





Marine Fuels 2020 & beyond

IMPACT AND SOLUTIONS

Fuel Line Optimization

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Only 14 months to 2020, and still many uncertainties!

Fuel availability
Technical solutions
Fuel quality



Oil price
Fuel compatibility
Fuel specification

2020 Fuel Challenges...

- High variety of different fuel blends (majority will be residual).
- Average viscosity will decrease 30-500 cSt and higher variations.
- Density will decrease and higher variations.
- Catalytic fines will be there in varying amounts and more hard to predict: max. 60 ppm (ISO RMG).
- Special knowledge needed to avoid stability, compatibility and pour point issues.

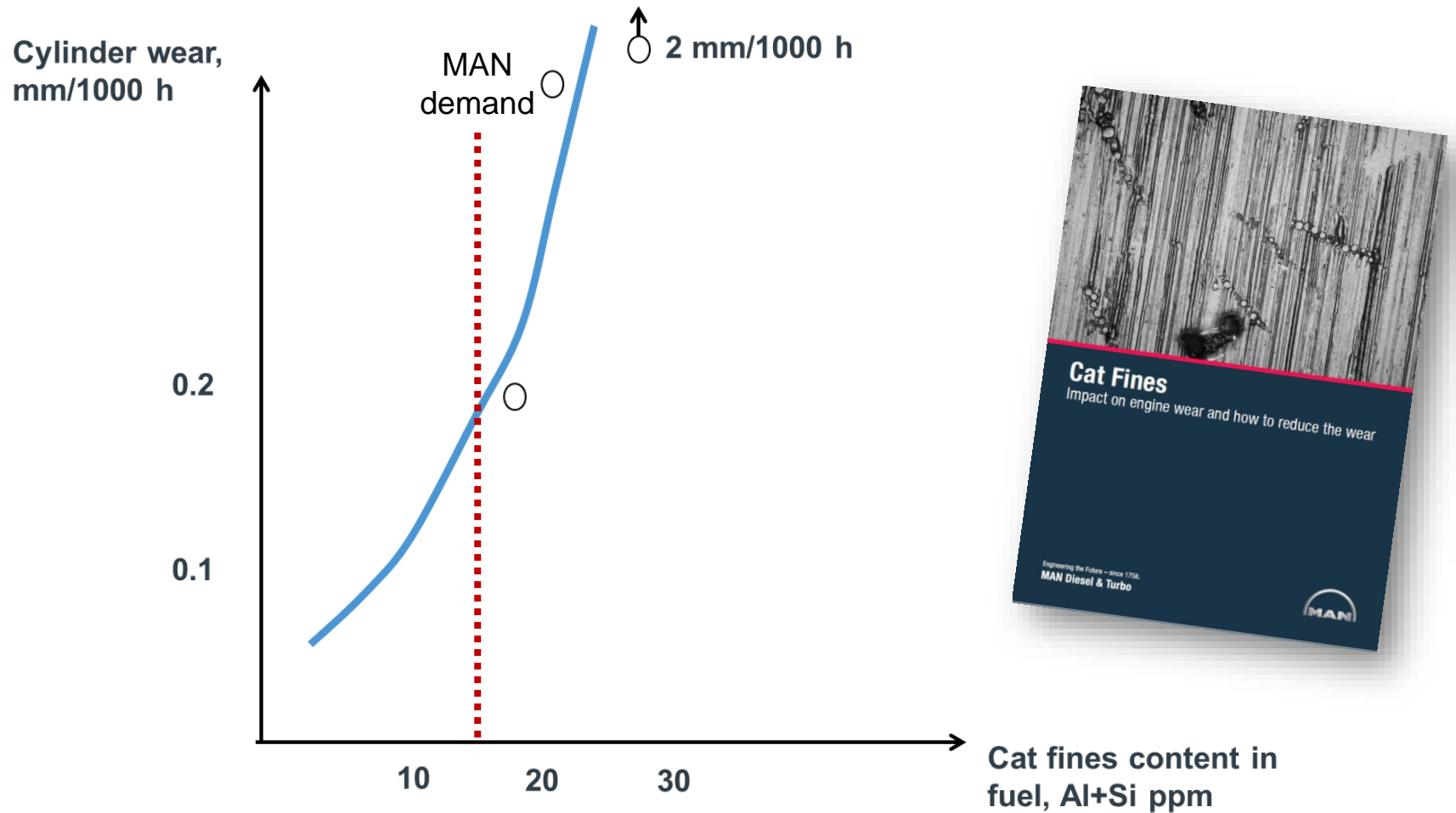


Fuel Quality: Cat Fines

- Catalytic fines cause serious wear to the engine
- MAN investigation looked at **226 vessels** with high-wear cylinder liners:
 - **190 cases** involved cat fines
