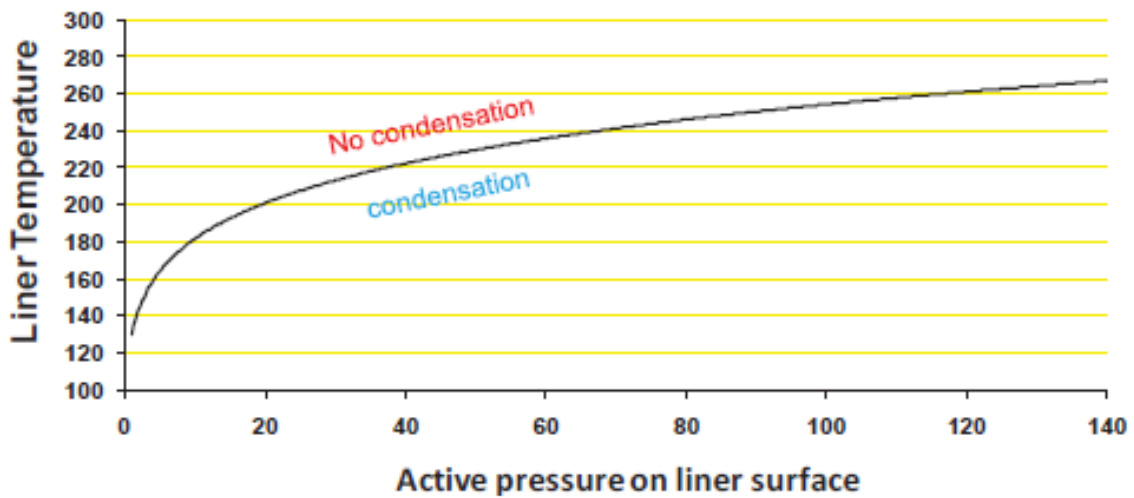


# GulfSea SDA Insights

## Scavenge Port Inspection Guidelines

Cold Corrosion is a common phenomenon occurring in many modern 2-stroke marine engines. The compliance of IMO Tier II NOx regulations and Energy Efficiency Design Index (EEDI) guidelines has resulted in increased pressure and lower operating temperatures within the engine cylinders. The operating temperatures can be lower than the water dew-point causing moisture to condense on the cylinder liner walls which combined with the sulphur during the combustion process causes sulphuric acid to form. The acid causes corrosion of the cylinder liner material, creating excessive wear.

**H<sub>2</sub>SO<sub>4</sub> dew point curve for a 3% sulphur fuel**



Graph Courtesy of MAN D&T

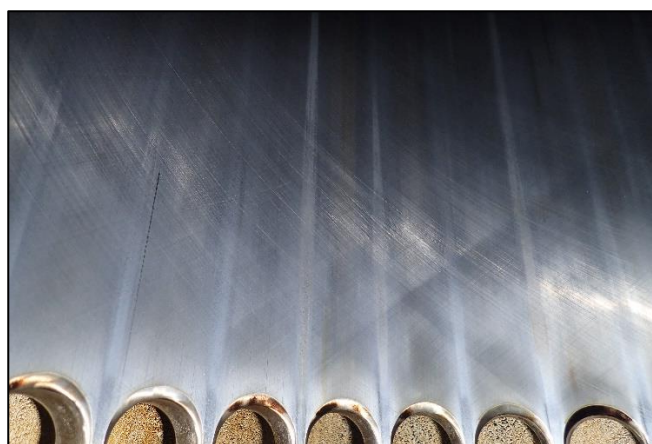


Cold Corrosion occurring on cylinder liners

# GulfSea SDA Insights

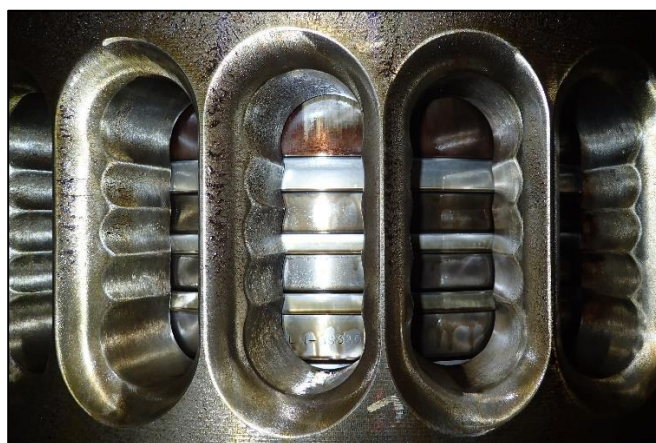
## Scavenge Port Inspection Guidelines

If Cold Corrosion is observed in any of the cylinders it is recommended that the feed-rate for the affected unit(s) is increased and the liner condition monitored at the earliest opportunity. If the problem persists continue increasing the feed-rate until the condition improves. Depending on the sulphur content of the fuel in use it may be required to change a higher BN cylinder lubricating oil.



The pictures above show a cylinder liner without cold corrosion with the honing marks still visible

In addition to taking regular Scrape Down Samples to monitor the residual BN value and Iron content it is recommended to carry out regular visual inspections through the scavenge ports to monitor the actual condition of the cylinder liners, pistons and piston rings.



