



# MARINE FUEL SPECIALTIES

*Enhancing your fleet  
performance*

## MARINE FUEL PERFORMANCE

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# FROM THE OILFIELD TO THE FUEL

**MARINE FUEL SPECIALTIES**

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**DRILLING**

**PRODUCTION**

**COMPLETIONS**

**PIPELINE & STORAGE**

**TERMINAL & STORAGE**

**REFINERY**

**AVIATION FUEL**

**PASSENGER VEHICLES**

**POWER**

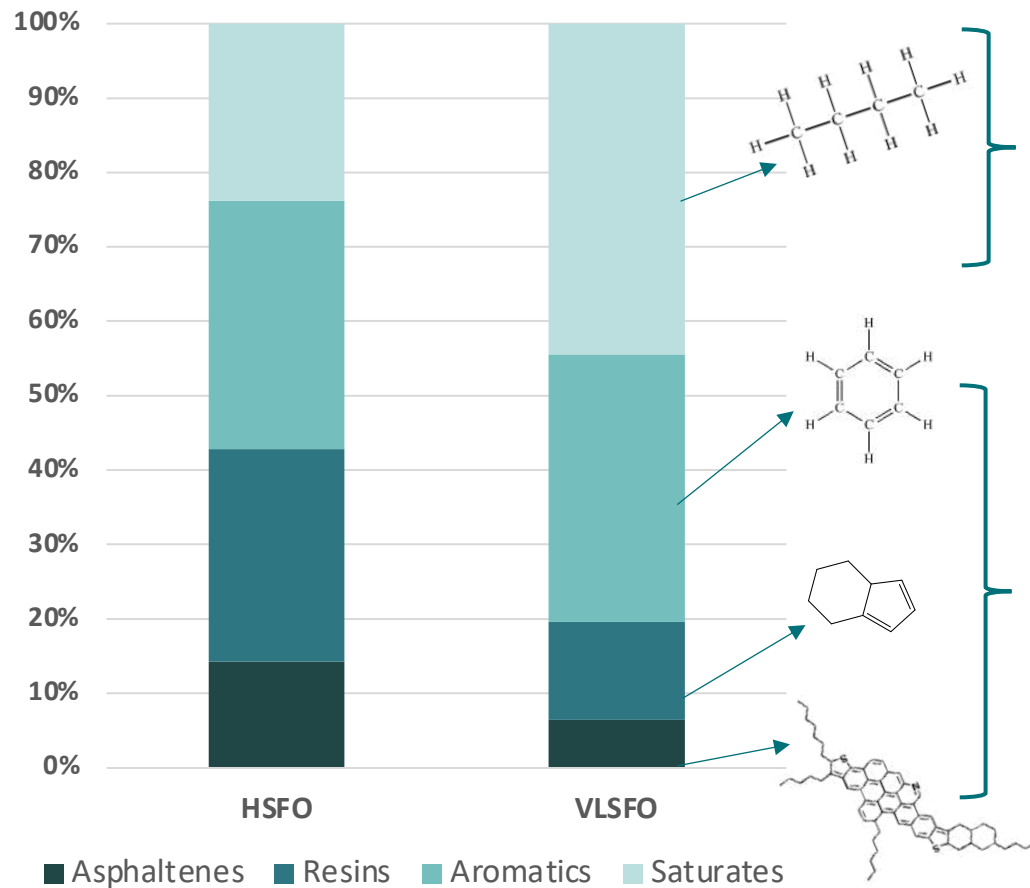
**MARINE**

**HEAVY DUTY & FLEET**



# FUEL QUALITY: VLSFO VS. HSFO

## DEFINING THE DIFFERENCES



**Paraffinic** – Straight chain hydrocarbons with a low viscosity and good combustion characteristics. Most likely to be low quality/cost streams. Poor stability when heated, possible cause of wax at low temperatures.

**Aromatics** – Benzene ring hydrocarbons, lower proportion in VLSFO. Asphaltenes are able to remain stable for longer in high aromatic blends, however high paraffin blends create a challenging environment for asphaltene stability.

