

# IMO2020 & VLSFOs

## The Story So Far.....

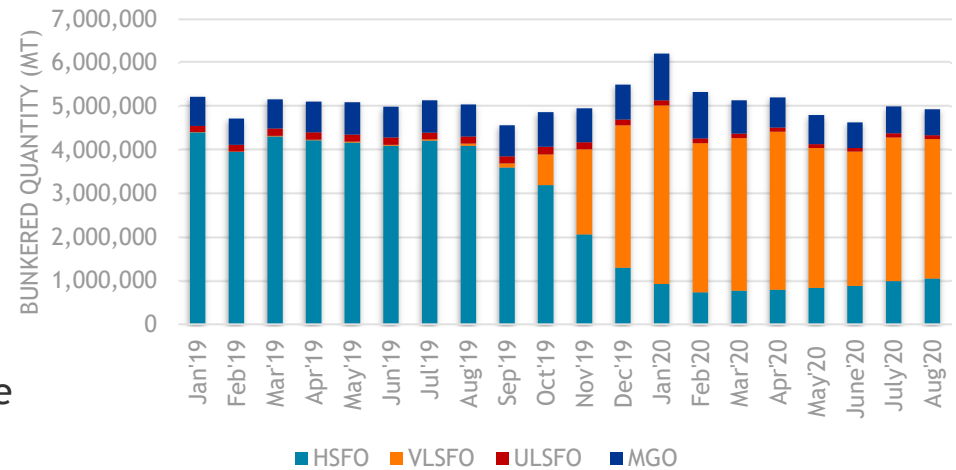


# Marine Fuels: Supply & Demand

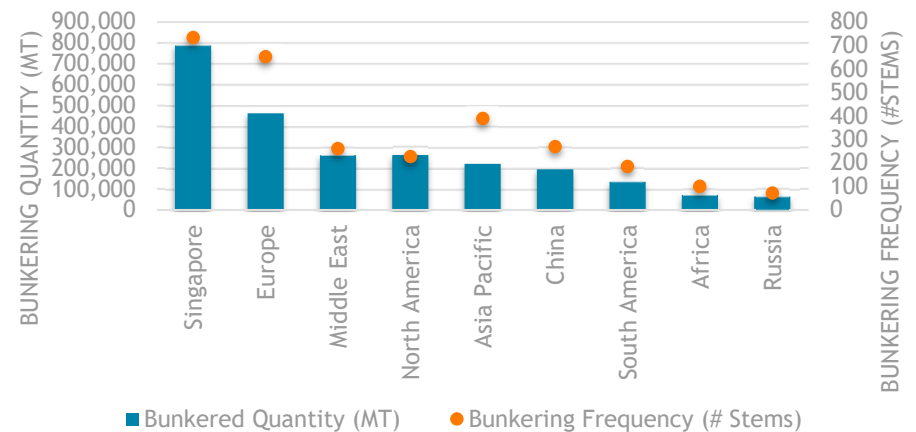
## • VLSFO Supply & Demand:

- Immediate switch to VLSFOs from 1<sup>st</sup> Jan
- August 2020 - VLSFOs = 65% of samples received
- HFO=21% of samples, MGO= 12%, ULSFO=2%
- Singapore largest VLSFO bunker port
- Wide availability of VLSFO fuels globally
- COVID-19 Pandemic reduced fuel demand Mar-June
- Starting to see some recovery July-Aug
- Anticipated MGO demand never materialised
- HSFO demand has increased each month since Feb.
- 43% growth in 6 months
- Indicates increasing scrubber usage

