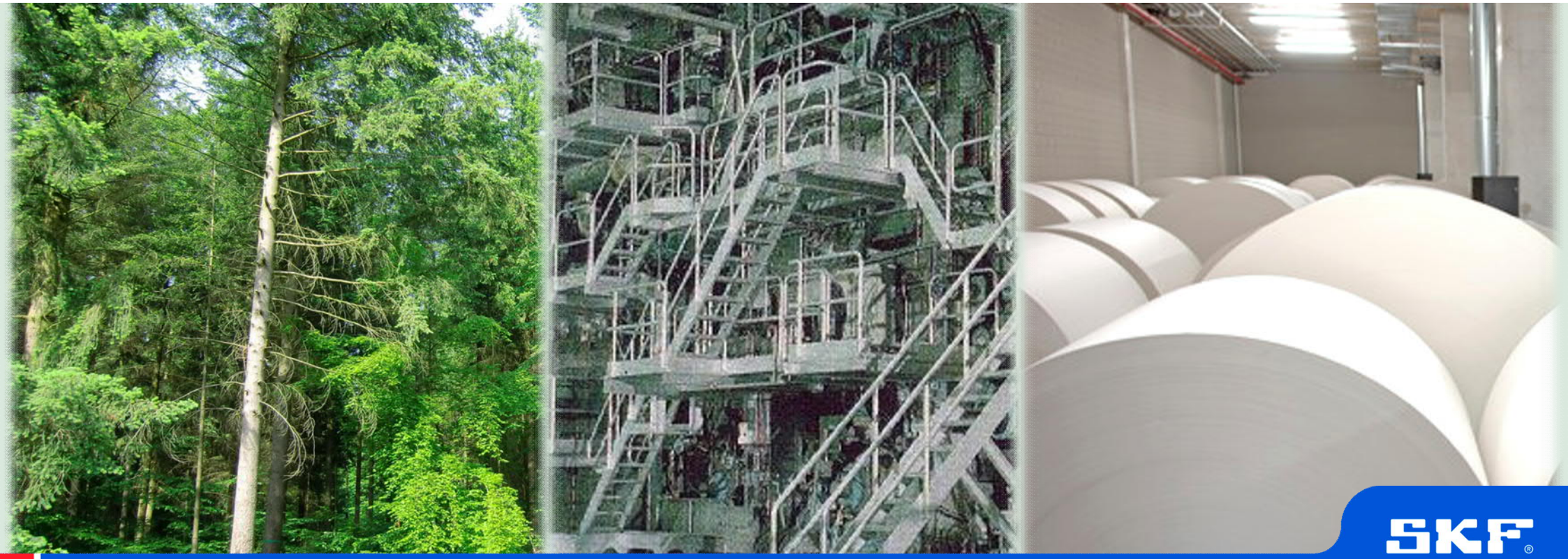
Oil Circulation Lubrication Systems

Modern oil circulation lubrication systems help reduce energy consumption



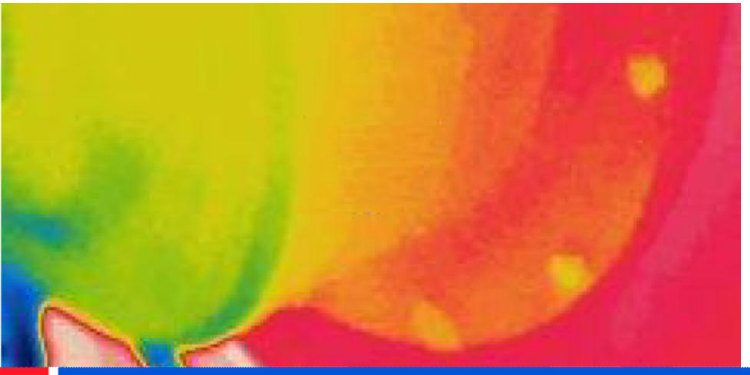
SKF CircOil – What is it all about?

The task of an oil circulating lubrication system is

- to provide the correct amount of high quality oil to each lubrication point at the correct temperature and viscosity, the correct pressure and the required cleanliness level
- to keep the oil in an optimum shape (calm down and condition)
- to remove abrasive particles, oxidizing agents, water and air from the oil

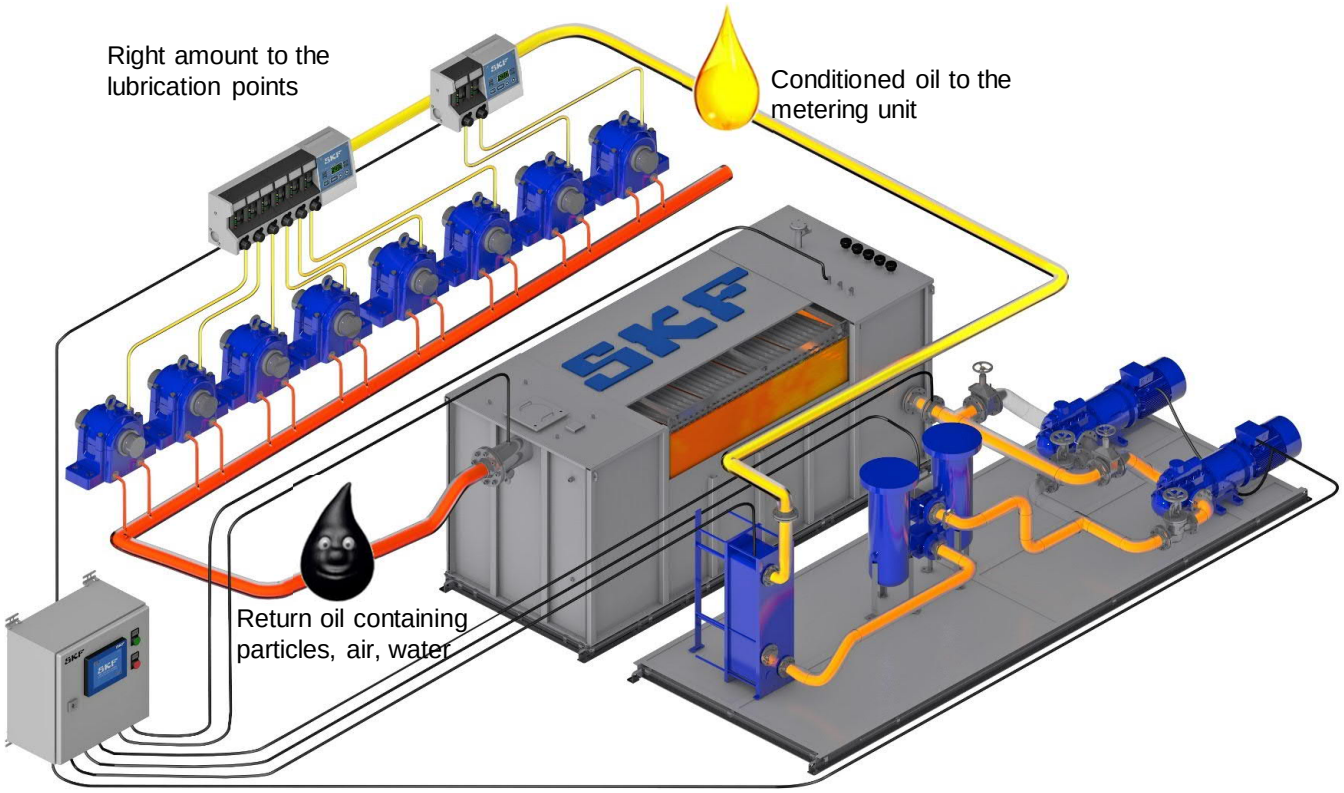
All this has a strong impact on rotating equipment performance and its life cycle.

