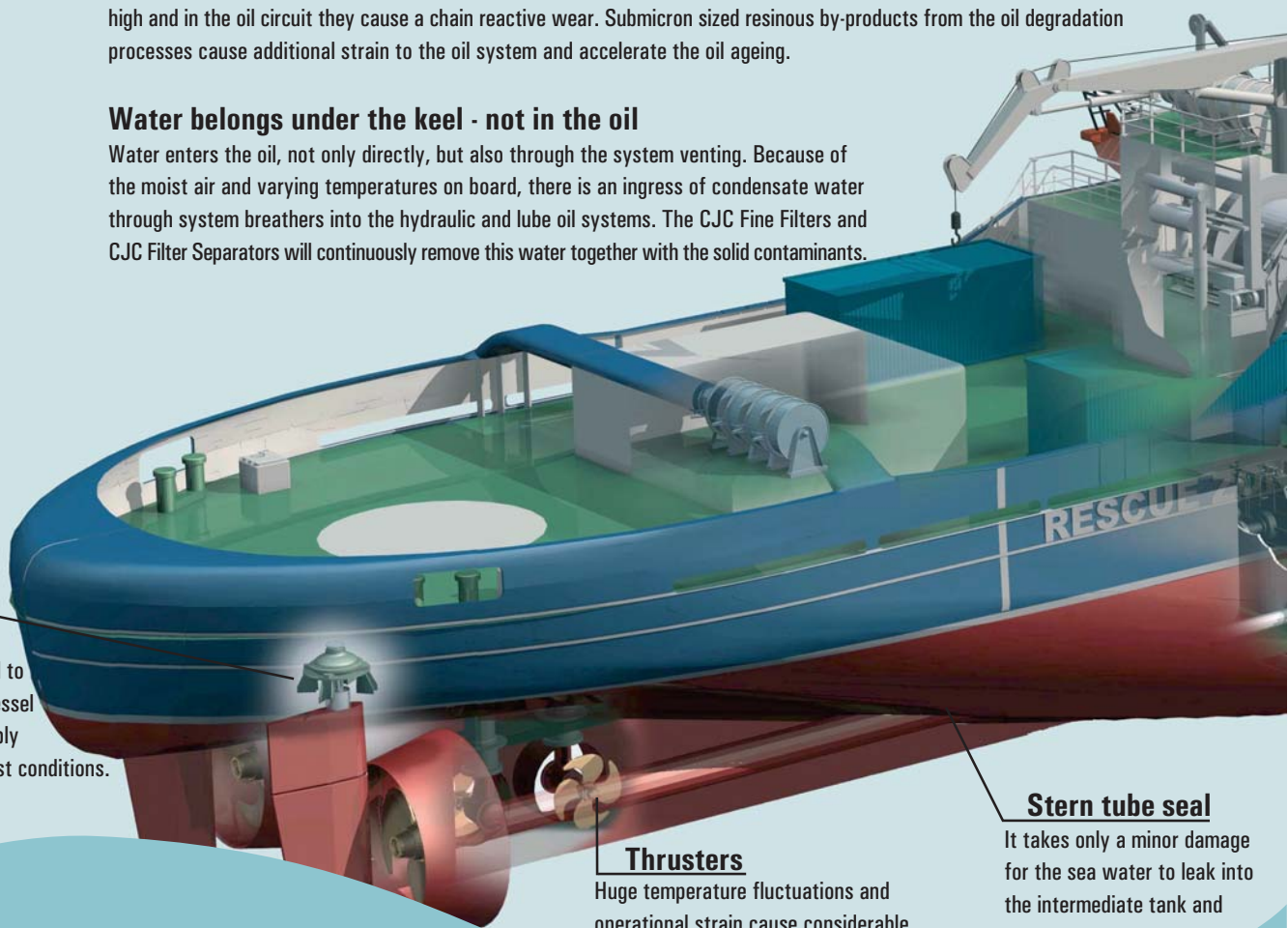
Filtration and conditioning of diesel fuel is self evident. However, oil care on on-board hydraulic and lubrication systems is equally important. Continuous oil care will prolong the service life considerably on all types of on-board oil systems: Hatch covers, cranes, winches, ramps, thrusters, stabilisers and steering gears. CJC Fine Filters and CJC Filter Separators permanently and constantly retain solid contaminants and water.

Small particles, big damage

Particles $< 5\ \mu m$ in size are particularly harmful to lube and hydraulic systems. The amount of $< 5\ \mu m$ particles is very high and in the oil circuit they cause a chain reactive wear. Submicron sized resinous by-products from the oil degradation processes cause additional strain to the oil system and accelerate the oil ageing.

Water belongs under the keel - not in the oil

Water enters the oil, not only directly, but also through the system venting. Because of the moist air and varying temperatures on board, there is an ingress of condensate water through system breathers into the hydraulic and lube oil systems. The CJC Fine Filters and CJC Filter Separators will continuously remove this water together with the solid contaminants.



Steering Gear

A well functioning steering gear is critical to the operation of the vessel and it must work reliably even under the roughest conditions.