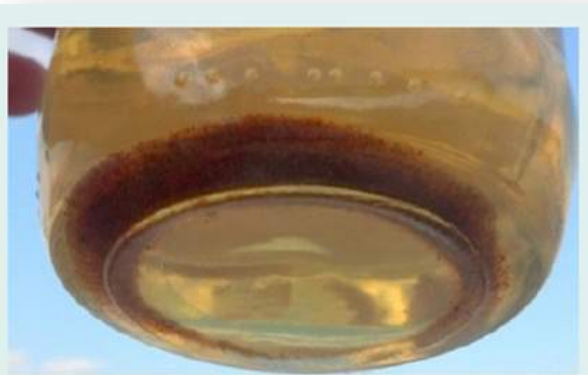


	2020 RM VLSFO	2018 RM HSFO
Viscosity at 50°C, cSt	105	355
Density, kg/m <sup>3</sup>	936	988
MCR, mass%	5.4	13.9
Net Spec Energy, MJ/kg	41.7	40.3
CCAI	813	848
Al+Si, mg/kg	18.2	22.3
Sulphur, mass%	0.45	2.61

PP >21°C	VLSFO	HSFO
% of sample	19	2

**IMO MEPC 76-5, over 100,000 fuels**

# DISTILLATE AGEING – INSTABILITY IN LIGHTER FRACTIONS

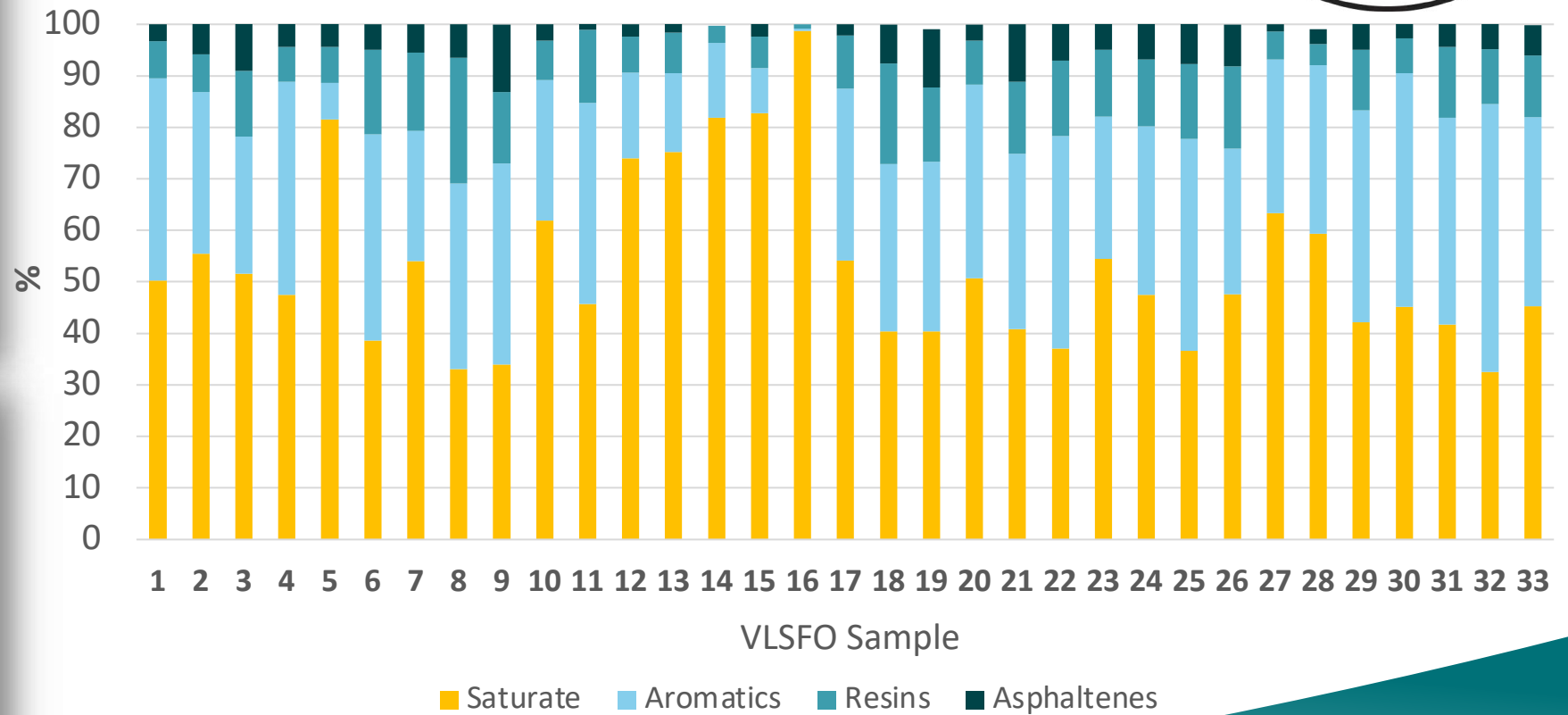


*Sediments: Hard oxidation product, sand-like insoluble, accelerated by increased temperatures, storage time and comingling.*