Lubrication
20 – 25%



Heat dissipation
75 – 80%

Main System Components



- Supply unit
- Flow meters
- Pipes and tubes

SKF Oil Circulation Lubrication System

PUMPING UNITS

FLOW METERS

OIL CONDITIONING UNIT

SUMP UNIT

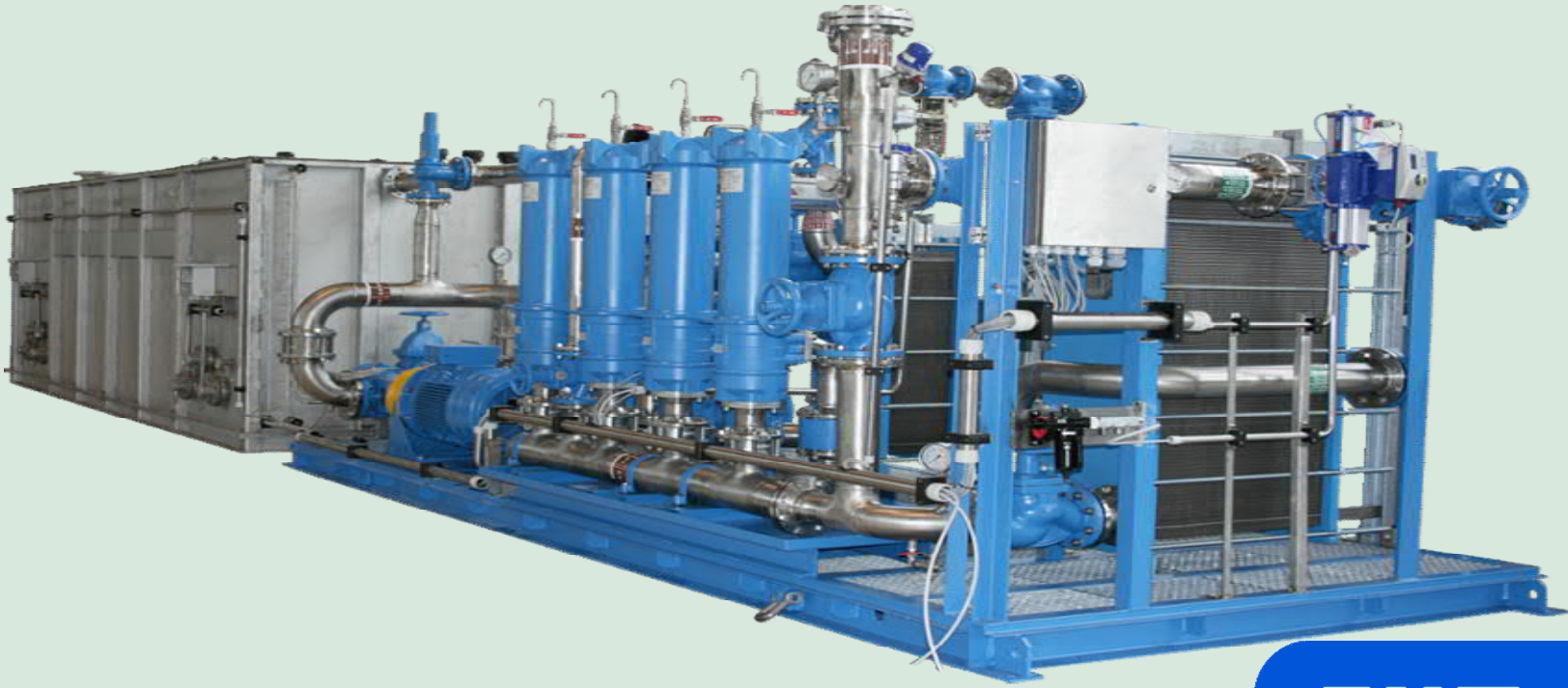
CONTROLS

SKF Flowline
SKF Streamline
top of line tank technologies

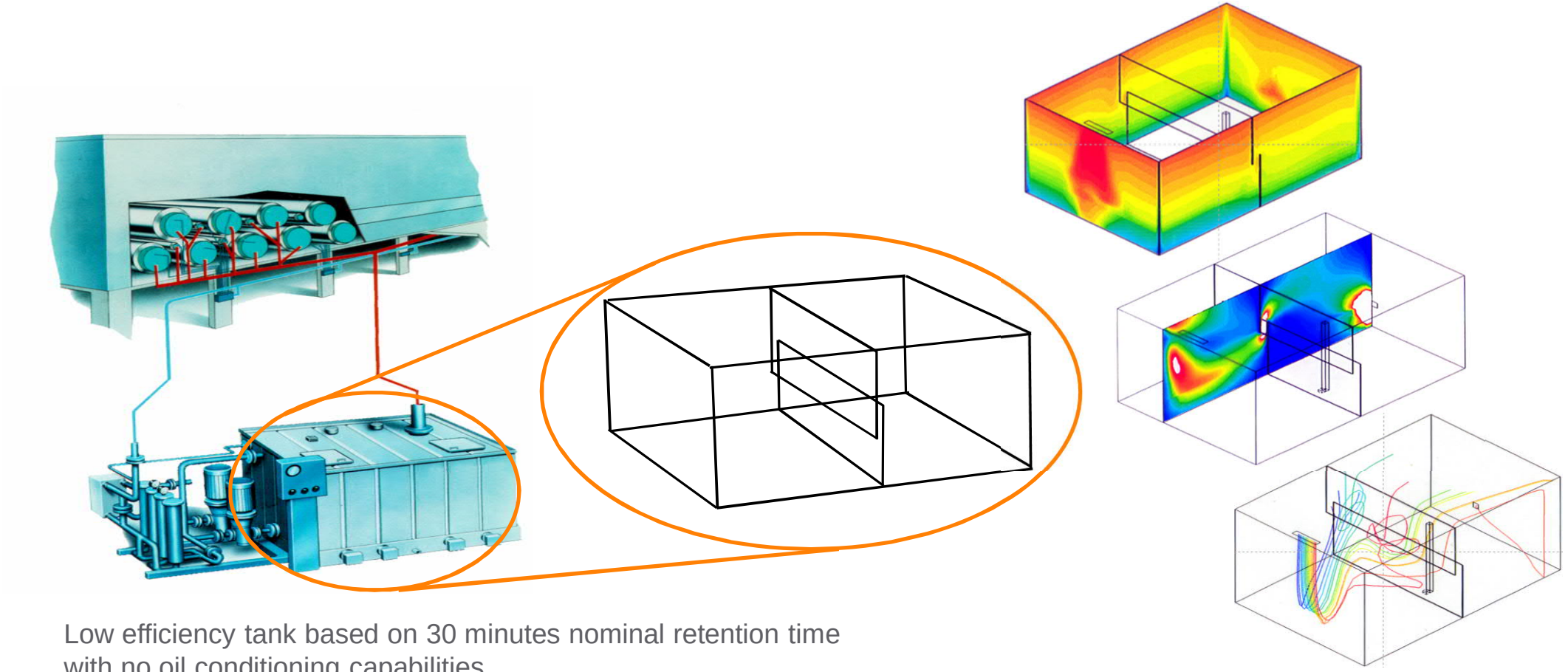
SKF Tank technology

Flowline tank

Streamline tank



Traditional tank design