Thrusters

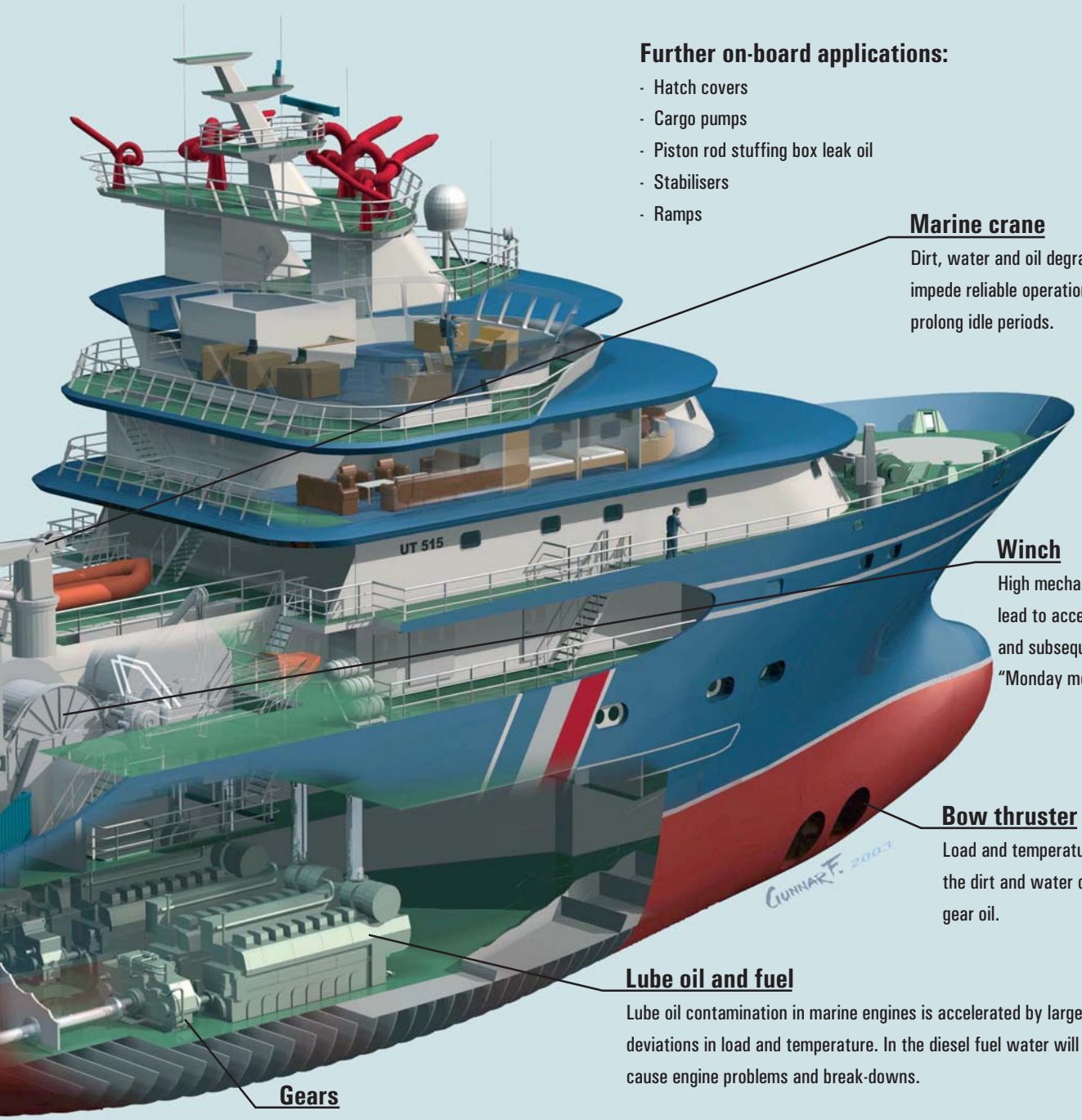
Huge temperature fluctuations and operational strain cause considerable contamination of the thruster gear oils.

Stern tube seal

It takes only a minor damage for the sea water to leak into the intermediate tank and contaminate the oil.

We would be pleased to send you our application studies about our customers' successful use of CJC™ Fine Filters.

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by



Further on-board applications:

- Hatch covers
- Cargo pumps
- Piston rod stuffing box leak oil
- Stabilisers
- Ramps

Marine crane

Dirt, water and oil degradation by-products impede reliable operation - and break-downs prolong idle periods.

Winch

High mechanical and thermal loads lead to accelerated oil degradation - and subsequently to "Monday morning syndrom".

Bow thruster

Load and temperature changes increase the dirt and water contamination of the gear oil.

Lube oil and fuel

Lube oil contamination in marine engines is accelerated by large deviations in load and temperature. In the diesel fuel water will cause engine problems and break-downs.

Gears

The reduction gear of the main engine is often subjected to severe, abrasive wear - and consequently the gear oil is heavily contaminated.

We don't know the exact lifetime of CJC™ Filters.

We have been manufacturing them for only 50 years.

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

Removal of Dirt, Water and Varnish

Oil care is a must

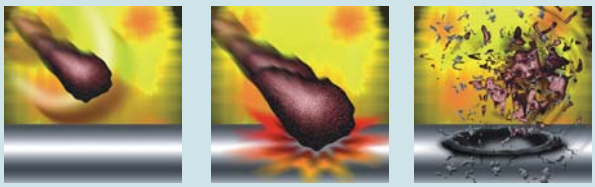
because up to 80% of all machinery repair and maintenance costs can be tracked back to contaminated system fluids. This has been substantiated by several independent analyses. It is not only the reduced, specific properties of the oils that cause these, preventable, costs. The main cause is wear induced by contamination through solid particles, water and varnish.

The most common types of wear

Particles

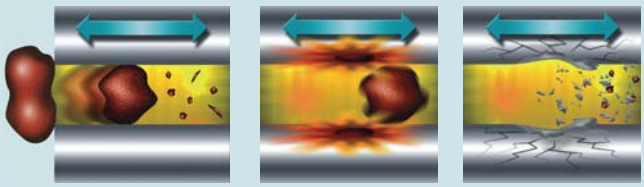
Erosion

Small particles in high velocity oil flow beat against metal surfaces and edges, breaking off more particles (sand blasting effect).



Abrasion

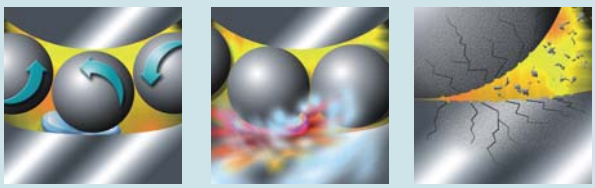
Hard particles jammed between moving parts destroy the surfaces (abrasive wear).



Water

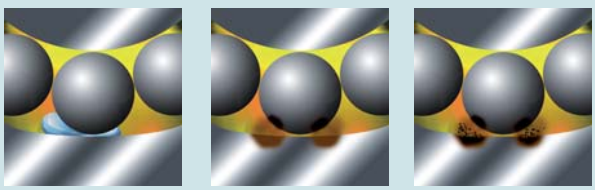
Cavitation

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



Corrosion

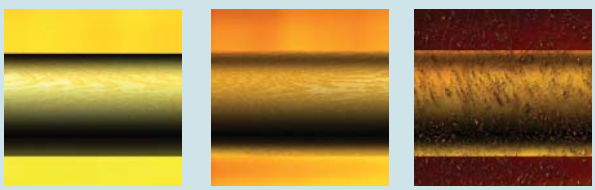
Water or chemical contaminants in the oil cause rust or chemical reactions, which deteriorate the component surfaces.