*Gums: Sticky oxidation product (Adherent insoluble). Become impregnated with inorganics (metals, cat fines etc.) and act like a grinding paste on surfaces.*

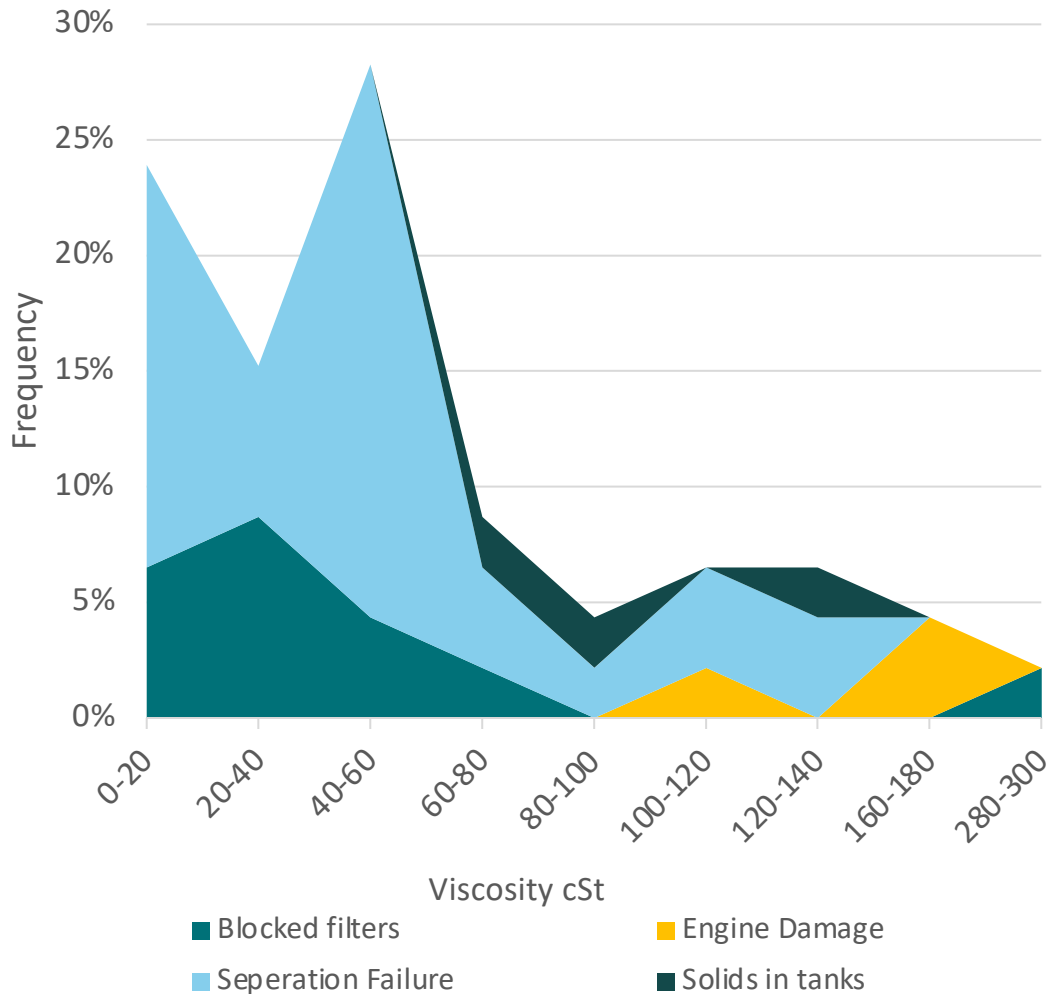