Low efficiency tank based on 30 minutes nominal retention time
with no oil conditioning capabilities

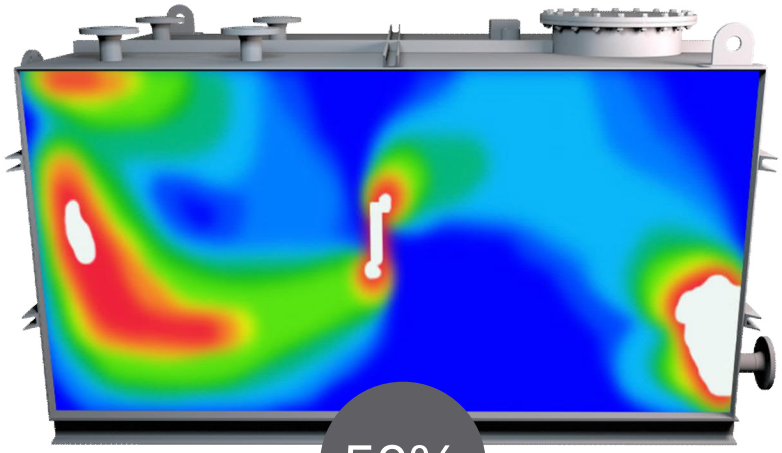
Impact of wrongly sized reservoirs

Foaming, quick deterioration of oil quality

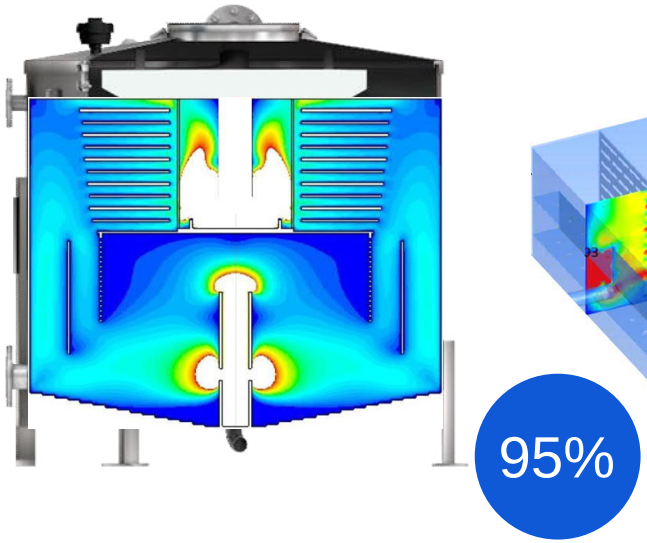
Main sources of air - foaming

- Wrong tank size or tank design
- Wrong design of return lines
- Foaming of return oil when entering the oil tank
- Wrong type return filtration

