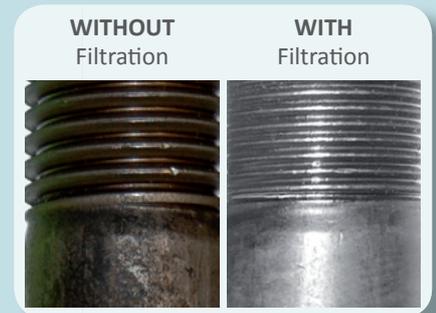
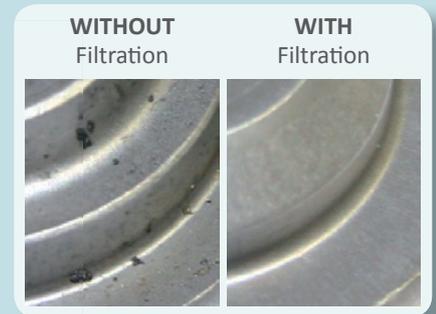


# CJC™ Fine Filter Technology

Oil Maintenance Systems for Quenching Oil



Synonym for Oil Maintenance



# Contaminations in Quenching Oil

## Contaminations in quench baths

Quench oils are exposed to an extremely high ingress of dirt.

### Cracking products

Thermal strain during quench process (e. g. asphaltenes)

### Particles

Carbon - via quench process  
Cinder - via quenched parts  
Dust - from the environment

### Water

Condensation and leakages

### Cover paste

Ingress via quenched parts

## Worse quenching results

### Deposits

Black deposits on quenched parts, coolers, circulating systems and aqua-alarm-systems

### Contaminations

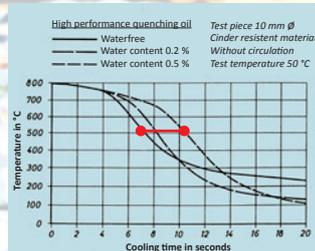
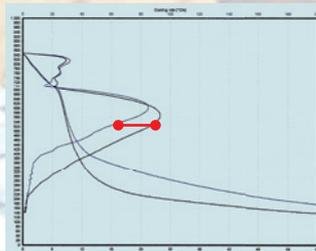
in the quench bath influence the cooling curve, the critical cooling time and therefore the quenching result respectively the material quality

### Cooling curve

Unevenly extended vapour phase, foam formation, risk of splashing

### Sludge accumulation

in tanks, deposits on parts' surfaces



## Influence on costs and quality

### After-treatment

Additional cleaning, high dirt load of the washing baths

### Blasting and grinding processes

are cost and labour intensive, overheating of the parts

### Surface quality

deteriorates, risk of fire increases

### Maintenance

and costs increase

**UNFILTERED**  
quench bath



Bushing



Valve cover



Semifinished product



Screw

**FILTERED**  
quench bath



# CJC™ Fine Filter Insert



## Particles

### Depth filter inserts - plenty of space for contamination

75 % of the insert volume forms a structure of cavities. Even the smallest particles are retained from the oil in this maze-like, small-pored meshed filter material. Each insert has a filtration degree of 3 µm absolute (1 µm nominal). Depending on density and size, several kilos of dirt can be retained until the CJC™ Fine Filter insert is saturated.



## Water

### Learning from the nature - each fibre absorbs water

The natural cellulose fibres of the CJC™ Fine Filter insert absorb water and retain it permanently. Even if only a few ppm of water are in the oil, the fibres dry the oil, provided the flow of the fluid through the filter material is sufficiently slow (except: aqueous quenching media). Already the smallest size of the filters has got an absorption capacity up to several litres (max. 33.6 L).

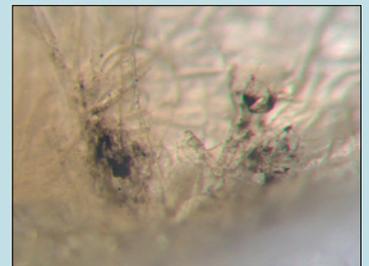


Cellulose fibre composite (CJC™ Fine Filter insert)

## Asphaltenes

### 184 soccer fields - a lot of space for docking

Asphaltenes and other oil degradation products are polar - therefore, they can be removed by cellulose. Due to their molecular structure, cellulose fibres have countless polar sites. With a combination of adsorption and absorption, the oil degradation products are drawn from the oil and held back permanently. Cellulose fibres have an inner surface of 150 m<sup>2</sup> per 1 gram; with a weight of 9.2 kg, filter elements of the smallest size therefore offer a surface that equals more than 184 soccer fields. In addition, a considerable amount of dirt will deposit on the outside of the filter element.

