



We make Oil greener.

Our History – so far.....



Åge S. Wågene, engineer, started his engineering business in air compressors in 1976 and operated with sales and service for compressors and pneumatic tools. The Company represented FF Air AS Denmark and the ABAC Group in Italy.

In 1999 the company started developing an oil treatment plant designed for hydraulic and lubricating oils, and launched the product in 2001. In the early years the company targeted the domestic shipping industry, and then entered the international market. The global shipping industry found the Wågene solution to be a highly effective means of keeping oil clean by removing particles and water.

In 2011 the company sold off its compressed air operations to focus entirely on oil maintenance. In recent years the maintenance of diesel has also come onto the market.

The company changed its name to Wågene Purifiner Technology AS in 2011 and has focused on building up a network of agents and retailers to supply the shipping Industry worldwide. By the end of 2013 the company had delivered more than 2,500 Purifiner units to industry. Two of our major customers are Carnival Cruises, the world's largest cruise line, and Bourbon Offshore France, one of the world's largest supply ship companies.

We will continue to break new ground by:

- reducing costs and consumption with clean oil
- reducing costs of loss and damage caused by contaminated oil
- providing considerable environmental benefits.

Åge S. Wågene

Why Oil Maintenance?



Oil in a system, hydraulic or lubricating oil will, constantly be exposed to different types of contamination, like solid particles of different types, and 'chemical' contamination, mostly as water due to condensation or leakage.

When the contamination in the oil is too high you must change the oil or perform a flushing (rapid purification of oil) to get oil more or less back to 'clean' oil status and so it again used in a system.

All experience through years has shown; Continuous Oil Maintenance, to clean away any solid contaminants and water, will give the best result in extending the oil life and to prevent breakdowns.

Norwegian Shell has conducted research on the prevention of breakdowns in a hydraulic system and states that around 80% of all failures and breakdowns in a hydraulic systems are due to contaminated oil containing solids and 'chemical'

You must continuously remove contamination from the oil

Therefore, continuous oil maintenance gives the best result when it comes to keeping the 'purity' of the oil.

Breakdown in Hydraulic Systems



80% of all breakdowns in hydraulic systems are caused by particle contamination, 30 to 40% due to water in the oil.

Contamination

- Chemicals
- Water
- Particles
 - Wear metals
 - External contamination
 - Decomposed additives

Negative Impact on Operation

- Breakdowns and lost production
- Increased maintenance costs
- Increased investments



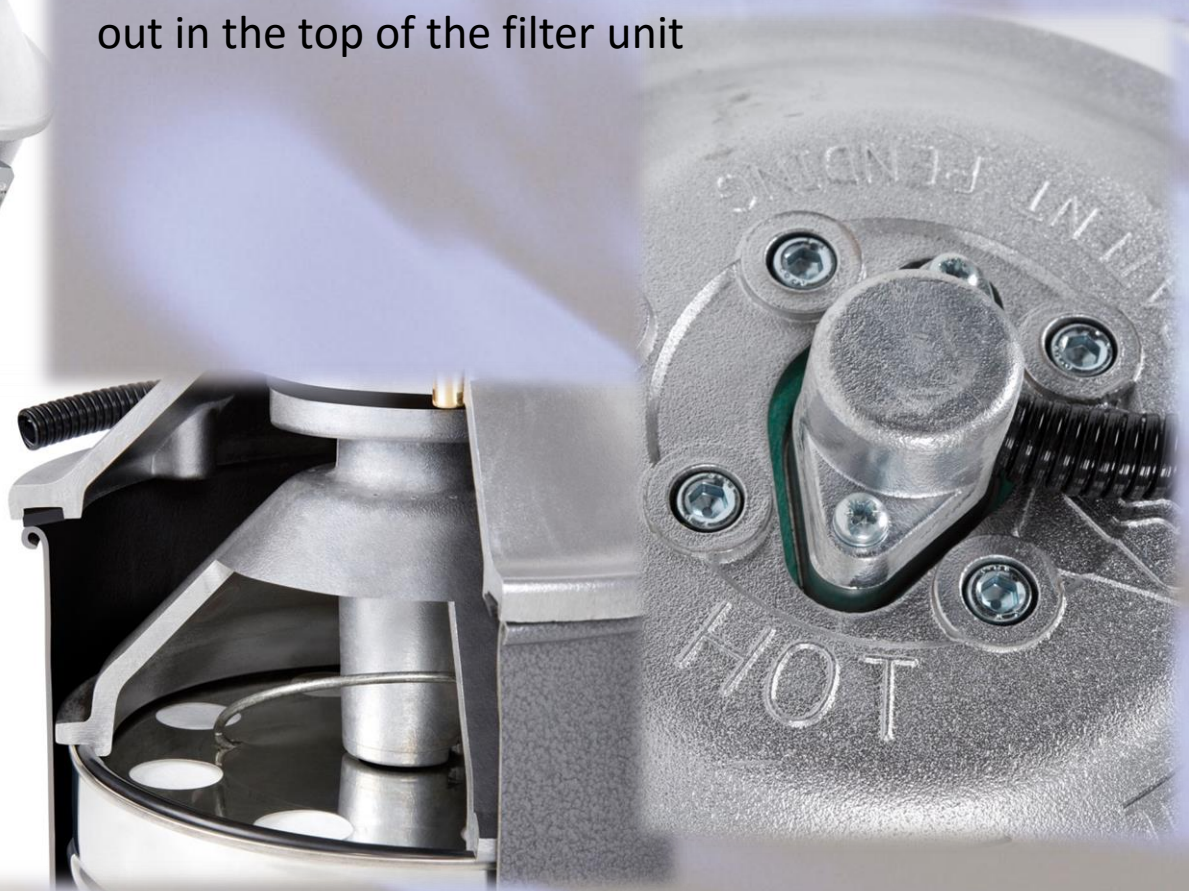
Before

After

Our Unique Filter



Our patented filter removes particles in a cotton filter and the water is evaporated out in the top of the filter unit



