



FLUIDIC AIR LUBRICATION

#FluidicAL - The first fluidic air lubrication solution for Shipping
from coasters to bulk carriers

Frode Lundsteen Hansen KCHS
Co-founder, CSO



The MPS story at a glance

2014-2018

- Technology developed
- Global patents in all key markets

2019-2020

- FluidicAL solution developed
- Class approval
- Retrofitting m/v Tharsis - Coaster

2021-2022

- Alfa Laval joins as shareholder
- Retrofitting Berge Bulk - Newcastlemax bulk
- Fleet agreement with Torm A/S
- Retrofitting Torm Hermia - LR2 tanker
- Present on various Maker's list

2023

- Agreement 7 DFDS RoRo vessels
- Retrofitting Torm Allegro - MR tanker
- Retrofitting 2 LR2 tankers
- Retrofitting LR1 tanker
- LOI for 2 new build electric coasters
- Alfa Laval bid for 100% of shares

Awards

- EU Seal of Excellence award
- Van Oord Innovation Challenge
- Solar Impulse Efficient Solution Label
- EU BlueInvest Blue Bio Economy



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Why Fluidic Air Lubrication

Intelligent integration of two technologies into one solution

- Efficiently generates micro air bubbles, using less compressors, to form a homogenous air layer
- Effectively covers the flat bottom, reducing the ship's friction, for higher energy savings
- Physically divides the flat bottom into sections, controlling of the air layer for better performance
- Does not require large sea chests or specific compressor location, for quicker dry docking



On the path for continued optimisation

The savings in real life vary, depending on the sailing profile, the vessel's speed and the weather circumstances. So we've had trials with 7–9% savings, and we've had savings over 15%. Life's not ideal, so you can't get 15% on a daily basis. But we average between 7% and 10%, which is definitely in the range claimed.

Jan Albert Bosma, Shipowner, Tharsis Sea-River Shipping



October 2020 - Coaster general cargo

The tests carried out...reveal about 5% net fuel savings @ 13 knots and 9% @ 11 knots. We still have some optimisation to do - that said we are positive...

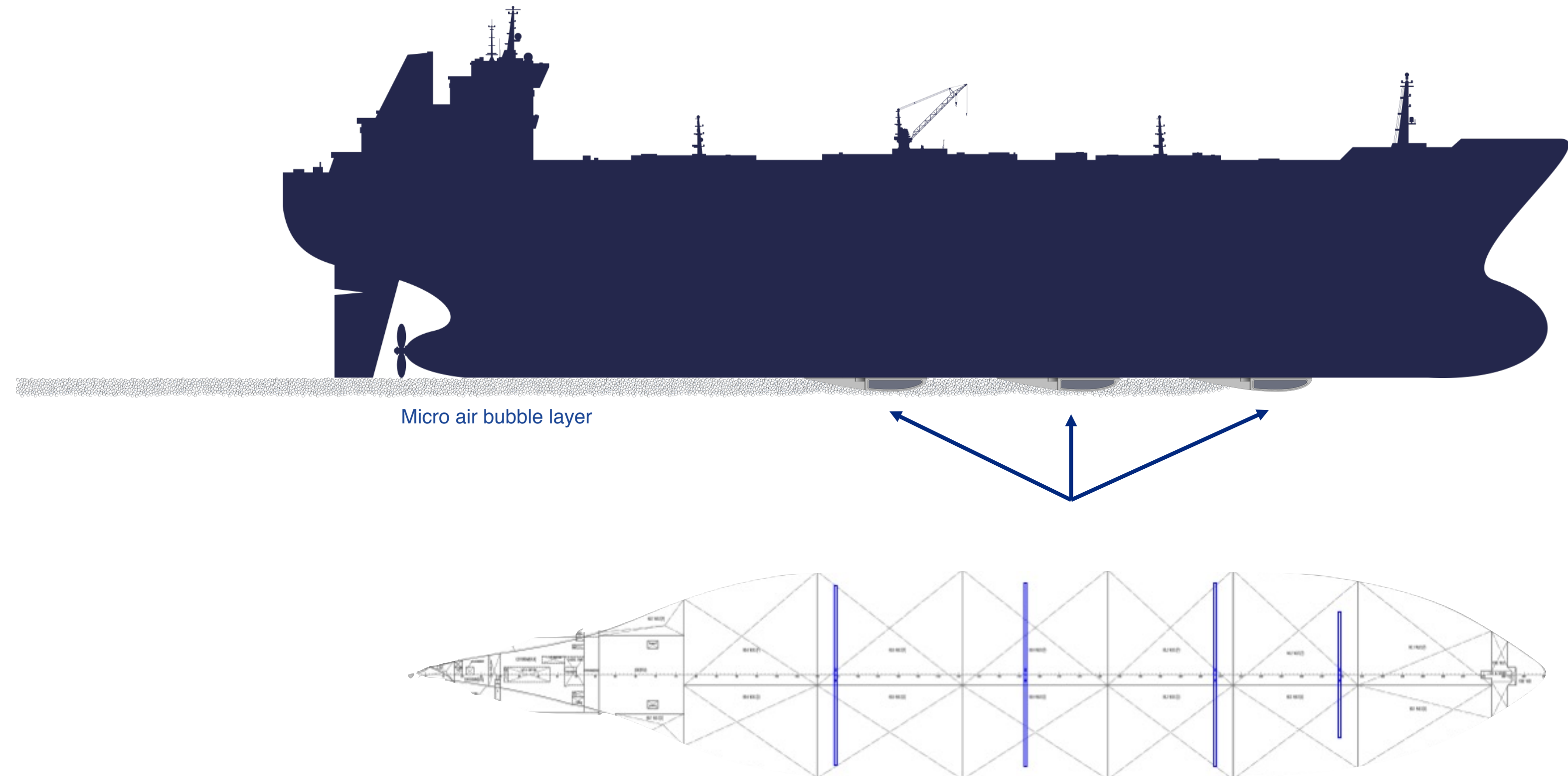
Per Skaaning Møllris, Head of Technical Decarbonisation, Torm A/S