 - High levels of cat fines can wear down a cylinder liner in few hours
 - Expensive to repair!



Cat fines – Impact on engine wear



Source: MAN Diesel & Turbo

The Alfa Laval Adaptive Fuel Line

The Alfa Laval Fuel Line focusing on optimization for:

- Energy efficiency
- Engine protection
- Environmental compliance
- Easy operation

3 main areas for optimization:

1. Equipment and feed optimization
2. Multi-fuel management
3. Oily waste treatment



1. Equipment and Feed optimization

Separator with ALCAP takes care of all 2020 fuels

- Efficient fuel treatment for all densities up to 1.010 g/cm^3
- Efficient fuel treatment for all viscosities within ISO 8217
- Prepared for future changes and requirements
- Lowest OPEX due to minimal oil losses
- Highest separation performance and engine protection

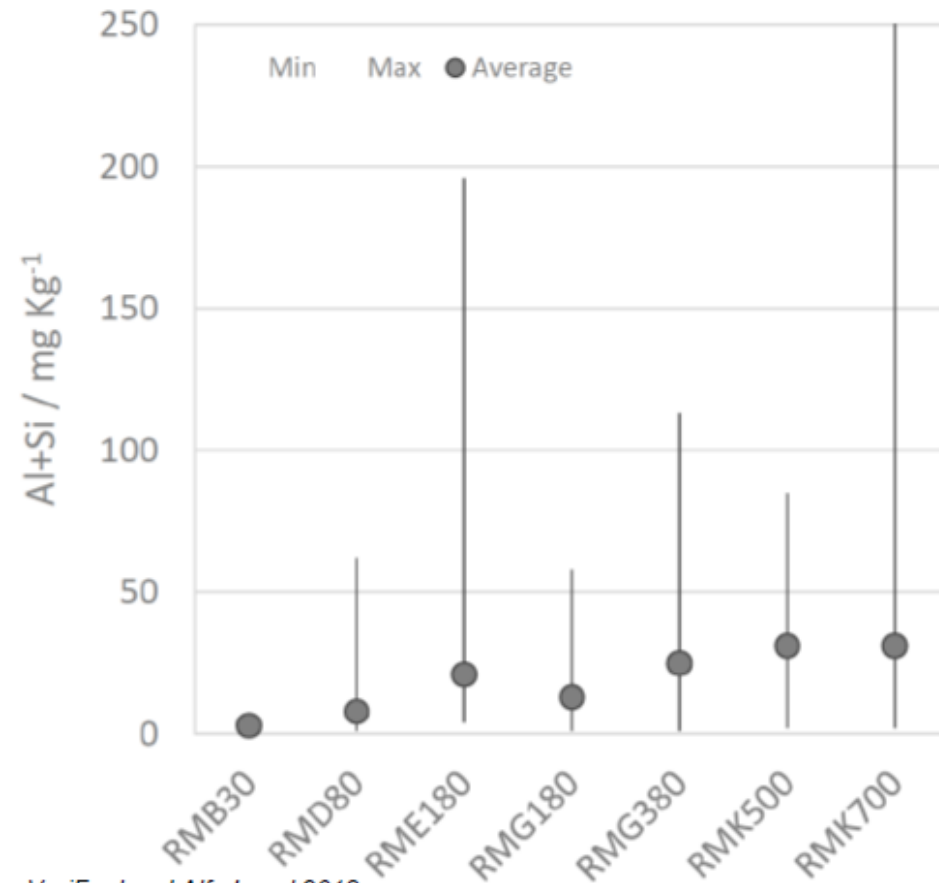


A separation system with Alcap™ technology.