SKF tank technology

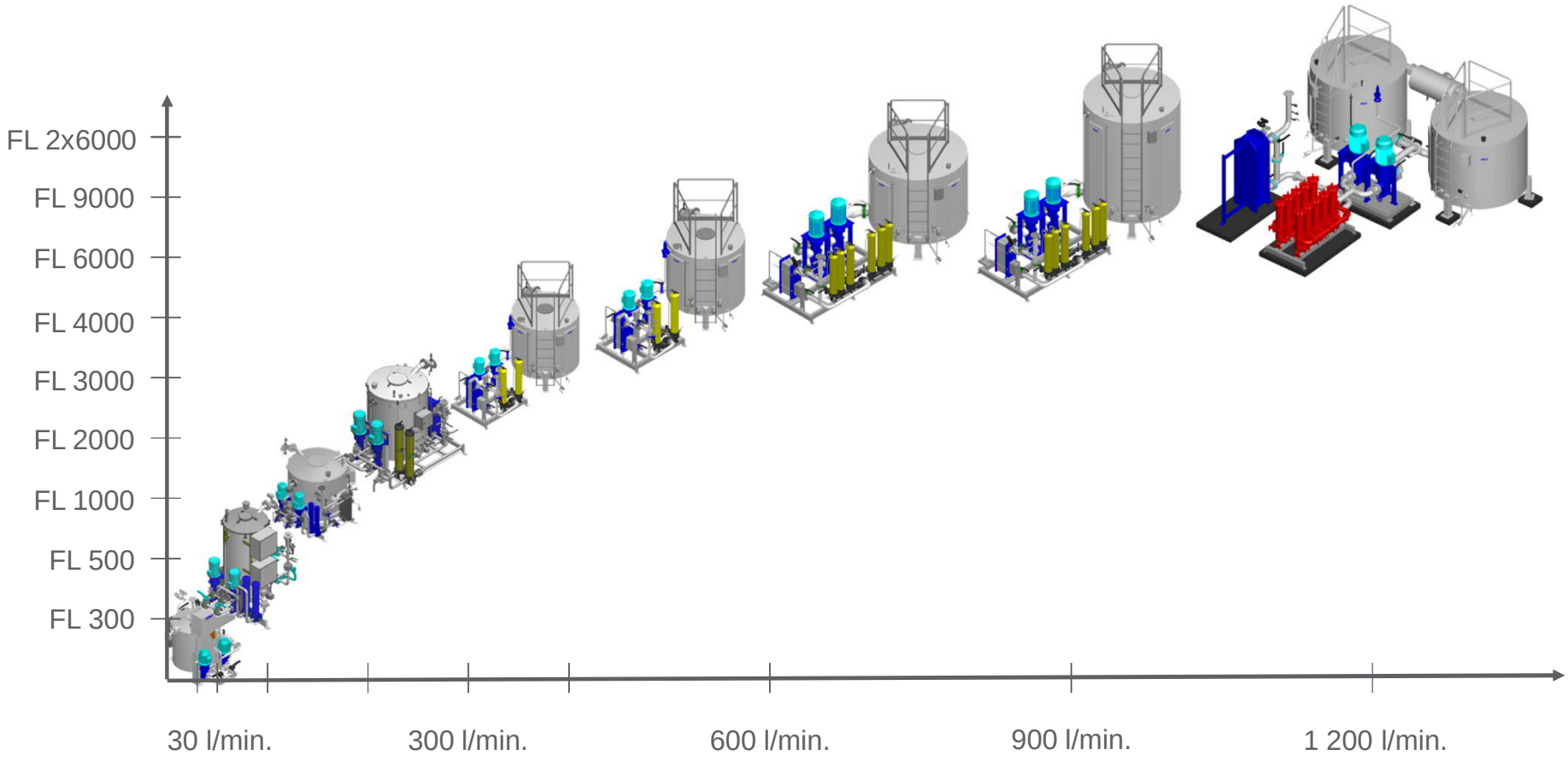


Traditional Tank
e.g. 7 500 liters
using less than 50% of the tank capacity
poor oil conditioning capabilities

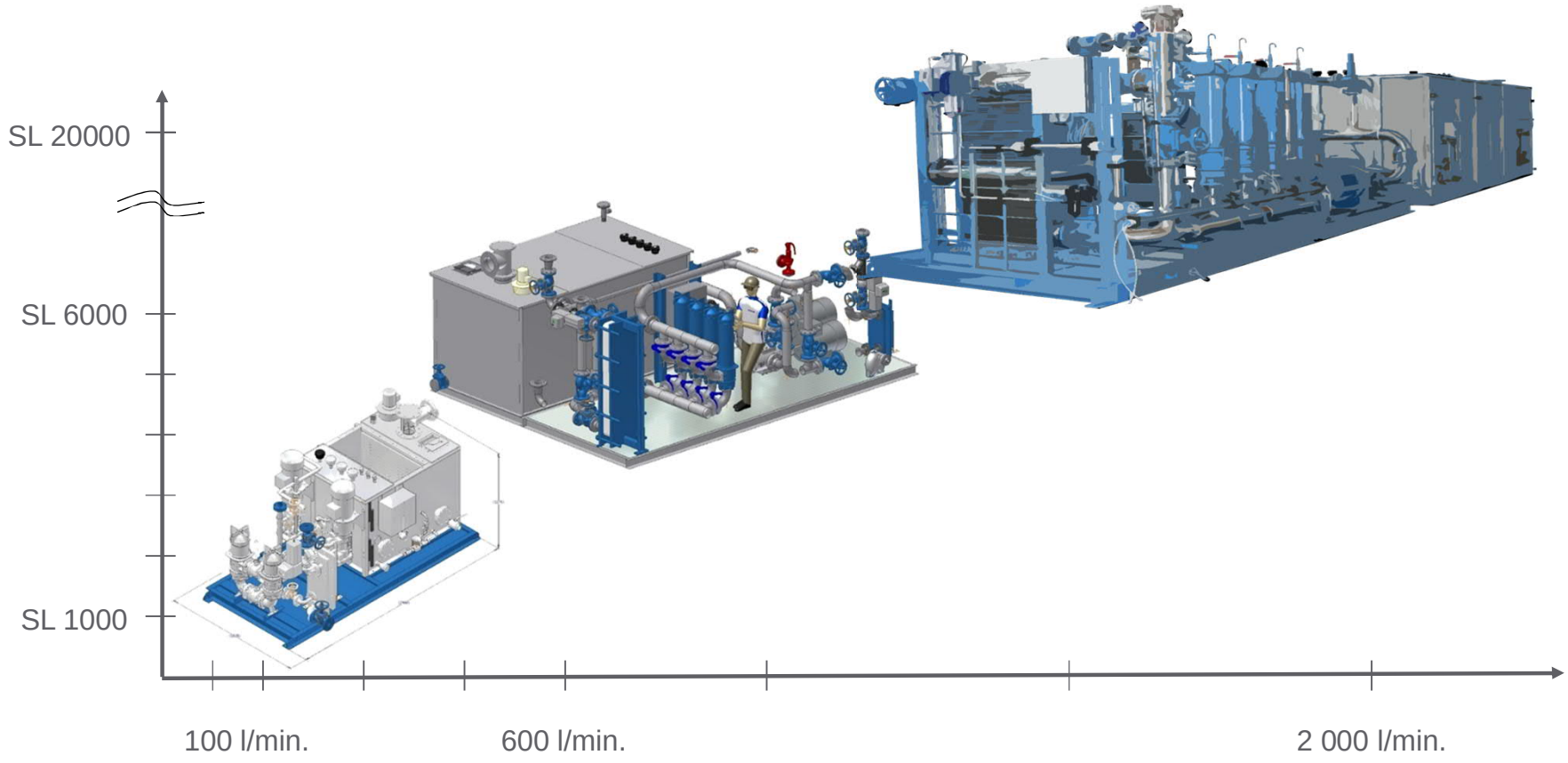


SKF Tank
e.g. 3 000 liters
using more than 95% of the tank capacity
excellent oil conditioning capabilities