Bunkered Quantity per month | per Fuel Type | 2019-2020



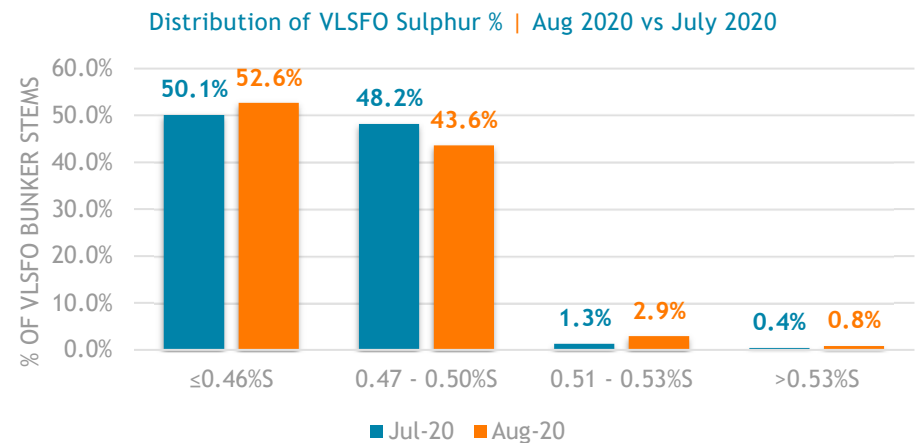
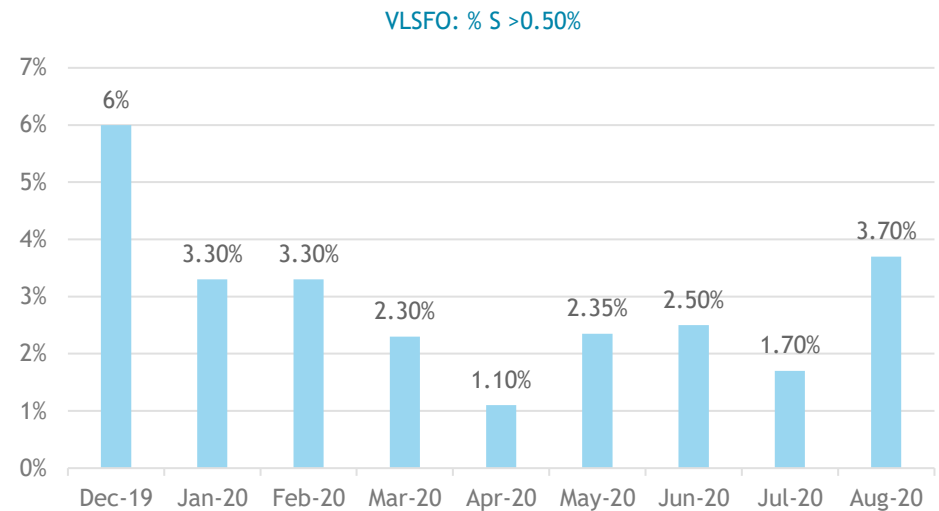
VLSFOs Bunkered Quantity & Frequency per Bunker Region | Aug 2020



# VLSFO Compliance

- **Sulphur Compliance**

- Sulphur compliance has varied throughout 2020
- Sulphur levels >0.50% varied by month from 1.1%-6.0%
- Currently 3.7% VLSFO exceed 0.50% Sulphur
- August 2020, 0.8% samples >0.53%S, double July's level



# VLSFO Compliance

- **SOLAS Compliance**

- VPS have issued 37 Bunker Alerts YTD

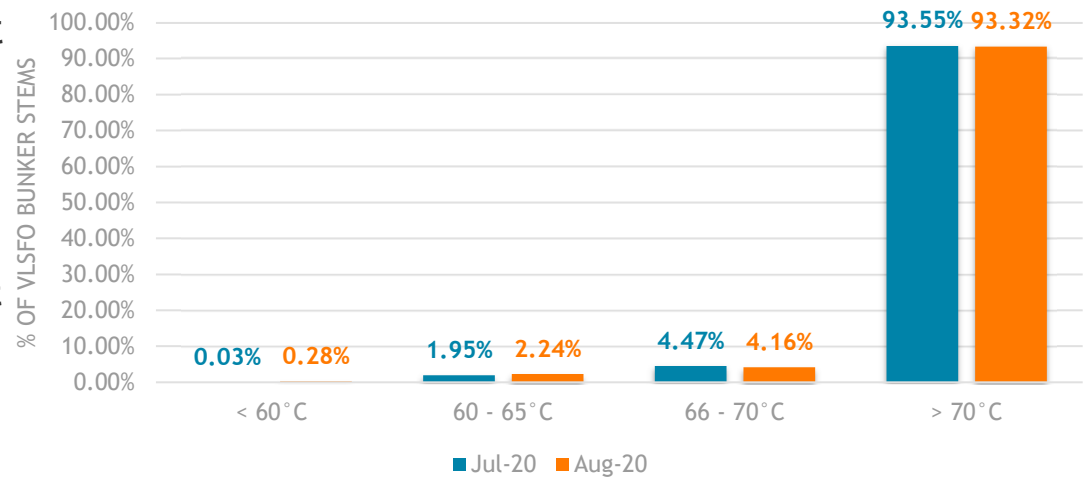
- 17 (46%) Bunker Alerts - Flash Point Related

- MGO (9), VLSFO (5), HSFO (3)

- Due to COVID-19 Pandemic, Road & Aviation fuel demand significantly decreased.