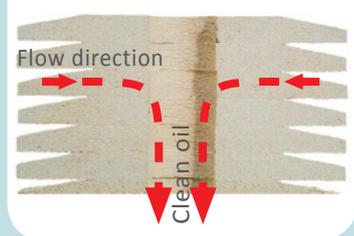


Cellulose single fibres (CJC™ Fine Filter insert)

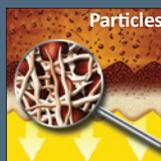
## Principle

The oil flows through the CJC™ Fine Filter insert radially from the outside to the inside. The micro-fine dirt particles are retained in the depth of the filter material. Water is absorbed by the cellulose fibres, oil degradation products deposit on the polar surfaces of the cellulose meshing. The longer the fluid has contact with the filter material, the more effective is the fine filtration. For that reason, the depth filter inserts of the CJC™ Fine Filter systems have particularly long filter paths. The filter material has no chemical effect on additives.

### Cross-section of a filter insert



## CJC™ Fine Filter inserts offer space for:



between the fibres



in the fibres



at the fibres



# Maintenance of Quenching Fluids

CJC™ Fine Filter systems for maintenance of quenching oil are directly connected to the quench bath. The oil highly contaminated during the quenching process is drawn from the lowest point of the oil bath and after passing through the CJC™ Fine Filter insert the clean oil is pumped back into the oil bath.

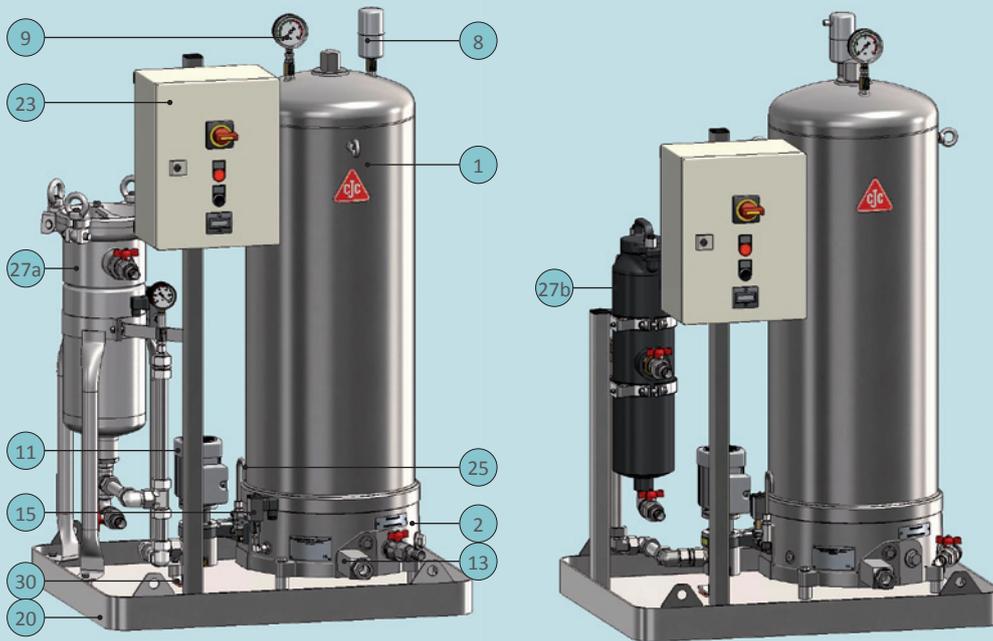
## Function of a CJC™ Fine Filter system

The gear pump draws oil contaminated with particles and water\* from the oil bath and passes it slowly and at a constant flow rate through the CJC™ Fine Filter system. The oil flows radially from the outside to the inside through the depth filter insert and returns, cleaned and dried, to the oil bath. Independently from the quenching process the contents of the oil bath is filtered continuously. The pressure gauge and the pressure switch signal a necessary filter insert change.