Extended Lifetime of Bearing



Texaco Regal 68 Hydraulic Oil

Used 17,500hours / 2 years



1

Cleaned, Used Oil
Old oil after Purifiner
NAS 3-4

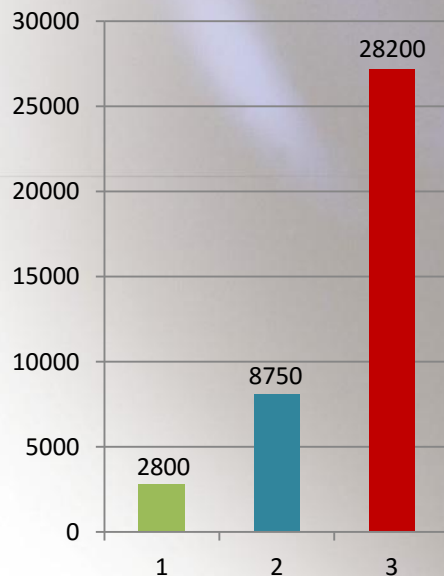
2

New Oil
(200 l drum)
NAS 4-6

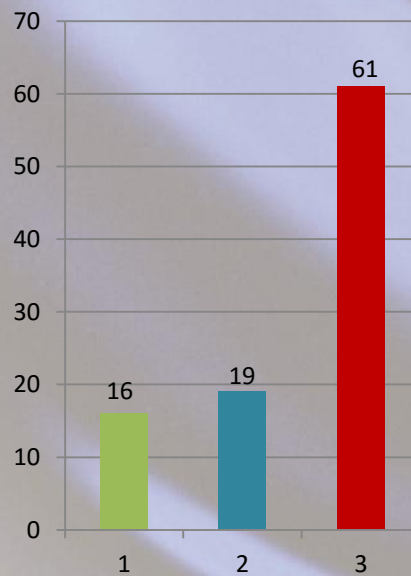
3

Old Oil
(17,500 hours)
NAS 7->

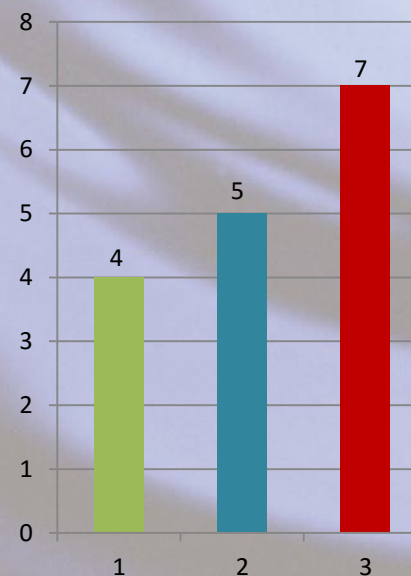
Particles Count
Down to 1 my



PPM
Water



NAS
Oil Quality

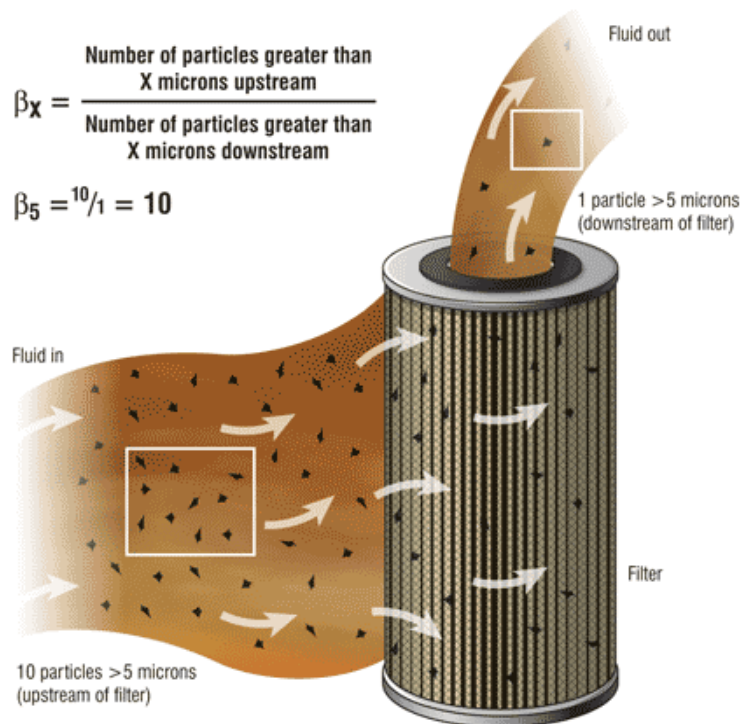


Test done by Norsk Oljelaboratorium AS 3 may 2013

BETA Value



Beta Ratio (x = particle size in micron)	Efficiency
$\beta_x = 2$	50.0%
$\beta_x = 10$	90.0%
$\beta_x = 20$	95.0%
$\beta_x = 75$	98.7%
$\beta_x = 200$	99.5%
$\beta_x = 1000$	99.9%



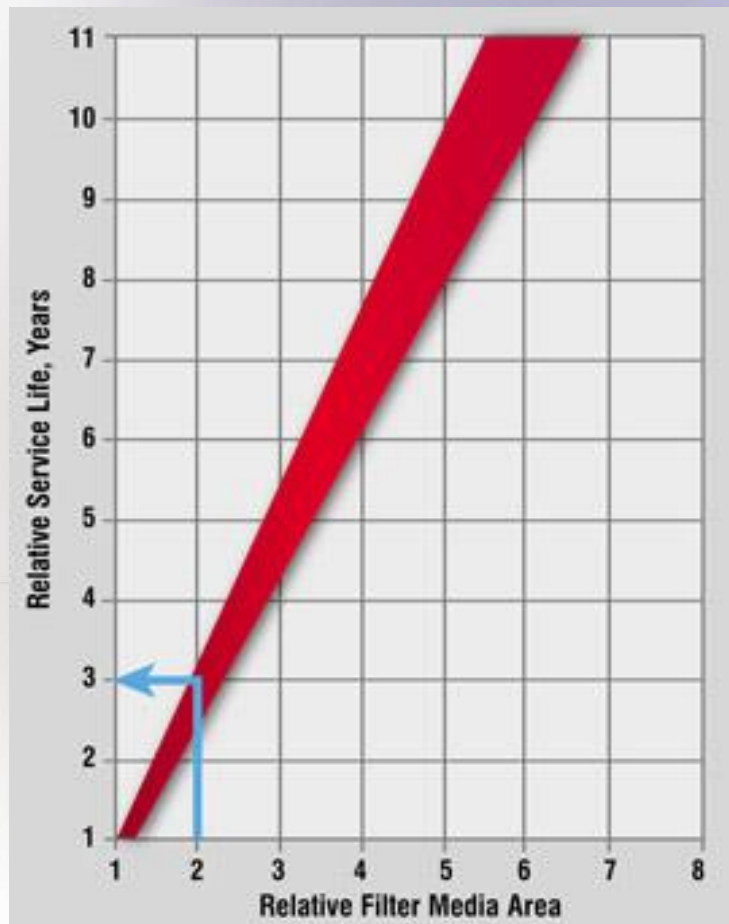
Briefly told Beta value is a measure of how efficient a filter is. For each number of particle that is supplied to the filter, it's measured how many particles passes through the filter.

Ex. A 5 micron filter that transmits one particle for each 10 particles larger than 5 microns. Is a Beta 5 = 10 filter as seen in the list it is 90% effective.

So it's important to know if a filter: How small particles can filter take away. And how efficient does the filter do this.

Our filter is Beta 3 = 20

DHC – Dirt Holding Capacity



Another important thing to know is how much particles a filter can hold before it's full.

This is measured in kg per. m² filter surface.

Most fine filters is 0.4 to 0.7 kg m². It's affected again by filter material, temperature, viscosity, design, etc.