- Road & Aviation fuel blended into Marine fuels?

VLSFO FP Compliance | Aug 2020 vs July 2020



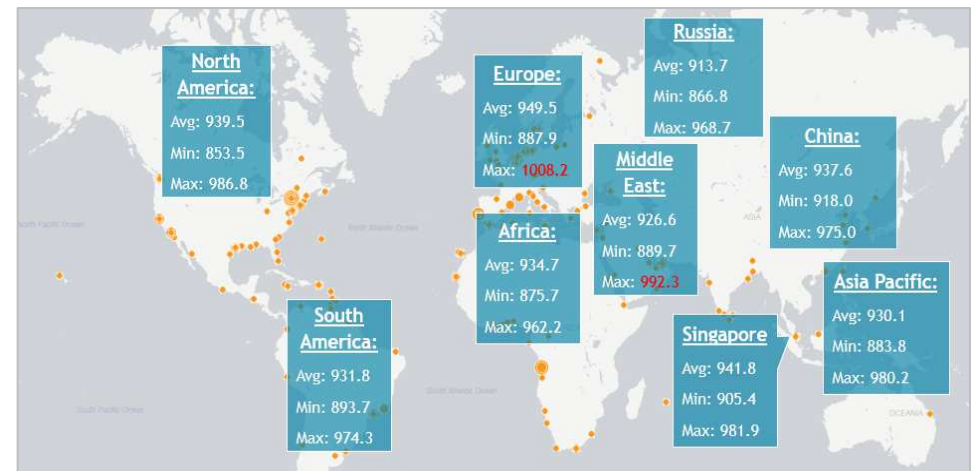
# VLSFO: Viscosity & Density

- **Viscosity** has been wide ranging since VLSFOs were introduced.
  - Currently 5Cst-407Cst.
  - 77% < 180Cst.
  - Only 4.7% > 280Cst
  - Viscosities have lowered over the year, due to lighter materials being blended.

Global overview of VLSFO Viscosity statistics | August 2020



Global overview of VLSFO Density statistics | August 2020



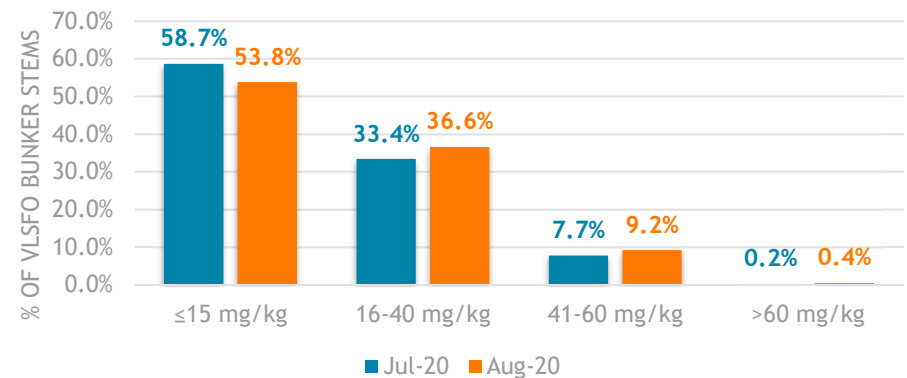
# VLSFO Cat-Fines

Global overview of cat fine statistics | August 2020

- **Cat-fines** improved significantly in 2020
  - Jan-20 Al+Si: 22% samples >40ppm
  - Aug-20 Al+Si: 9.6% samples >40ppm
  - Current Min <2ppm,
  - Current Max, 313ppm
  - Current Global Average 14.9ppm
- Improvement due to lower levels of residual component in VLSFO blends.