1. Equipment and Feed optimization

Certified Flow Rate (CFR)

- Flow rate (liters per hour) at which 85 percent of 5 μm sized spherical particles are removed from a synthetic test oil
- Work initiated in CEN/TC 313 and CIMAC WG7 (Fuels) to develop a new CFR test standard, also taking care of 2020 fuels



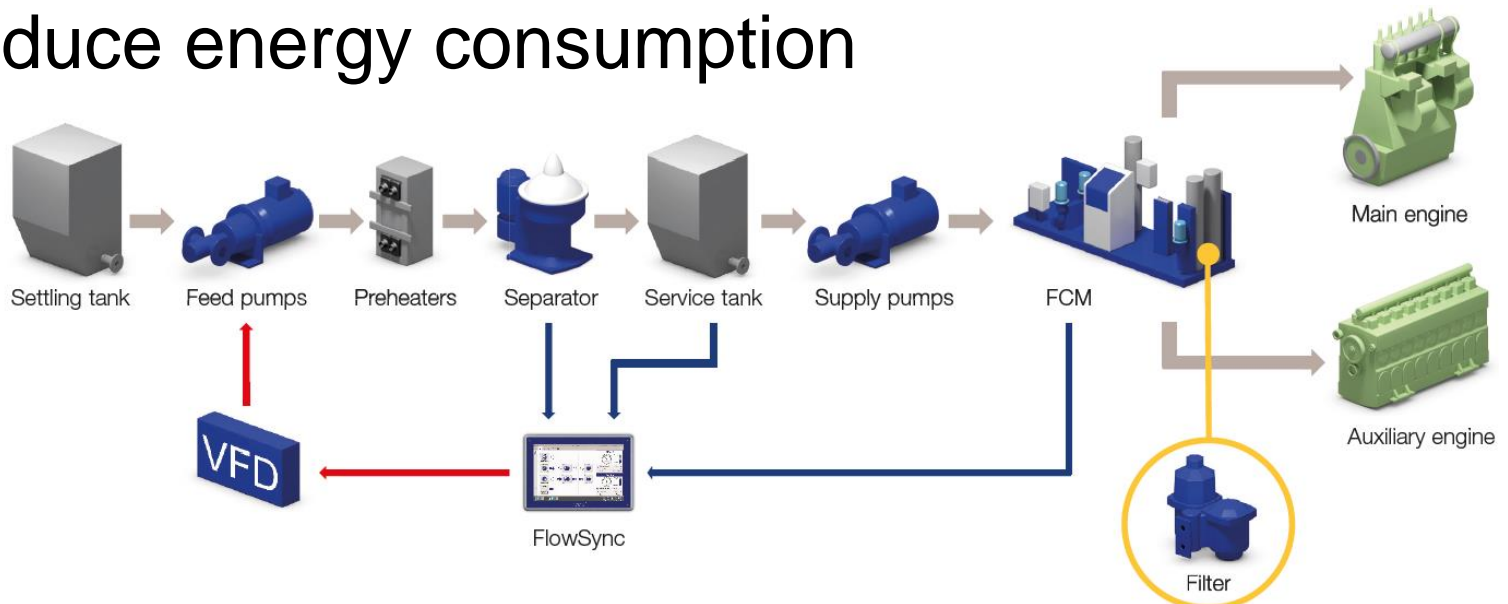
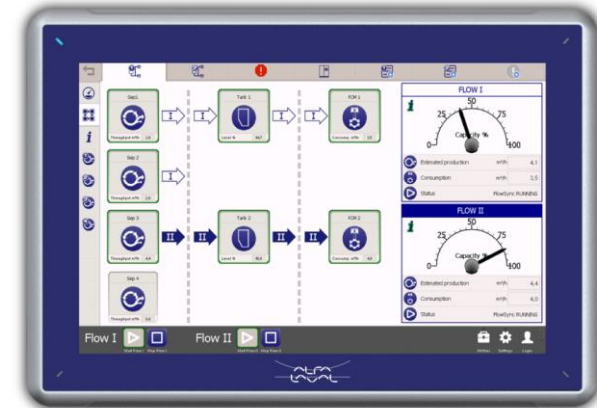
Source: VeriFuel and Alfa Laval 2018