Varnish

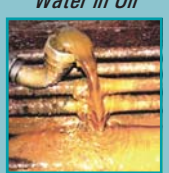
Oil degradation

High temperatures, oxidation and hydrolysis age the oil. The resinous by-products of the degradation process deposit on metal surfaces.

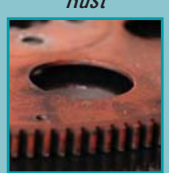


Abrasion

Water in Oil



Rust



Varnish

Off-line Oil Care

Particles

How do particles enter the oil?

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 generate more contamination (sand blasting effect).

Grooving through abrasion (bearing ring)

Where on board? ***Gears, engine, bow thrusters***

Water

How does water enter the oil?

It is very difficult to avoid water contamination of the oil. Humid air enters the system via breathers and is absorbed by the oil. Varying temperatures enhances this process. Cooling water leaks and similar water ingress are also common sources of oil contamination.

Corrosion (roller bearing)

Corrosion (shaft)

Where on board? ***Thrusters, stern tubes, fuel***

Varnish

How do oil degradation by-products get into the oil?

Oil degradation by-products from the ageing of the oil are found in both lubrication and hydraulic systems. Main causes are oxidation (oxygen), hydrolysis (water) and thermal degradation caused by excessive temperatures - and more often than not all three factors act in common. The varnish-like by-products deposit on the metal surfaces in the system and the solid particles are caught by this sticky substance.

Varnish deposits (steering gear)

Where on board? ***Hatch covers, winches, cranes***

CJC Fine Filters and CJC Filter Separators

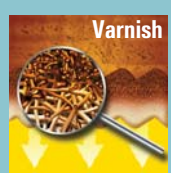
not only retain solid particles and water, but remove also oil degradation by-products. These degradation by-products, also called “soft contaminants”, are the precursors to the sticky varnish that deposits on metal surfaces. They cannot be removed by traditional filtration as they behave like a fluid in a fluid.

CJC Fine Filters and CJC Filter Separators can retain the degradation by-products through a combination of absorption and adsorption.

CJC™ Fine Filter inserts have room for

between the fibres

in the fibres



on the fibres

In-line - Off-line

Limitations and Advantages

Limitations of in-line filtration

In-line 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 only seldomly be achieved with in-line filters. Further, in-line filters are subjected to a constant, operation caused strain that may lead to material fatigue and pore structure damages. That may in turn allow larger particles to pass the filter or to be crushed into smaller particles when hitting the filter element. The in-line filter will not be able to retain these small particles.

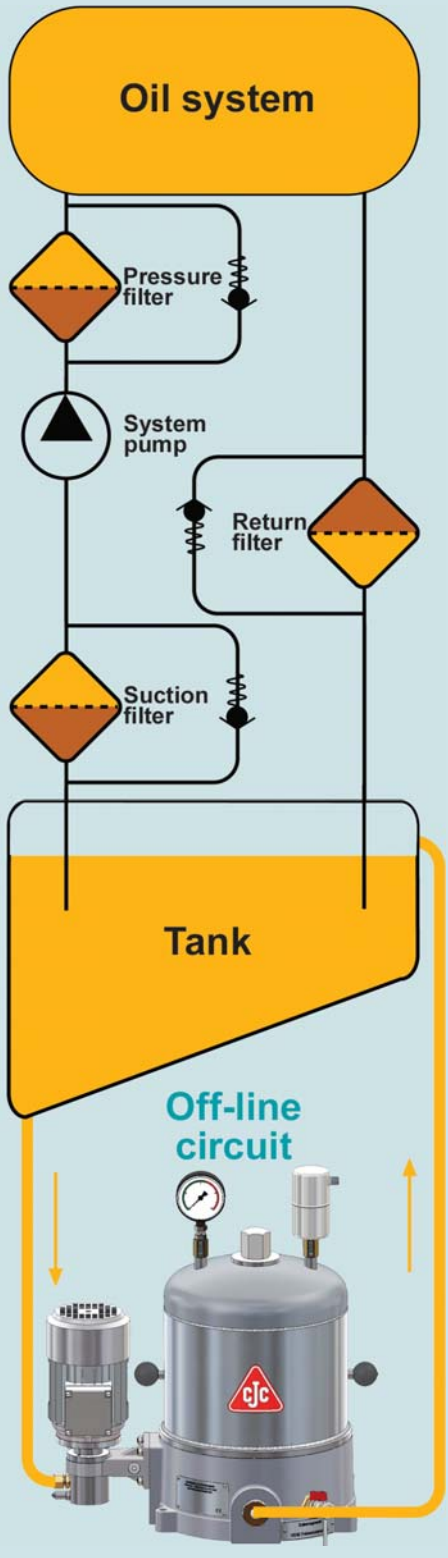
Additional Off-line Filtration

Only an additional off-line fine filtration can - in conjunction with the in-line filter - ensure a continuously high oil cleanliness. True fine filtration is only possible in off-line circuits because the off-line principle allows a perfect fluid flow rate / filter size relation. The oil can flow so slowly through the filter insert that even the smallest contaminant particles will deposit in the depth of the filter material. For a permanently high cleanliness it is recommended to filtrate the fluid continuously off-line.

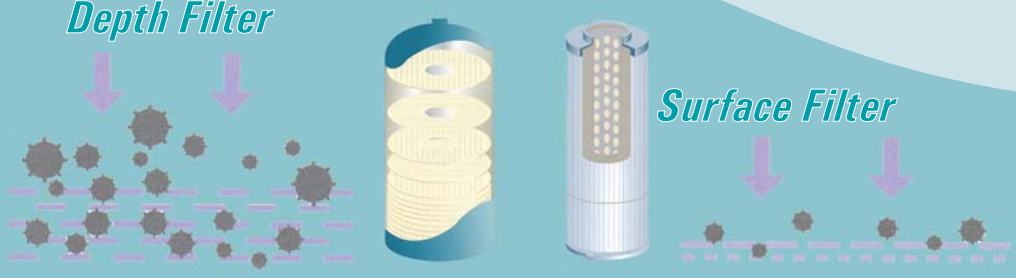
The diagram (right) shows the set-up of continuous oil care in a separate circuit with its own pump. The CJC Filter unit is connected to the system tank, drawing oil from the lowest point of the tank. After passing the Fine Filter the oil is returned to the tank at zero pressure.