VLSFO Cat Fines | Aug 2020 vs July 2020



# VLSFO: Stability

- **VLSFO Stability**

- Most concerning Issue
- All Regions have average TSP 0.01-0.03%
- Yet, Many Stability issues despite fuel meeting ISO8217 upon delivery.
- VLSFO Shelf Life <3 months

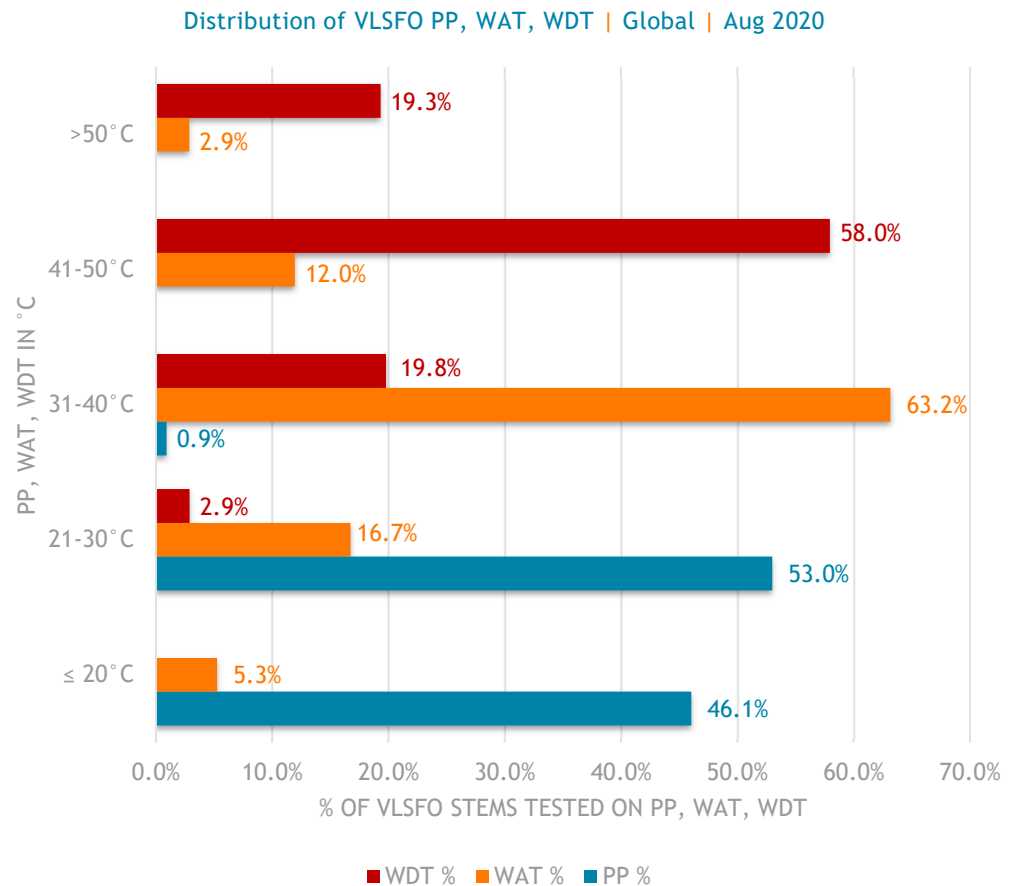
Global overview of VLSFO TSP statistics | August 2020



# VLSFO: Cold Flow Properties

- **Cold-Flow Properties**

- 99% of VLSFOs have PP<30°C
- WAT/CP is avg +24°C higher than PP.
- 78% of VLSFOs WAT/CP >30°C
- WDT is avg +10°C higher than WAT/CP
- 77% of VLSFOs WDT >40°C
- VLSFO Storage Temperatures are key to avoiding operational problems





