CJC™ Desorber

Solutions for removal of water from low and high viscosity oils, even in stable emulsions

Intended for:
Marine, Steel Works, Pulp & Paper, Mining, Power, Waste Oil Recovery Plants and Biodiesel Plants

Desorption of water from oil - even in stable emulsions

Clean Oil - Bright Ideas

1 The Problem

Water in oil causes oil degradation, micro pitting and cavitation or breakdown of mechanical parts

Problems caused by water in oil

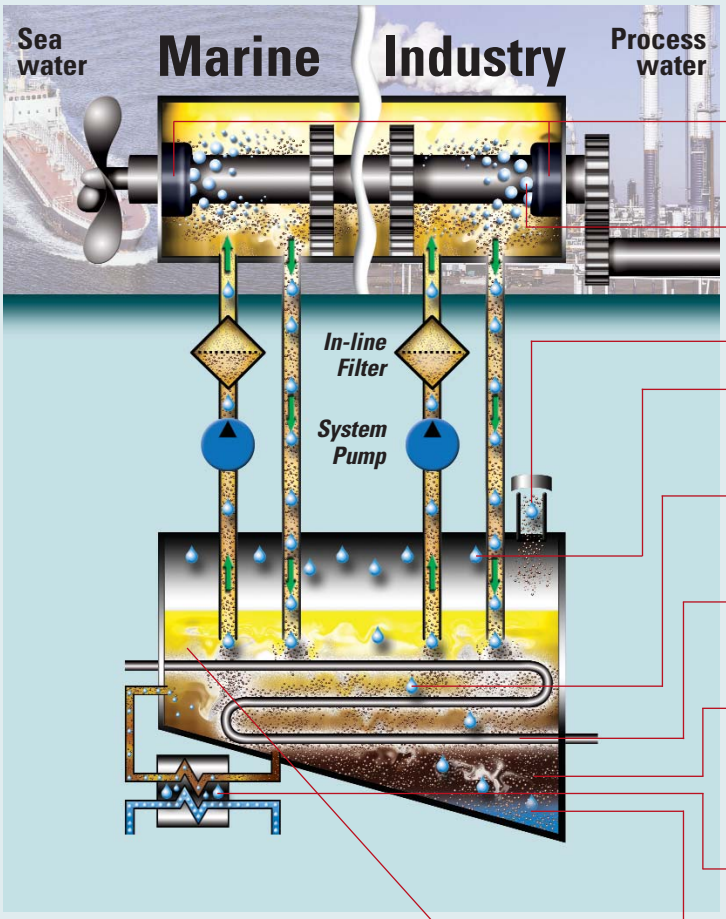
Water in oil leads to reduced viscosity, reduced filter ability, reduced lubricity, formation of rust and bacterial growth increasing degradation of the oil. All of these factors lead to reduced lifetime of both the components and the oil.

Water Contaminated Oil

Abrasion

Corrosion /Rust

Pitting/Fatique



Principle drawing of in-line filtration

Sources of Water Ingress and Contamination

Leakage Through Seals
Over time seals become worn, making ingress of water easy

Process Water Ingress

Air Vent
Particles and water ingress through the air vent

Internal Environment
Water condenses in the oil reservoir

Water Produced by Oxidation
High temperature + dirty oil = Acid, water and resin

Leakage in Heating Systems
Leakages in steam heating systems cause water ingress in the system oil

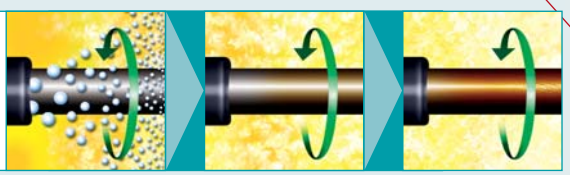
Rust/Corrosion
Water instigates the formation of rust particles, which are accumulated in the oil reservoir with resin and particles

Cooler Leaking Water
A leaking cooler results in water entering the oil reservoir

The water settles at the bottom of the oil reservoir

The most common types of degradation caused by water in oil:

Oil Degradation (Oxidation)
Worn seals cause ingress of water, which at high pressure emulsifies developing varnish deposits on system parts, creating a "sandpaper-like" surface.



Cavitation
Cavitation occurs in areas where water is present and oil is compressed; the water implodes, causing the metal surfaces to crackle and release metal particles.

Micro Pitting
When water particles accumulate in the oil, viscosity changes causing metal wear, cracking and pitting of gear and mechanical parts.