Advantages of Off-line Filtration

Continuous off-line filtration maintains the contamination at a level so low that the hydraulic components are not harmed. Because of the off-line principle, this type of oil care works independently of the main system operation. The separate pump of the CJC Fine Filter also prevents pressure variations over the filter.



Off-line filtration diagram



ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

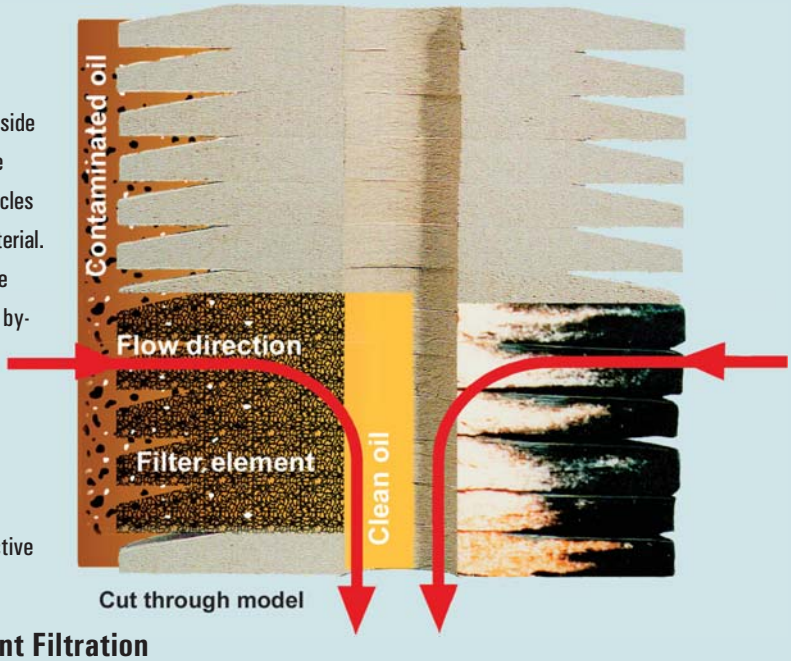
CJC™ Fine Filter Inserts - a Closer Look

Depth Filter Element = Efficient Filtration

The CJC Fine Filter inserts utilized in the CJC Fine Filter units are all depth filters with a filtration degree as fine as $< 1\ \mu m$. Studies made by independent scientific institutes (e.g. RWTH Aachen and TÜV Essen) confirm that CJC Fine Filter inserts ensure the best possible oil cleanliness according to ISO 4406 (down to code 10/3) and NAS 1638 (down to class 1). Also, the organic fibres of the CJC Fine Filter inserts have important advantages compared to other filter materials.

The Principle

The oil flows radially through the CJC Fine Filter insert, from the outside towards the inside. Throughout the flowpath the microscopic dirt particles deposit in the depth of the filter material. Water particles are absorbed by the cellulose fibres and oil degradation by-products are adsorbed by the polar spots of the cellulose maze.



Cut through model

The Additives

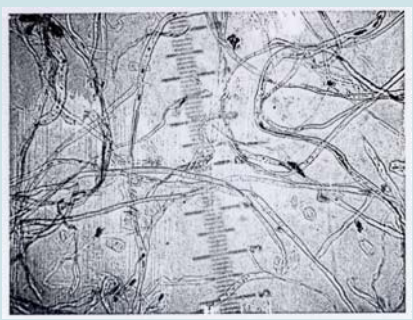
The filter material has no adverse chemical effect on oil additives. Active additives are not retained.

Long Filter Path - Efficient Filtration

The longer the system fluid is in contact with the filter material, the more efficient the filtration. This is why the depth filter inserts in the CJC Filter systems provide a particularly long filter path.

Cellulose: The Ideal Adsorption Material

Because of their structural design the CJC Fine Filter inserts can be described as a maze-like, very fine meshed 3-dimensional sieve with microscopic countlessly branched channels. 75% of the volume of the insert consists of a structure of cavities, which explains the very high dirt holding capacity. An important advantage of the extremely absorbent filter material is that it permanently retains water. By-products from oil degradation deposit and stay on the polar areas of the filter fibres.


Microscopic view of the Fine Filter material

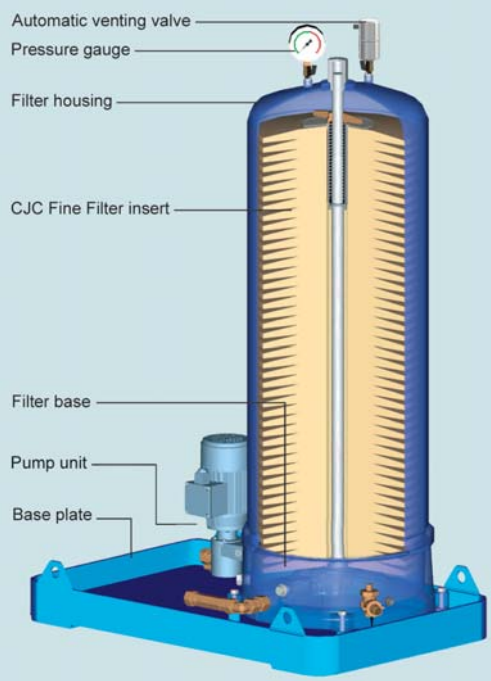
Disposal

Used CJC Fine Filter inserts can be disposed of according to the (German) Waste Product Key 150202. Because the filter inserts consist of organic materials only, no raw material based separation is required. Thus, they also comply with the requirements of DIN EN ISO 14001:2005 “Environmental Management Systems”.

"Filtration efficiency is basically a function of the fluid's time of contact with the filter material."