Febrary 2023 - LR2 Crude Oil Tanker

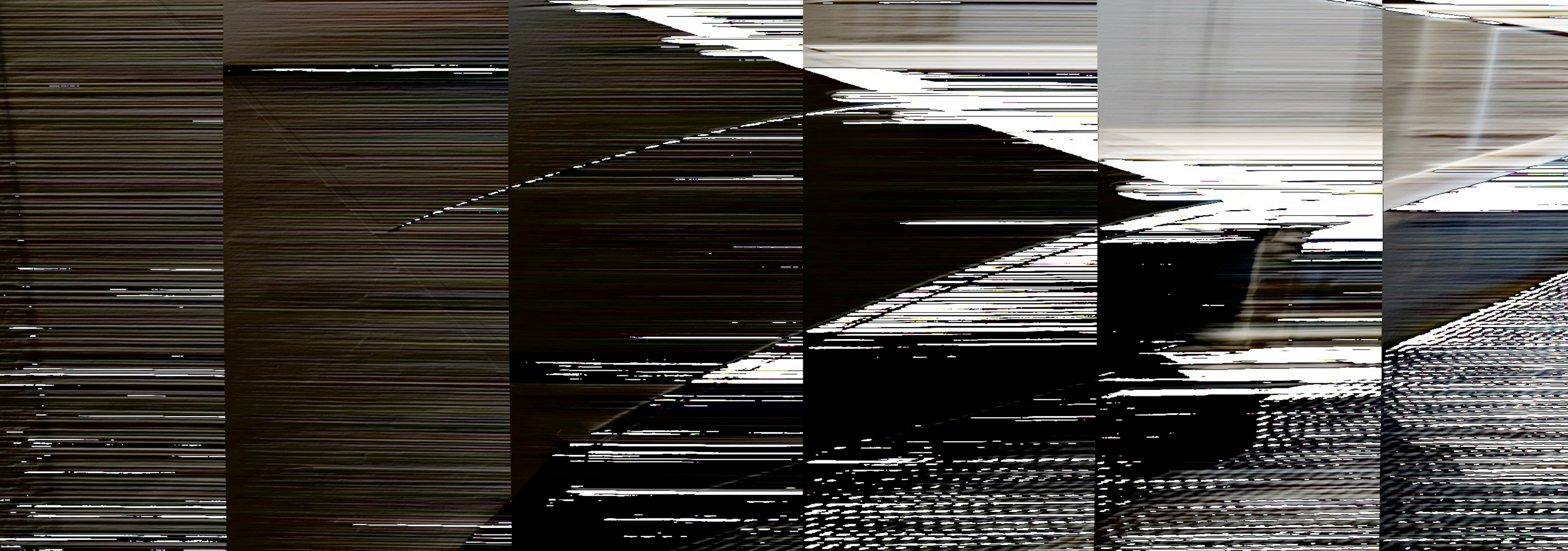
FluidicAL covers the largest area of the flat bottom of any solution available