\*not for aqueous quenching media

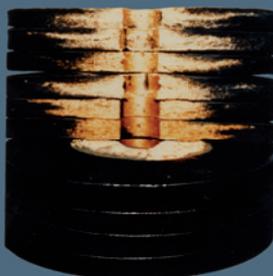
Depending on the dirt ingress a prefilter can be installed optionally:

- Bag and sieve basket filter for removal of large particles (Item 27a)
- Magnetic and sieve filter for removal of cinder and magnetic particles (Item 27b)



Item	Description
1	Filter dome
2	Filter base
8	Automatic bleeding and venting valve
9	Pressure gauge
11	Pump with motor
13	Non-return valve
15	Pressure switch
20	Base plate
23	Control box
25	Sampling point
27a	Bag and sieve basket filter
27b	Magnetic and sieve filter
30	Leakage sensor

Cut through used CJC™ Fine Filter insert.



Replacement of an used CJC™ Fine Filter insert



## 8 up to 56 kg of dirt

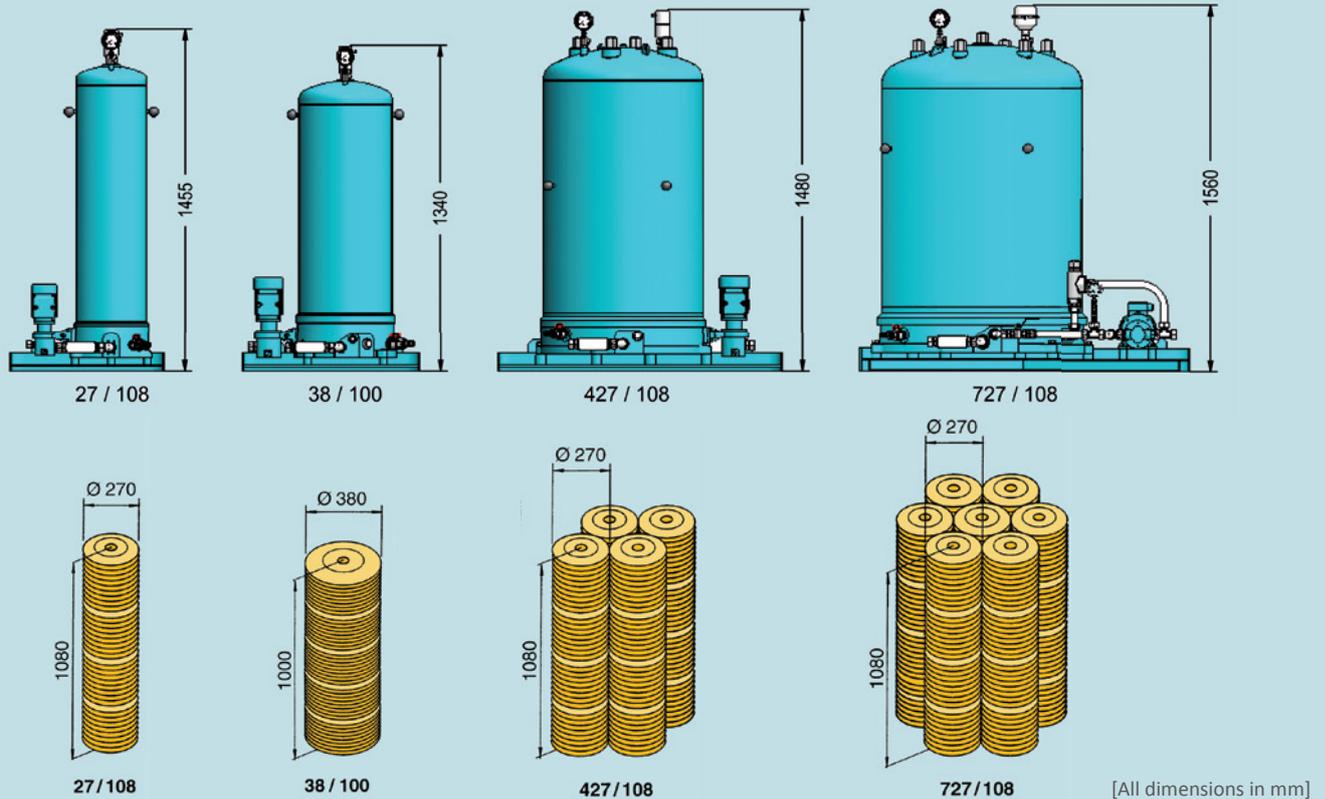
Depending on their size CJC™ Fine Filter systems can retain 8 up to 56 kg of dirt before the CJC™ Fine Filter inserts need to be changed.