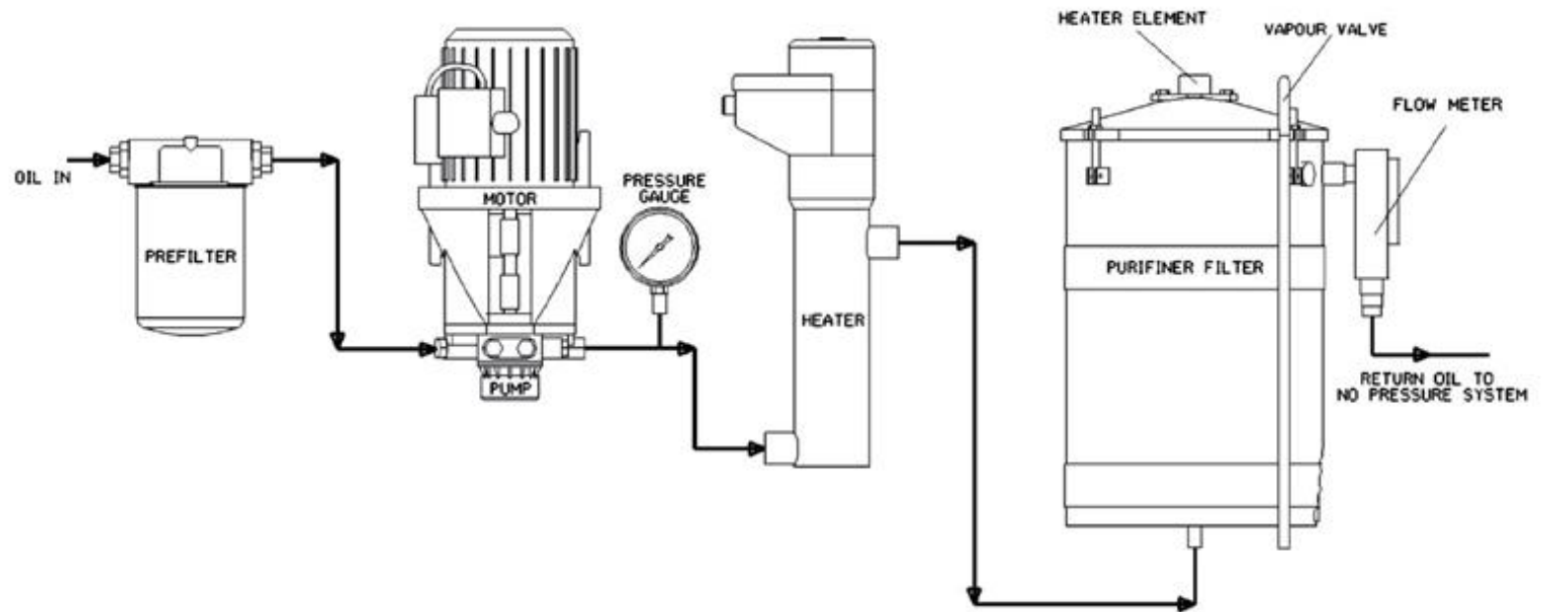
Our filter weight is approximately 4kg. Which is in the upper part of the scale.

Purifiner TF5060PMH



Purifiner for pressure free systems with preheater

Functional Description



TF for Pressure Free System

The TF unit is designed for hydraulic and lubricating oils. It is NOT intended for pressurized systems or where the cleaning unit is placed higher than the system it shall clean. The TF has the ability to 'lift/suck' oil into the filter, but must have 'free fall' (fall back by gravity) back to the tank/oil reservoir.

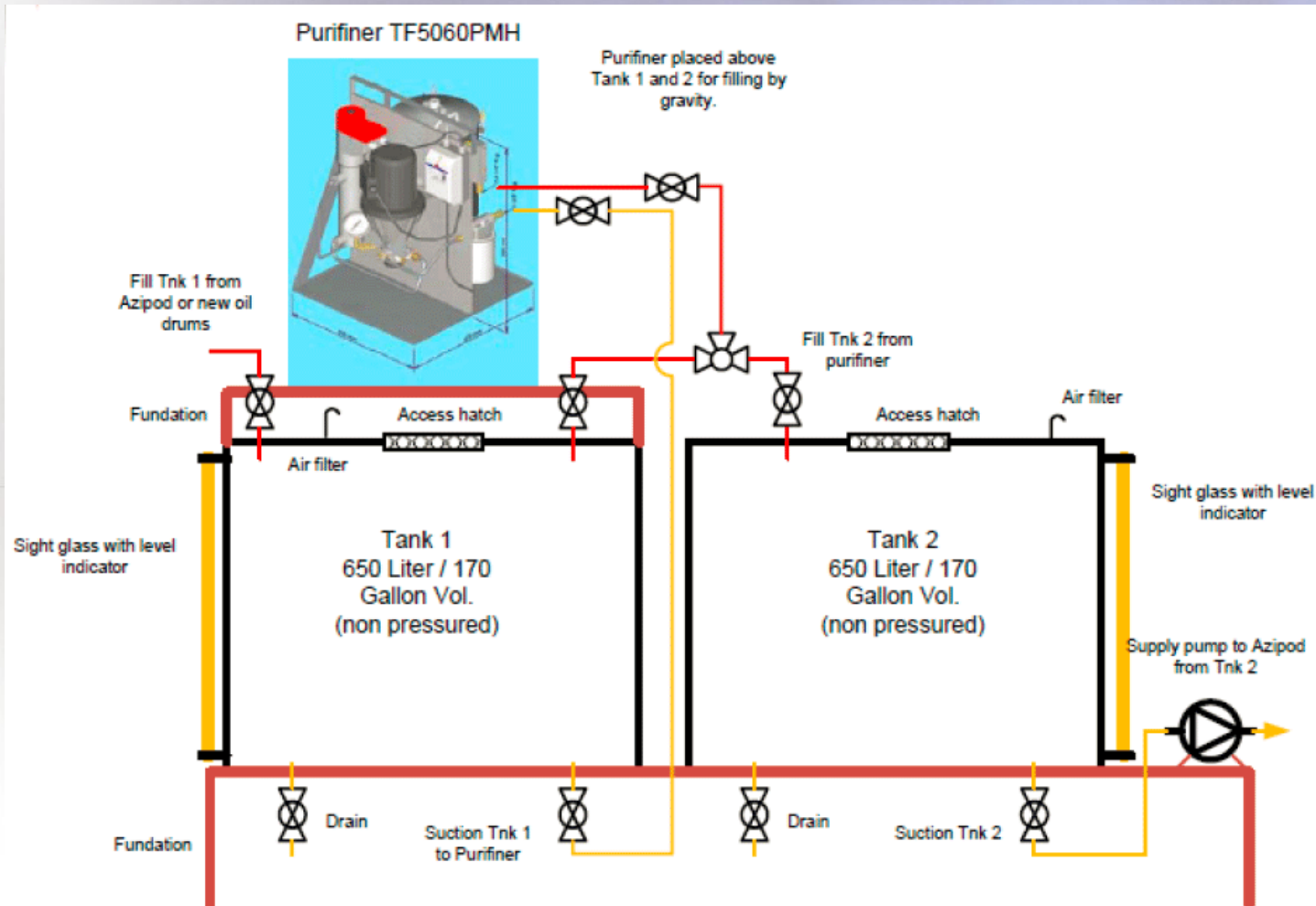
Capacity	: 600 litre / 24 hours
Flow	: Up to 3,000 litre (amount of oil in the system/tank it shall clean)
Oil type	: All hydraulic oils and most lubrication oils. Also other oil types are tested (request for other types)
Viscosity	: 32 - 320
Max pressure, inlet	: 200 bar using a reduction valve (up to 3 bar as standard)
Max backpressure, outlet	: 0 bar (Fall back to tank by gravity)
Use of filter	: Normally 3-5 filters a year in continuous operation
Max Power Consumption	: 2,400 watt, 230 volt, 16 amp, single phase
Warranty:	: 12 months
Weight	: 45 Kg
Dimensions	: 58x45x47 cm (HxWxD)