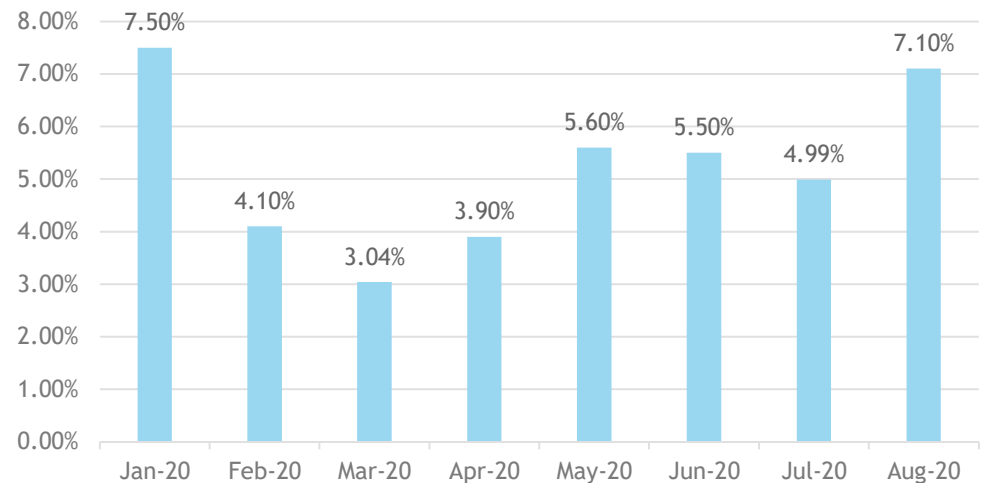
# VLSFO : Cold-Flow Properties

- **VLSFOs with high TSP and high WAT**
- Heating fuel above WAT to prevent cold flow issues can cause TSP to rise. When fuel eventually burnt, the TSP could be off-spec and thick sludge is formed. Typically, the fuel forms sludge at the purifiers and increasing the temperature further (from storage to separation temperature) has generally worsened the situation.
- Recommendation - Limitation of VLSFO bunker storage time on board to 2 months.
  
- **VLSFOs with low viscosity ( $<10$ ) and high WAT ( $WAT > 40^{\circ}\text{C}$  and  $WDT > 75^{\circ}\text{C}$ )**
- Fuel separation temperature  $< WAT$  so vessel cannot heat  $> WAT$ . This causes a problem with sludge formation in the tanks & transfer pipeline, results in filters clogging with wax, together with serious handling and transfer issues.
- Recommendation - Controlled use of additives in some cases can improve the situation just enough to use the remaining fuel.
  
- **VLSFOs where WDT is above  $75^{\circ}\text{C}$**
- Suggest carrying out an exact flashpoint test to make sure that the fuel is not being heated above the flashpoint.

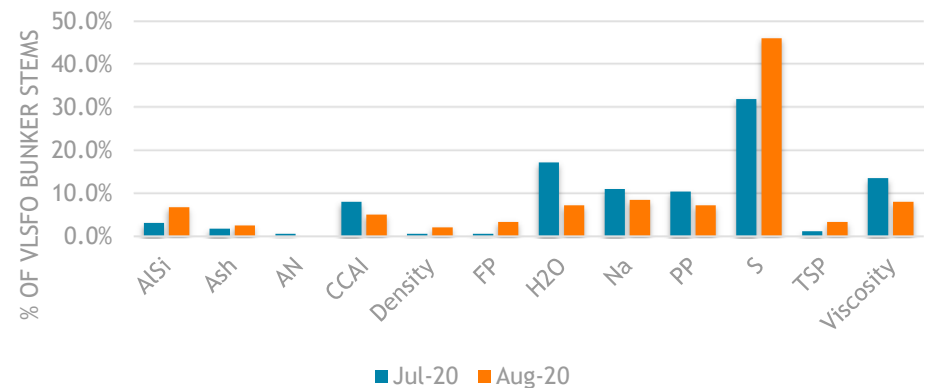
# VLSFO: Off-Specs

- Off-Specs quoted relate to ISO8217 Spec-limits
- Currently 7% of VLSFOs exceed at least one test parameter specification
- Sulphur accounts for almost 50%
- Europe currently has the highest level of off-spec VLSFOs, 17%, mainly S.
- Singapore currently 4.2% off-specs, mainly flash point.