1. Equipment and Feed optimization

FlowSync

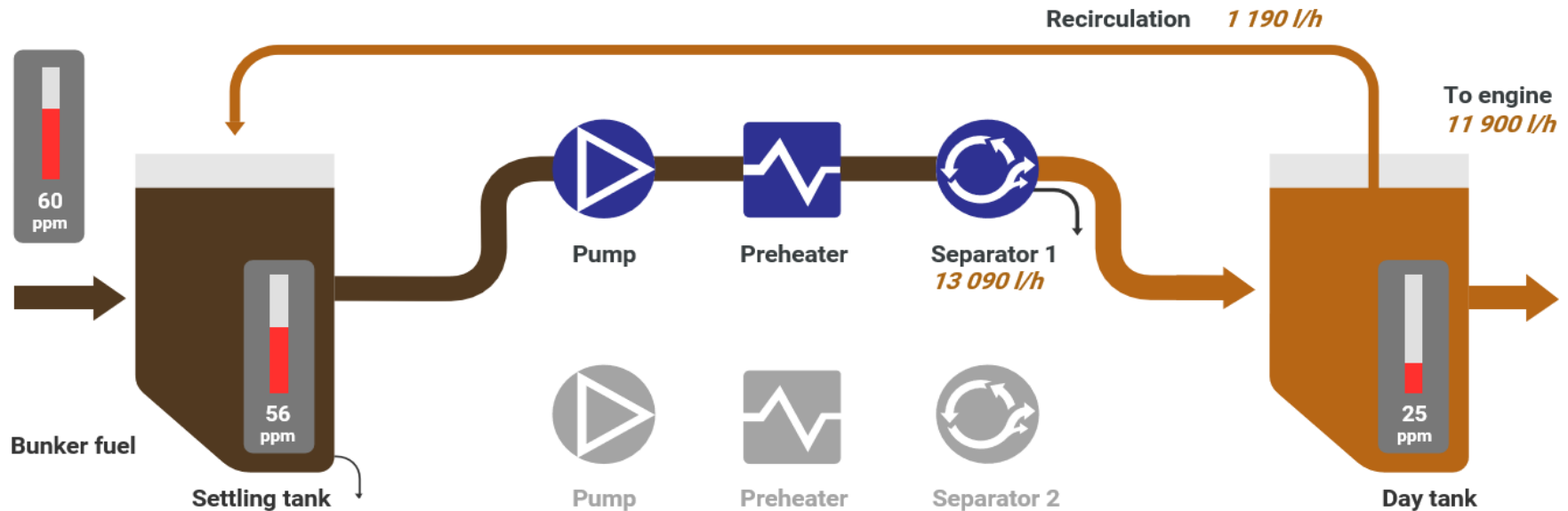
FlowSync adjusts the flow to separators to actual fuel demand by the engine