SKF Flowline product line



SKF Streamline product line



Air in lubrication oil

- Shortened life of oil because of oxidization
- Deterioration of oil properties
- Decreased efficiency of lubrication

Air Separation Site Survey

Site survey:

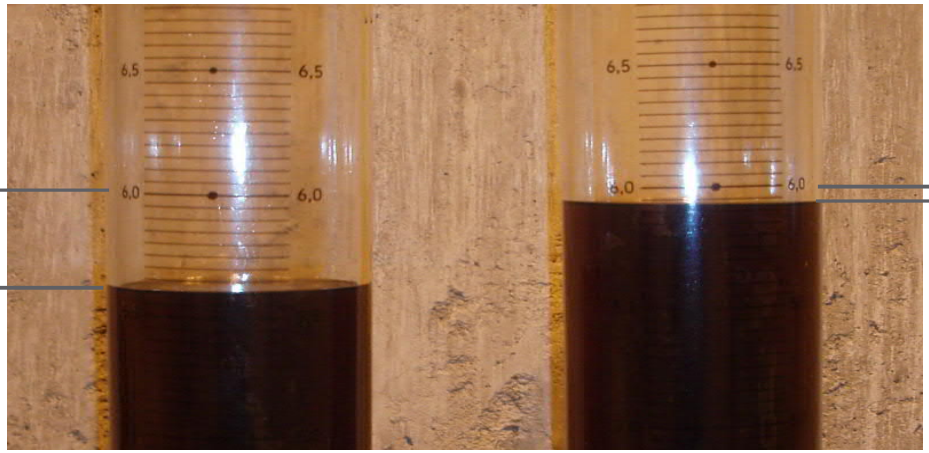
Oil samples, both 6 l, were collected from the return oil and from the oil outlet downstream of a Flowline tank.

Both samples were allowed to settle down 48 hours to remove the air completely from the oil .

Return oil sample

Air removal 0.4 l

(Returning oil included 6.7% of air)



Oil sample after Flowline tank

Air removal 0.07 l

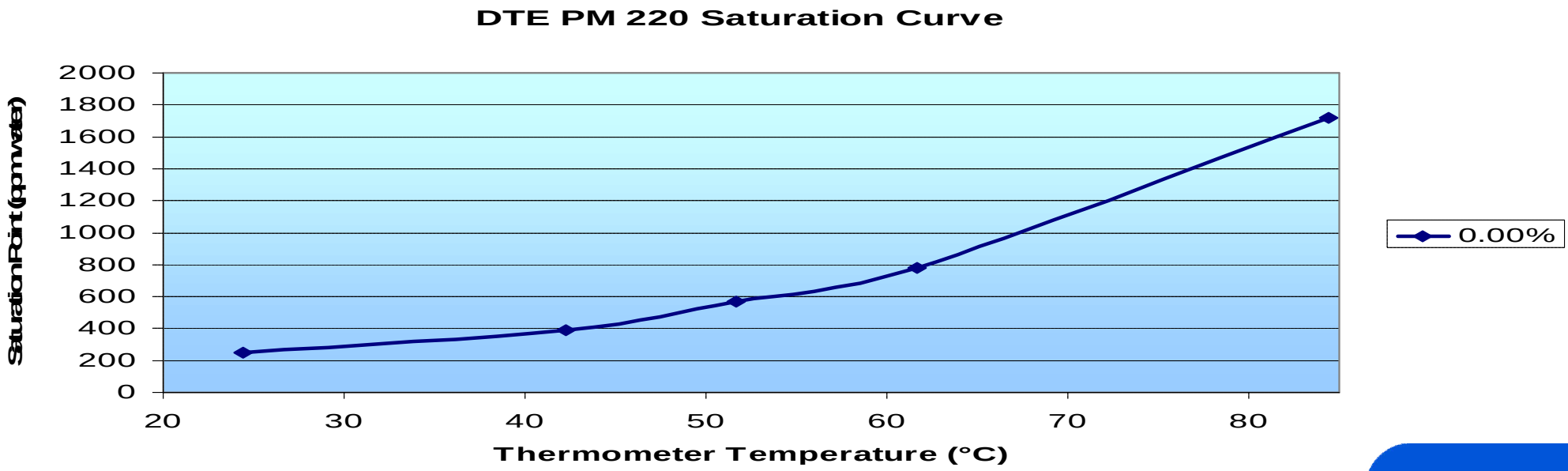
(Oil after Flowline tank included 1.2% of air)

Result: The Flowline tank eliminated more than 80 % of the air from the return oil.