Function and Advantages

Sturdy and Low-Maintenance Design



Due to the compact design installation of CJC Filters is easy, even where space is limited, and oil cleanliness can be ensured for all on-board fluid systems. The CJC Fine Filter systems are recognised for their long service life and reliability.

The gear pump of the CJC Fine Filter system draws the contaminated oil from the fluid system tank and pumps it slowly at a constant rate through the Fine Filter insert. The oil passes the insert from the outside inwards, and leaves the insert through the centre of the filter base, clean and dry.

A pressure gauge on the filter housing indicates when filter insert replacement is due. During insert replacement the CJC Fine Filter unit is briefly stopped, but the main fluid system remains in operation.

In case the filter insert is completely saturated (reaching maximum pressure drop) a built-in valve by-passes the oil back to the pump inlet port.

Reducing Purchase and Waste Disposal Costs

Fine filtration prolongs the service life of the system fluid considerably. The positive effects of this are reduced purchase costs for new fluid and minimized disposal costs for used fluids.

Minimizing Downtime

The predominant cause for machine break-downs and standstill periods are contaminated system fluids. Continuous fine filtration reduces the number of standstills. Maintenance costs decrease and unplanned service and off-hire periods are minimized.

Protecting Hydraulic Components from Corrosion

In many hydraulic systems the ingress of condensate water is unavoidable. CJC Fine Filter inserts remove this water so corrosion of the hydraulic components is prevented.

Continuous Filtration

A CJC Fine Filter operates by means of its own pump, with little power consumption and independently of the main system. This means that the system tank oil is continuously filtered, even when the main hydraulic system is not in operation.

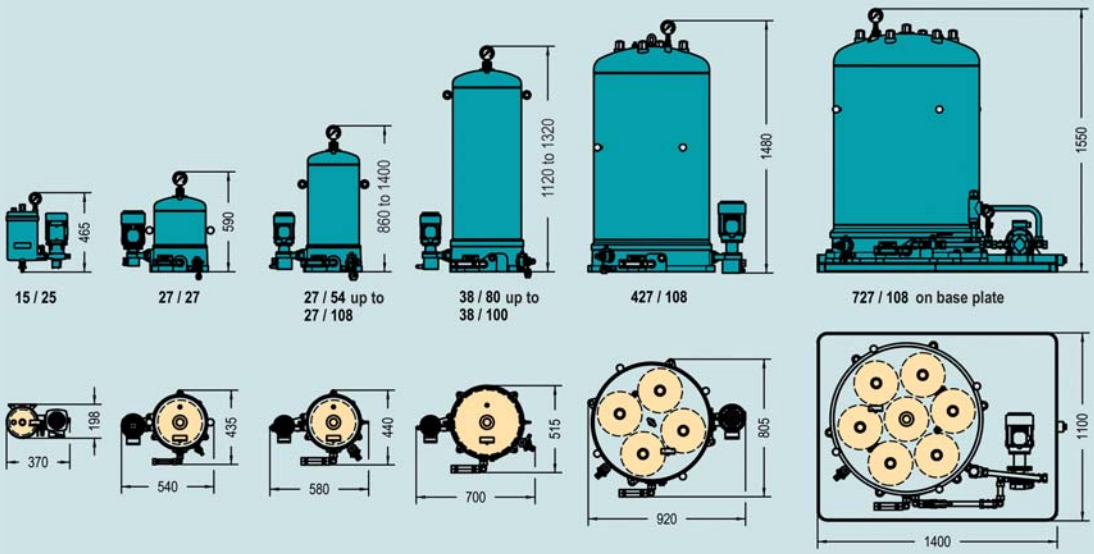
Prolonging the in-line filter's service life

The very high dirt holding capacity of the CJC Fine Filter inserts reduces the strain on the in-line full flow filter, hence prolonging its service life.

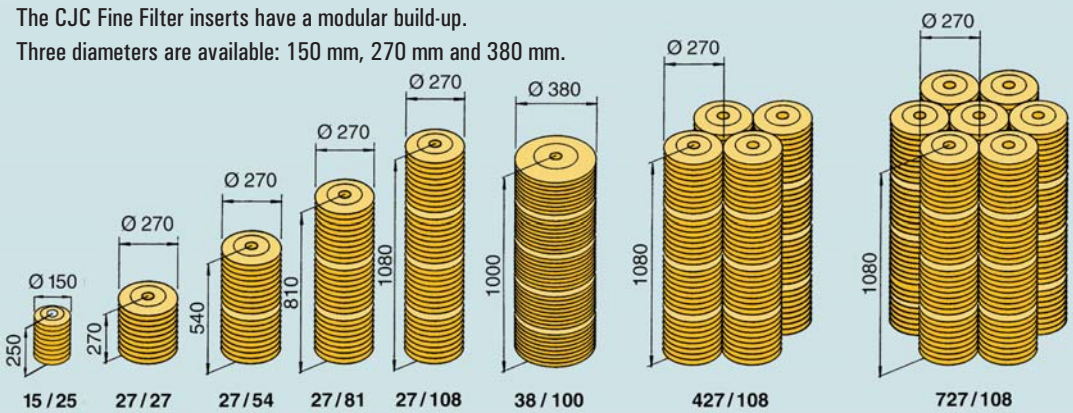
Easy installation:
The oil is drawn from and returned to the system tank.

Modular Build-up

For any Amount of Dirt



The CJC Fine Filter inserts have a modular build-up.
Three diameters are available: 150 mm, 270 mm and 380 mm.



The basis for dimensioning filters is the total system fluid volume. The table indicates the standard module sizes for mineral and synthetic hydraulic and lubrication fluids with viscosities below ISO VG 46 and oil operational temperatures of 40°C. Variations in viscosity, temperature, degree of contamination etc. may influence the dimensioning.