The purity rate in continuous use:

Water	: Down to 50-90 ppm (0,005-0,009%)
Particles	: Nominal down to 1µm
NAS	: NAS class 3-4



Tanks for Cleaning of Oil

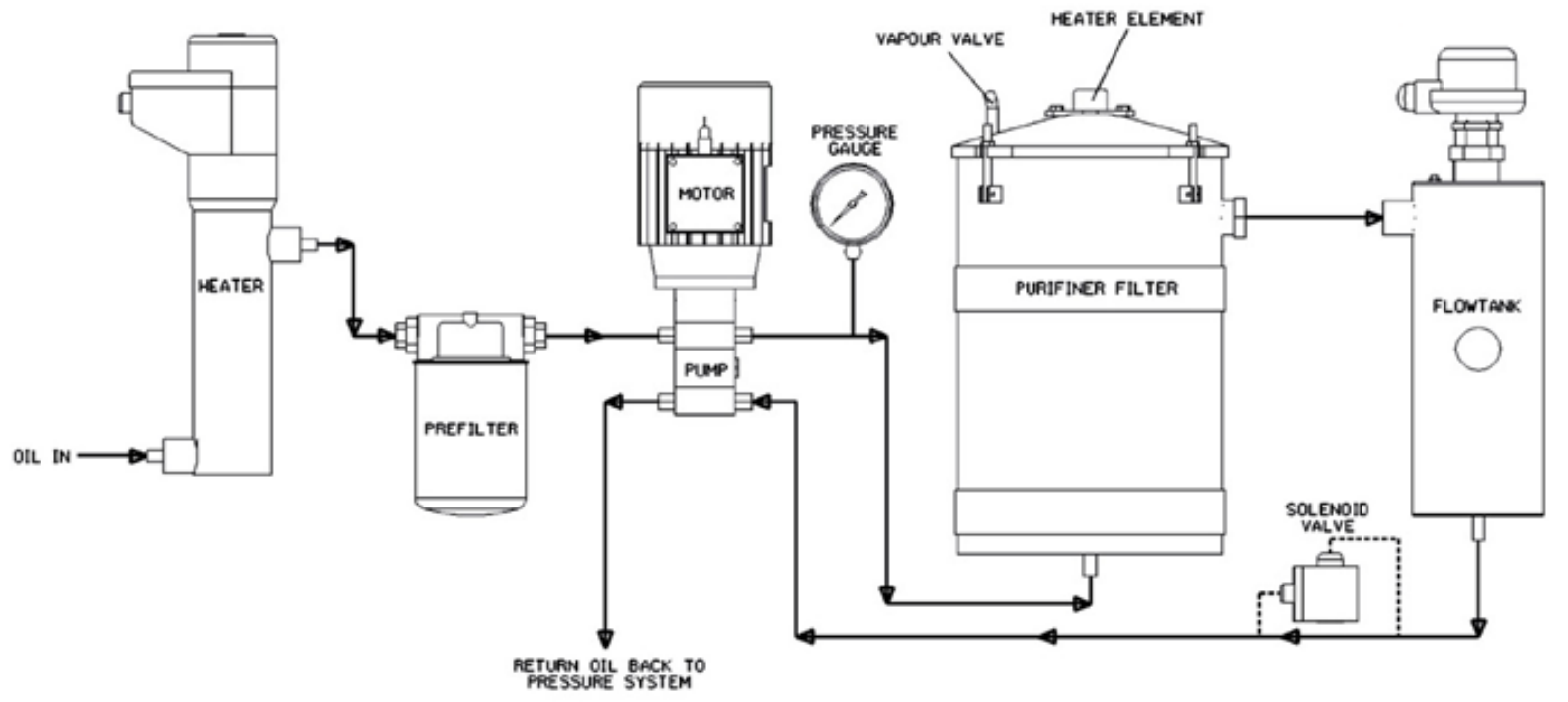


Purifiner TS5060PMH

Purifiner for pressurised systems with preheater



Functional Description





TS for Pressurized Systems

The TS unit is designed for pressurized hydraulic and lubricating systems. This unit can be placed lower than the tank or return point. It can also handle back pressure from the hydraulic system up to 8 bar. The Purifier can be connected directly to the system as a 'bypass filtration'.

Capacity	: 600 litre / 24 hours
Flow	: Up to 3,000 litre (amount of oil in the system/tank to be cleaned)
Oil type	: All hydraulic oils and most lubrication oils. : Also other oil types are tested (request for other types)
Viscosity:	: 32 - 320
Max pressure, inlet	: 200 bar. Using a reduction valve (up to 3 bar as standard)
Max backpressure, outlet	: 8 bar
Filter use	: Normally 3-5 a year with continuous cleaning
Max Power Consumption	: 2400 watt, 230 volt, 16 amp, single phase
Connection	: 3/8" external thread
Warranty	: 12 months
Weight	: 45 Kg
Dimensions	: 58x45x47 cm (HxWxD)