Dividing the flat bottom area into sections



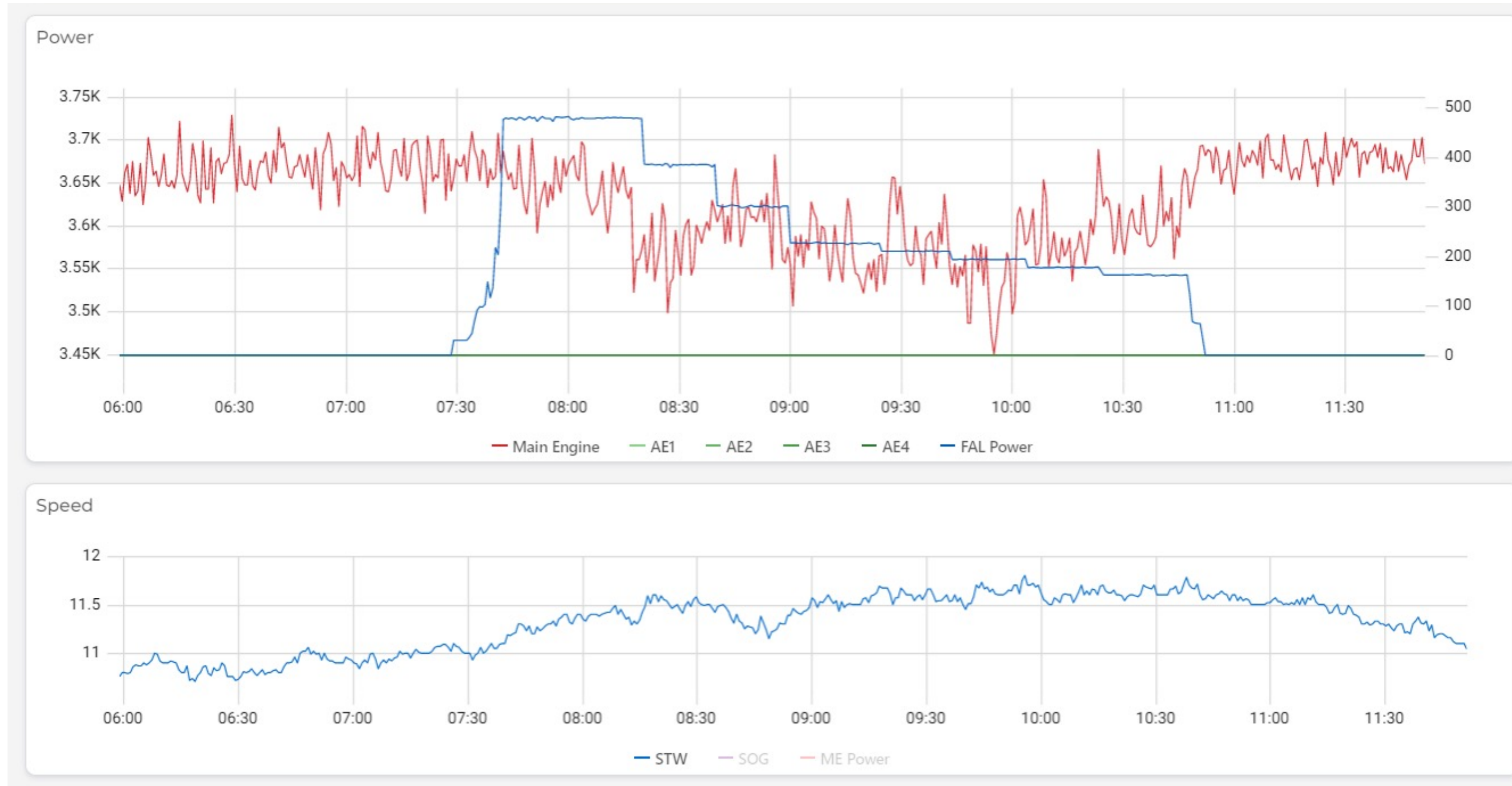
Extremely low profile of 6 cm



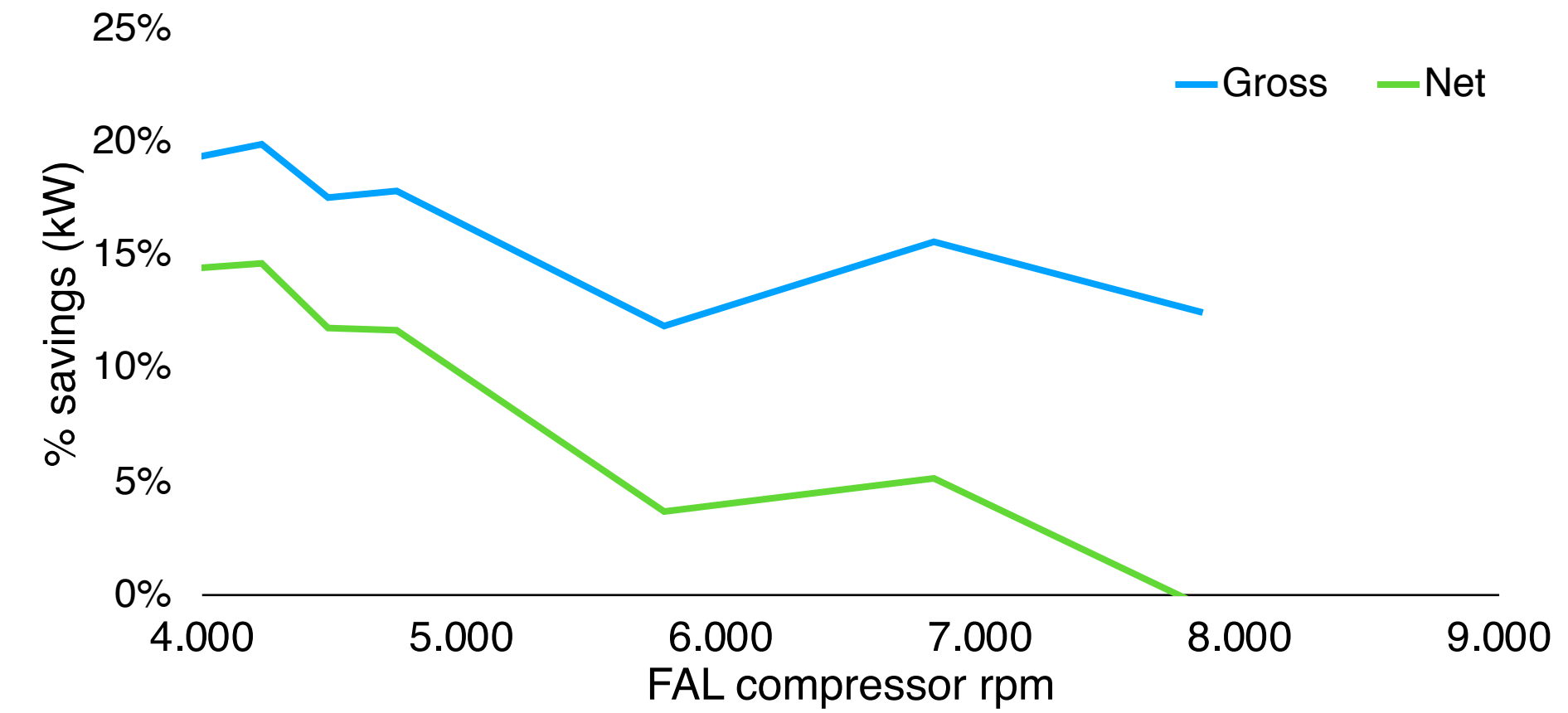


How we test and optimise performance

Fixed power mode, increasing STW as compressor rpm is reduced



Reducing rpm to reach an optimum point



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Per Skaaning Mølrís, Head of Technical Decarbonisation, Torm A/S