- Improved separation efficiency
- Reduce energy consumption



One Separator – Full Speed

Fuel cleaning process
Conventional layout



Fuel Sludge / water

OPERATING PRINCIPLE _____

☒ Single

☐ Parallel

FLOW CONTROL _____

FlowSync installed ☐

ENGINE DATA _____

Average power 100 %



Installed engine power 50.0 MW



MEDIA DATA _____

Separator feed temperature 98 °C

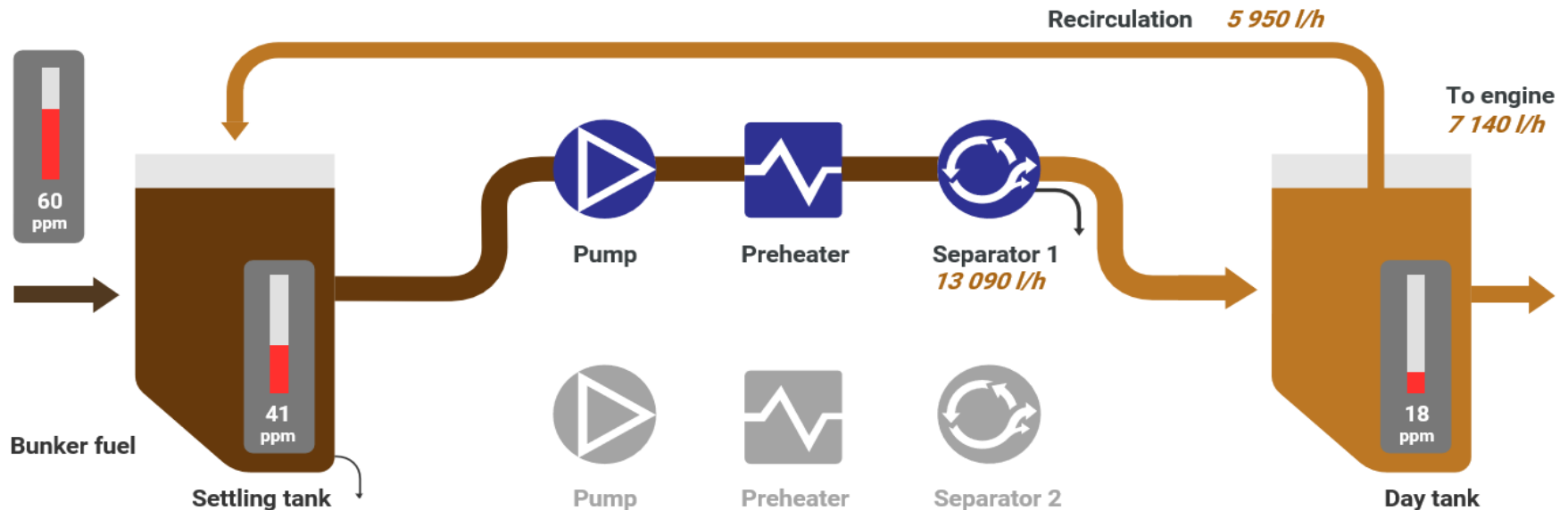


Bunker feed temperature 50 °C



One Separator – Slow Steaming

Fuel cleaning process
Conventional layout



Fuel Sludge / water

OPERATING PRINCIPLE _____

☒ Single

☐ Parallel

FLOW CONTROL _____

FlowSync installed

ENGINE DATA _____

Average power 60 %



Installed engine power 50.0 MW



MEDIA DATA _____

Separator feed temperature 98 °C



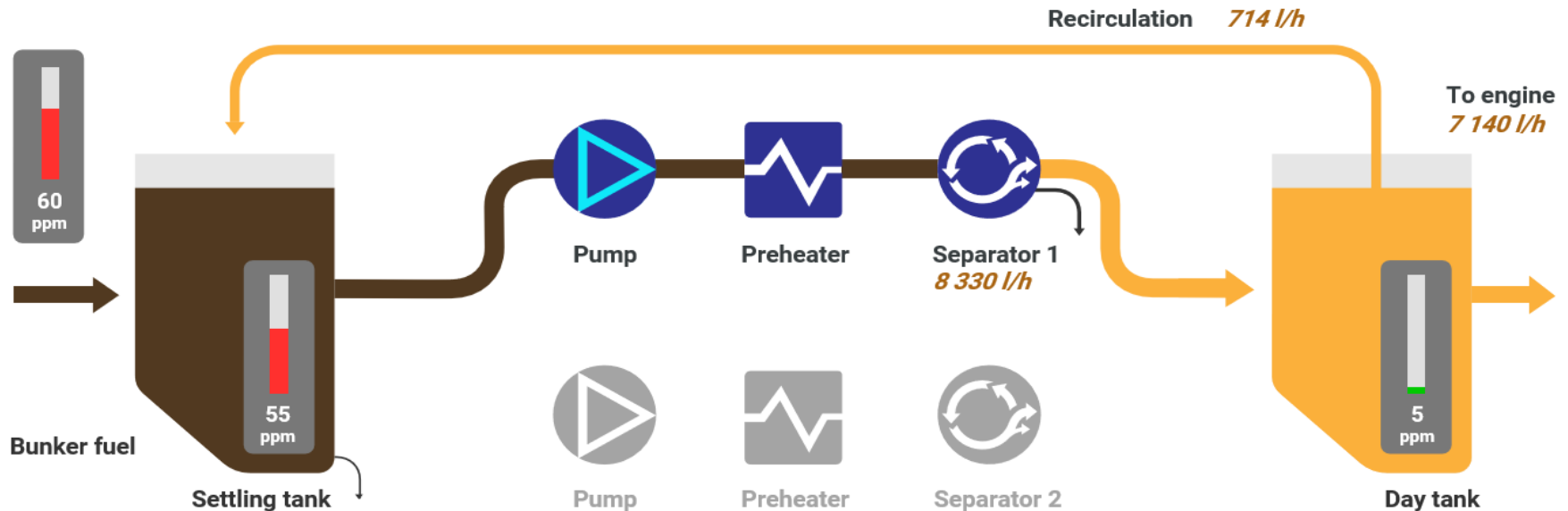
Bunker feed temperature 50 °C



One Separator – with FlowSync

Fuel cleaning process

With FlowSync



OPERATING PRINCIPLE _____

☒ Single

☐ Parallel

FLOW CONTROL _____

FlowSync installed



ENGINE DATA _____

Average power 60 %



Installed engine power 50.0 MW



MEDIA DATA _____

Separator feed temperature 98 °C