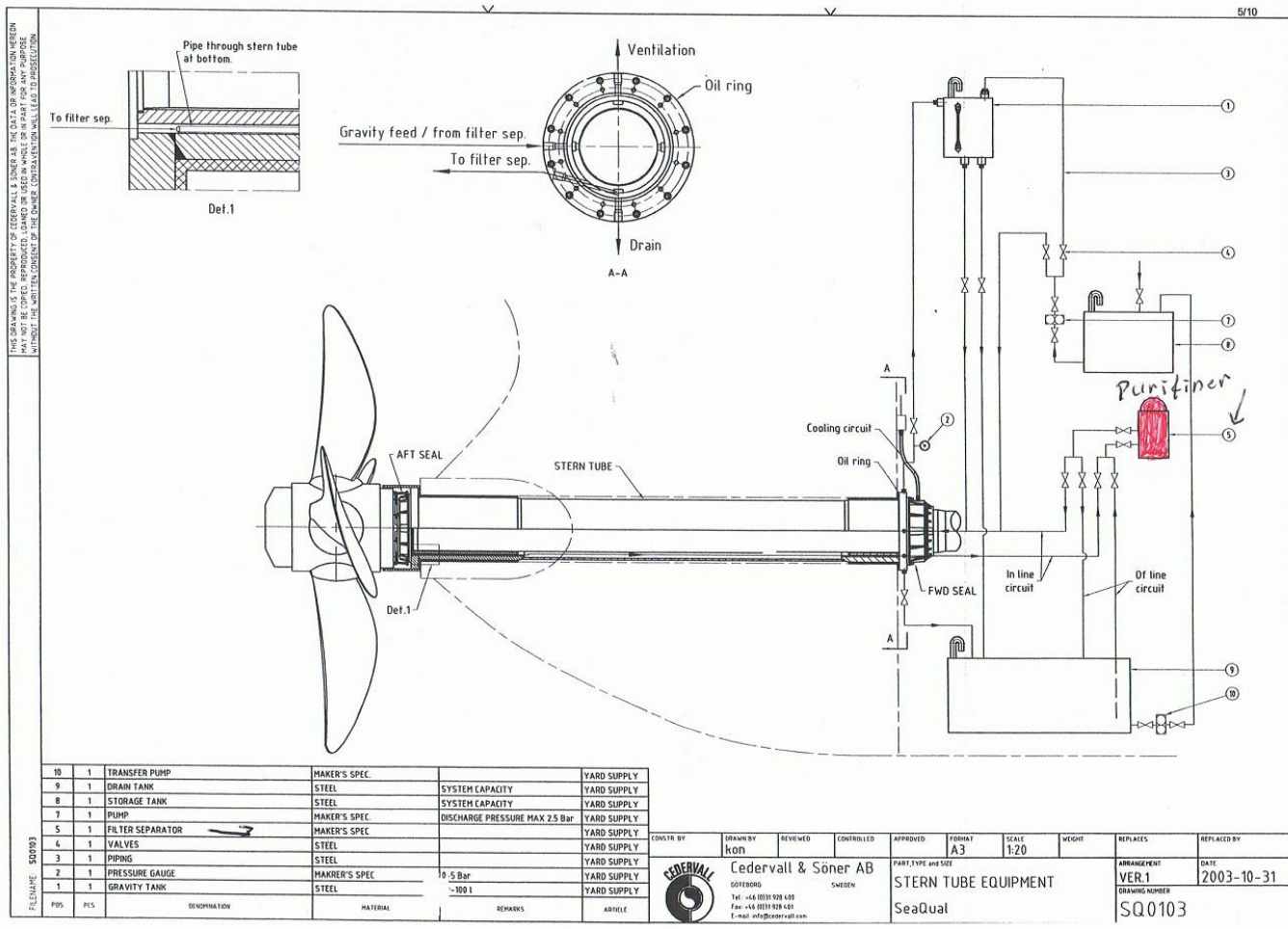
The purity rate in continuous use:

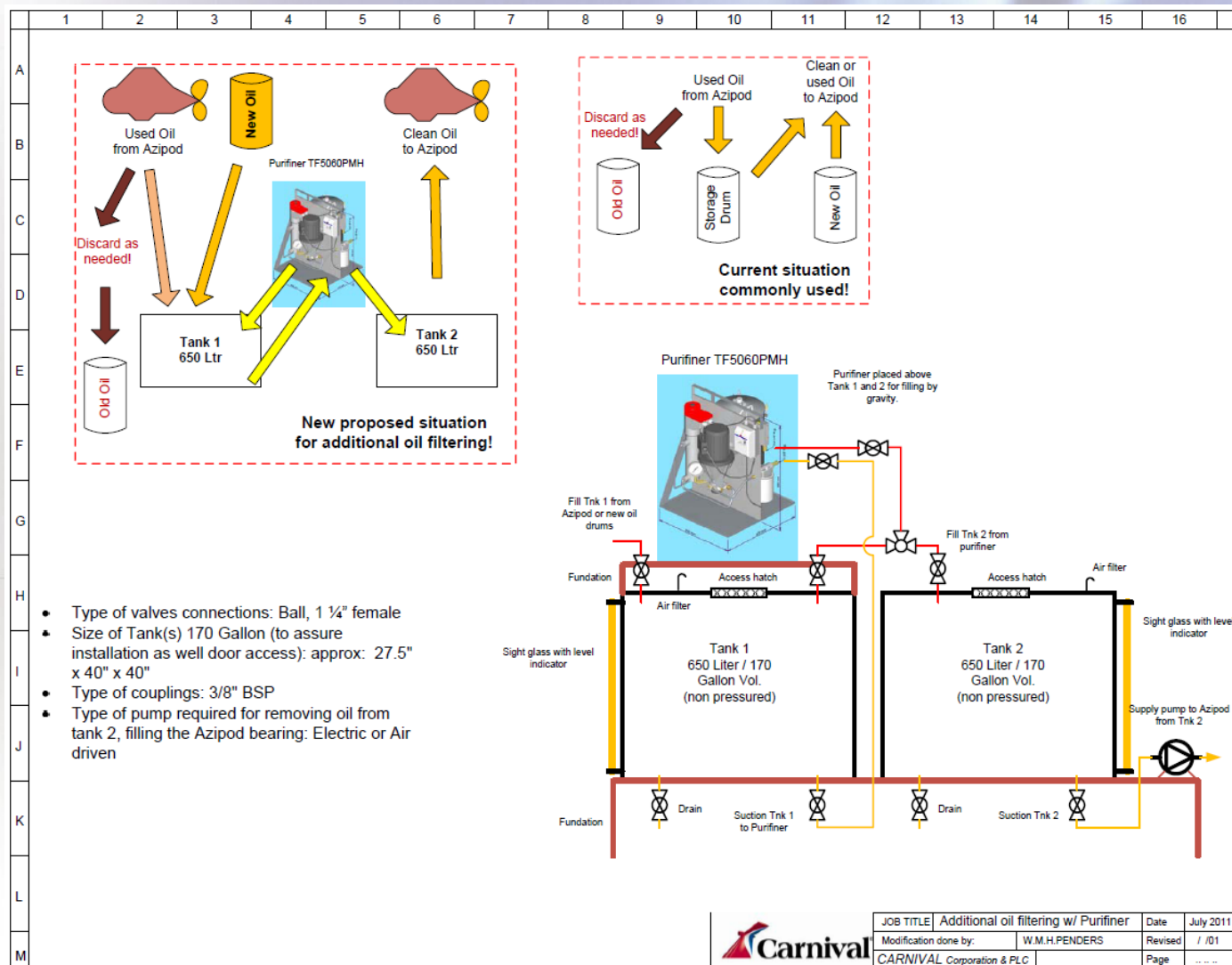
Water	: Down to 50-90 ppm (0,005-0,009%)
Particles	: Nominal down to 1µm
NAS:	: NAS class 3-4



Other Oil Purifiner Models







Why Choose Purifiner?