FluidicAL is the only fluidic air lubrication

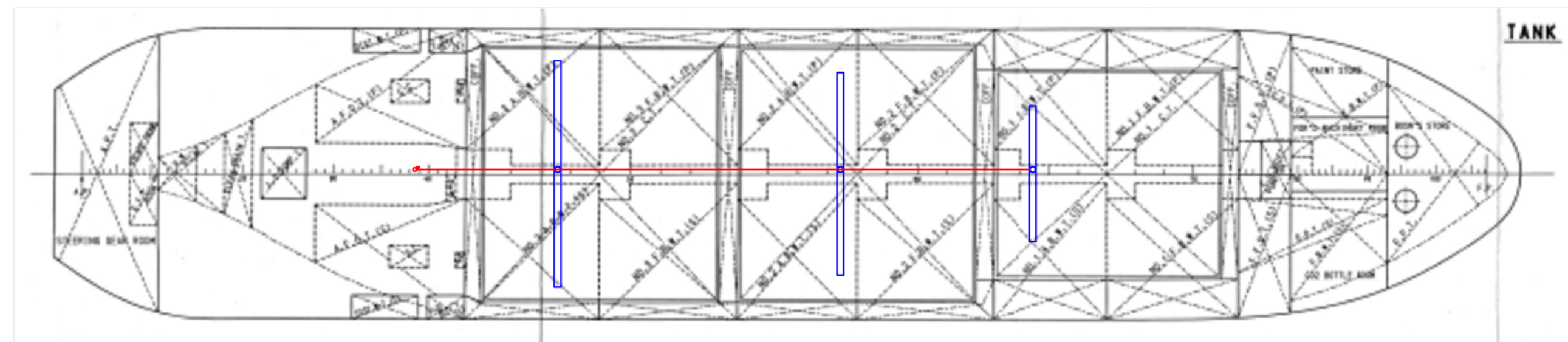
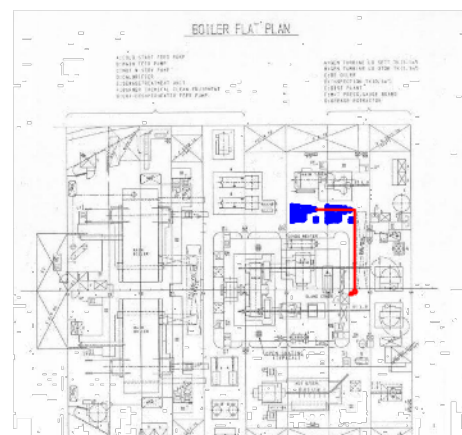
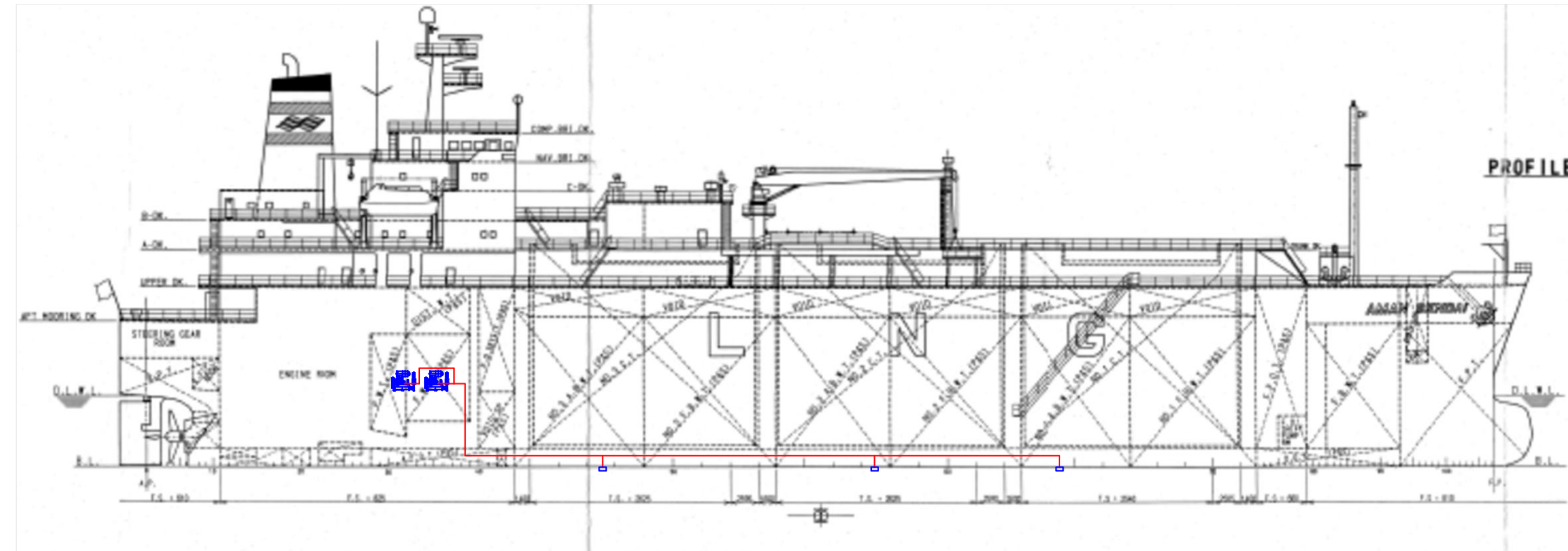
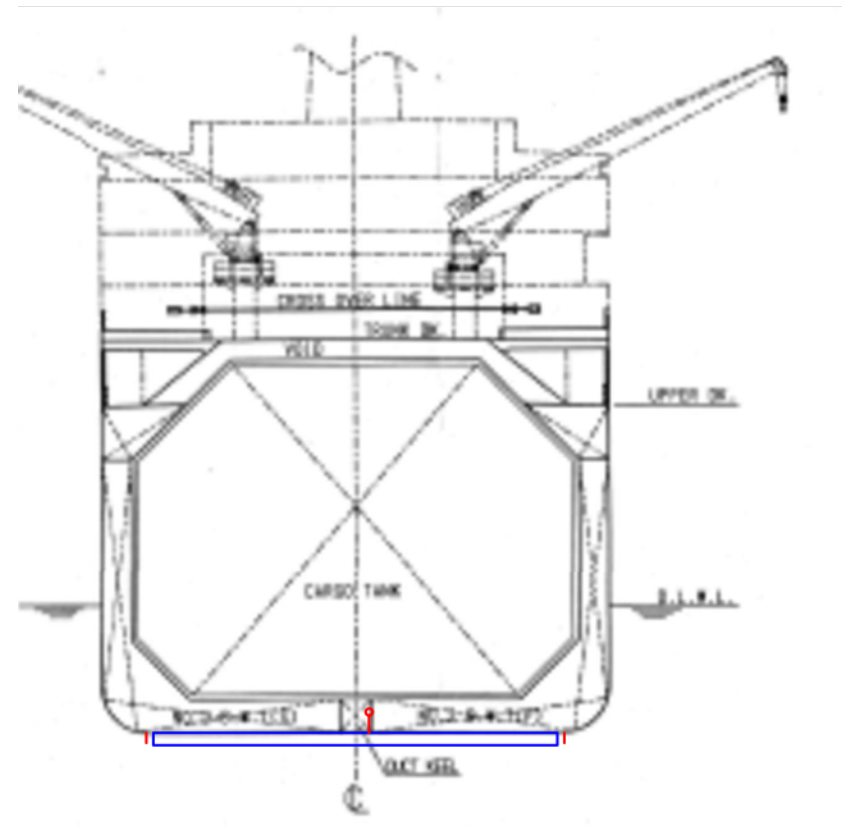