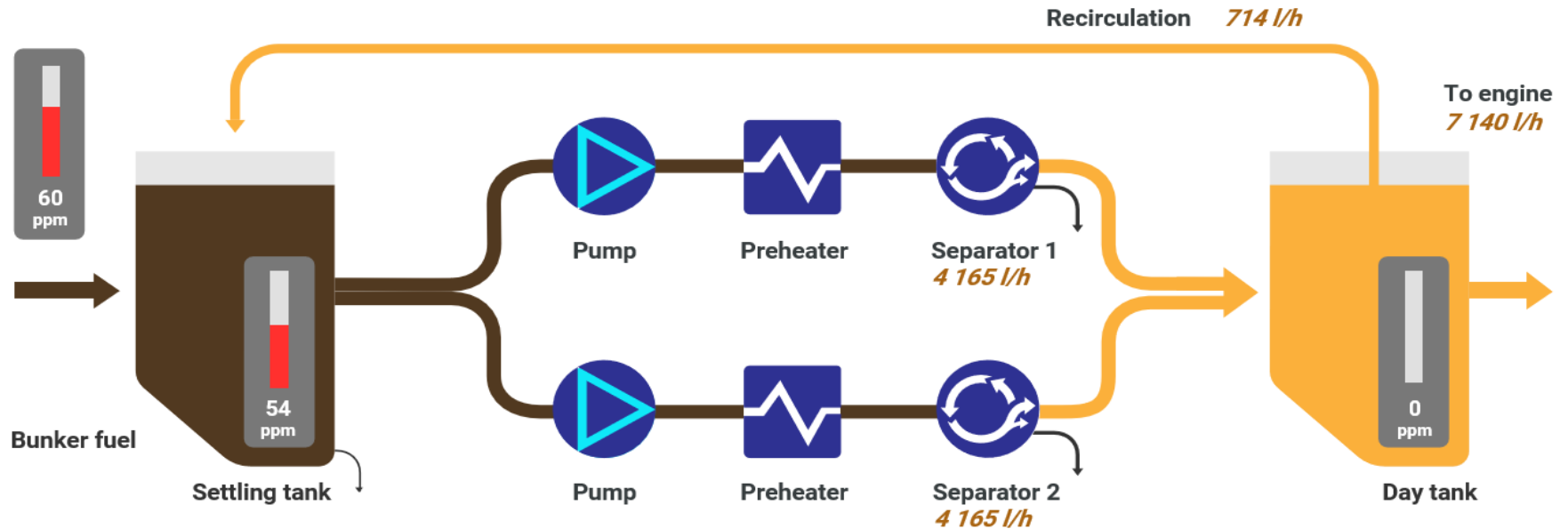
Bunker feed temperature 50 °C



Separators in Parallel – with FlowSync

Fuel cleaning process

With FlowSync



Fuel Sludge / water

OPERATING PRINCIPLE

☐ Single

☒ Parallel

FLOW CONTROL

FlowSync installed



ENGINE DATA

Average power 60 %



Installed engine power 50.0 MW



MEDIA DATA

Separator feed temperature 98 °C



Bunker feed temperature 50 °C



Benefits with FlowSync



Lower engine wear and less
maintainance

Protect the engine



Improved energy savings

Less environmental impact

2. Multi Fuel Management

Fuel Conditioning Module (FCM 1.5)

- Experience: - More that 30 years, 250+ units per year
- Flexibility: - Manages up to 4 different fuel on board
- Engine protection: - Controlled Fuel Change Over
- 10 μ Moatti Filter on hot side closer to engine
- Optimization: - Provides data for optimization of fuel treatment system
- Detect fuel losses at an early stage
- Changing fuel faster and saving money



3. Oily waste treatment

PureDry

Up to 2% reduction in fuel costs

**Up to 99 % reduction of oily waste volumes –
minimal amount of solids for disposal ashore**

- Eliminates oil sludge handling costs