		CJC Fine Filter insert			Holding Capacity *				
Oil Volume max. [l]	CJC Fine Filter Size	Type	Volume [l]	Surface [m²]	Dirt [kg]	Water [l]	Volume [l]	Pump Capacity [l/min]	Power Output [kW]
300	15/25	HDU	4	0,38	0,3	0,4	6	0,35 - 0,7	0,08
700	27/27	HDU	12	1,13	2,0	1,2	18	0,75 - 1,5	0,09 - 0,12
1500	15/25	B	3	0,57	0,4	0,3	6	0,35 - 6,0	0,08 - 0,18
1500	27/54	HDU	24	2,26	4,0	2,4	35	0,75 - 3,0	0,09 - 0,18
2200	27/81	HDU	36	3,39	6,0	3,6	60	1,5 - 4,5	0,12 - 0,18
3000	27/27	B	9,6	2,05	2,0	0,9	18	0,75 - 9,0	0,09 - 0,25
3000	27/108	HDU	48	4,52	8,0	4,8	80	1,5 - 6,0	0,12 - 0,18
5000	27/54	B	19,2	4,10	4,0	1,8	35	3,0 - 16,0	0,25 - 0,55
7000	27/81	B	28,8	6,15	6,0	2,7	60	4,5 - 21,0	0,18 - 0,55
10000	27/108	B	38,4	8,20	8,0	3,6	80	6,0 - 32,0	0,18 - 0,55
12000	427/108	HDU	192,0	18,08	32,0	19,2	320	6,0 - 21,0	0,18 - 0,55
20000	727/108	HDU	336	31,64	56,0	33,6	621	21,0 - 40,0	0,55 - 1,10
40000	427/108	B	153,6	32,80	32,0	14,4	320	16,0 - 65,0	0,55 - 1,55

* test dirt: spherical iron oxide pigments - average particle size of 0.5 µm

We are pleased to assist you with the dimensioning.

Feel free to contact us!

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

Analysing and Evaluating Oil

Setting the Required Cleanliness Level

Various literature recommends the following oil cleanliness (ISO 4406 / NAS 1638) for certain applications:

22 / 20 / 17 12	19 / 17 / 14 9	17 / 15 / 12 7	16 / 14 / 11 6	14 / 12 / 10 4
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

Prolonging the Service Life of System Components

The service life of hydraulic and lubrication system components varies distinctly according to the cleanliness level (ISO 4406 / NAS 1638).

22 / 20 / 17 12	19 / 17 / 14 9	17 / 15 / 12 7	16 / 14 / 11 6	14 / 12 / 10 4
50 % of nominal service life	**75 % of nominal service life**	**100 % of nominal service life**	**150 % of nominal service life**	**200 % of nominal service life**

Correct Oil Sampling

The classification of an oil cleanliness code is usually done by means of an automatic particle counter. The relevant procedure is described in DIN ISO 5884.

To get a reliable analysis result it is very important that the oil sampling is done correctly. Sampling at the wrong place and with inadequate or dirty equipment will corrupt the analysis result. An incorrect sampling procedure can lead to large dust particles being drawn into the sample, affecting the analysis dramatically. Sampling bottles should only be opened very briefly before and after the sampling. Bottles must be of glass and pre-cleaned according to DIN ISO 5884.

On request we can supply you with a sampling information sheet as well as clean sampling bottles.

Our Laboratory

offers fast and precise analyses of oil samples to support our customers' trend monitoring. Laser particle counters are used for precise classification of oil samples according to ISO 4406 or NAS 1638.

Important Additional Analyses

Water content analysis according to DIN 51 777 (Karl Fischer method)

Viscosity analysis according to DIN 51 366

Solid contaminants analysis according to DIN 51 592 and ISO 4405

Microscopic analysis

Spectroscopic analysis to determine origin of contaminants

**0,05 %*

of insolubles is permissible in new oil. *(DIN 51 524, part 2)*

Oil Cleanliness Codes and Their Meaning

Classification Analyses

Various analysis methods are used of which the most important are

- ISO 4406 (International Organisation of Standard) and
- NAS 1638 (National Aerospace Standard).

ISO 4406 Classification

When using **automatic particle counters** the number of particles ≥ 4 µm, ≥ 6 µm and ≥ 14 µm in a 100 ml sample are counted. The three particle amounts are then categorised in class codes, which equals the cleanliness class.

If **microscope analysis** is used only particles ≥ 5 µm and ≥ 15 µm are counted.

ISO 4406 Cleanliness Class Code	Number of particles in 100 ml of fluid					
	≥ 4 µm		≥ 6 µm		≥ 14 µm	
	more than	and up to	more than	and up to	more than	and up to
24 / 21 / 19	8.000.000	16.000.000	1.000.000	2.000.000	250.000	500.000
23 / 20 / 17	4.000.000	8.000.000	500.000	1.000.000	64.000	130.000
22 / 19 / 16	2.000.000	4.000.000	250.000	500.000	32.000	64.000
21 / 18 / 15	1.000.000	2.000.000	130.000	250.000	16.000	32.000
20 / 17 / 14	500.000	1.000.000	64.000	130.000	8.000	16.000
19 / 16 / 13	250.000	500.000	32.000	64.000	4.000	8.000
18 / 15 / 12	130.000	250.000	16.000	32.000	2.000	4.000
17 / 14 / 11	64.000	130.000	8.000	16.000	1.000	2.000
16 / 13 / 10	32.000	64.000	4.000	8.000	500	1.000
15 / 12 / 9	16.000	32.000	2.000	4.000	250	500
14 / 11 / 8	8.000	16.000	1.000	2.000	130	250
13 / 10 / 7	4.000	8.000	500	1.000	64	130
12 / 9 / 6	2.000	4.000	250	500	32	64
11 / 8 / 5	1.000	2.000	130	250	16	32
10 / 7 / 4	500	1.000	64	130	8	16
9 / 6 / 3	250	500	32	64	4	8
8 / 5 / 2	130	250	16	32	2	4
7 / 4 / 1	64	130	8	16	1	2

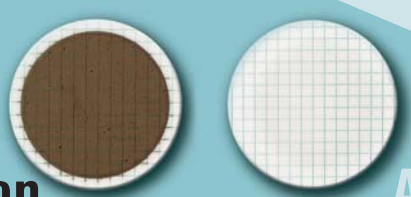
Example: Oil cleanliness code 18/15/12 means that the oil contains 130,000 up to 250,000 particles ≥ 4 µm, 16,000 up to 32,000 particles ≥ 6 µm and 2,000 up to 4,000 particles ≥ 14 µm.