# The Correct Dimensioning



The following drawing shows the various sizes and their modular design.

All CJC™ Fine Filter systems are equipped as standard with sampling point, automatic bleeding and venting valve, pressure switch, leakage sensor as well as motor protection switch and shunt release.



[All dimensions in mm]

## CJC™ Fine Filter insert JH up to ISO VG 68 / 40 °C

Oil volume max. [ l ]	CJC™ Fine Filter type	CJC™ Fine Filter insert		Holding capacity*		Contents [ l ]	Pump flow [ l/min ]	Power consumption [ kW ]
		Volume [ l ]	Surface [ m² ]	Dirt [ kg ]	Water [ l ]			
2,000	27/108	48	4.52	8	4	80	1.5 - 4.5	0.12 - 0.18
4,000	38/100	85	8	15	7.2	125	4.5 - 9	0.18 - 0.25
9,000	427/108	192	18.08	32	16	385	9 - 18	0.25 - 0.37
15,000	727/108	336	31.64	56	28	621	18 - 45	0.37 - 0.75

Subject to technical changes.

\*Test dirt: spherical ferrous oxide with prevailing size of 0.5 µm.

The listed types serve as a guideline for closed quenching baths. Dimensioning may differ for open quench baths due to the higher dirt ingress. Differing viscosity and temperature can also lead to different system sizes. All systems are available with prefilters. We will gladly inform you about further optional accessories.

Your customized solution is our standard.



# Applications

## Chamber Furnace

Application Study:



IPSEN Discontinuous chamber furnace, Germany  
2,400 litres mineral oil based quenching oil

**Problem:** Black deposits on hardened parts, despite extensive after-treatment not removable

**Solution:** CJC™ Fine Filter unit 38/100, filter insert type JH

**Result:** No deposits on the hardened parts, (already after 1.5 weeks) no after-treatment, minimized scrap



Hardened parts:  
on the left with **unfiltered**,  
on the right with **filtered quenching bath**

## Open quench oil bath

Application Study:



Open quench oil bath, Finland  
40,000 litres quenching oil type Mobiltherm FD

**Problem:** Irregularities during quenching process due to sludge, black spots on surfaces

**Solution:** CJC™ Fine Filter unit 3x427/81, filter insert type JH

**Result:** After only 2 days clean surfaces, oil lifetime increased by factor 2



First change of filter inserts

## Wash water

Application Study:



Washing bath filtration, Germany  
400 - 500 litres wash water from the 1st wash tank

**Problem:** Wash water has to be changed very often, contaminants in the washing solution re-deposit on the goods

**Solution:** CJC™ Fine Filter unit 27/108, filter insert type BLA

**Result:** After only a few circulations of the fluid the most of the contaminants are removed



approx. 30 kg of dirt  
after 6 weeks of filtration

## Reconditioning of skimmed oil

Application Study:



Continuous quenching line with subsequent washing bath, Germany  
4 washing baths each with 1,000 litres

**Problem:** Drag loss of quenching oil, cost-intensive disposal of the oily washing emulsion, costly purchase of new oil

**Solution:** CJC™ Filter Separator 27/108, filter insert type BLAT

**Result:** Saving of 3,000 litres quenching oil per month (refilling process), i. e. up to 70,000 EUR/year

Hydraulic oil Lubrication oil Gear oil Motor oil Diesel / Fuel

Insulating oil Turbine oil Tap changer oil Phosphate ester (HFD)