- Reduction of sludge incineration frequency
- Reduction in CO₂ footprint as environmentally friendly system
- Easy installation by compact modular design



Figure 23. The Alfa Laval PureDry system.

3. Oily waste treatment

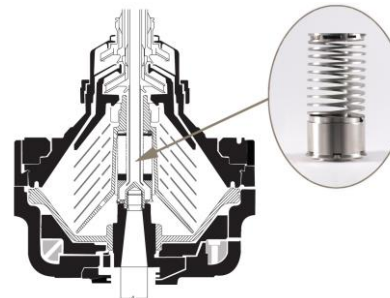
The Emulsion Breaker without chemicals and/or filters

PureBilge

- 6000G (not 1 !) Dynamic solution
- High particle separation efficiency
- No concerns on oil shock and rough sea
- Efficiently handle emulsion
- Unique XLrator inlet
- Fewer maintenance compared to coalescer



The only 5 ppm
dynamic Bilge Water
Separating System on
the market that reaches
5 ppm by full flow



Patented *Alfa Laval XLrator*
gently accelerates bilge water
into the separator to improve
separation efficiency

Fuel Solutions Portfolio

FUEL CONDITIONING SYSTEMS



FCM 1.5



HFO

MGO

Hfo
Emulsions



FCM LFF



MeOH

LPG



FCM Gas



LNG

HP

LNG

LP

Application knowledge

www.alfalaval.com/fuelline



Meet the experts on the web

www.alfalaval.com

www.alfalaval.com/fuelline

Application knowledge

www.alfalaval.com/fuelline

The Alfa Laval Adaptive Fuel Line Blue Book!