Emulsified Water in Oil
*Oil sample taken **before** desorption*

*Emulsified water in oil (with density above 1) which **cannot** be separated by settling nor mechanical forces*

2 The Solution

Dry oil through the CJC™ off-line desorption process - even in systems with emulsified oil

D10

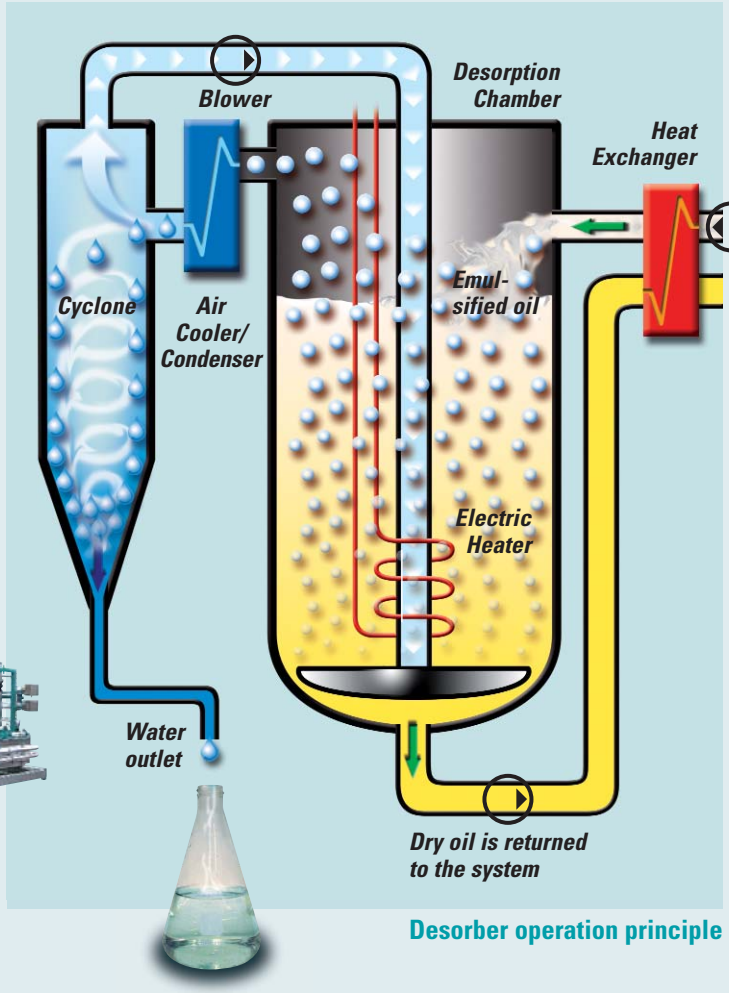
D30

D40

D88

Customised

The desorption process is based on the principle that heated air can effectively hold large quantities of water. In the CJC™ Desorbers the oil is pre-heated and met by a counter flow of cold, dry air. The air, heated very quickly by the hot oil, will expand and absorb any water present, until saturation.



Desorber operation principle

The Desorber Operation Principle

The supply pump draws oil from the oil system, and the oil is pre-heated through the heat exchanger to save energy and supplied into the top of the desorber chamber and distributed evenly in the chamber.

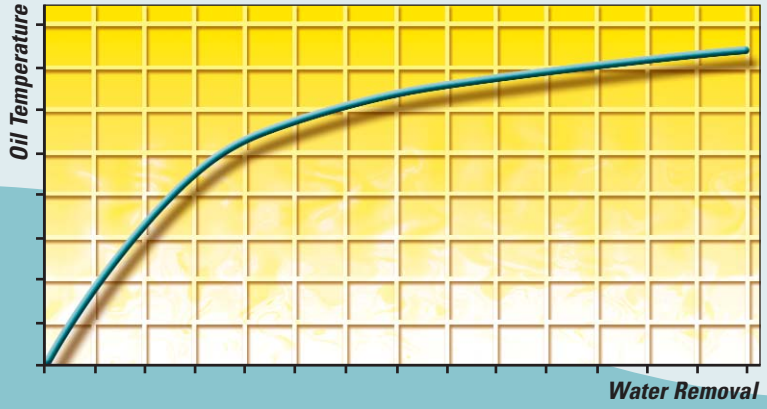
The oil temperature is maintained by an electric heater. At the same time air passes from the air pump and releases through several hundred nozzles in the bottom of the chamber.

The cold and dry air meets the hot and wet oil in a counter flow. The air is instantly heated by the oil, expands and is saturated by the water in the oil.

The saturated air is condensed by the air cooler and the free water is separated and discharged in the cyclone. The dry and cold air is re-used in the closed circuit.

The discharge pump returns dry oil to the main system through the heat exchanger at an oil temperature close to the original oil temperature.

Performance chart based on Mollier diagram



Desorber Efficiency

The desorber's ability to remove water is dependant upon oil temperature and cooling temperature, and therefore it is essential to obtain the right mix of the following parameters:

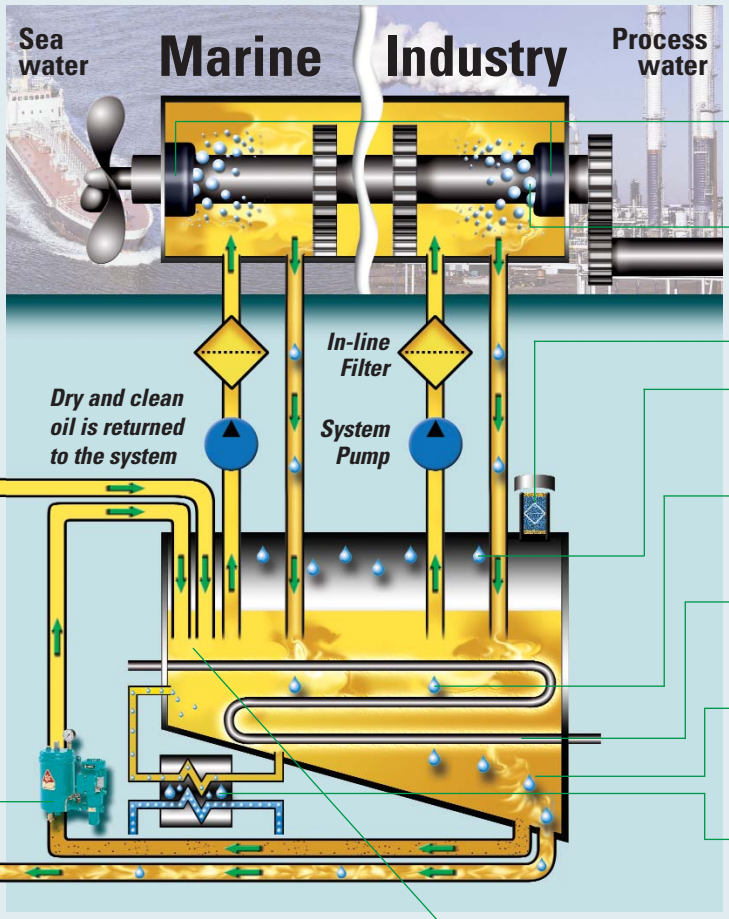
- *Oil temperature in tank*
- *Oil heating system*
- *Ambient temperature*
- *Temperature of cooling medium*

3 The Result

Continuous oil maintenance ensures high quality of oil throughout the entire lifetime of the equipment

Benefits and advantages of using CJC™ Desorbers

The benefits obtained when installing a CJC™ Desorber will have a positive effect on your maintenance budget as well as increase your productivity and reduce your energy consumption.



CJC™ Desorber
Dry oil through off-line desorption

CJC™ Fine Filter
The Off-line Fine Filter ensures clean oil by removing particles and oil degradation by-products

Principle drawing of desorption and off-line filtration

Sources of Water Ingress and Contamination Are Now Under Control

Leaking Through Seals
Ingress of water remains but is now continuously desorbed

Process Water Ingress

Air Vent
Contamination can be reduced by adding an Air/Selica Gel filter

Internal Environment
Water still condensates in the oil reservoir - but will be desorbed

Water Produced by Oxidation
Low risk of developing water, acids and resin

Leakage in Heating Systems
Water is now removed before it reaches the oil system

Rust/Corrosion
Contamination is still being created but is removed by the CJC™ Fine Filter

Cooler Leaking Water
The leaking cooler can be repaired at scheduled overhauls as the CJC™ Desorber continuously removes the water

Clean Oil
*Oil sample taken **after** desorption and filtration*

Less Maintenance

- Less wear and increased lifetime of components and oil
- Longer time between service intervals
- Enhanced operational precision

Increased Productivity

- Fewer unplanned breakdowns and improved reliability
- Leaking coolers can be repaired at scheduled overhauls

Lower Energy Consumption

- Lubricating capabilities remain intact and internal friction is lowered
- Reduced pressure drop over in-line filters
- Viscosity index is kept stable and efficiency is maintained

-all advantages to the total economy!

The CJC™ Desorber

The CJC™ Desorber is of uncomplicated design and almost maintenance free

Key features of the CJC™ Desorbers

The CJC™ Desorbers provide solutions for removal of water in mineral, synthetic and high viscosity oils. Even in stable emulsions and in oils with a density above 1.

Control Panel

Desorber Chamber
Process reaction chamber

Condenser
Releases water by cooling the air. Can be supplied with different cooling media as an option

Supply Pump

Discharge Pump
(Not visible)
Placed behind the heat exchanger

Blower
(Not visible)
Supplies dry air to the desorber chamber.
As an option it can be modified for inert gas, when the risk of oil degradation is high

Placed behind the control panel

Cyclone
Water and air are separated in the cyclone and discharged

Heat Exchanger
Preheats the oil

Main Heater
(Not visible)
Raises oil temperature to optimum.
Variable heating capacities and media as an option

Placed inside the chamber desorber

Main components (Desorber D30)

Add-on options

- On-line monitoring of water content
- Automatic temperature control and optimisation
- Remote alarms and control
- Desorber can be supplied as explosion proof version
- Oil absorb to guarantee oil free water outlet

Customised CJC™ Desorber

C.C.JENSEN all over the World

The CJC™ Off-line Filters are distributed through our own international sales organisation and designated distributors

CJC™ stands for reliable supply all over the world

Manufacturer

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Your local CJC™ distributor

Clean Oil - Bright Ideas

We are represented all over the world by distributors. Find your nearest distributor on our website: www.cjc.dk - or give us a call.

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