NAS 1638 Classification

Particles are classified in 5 size ranges. The number of particles (in 100 ml) per size range is counted. According to the classification of each size range the overall cleanliness class code is defined (see table).

Number of particles in 100 ml of fluid														
Size category [µm]	NAS 1638 Cleanliness Class Code													
	00	0	1	2	3	4	5	6	7	8	9	10	11	12
5 - 15	125	250	500	1.000	2.000	4.000	8.000	16.000	32.000	64.000	128.000	256.000	512.000	1.024.000
15 - 25	22	44	88	178	356	712	1.425	2.850	5.700	11.400	22.800	45.600	91.200	182.400
25 - 50	4	8	16	32	63	126	253	506	1.012	2.025	4.050	8.100	16.200	32.400
50 - 100	1	2	3	6	11	22	45	90	180	360	720	1.440	2.880	5.760
> 100	0	0	1	1	2	4	8	16	32	64	128	256	512	1.024

Example: Oil cleanliness code 6 means that 100 ml of oil contain up to 16,000 particles in the 5 to 15 µm range, up to 2,850 particles in the 15 to 25 µm range, up to 506 particles in the 25 to 50 µm range, up to 90 particles in the 50 to 100 µm range and up to 16 particles > 100 µm.



Before Filtration **After Filtration**

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

Fuel Conditioning

Clean Diesel Oil Protects the Engine

Why Fuel Conditioning?

Independently of the original standard of the fresh fuel the quality of the fuel injected in the engine is influenced by:

- **contamination with water**
- **solid contamination in the storage tank**
- **humidity of the ambient air**
- **bacteria**

The Effects of Unfiltered Fuel:

Poor quality fuel can cause a number of different faults and break-downs to engines and their components:

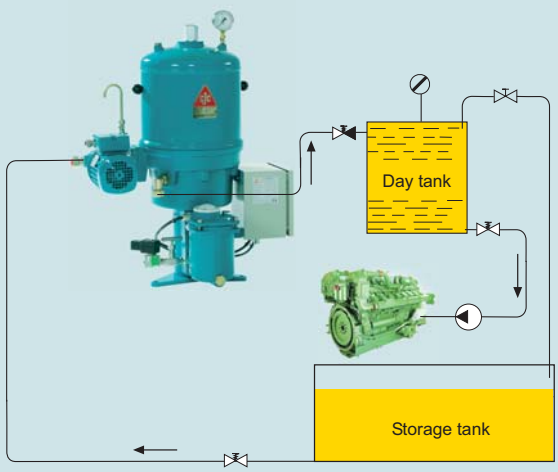
- **reduced caloric value due to water content**
- **injection nozzle wear**
- **corroding engine interiors**
- **increased service frequency**
- **reduced engine service life**

The Solution

A CJC Filter Separator combines the removal of particles down to 1 μm with the continuous separation of water from the fuel (DMA and DMB, other types on request).

Easy Installation

For fuel fine filtration on ships the CJC Filter Separator is installed between the storage tank and the day tank. This way the engine is always fed with clean and water free diesel fuel.



Improved Engine Performance with CJC Filter Separators

A CJC Filter Separator prolongs the service life of ships' diesel engines, their injection nozzles and fuel pumps. CJC Filter Separators work virtually maintenance free. They are particularly advantageous to use on high speed engines, especially on generator sets and main engines of coasters, tugs, feeder vessels, fishing ships and special purpose vessels.

All diesel fuel conditioning CJC Filter Separators utilize the FU filter insert. 75% of the FU insert's volume are cavities, hence its immense holding capacity for solid contaminants.

CJC Fine Filter insert FU 27/27

Your customized solution is our standard.

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

CJC™ Filter Separators

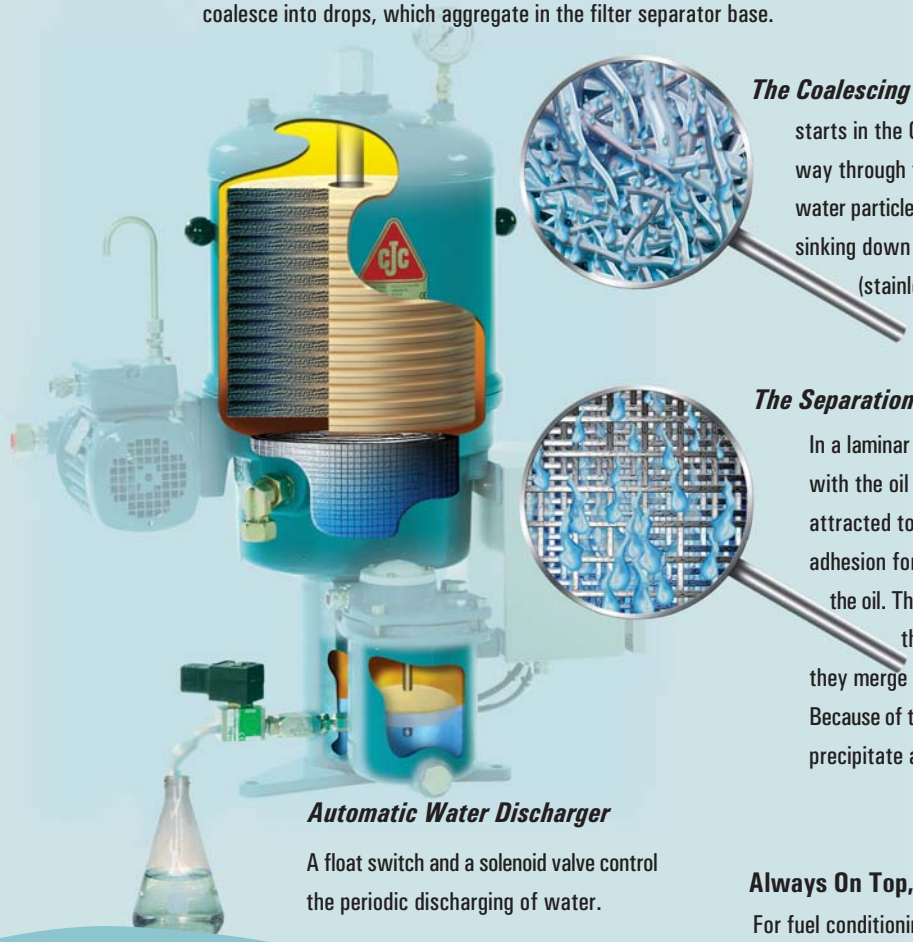
Removal of Water and Solids

Constant Dripping Does Not Only Erode Rocks,

it also attacks surfaces and interiors of hydraulic and lubrication systems. Water can enter the oil through leaking coolers, seals and breathers or by condensation of humid air. Whichever the source, the operation interruptions will be costly. Water also accelerates the ageing of the oil and instigates washing out of additives. A constant presence of water also increases the risk of rust formation. CJC Filter Separators can remove even large amounts of water from the oil / fuel.