Brake fluid Cooling lubricant Silicone oil Water glycole (HFC) Petroleum

Cutting oil Drawing oil Honing oil Rolling oil Lapping oil Thermal oil

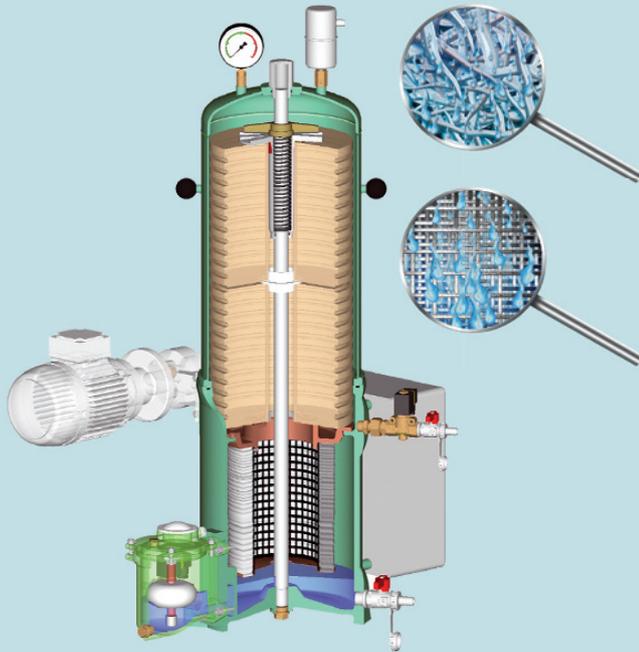
Refrigerator oil Compressor oil Drilling oil Rapeseed oil Palm oil

# Drying of skimmed Oil



## CJC™ Filter Separatoren

The specially treated CJC™ Fine Filter insert type BLAT, retains solid particles as well as oil degradation products without absorbing water. The water is separated in a subsequent process in the coalescing element.



The coalescing process starts in the CJC™ Fine Filter insert. During the passage through the mesh of cellulose and cotton linters microscopic water parts combine to droplets.

The water droplets are carried with the laminar oil flow through the coalescing element and attach to the stainless steel mesh because of the larger adhesion forces. The flow pushes them along the metal fibres, lets them combine with other droplets at the intersections and, due to the higher density, fall into the filter base as larger droplets.

Flow switch and solenoid valve regulate the periodical discharge of the accumulated water.

## CJC™ Desorber

Larger amounts of water can be discharged with a CJC™ Desorber. Independently from additivation and viscosity even stable emulsions can be dried. Depending on the requirement and dimensioning CJC™ Desorber can separate 0.2 up to 15 Litres of water per hour.

### Function principle

The desorption process is based on the principle that heated air can effectively hold large quantities of water. In the Desorber, oil preheated to 60 - 85 °C is met by a counter flow of cold, dry air. The air, heated very quickly by the hot oil, will absorb any water present until saturation is reached. During the subsequent air cooling process the water condenses and the dry air is used again for drying of the following oil flow.



CJC™ Fine Filter unit 27/27  
Removal of particles and oil degradation products, absorption of water



CJC™ Desorber D40  
Removal of large amounts of water from emulsified oils



CJC™ Cleaning Table  
Manual parts cleaning



CJC™ Fluid Treatment unit 15/25-15/25  
Neutralization of acids, removal of particles, water and oil degradation products



CJC™ Transformer Oil unit 3R27/108  
Drying of transformer insulation, insulation is dried indirectly via the insulating oil

For each industrial application a suitable solution.



# - worldwide



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Founded in 1928 and located in Hamburg, we develop and manufacture CJC™ Fine Filter technology since 1951. With substantiated know-how and in-house analysis and test facilities we are experts when it comes to the maintenance of oils and fuels.



## Quality

Competent advice and individual solutions, even for the most difficult filtration problems of our customers - that is our daily claim. The certification of our company according to DIN EN ISO 9001:2008 provides us with assurance and motivation.



### CJC™ worldwide

CJC™ Fine Filter systems are available worldwide through subsidiaries and distributors.

Find your nearest distributor on our website [www.cj.de](http://www.cj.de).

- Or give us a call!