	Front injecting systems	FluidicAL	
		Retrofit solution	Newbuild solution
Technology paradigm	Single technology	Dual technologies	
Injection strategy	Sea chests integrated in the front of the vessel	Injection wing-shaped bands dividing the hull into sections for better coverage	
Air layer control	Difficult once air is released at the front	Software based, optimised for draft, trim, and sailing conditions	
Speed dependency	Minimum speed threshold of 10+ knots	Design and injection strategy can be optimised for different speeds	
Installation	Extensive structural modifications	No structural modification	Various options for integration
Placement of compressors	Vessel's front compartments	No limitations	
Upgradable	Not possible	Possible	



EXAMPLE OF INSTALLATIONS

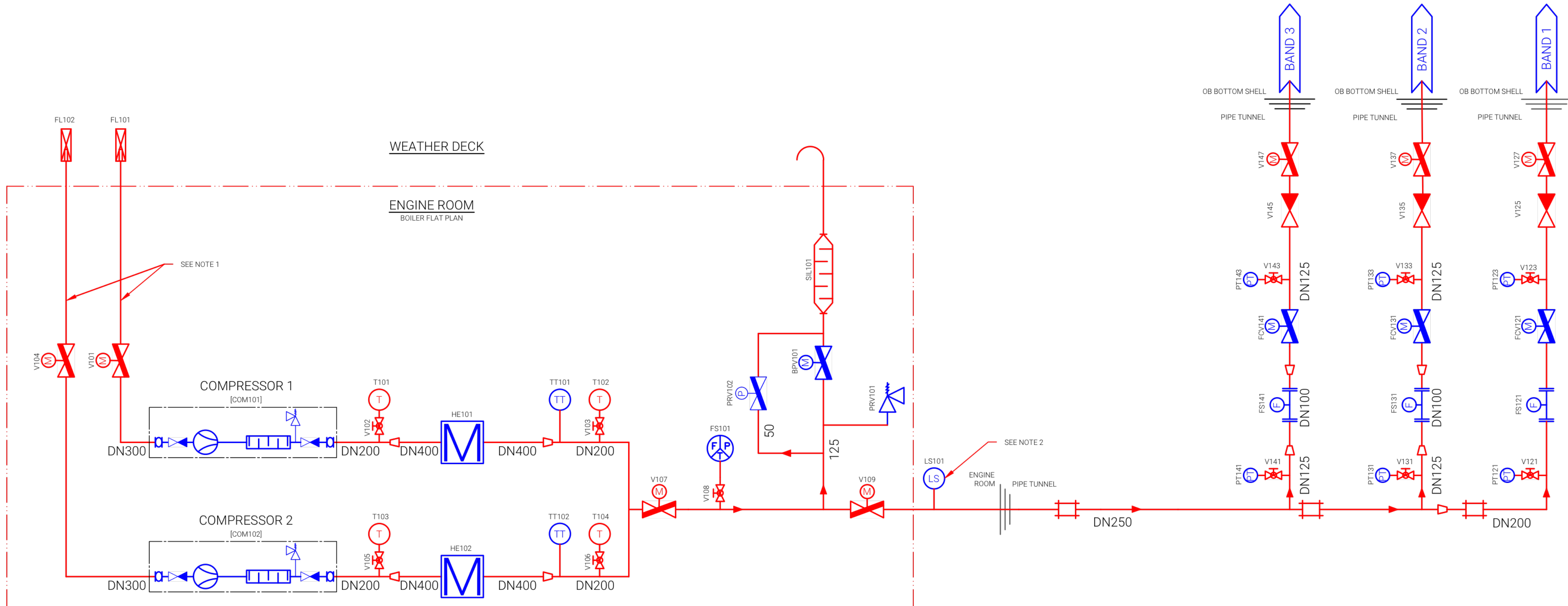
Flexible placement of compressors



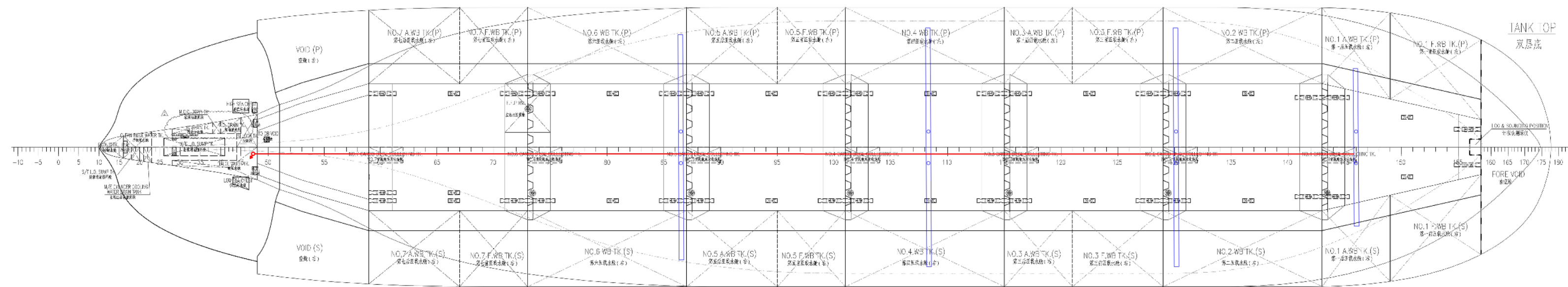
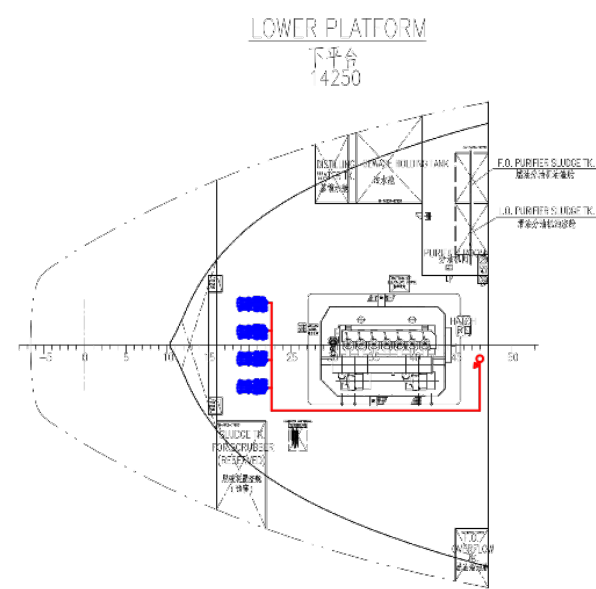
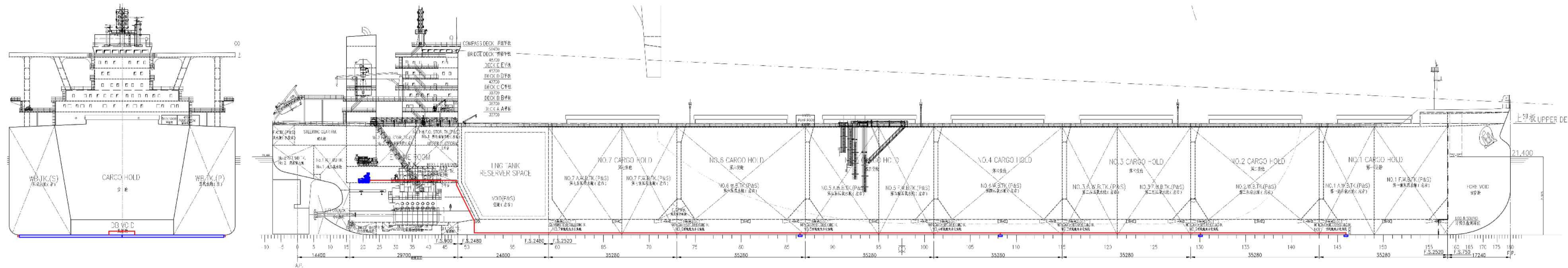
— YARD/ OWNER SCOPE OF SUPPLY
— MPS SCOPE OF SUPPLY