- It saves the environment
- It saves you a lot of money
- There is a small but necessary investments
- It is economical / inexpensive to operate. Consumption is only 3-4 filter elements per year
- Extends oil life 10 to 15 times
- It reduces the accident rate on machinery and equipment
- Oil quality NAS 4 ISO 15/13/10



In 2002 we installed 10 units onboard 2 Cruise ships 'Midnight Sun' and 'Trollfjord' for Hurtigruten. Placed on Stern Tube and Thruster.

11 years later:

In 2013 the ships went into dock for Maintenance.

They changed the oil for the first time on 11 years.

Oil samples showed that the old oil was still as good as NEW!



Reference - Fjord1/Norled



- Installation in 2006
- 5 new gas ferries
- Thruster
- 4 units per ferry
- 20,000 litres of hydraulic oil on each ferry
 - 100,000 litres of hydraulic oil in 5 ferries in total
- Producer of Thruster: Change the oil every 18 months
 - The cost is estimated to USD 170,000
- 20 Purifiner units TS5060PMH-Twin were installed
 - Cost about USD 170,000
- After 18 months, the company had saved USD 170,000 in oil changes
- They have not changed the oil since 2006
 - Saving for a 5 years period:
 - 3 x oil changes during a 5 years period – USD 170,000 per oil change
 - **= Saved more than USD 500,000, in oil only**

Saving by Using Purifiner



Oil in litre	1 500	3 000	6 000	9 000	18 000	27 000
Oil cost	35	27	25	23	22	21
Cost oil change	52 500	81 000	150 000	207 000	396 000	567 000
	TF Single Unit	TS Single Unit	TS Twin Unit	TS Triple Unit	2xTS Triple Unit	3xTS Triple Unit
Purifiner	33 000	58 000	67 000	78 000	156 000	234 000
Filters (4pcs/year)	6 560	6 560	13 120	19 680	39 360	59 040
Power supply	500	500	1 400	1 900	3 800	5 700
Total cost						
Maintenance	40 060	65 060	81 520	99 580	199 160	298 740
Savings year						
1st year	12 440	15 940	68 480	107 420	196 840	268 260
Saving year 5	222 440	339 940	668 480	935 420	1 780 840	2 536 260
Saving year 10	484 940	744 940	1 418 480	1 970 420	3 760 840	5 371 260

All in Norwegian krone NOK

This is only the cost of oil. In addition you save money on reduced maintenance cost and protect expensive equipment



Major contract on oil maintenance

Carnival Cruise Corporation and Wågene Purifier Technology AS signs major contract on delivery of oil maintenance equipment.

Ing. Åge S. Wågene AS in Sandefjord, a specialist in maintenance of hydraulic and lubricating oil, has entered into

an agreement with Carnival Cruise Corporation USA.

World Largest - Carnival Corporation is comprised of Carnival Cruise Line USA, Carnival UK, Holland America Line USA, and Costa Cruises Italy, which together operate a fleet of 100 cruise ships and is currently the world's largest cruise line.

Good Experiences - Holland America Line's has from 2007 used WPT oil maintenance solutions, and have installed

over 40 systems, and from the positive experience of the purity of the oil, Carnival Corporation selected the same solution to the entire fleet. In the first delivery it will be delivered a total of 88 Purifier oil cleaning units of two different sizes to 22 ships over the next 18 months.

The agreement includes an option for additional deliveries to several ships, but on other types of applications on board.

Great recognition – Wågene Purifier Technology AS has in recent years gained considerable recognition for its technology and systems for the maintenance of hydraulics and lubricating oil.

Big Savings – WPT has delivered over 1700 units world wide. It saves over 80% of the total hydraulic oil cost a year.

www.maritimt.com



First Contract

Start ~~Oktober 2010~~ to ~~Desember 2012~~

~~43 Ship~~ **86 Oil Purifiers**

Second Contract

Start ~~January 2012~~ to ~~October 2012~~

~~74 Ships~~ **88 Oil Purifiers**

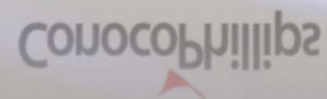
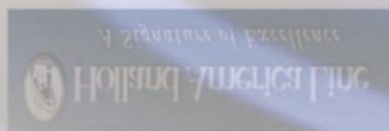
Third Contract

Start September 2013 to End of 2016

63 Ships 126 Oil Purifiers

Total
150 Ships and 300 Oil Purifiers

References:



Purifiner WPM-100 Twin



The unit is designed for continuous cleaning of engine oil on generators and standby engines. It increases the oil's lifetime, reduces wear and tear and all the time keeps the engine 'ready for action'.

Capacity	: 1,200 litre / 24 hours
Flow	: Oil tank up to 500 litre in the sump
Oil type	: Engine oil or hydraulic systems
Max Power Consumption	: 500 watt, 230 volt, 16 amp, single phase or 400v, 16 amp, three phased
Warranty:	: 12 months
Weight	: 60 Kg
Dimensions	: 70x54x51 cm (HxWxD)

The purity rate in continuous use:

Water	: Down to 500 ppm (0,05%)
Particles	: Nominal down to 1µm



Purifiner WPM-100 Twin



Extends the engines lifetime and
saves 70% of the cost of oil.

Cleans out particles and soot.

Removes particles down to 1 micron.

Evaporates out water, diesel and
cooling liquids down to 500 ppm.