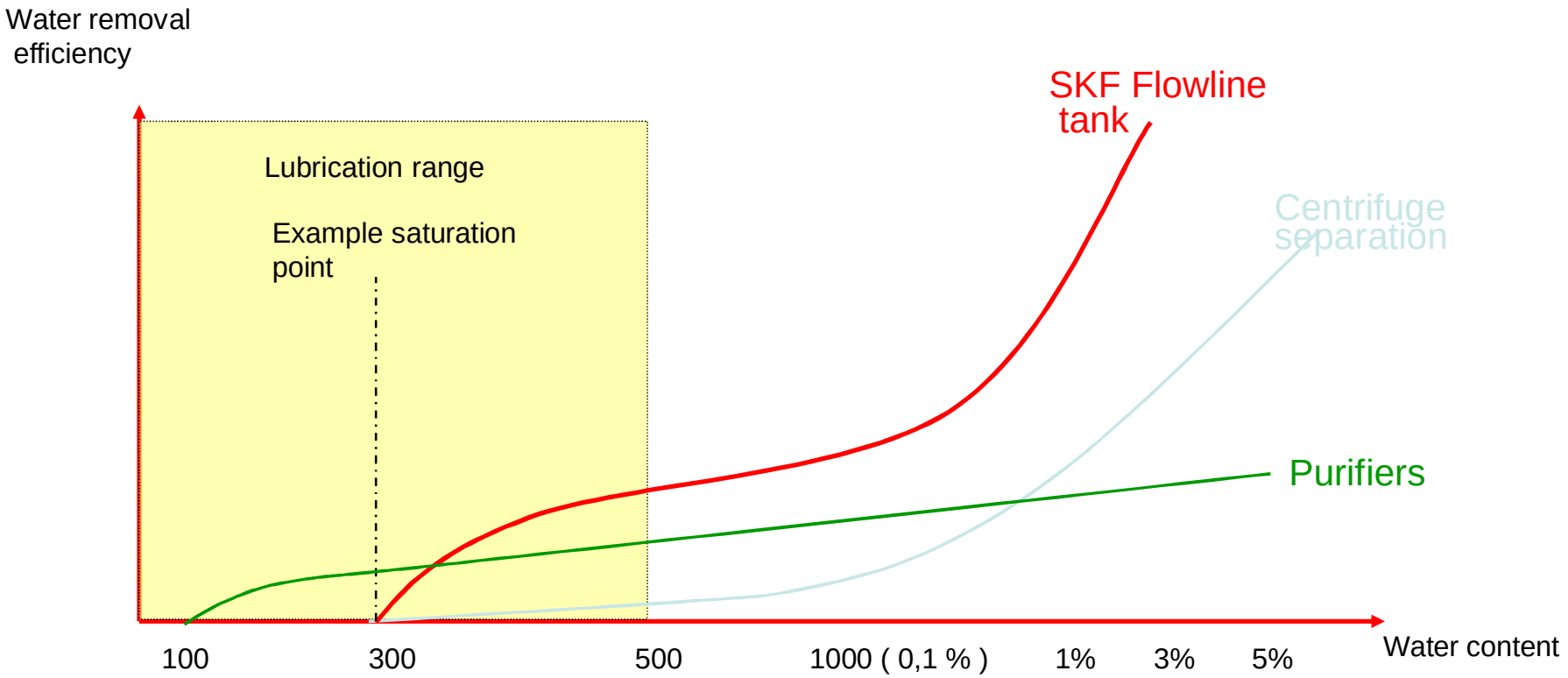
Water separation

Saturation curve

- Oil specific figure
- Temperature dependent



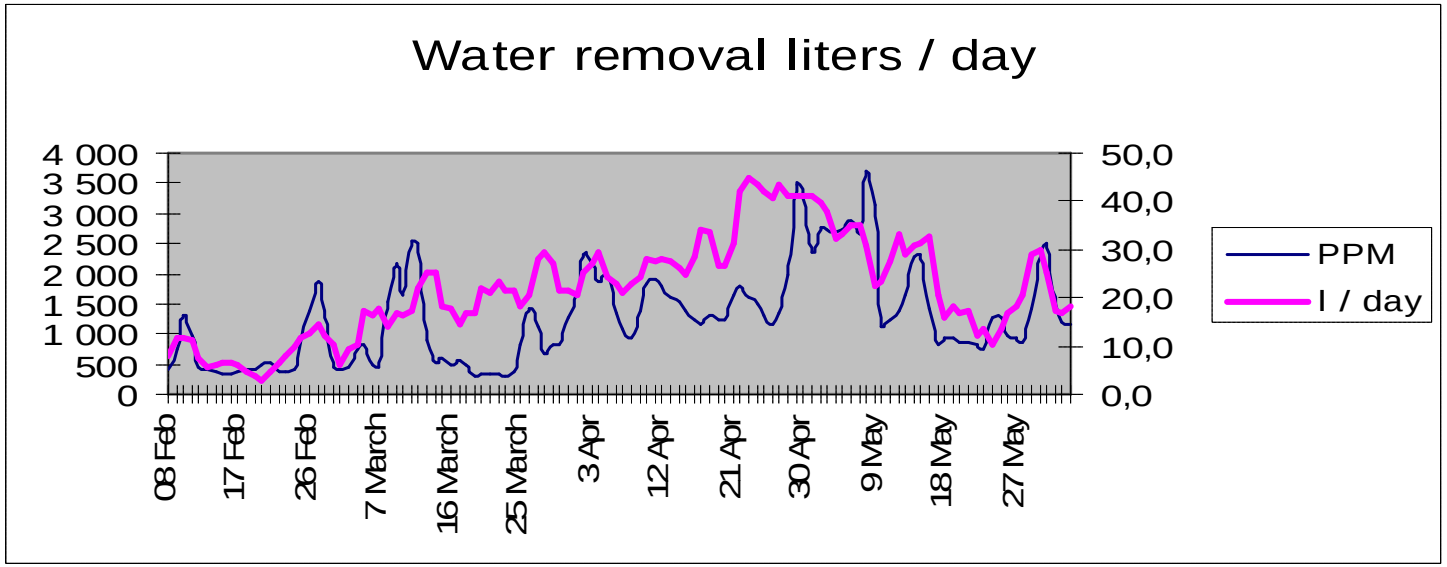
Water removal efficiency



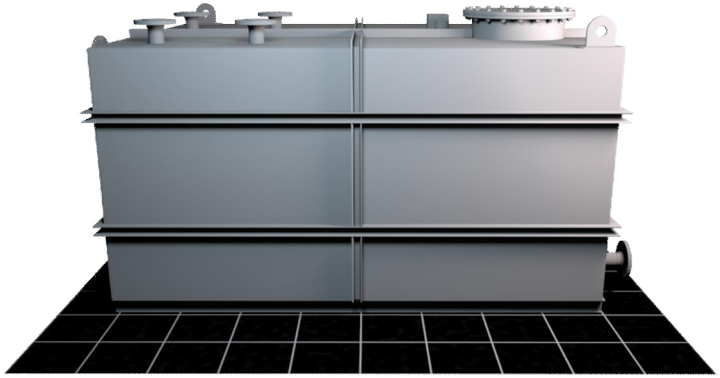
Water removal case study

Proprietary paper company, PM-2 dryer section

Customer experienced steam joint problems but with Flowline Tank excess water could be daily removed without major operational issues (in other words the more water came in, the more system could remove it)