Blue lines represent MPS' scope of supply, red lines the shipowner's scope

No rotating equipment outside

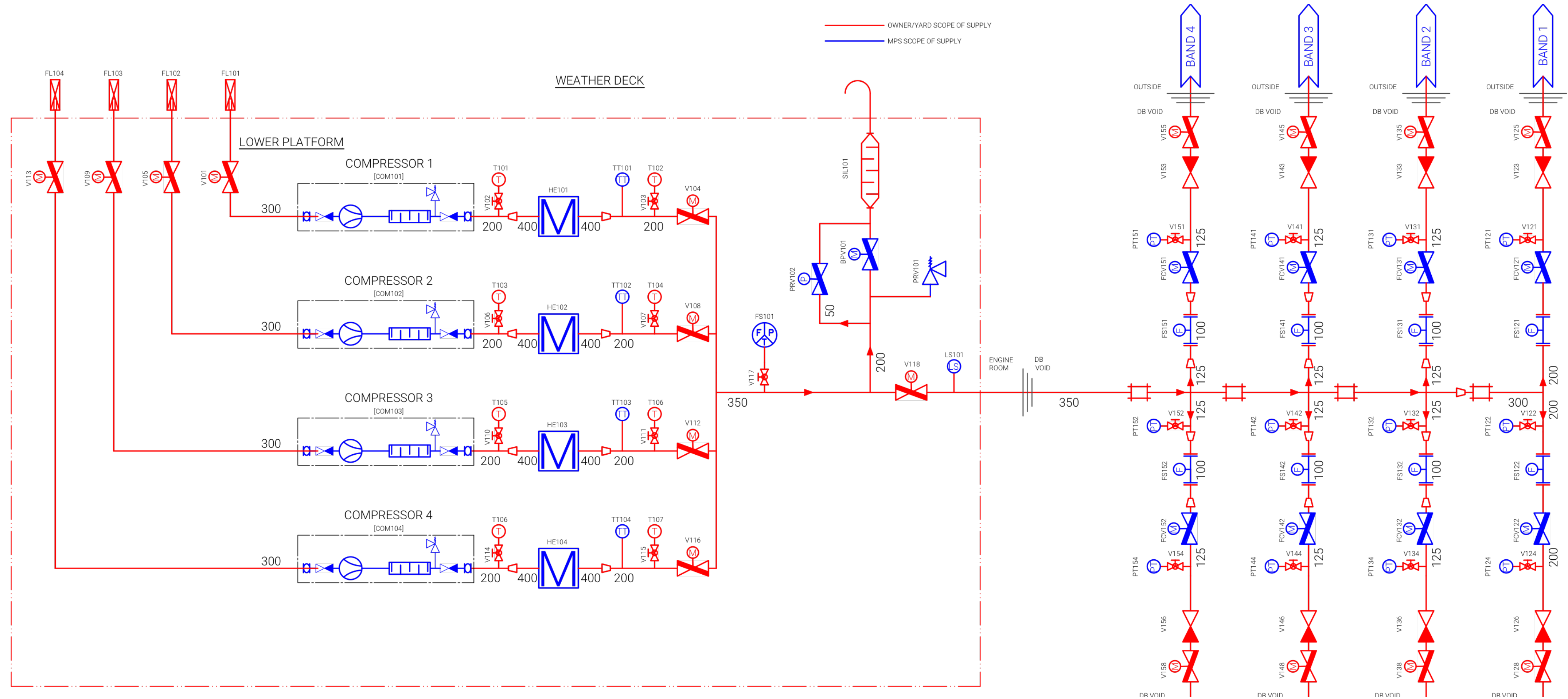


Flexible placement of compressors

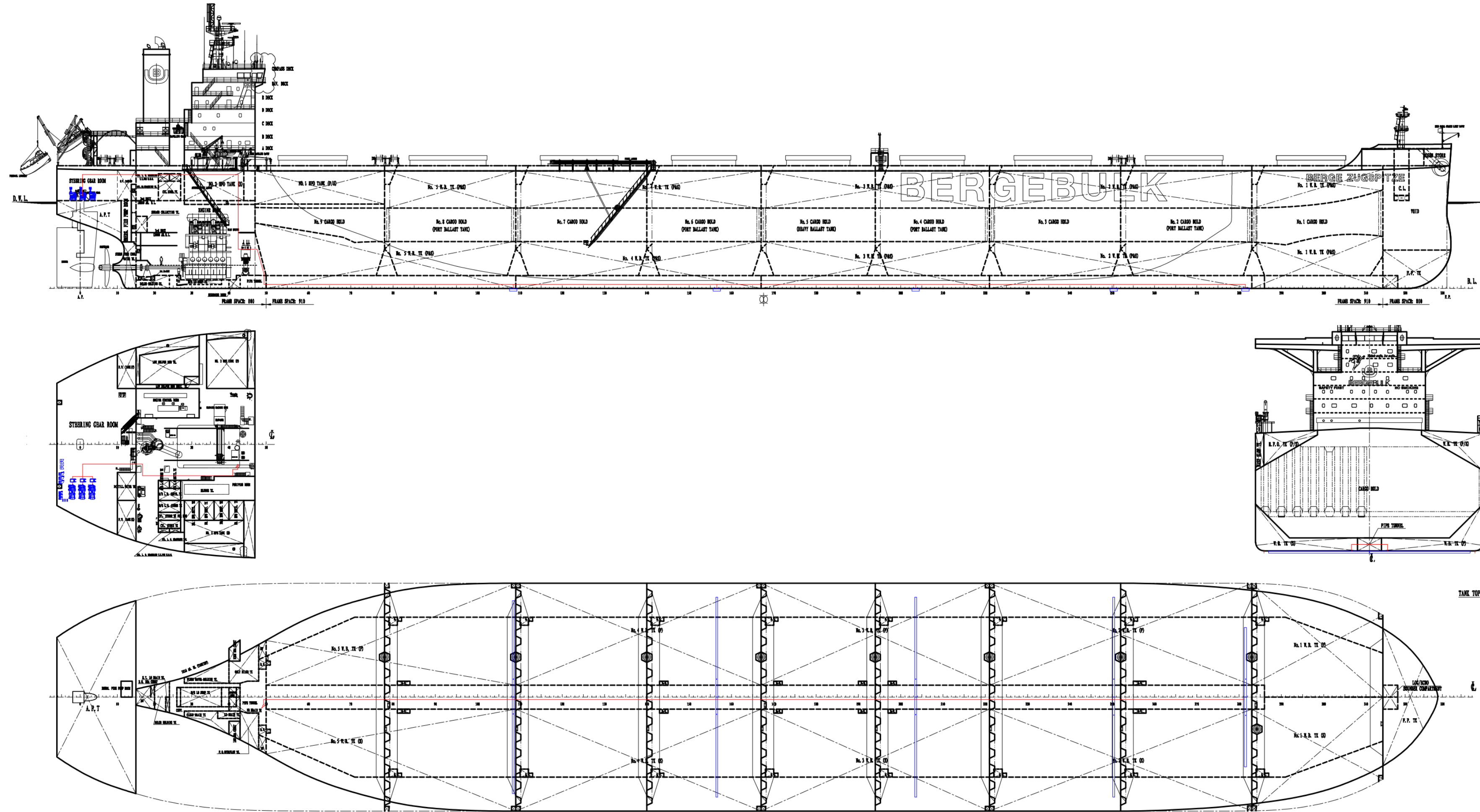