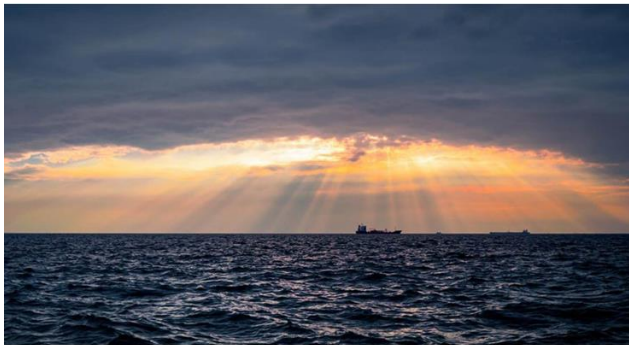


- Marine Bunker Fuels
- Fuel Treatment - Engine Performance
- Legislative Impact on ship operation
- Fuel Oil Treatment - The Modern Approach

Application knowledge

www.alfalaval.com/fueline

Videos and articles about Cat Fines



The daily grind – Cat fines and engine wear, Part 1



The daily grind – Cat fines and engine wear, Part 2

www.alfalaval.com

www.alfalaval.com/fueline

Product knowledge

www.alfalaval.com/fueline



Separators
Mineral Oil



PureBilge



Separators
Gas Oil



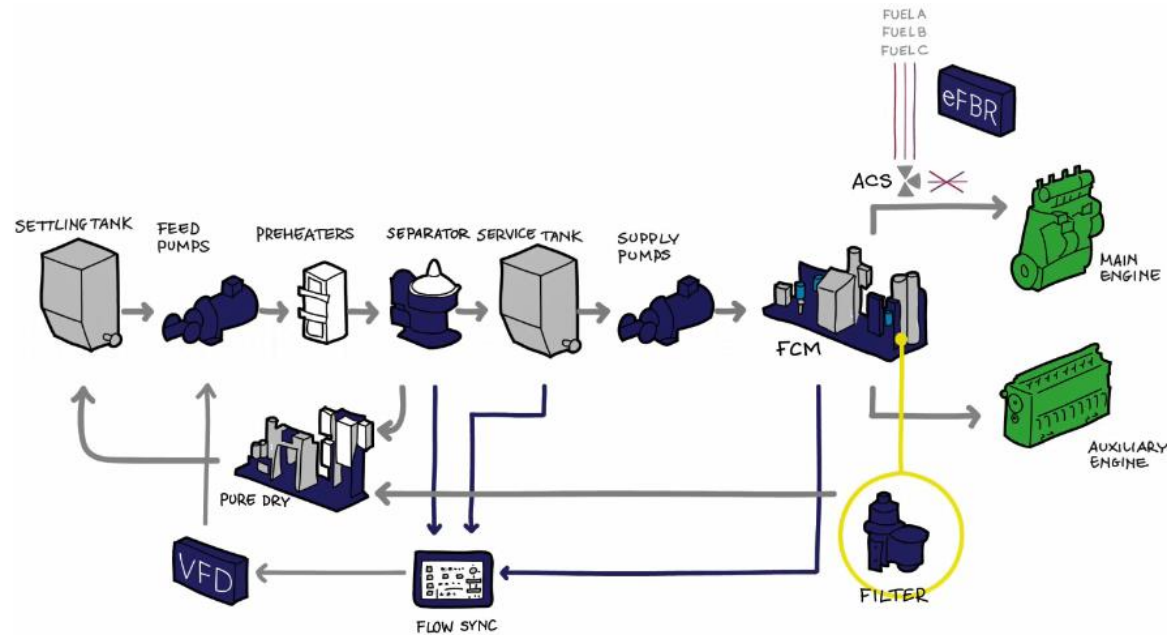
PureDry



FlowSync
Mineral Oil



Fuel conditioning
Oil



www.alfalaval.com/fueline