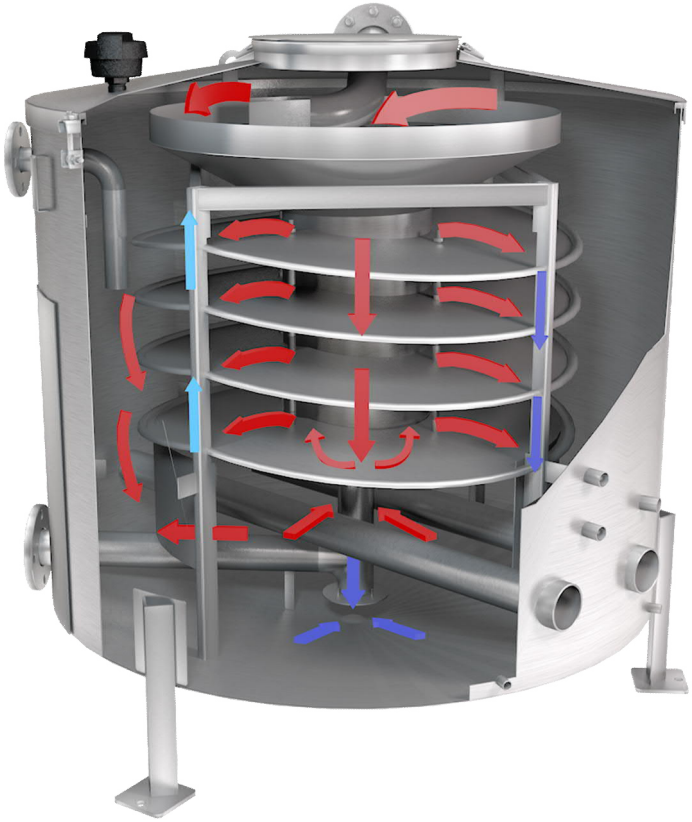
Traditional Tank vs. SKF Tank Technology

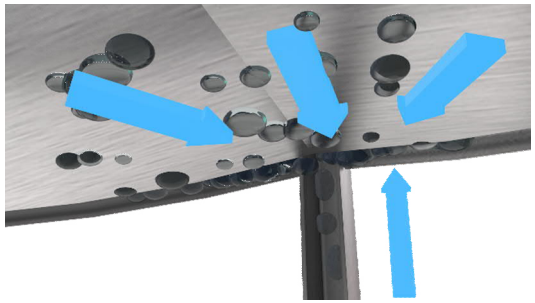


Traditional
30 min. retention time
no internal oil conditioning capabilities

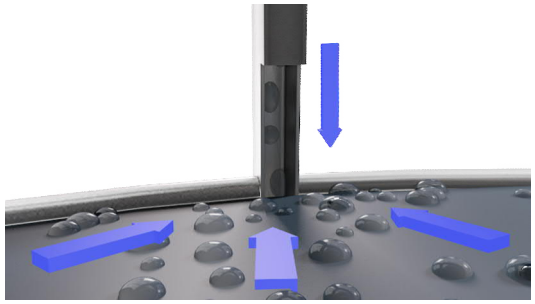
SKF
10 min. retention time
internal **oil conditioning capabilities**

Flowline Tank Technology – How it works





Air



Water

SKF vs. traditional design

SAVINGS
4,500 liters x 7 US$
31,500 US$

	Traditional System	SKF System
Total Flow	250 l/min (65 gpm)	250 l/min (65 gpm)
Reservoir Volume	7 500 liters (2 000 gallons)	3 000 liters (800 gallons)
Operational Efficiency	33%	95%
Actual Capacity	2 500 liters (650 gallons)	2 850 liters (750 gallons)
Actual Retention Time	10.00 min	11.24 min
Example of price comparison		
Reservoir Volume	7 500 liters (2 000 gallons)	3 000 liters (800 gallons)
Oil price (e.g.)	6,00 US$ / liter	6,00 US$ / liter