VLSFO % Off-Specs

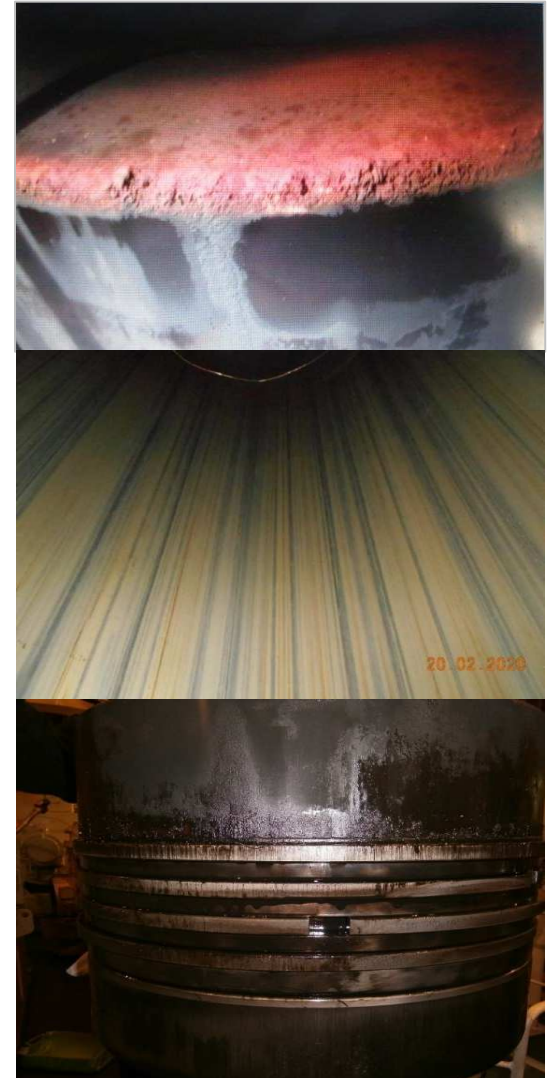


Break-down of Off-Specs per Parameter | Aug 2020 vs July 2020



# Liner Wear & Engine Damage

- Q1-2020 VPS witnessed over 40 vessels with broken piston rings, damaged cylinder liners & hard deposits.
- VPS Investigation & White Paper (Published May-20)
- All burnt on-spec VLSFOs
- All used BN40 lubricating oil
- 2-stroke engines most susceptible
- Numerous fuel & lubricant suppliers, various engine manufacturers
- Cause: Reserve BN of CLO not being utilised to neutralise acids from fuel combustion due to lower sulphur.
- Result: Hard Calcium deposits on the piston crown, causing liner wear, scuffing & broken piston rings.
- When BN is reduced, detergency reduces and the oil film is lost, when BN increases, detergency improves and oil film is retained but the deposit formation starts.



# VLSFOs & Bunker Quantity Surveys (BQS)

- Jan 2020 - VPS Circular highlighted **quantity shortages of 140mt**
- **Contributing Factors:**
  - VLSFO bunkers not stabilizing in the sounding pipes, leading to inaccurate measurement.
  - Prevailing low ambient temperatures causing a waxy condition of the VLSFO and poor flow of the fuel.
- C/E issues **“Note of Protest”** to the Supplier
- It is therefore important to engage a professional Bunker Surveyor in order for the parties concerned to know the following:
  - The precautions taken during bunkering to detect such loss.
  - Independent assessment of the situation and Notification of issues on-site.
  - The final quantity difference encountered & possible reasons.
  - Documentation of action taken. Photos taken where permitted as evidence.
  - The follow-up at next port.
  - Assessment of completed investigation and provision of a conclusion on the quantity difference.
- Important to follow correct **Sampling Procedure** to obtain a representative sample



# Summary

- VLSFO currently the most popular bunker fuel of choice
- Wide geographical availability.
- 43% increase in demand for HSFO over the past 6 months, indicates increased Scrubber usage month on month during 2020.
- No real increase in demand for MGO in 2020.
- VLSFO sulphur compliance has varied from 1%-6% off-specs across 2020
- COVID-19 impact and the low demand for road & aviation fuels, has seen these fuels blended into marine fuels resulting in many Flash Point issues.
- VLSFO Densities & Viscosities continue to be very variable and relatively lower levels
- VLSFO Stability & Cold-flow issues are the most common concern for fuel/vessel operations
- VLSFO & Lubricating Oil behaviour require close monitoring, to avoid cylinder liner damage.
- Numerous factors during 2020 resulted in the need for increased focus on fuel management.

Thank you for your attention!

YOUR FUEL MANAGEMENT PARTNER



[www.v-p-s.com](http://www.v-p-s.com)

[wolf.rehder@v-p-s.com](mailto:wolf.rehder@v-p-s.com)



The Leader in Maritime  
Testing & Surveys

+49 40 309540913