### Paraffinic/Aromatic Distribution



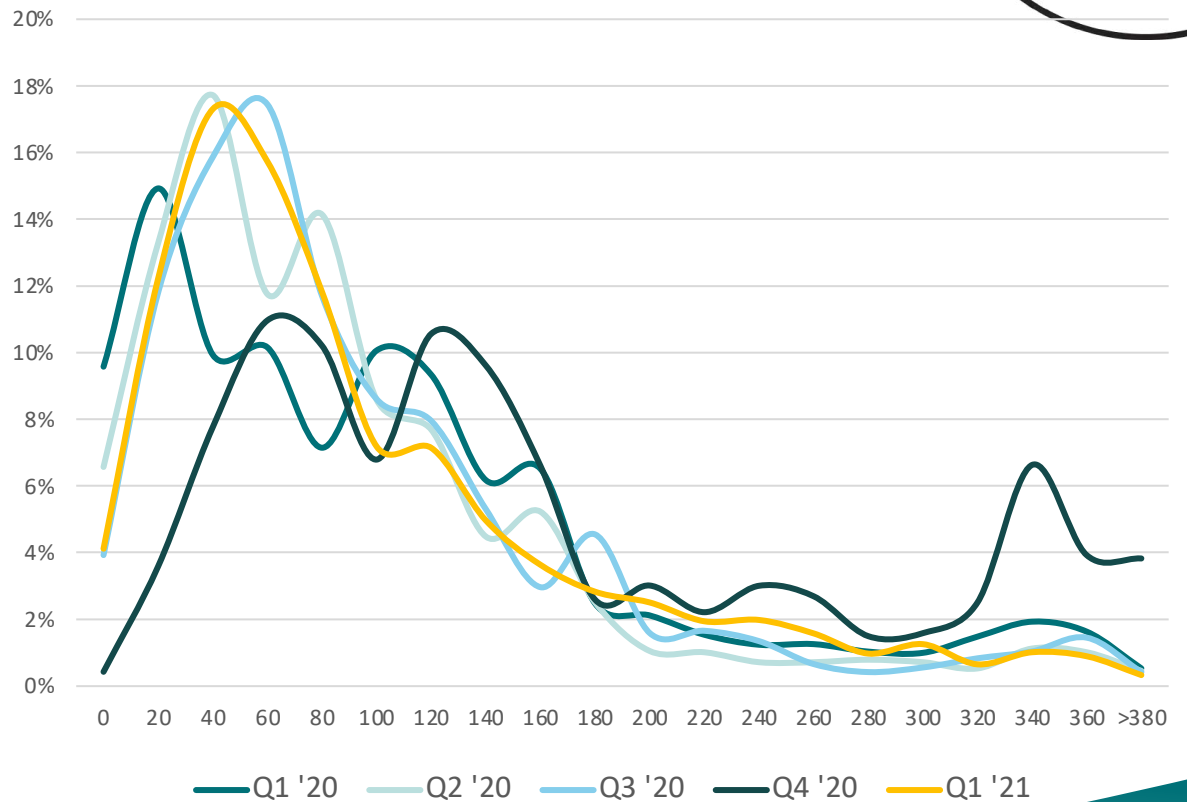
# FUEL TRENDS

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## Viscosity vs. Issues, and Distribution