Control and monitoring

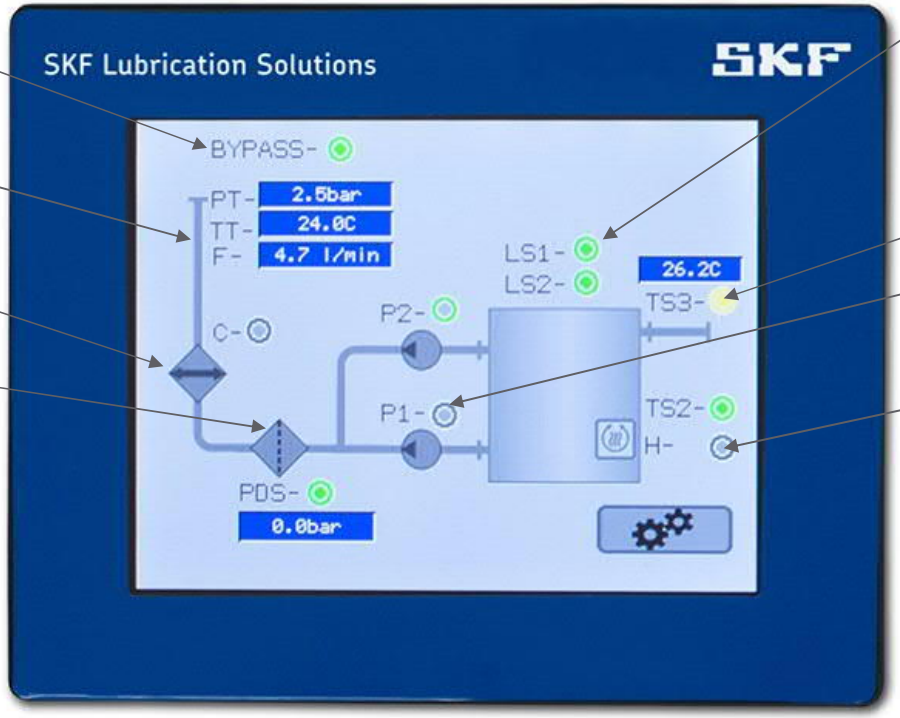
SKF ST-2240-CIRC stand alone controller

Bypass control

Monitoring and control of oil output

Cooler control

Filter monitoring



Tank level monitoring

Return oil temperature monitoring

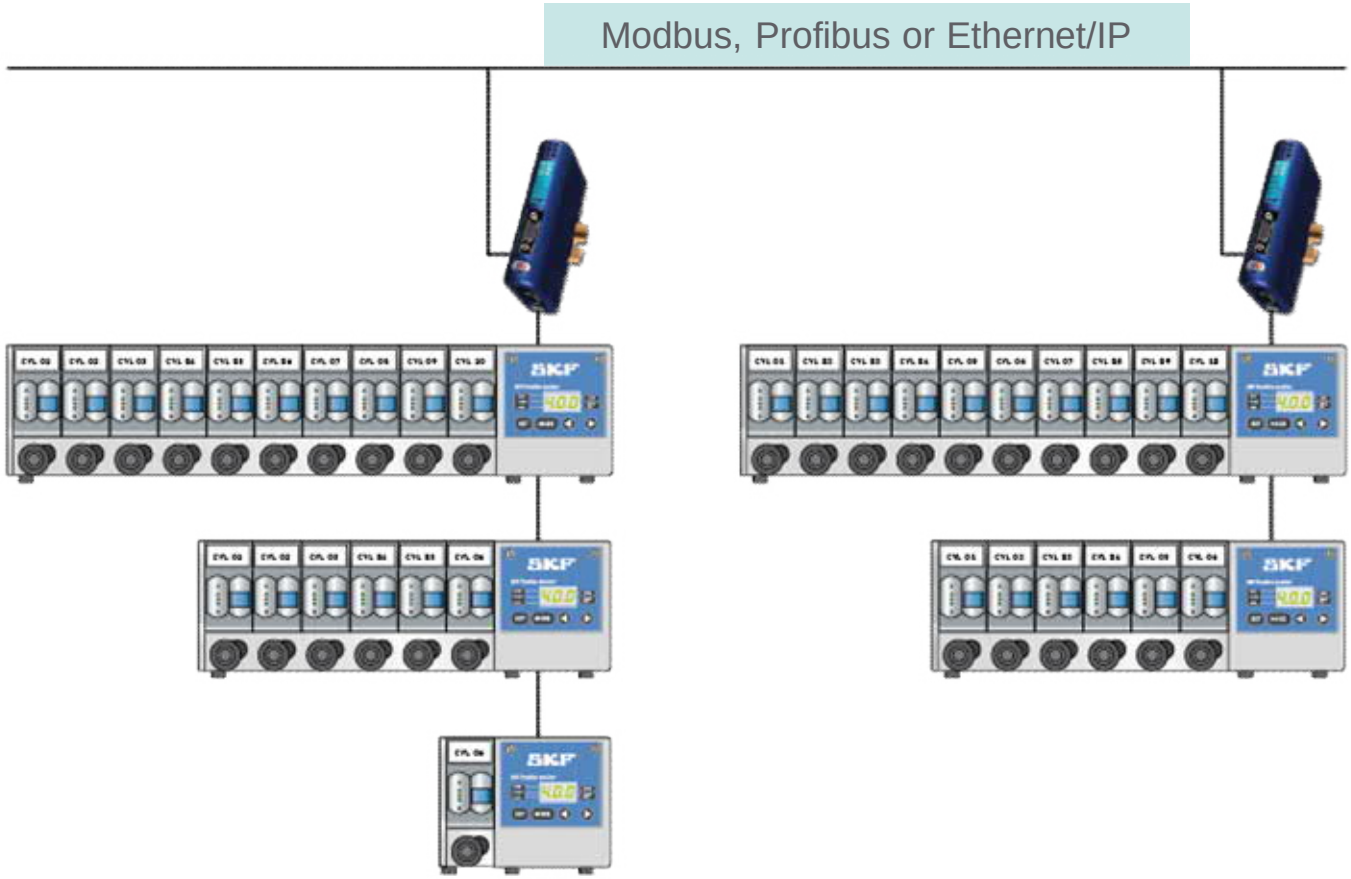
Pump control

Heating control

SKF CircOil metering devices

SKF Flowline monitor

DCS interface with Fieldbus/network converters



Fieldbus/network converter

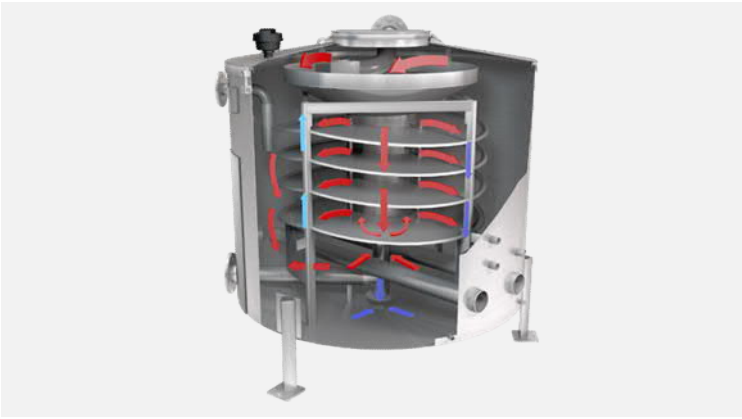
CAN bus

Up to 120 flowmeters can be interfaced with one converter.

SKF solution benefits

Improved runnability and lower maintenance costs

- Smaller reservoirs thanks to higher efficiency
- Excellent oil conditioning by effective separation of water droplets, trapped air and contaminants
- Less lubrication related costs
- Less space requirement
- Lower environmental impact and fire hazard in case of an accident
- Lower power and cooling water consumption
- Better lubrication results thanks to better oil conditioning



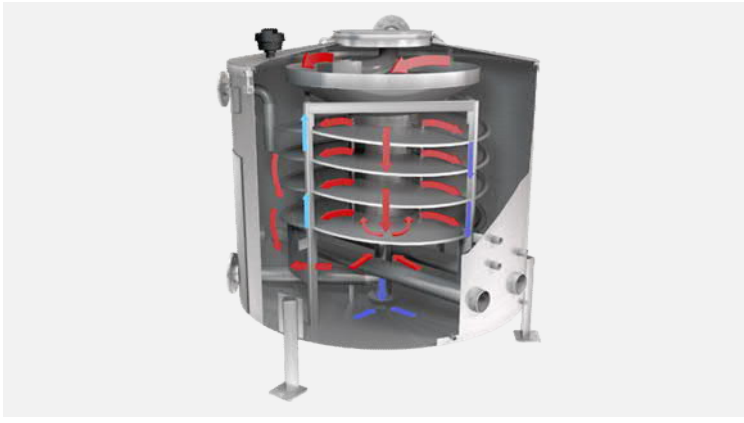
Up to 95% efficiency vs. traditional design (33%)

Oil retention time down to 10 minutes from a traditional 30 minutes

SKF solution benefits

Improved runnability and lower maintenance costs

- 20 % lower pumping energy consumption (Variable frequency drives for system pressure control)
- 20 % lower cooling water consumption
- High filtering efficiency, low filtering costs
- Easy cold start-up
- User-friendly system control



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