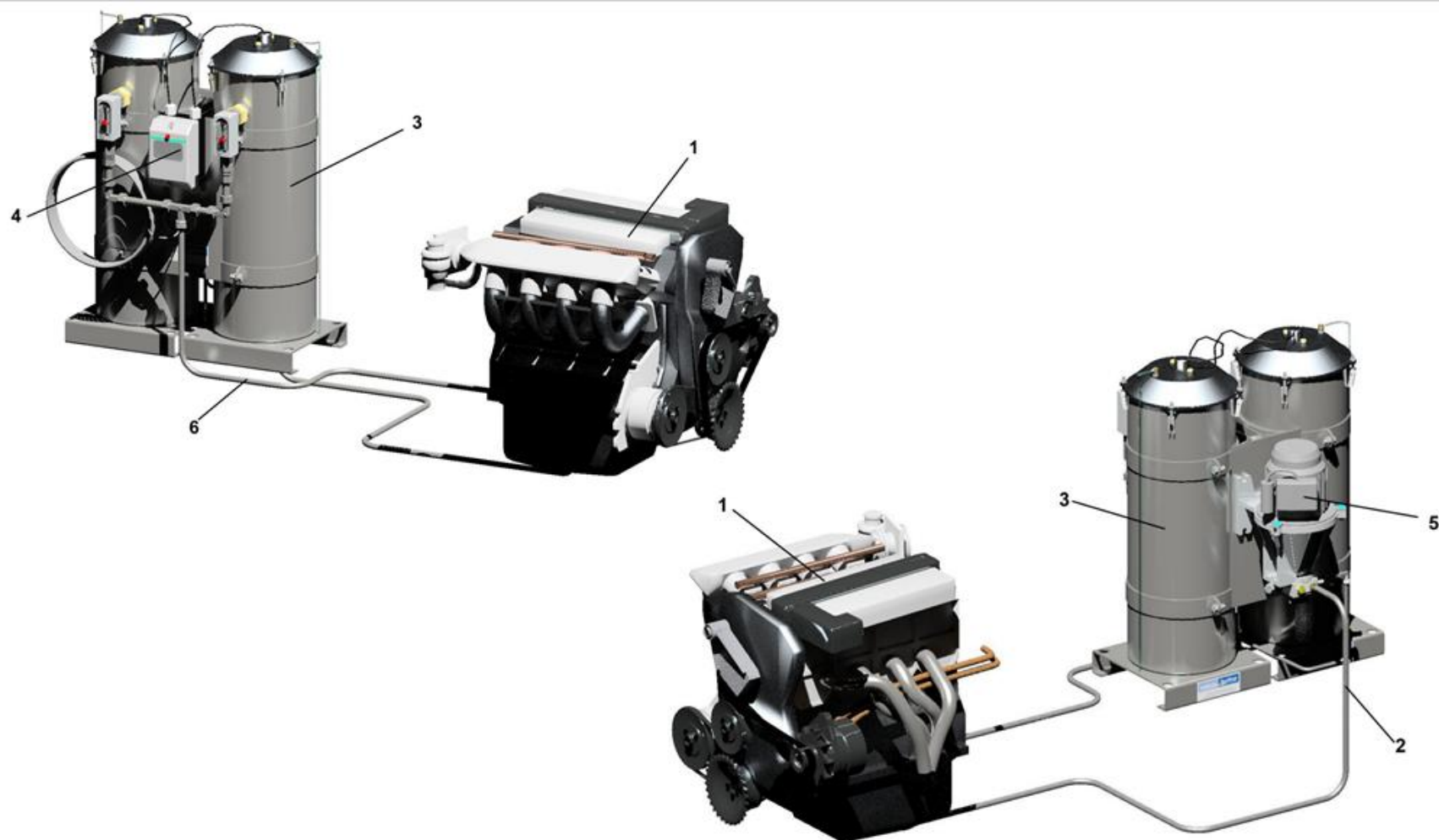
Applications:

Generators

Standby Engines

Other





	6	Oil Return	Olje Retur	
	5	Framo Pump	Framo Pumpe	
	4	El. Box	El. Boks	
	3	Filter WP-100	Filter WP-100	
	2	Oil Suction	Olje Sug	
	1	Engine	Motor	
Ant	Pos Nr.	English Text Part Nr.	Norsk Tekst Dele Nr.	Ordre Nr. Part Nr.

Drawn by:
Jan Aune
Date:
23.04.2015

Appr. by:

Engine, WP-100

Purifiner TF5060C



Filters and cleans oil for better quality than new oil free of particles and water. This extend oil life 10 to 15 times. Filter unit removes particles down to 1 micron. Evaporate all the water, including emulsified water in oil, down to 0.01%. For direct installation on on machine.

Specifications Purifiner Controller unit

Power Supply	: 24 V
Nominal Wattage	: 360W / 15A
Flow Rate	: 600/24H – 25L/H
Inlet pressure	: Max 200 bar
Back pressure	: Max 3 bar
Filter	: 1-3 micron nominal
Water Removal	: Evaporation
Weight	: 11 kg
Dimensions	: 38x35.5x14 cm (H x W x D)
Pipework	: Inlet=10L Output =12S

The purity rate in continuous use:

Vann	: Down to 500 ppm (0,05%)
Particles	: Down to 1-3 Micron
NAS	: NAS class 3-4



Purifiner TF5060C



Construction, Mining, Forestry etc.

24V Controller Unit

Filters and cleans oil to better quality than new oil free of particles and water.

This extends oil life with 10 to 15 times.

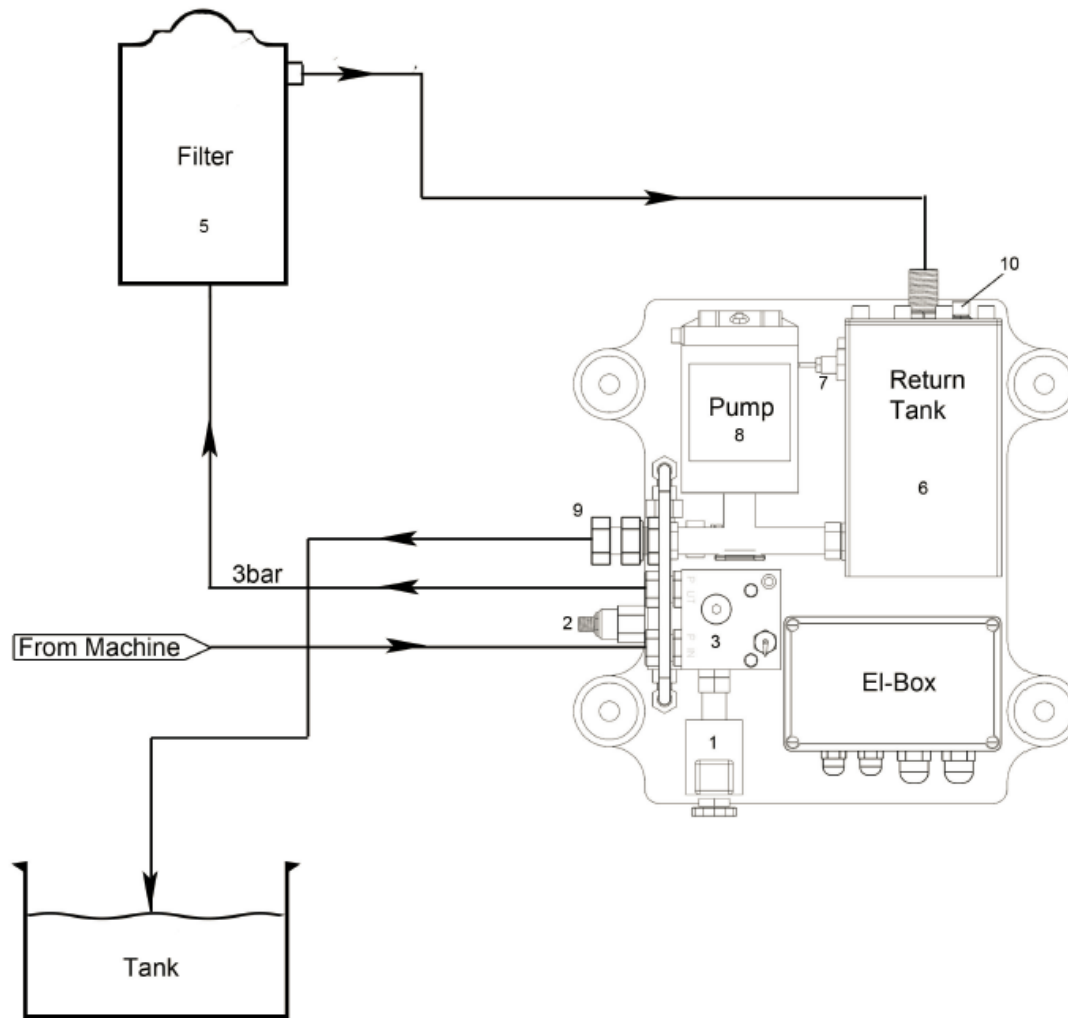
Cleaner unit removes particles down to 1-3 micron.