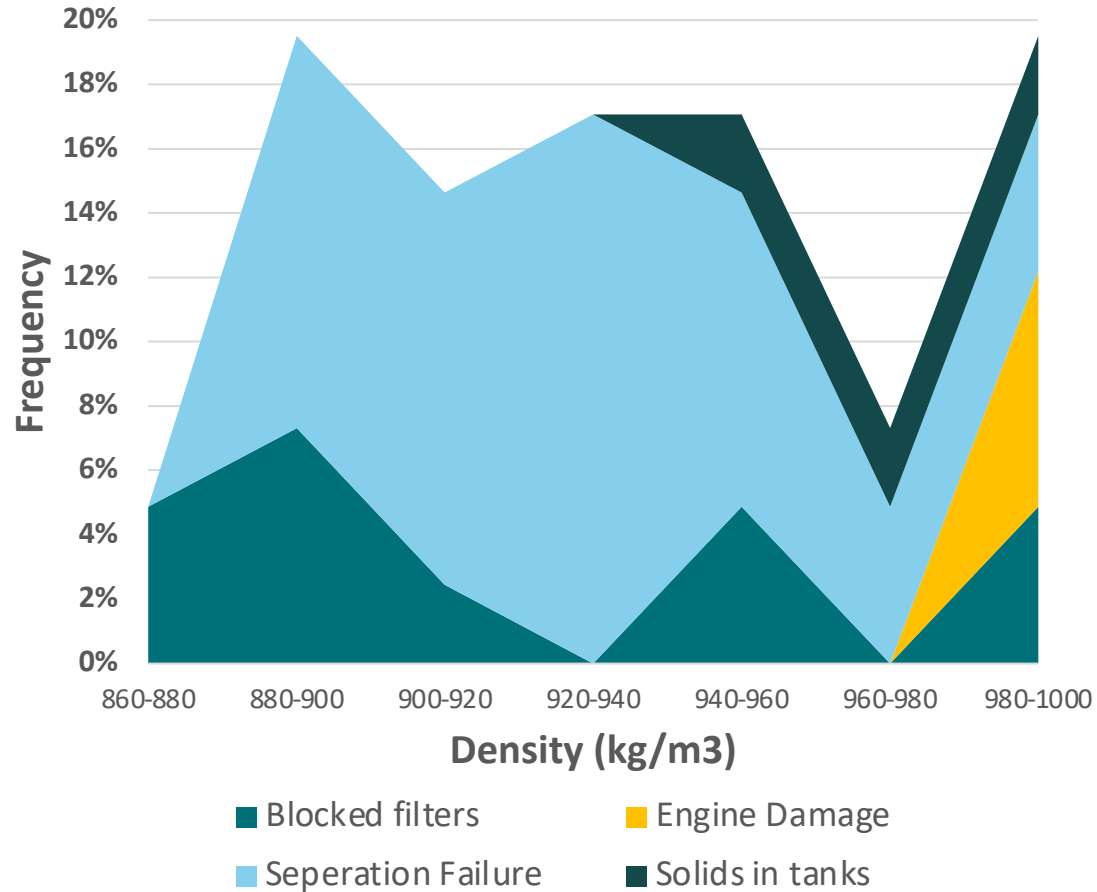
Average viscosity of VLSFO over time from global bunker ports