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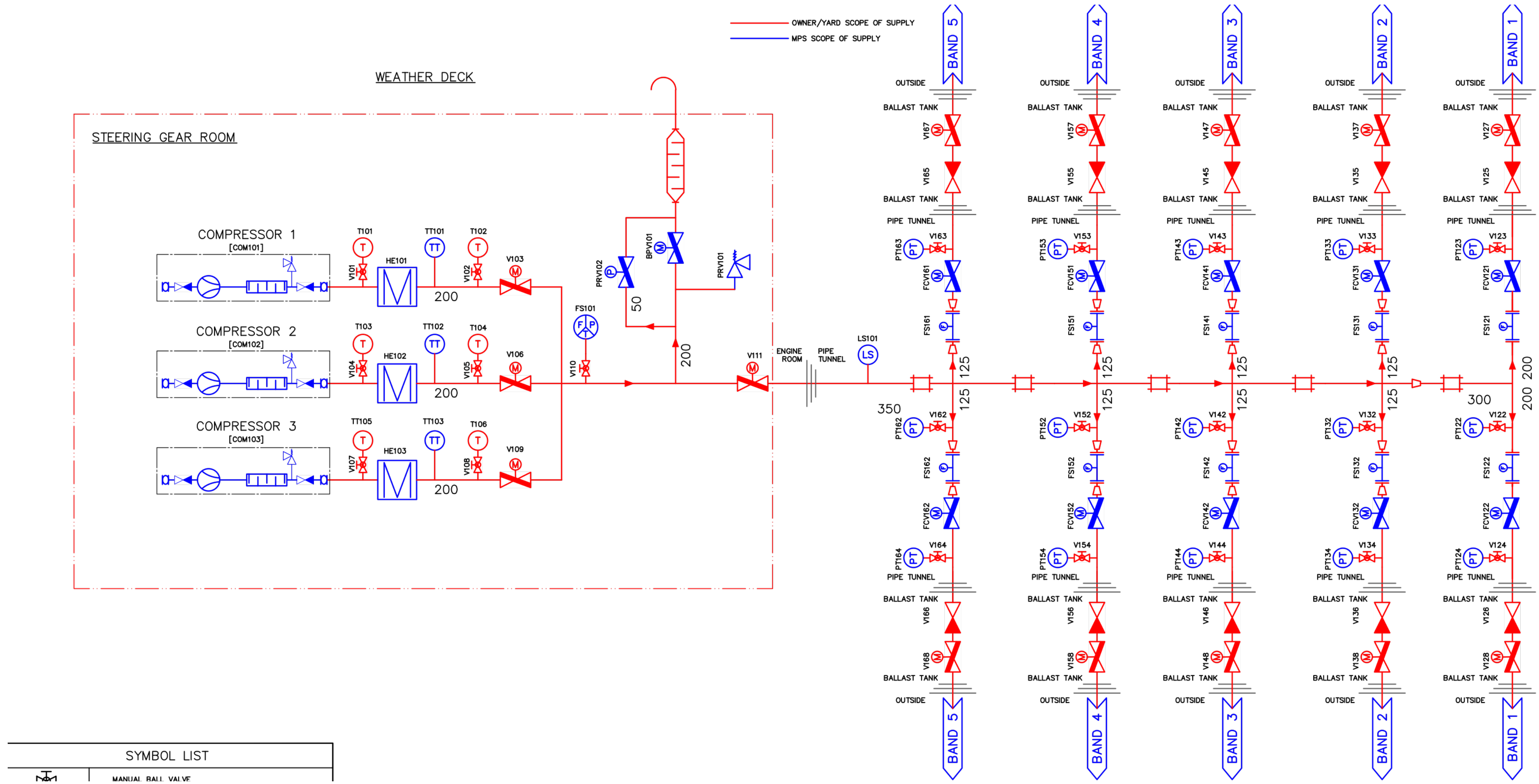
No rotating equipment outside



Flexible placement of compressors



No rotating equipment outside





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