Evaporate all the water, including emulsified water in oil, down to 100 PPM (0.01%).

Built for installation directly on equipment.

NB: Filter must be installed higher than controller.





Hitachi 870 LCH



NASTA®

Torstein Strømmen
Service avtaler/Kundeoppfølging
NASTA AS

Liebherr Mobile Crane



Before



After



Arnfinn Mathisen

Verksted Leder

Nordic Crane Kynningsrud AS



Purifiner

TECHNOLOGY



Diesel Purifiner

- Removes particles
- Removes water
- Removes fungal growth
- Removes living conditions for fungal growth
- Low running costs
- 600 litres per hour





Purifiner Market



- **Shipping**
 - Thrusters
 - Propeller Shafts
 - Control Machines - Gear
 - Ro-ro Equipment, Hanging Decks
 - Bow Ports
 - Walkways
 - Winches
 - Cranes
 - Anchors
- **Offshore**
 - Power Packs
 - Winches
 - Cranes
 - Anchor
 - Valves
 - Thrusters



Fishing Fleet

- Well Boats / Aquaculture
- Cargo Boats

Commercial Vessels

- Tankers
- Supply, Service Offshore
- Container
- Cruise Ships
- River Boats - Cargo and Cruise

Military

- Air Force
- Coast Guard
- Navy



There are thousands of registered vessels. On worldwide basis are approximately 30,000 ships of size larger than 5,000 dwt.

Industry

- Printing Press
- Paper Industry
- Food Manufacturers
- Mechanical and Hydraulic Presses
- Power Plants



Construction, Mining and Forestry

- Contractors
- Forest Harvesting and Management
- Mining Industry
 - Drilling Rigs
 - Earthmoving
- Machine Manufacturers



Rental Industry

- Equipment Rental

Elevators

- Commercial Buildings / Warehouses
- Apartment Blocks
- Ships and Ferries



Railways

- Diesel Locomotives (Diesel Purifying)



Manufacturers

- Thrusters
- Azipods
- Steering and Gears
- Propellers
- Cranes and Winches



Example of Multi-Unit Market



PSV

- Thruster 3-4
- Stern Tube 1-2
- Steering Gear 1
- Crane 1-2

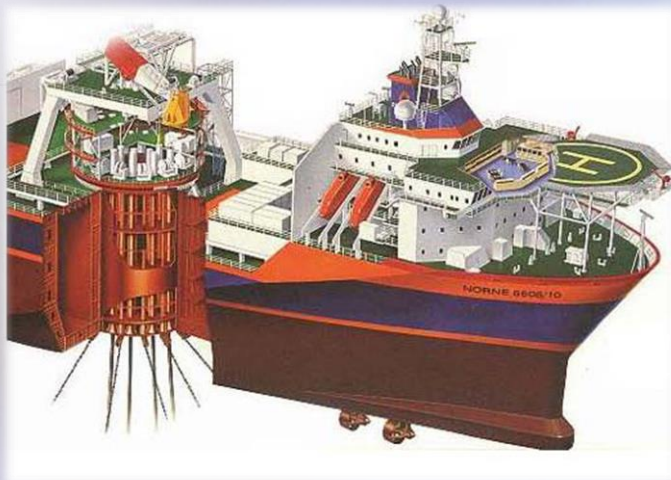
Total 6-8 Units



AHTS

- Thruster 4-5
- Stern Tube 1
- Azipod 2
- Crane 3-4
- Port 1
- Steering Gear 1

Total 12-13 Units



FPSO

- Azipod 4
- Thruster 4
- Power Pack 4
- Crane 2-3
- Winch 2-3
- Stern Tube 2
- Steering Gear 2
- Port 2-3
- Drill Floor 2-3

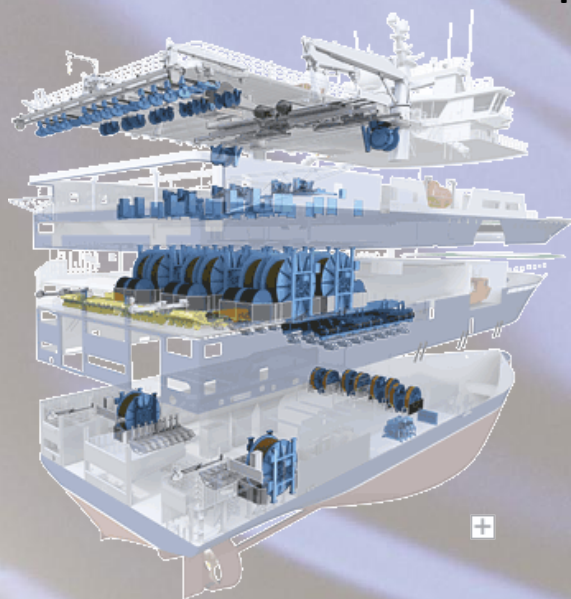
Total 22-30 Units



SEISMIC SHIP

- Thruster 4
- Propeller Shaft 2
- Power Pack 4
- Compressors 2
- Crane 4-3
- Winch 2

Total 16-19 Units





FERRIES / CRUISE

- Steering Gear 2
- Azipod 8
- Port Side 4
- Power Pack 4
- Bow Port 1
- Hydraulic Deck 2-3
- Stern Tube 4

Total 21-24 Units



BULK / TANKERS

- Thrusters 3
- Stern Tube 2
- Steering Gear 2
- Power Pack 1
- Crane 2

Total 10 Units



RO-RO SHIPS

- Thruster 3
- Stern Tube 2
- Side Port 6
- Bow Port 2
- Winch 2

Total 15-17 Units



OFFSHORE

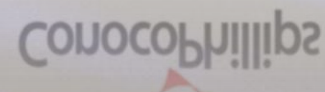
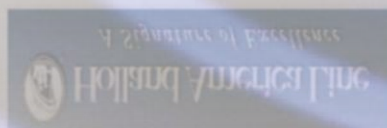
- Anchor Winch 4
- Crane 3
- Power Pack 2-4
- Thruster 4
- Drill Floor 2

Total 15-19 Units

Selected References



References:





NORSK MINERAL



SKANSKA





We make Oil greener.