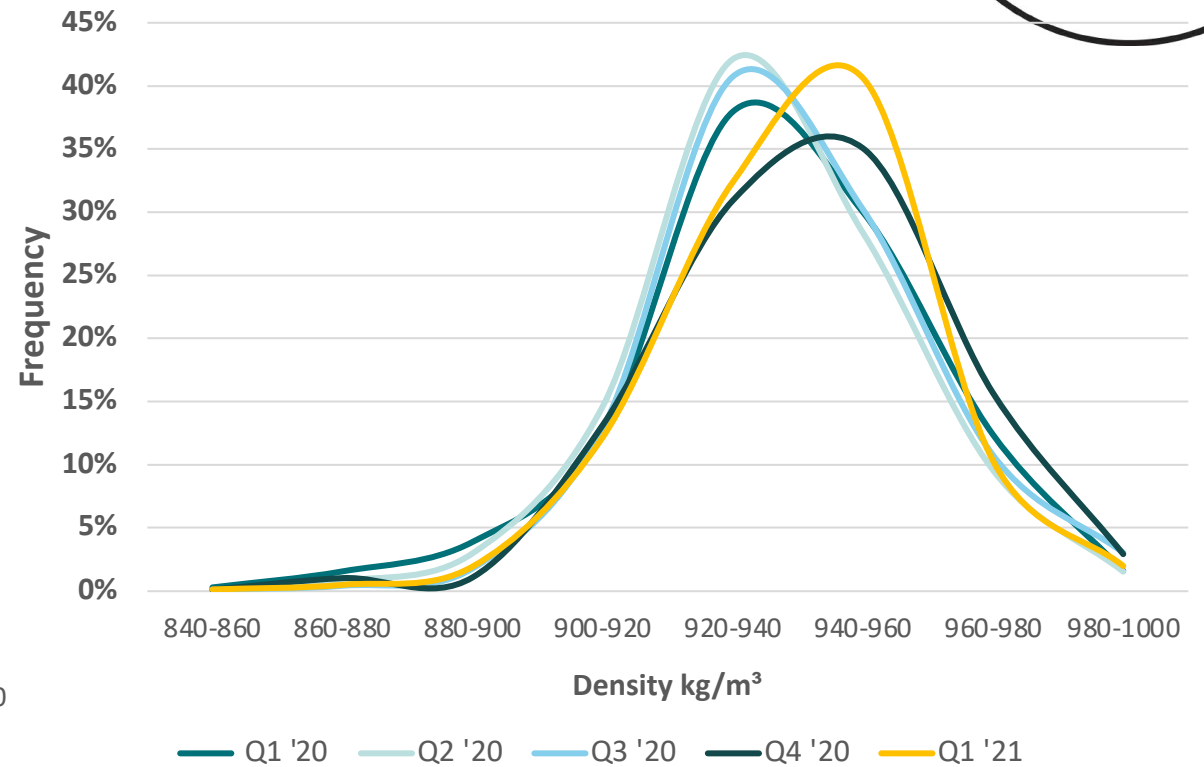
# FUEL TRENDS

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## Density distribution

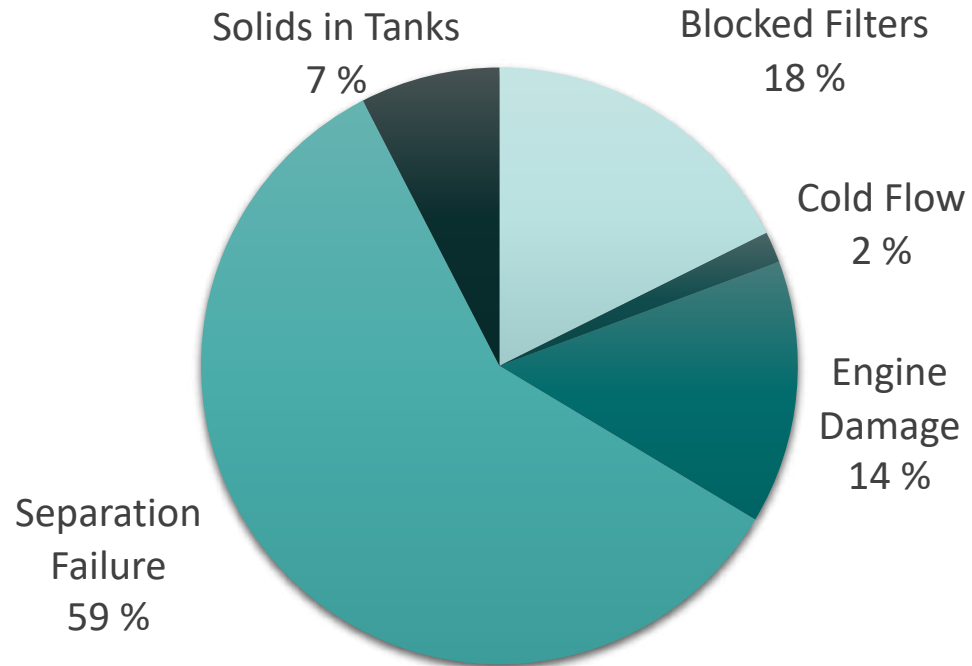


## VLSFO Density Distribution

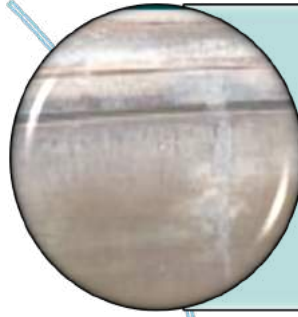


# VLSFO PROBLEM DISTRIBUTION

## FAULT DISTRIBUTION



- Blocked filters
- Cold flow
- Engine Damage
- Separation failure
- Solids in tanks



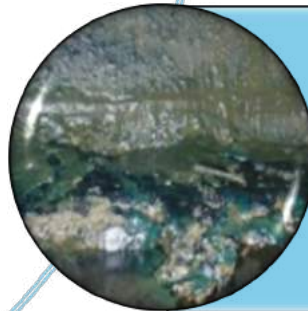
### Engine Damage

- Increase post combustion fouling
- Liner wear
- Piston ring breakage
- Scavenge fire
- Fuel injector and pump failure



### Handling

- Excessive Purifier maintenance
- Filter blocking
- Engine fuel starvation
- Cold flow issues



### Storage

- Un-pumpable tanks
- Poor Long-term storage
- Fuel stratification (separation of components)
- Wax formation
- Comingling

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# THANK YOU!

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Visit our website for more information on marine fuels

[www.innospec.com/IMO2020](http://www.innospec.com/IMO2020)

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