Operation Principle:

The system fluid flows through the CJC Fine Filter insert, a depth filter, which retains all solid and resinous contaminants. Simultaneously, the microscopic water particles aggregate into droplets. In turn, the droplets coalesce into drops, which aggregate in the filter separator base.



The Coalescing Process

starts in the CJC Fine Filter insert. On their way through the cellulose fibres microscopic water particles aggregate into water droplets, sinking down into the coalescing element (stainless steel web).

The Separation of Water

In a laminar flow the water droplets stream with the oil through the web and are attracted to the steel strands because the adhesion forces are stronger than those of the oil. The flow pushes the droplets along the strands and at crosspoints they merge with other droplets into drops. Because of their weight, the drops eventually precipitate and settle in the filter base.

Automatic Water Discharger

A float switch and a solenoid valve control the periodic discharging of water.

Always On Top, Even in High Seas

For fuel conditioning applications the water discharger float switch can be replaced by a electronic water sensor which is insensitive to heeling.

Effective water separation

Dimensioning for Fuel Care

The Centrifuge Alternative

Dimensioning of CJC Filter Separators:

A CJC Filter Separator must never be chosen too small because efficient fine filtration and water separation require a slow, steady flow through the CJC Fine Filter insert. Also, selecting a too small unit may lead to more frequent filter insert replacements.

In order to find the correct electrical configuration of the CJC Filter Separator, in addition to the engine fuel consumption, information about vessel power supply and frequency is also required.

German Lloyd has issued a type approval for CJC Filter Separators.

PTU1 15/25	
Filter capacity	max. 60 l fuel / h
Filtration degree	< 1 micron / (3µm absolute)
Dismantling height	+ 200 mm
Water discharge	manual
Net / Operational weight	19 / 25 kg
Dimensions H x L x B	680 x 360 x 220 mm
Power supply	230 - 440 V, 50/60 Hz, 24 VDC

PTU2 27/27	
Filter capacity	60 to 200 l fuel / h
Filtration degree	< 1 micron / (3µm absolute)
Dismantling height	+ 320 mm
Water discharge	manual / automatic
Net / Operational weight	77 / 99 kg
Dimensions H x L x B	875 x 525 x 430 mm
Power supply	230 - 440 V, 50/60 Hz, 24 VDC

PTU1 27/ 54 - 108	
Filter capacity	200 to 400 l fuel / h
Filtration degree	< 1 micron / (3µm absolute)
Dismantling height	+ 730 mm
Water discharge	automatic
Net / Operational weight	98 / 140 kg
Dimensions H x L x B	1195 x 565 x 521 mm
Power supply	230 - 440 V, 50 / 60 Hz, 24 VDC

PTU3 27/ 54 - 108	
Filter capacity	400 to 800 l fuel / h
Filtration degree	< 1 micron / (3µm absolute)
Dismantling height	+ 730 mm
Water discharge	automatic
Net / Operational weight	115 / 190 kg
Dimensions H x L x B	1735 x 565 x 521 mm
Power supply	230 - 440 V, 50 / 60 Hz, 24 VDC

Dimensioning of CJC Filter Separators

Fuel consumption (l/h)*	Type of water discharge	CJC Filter Separator	CJC Fine Filter insert
20 - 60	manual	PTU1 15/25	FU 15/25
60 - 200	manual / automatic	PTU2 27/27	FU 27/27
200 - 400	automatic	PTU1 27/54	FU 27/54
400 - 1150	automatic	PTU3 27/108	FU 27/108

* If the fuel consumption (incl. auxiliary engines) in litres per hour (l/h) is unknown the following formulas can be applied:

Consumption based on engine output in horsepower (HP): l/h = 0.20 x PS
Consumption based on engine output in kilowatt (kW) : l/h = 0,24 x kW

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

CJC™ Thruster Unit and CJC™ Desorber

Water-free Oil from Bow Thruster to Stern Tube

The CJC Thruster Unit is used not only for thrusters, but also for stern tube seals and on many off-shore drilling rigs.

CJC Thruster Unit - for bow thruster gear oil

CJC Thruster Unit 27/27

The CJC Thruster Unit is a CJC Filter Separator designed especially for thruster applications. The high-viscosity oil is preheated in two steps before entering the filter. The warm, thin oil is more filterable. The heating also eases the water separation. The CJC Thruster Unit also removes any oil degradation by-products from the oil.

The CJC Thruster Unit utilises a purpose designed CJC Fine Filter insert, type BLAT. This insert retains the solid contaminants and initiates the coalescing of water particles. A coalescing element - a tight mesh of stainless steel strands - is fitted after the filter insert, ensuring the final separation of the water from the oil.

CJC Fine Filter insert BLAT 27/27

CJC Desorber - separates even emulsified water

Water in the oil causes changes in viscosity, reduces lubricity and instigates rust formation, bacterial growth and accelerates oil ageing. Regular ingressions of water in the oil circuit can be overcome by a CJC Desorber. Due to the desorption principle it can dry even synthetic fluids and break stable emulsions, unaffected by the fluid's viscosity and additivation.

The CJC Desorber type D10 is used for oil volumes smaller than 2,000 l and for viscosities between ISO VG 32 and ISO VG 150. It will separate up to 0.2 l of water per hour and its design is so compact that it will pass through virtually any hatch on board. For larger oil systems the CJC Desorbers of types D30 and D38 are available.

CJC D10

all the seas are our home