Left picture shows the piston rings with sufficient lubrication; the picture on the right shows the condition of the piston crown side with minimal carbon deposits.

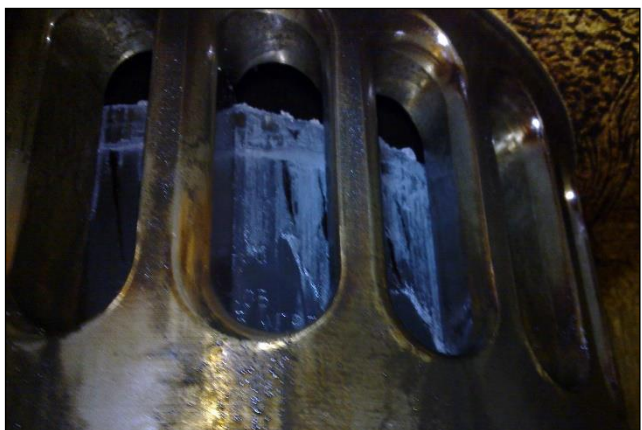
# GulfSea SDA Insights

## Scavenge Port Inspection Guidelines



The pictures above show flaking/peeling of piston ring coatings

Under normal operating conditions the cylinder oil feed rates should be adjusted in accordance with manufacturer's recommendations. High or excessive cylinder oil feed rates lead to excessive alkalinity (BN) which will cause calcium carbonate to form. This might result in scuffing on the cylinder liners.



The pictures above show the effects on piston crown due to high cylinder oil feed rate; the white substances shown on the right are calcium carbonate deposits.

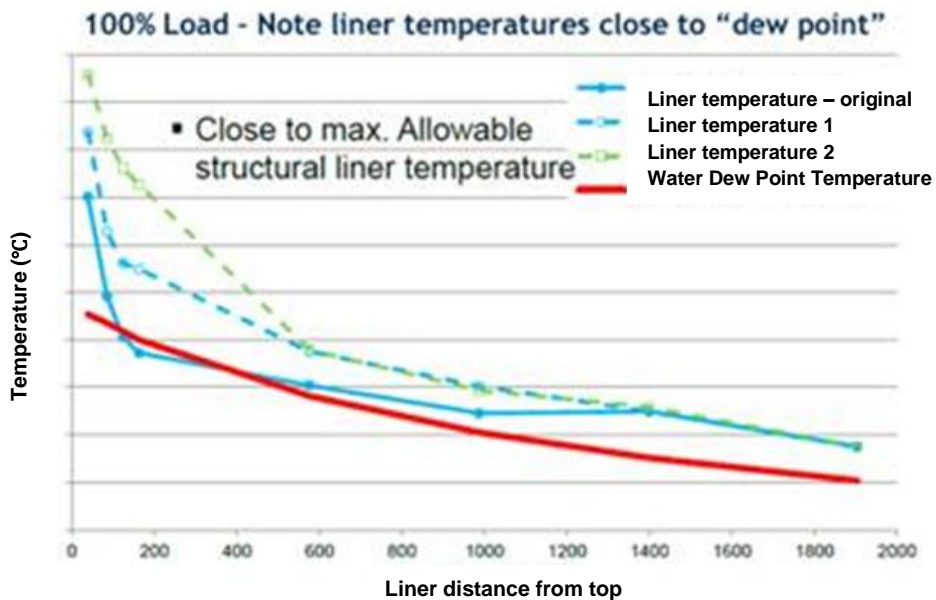
# GulfSea SDA Insights

## Scavenge Port Inspection Guidelines



The left picture shows bad fuel quality and excessive “blowby”; the picture on the right shows “normal” running condition of the engine

The two graphs below are an alternative dew point pictures.

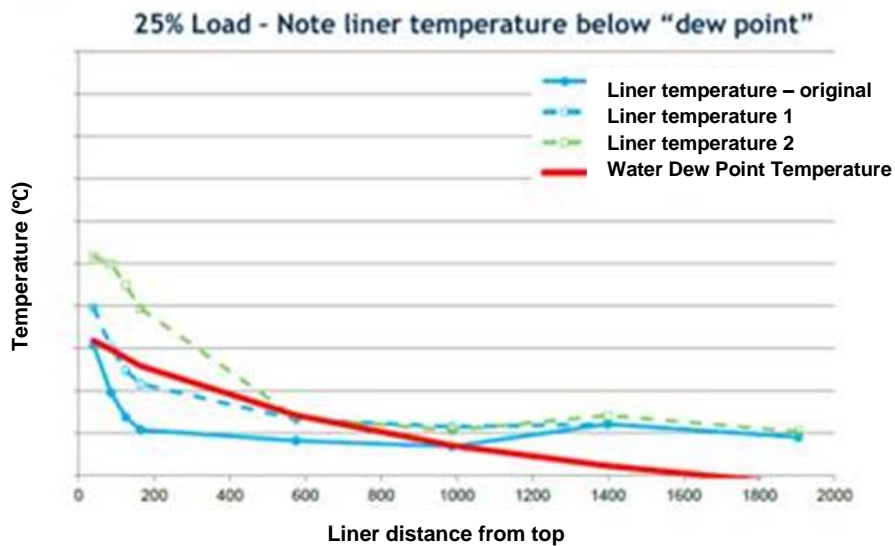


Graph Courtesy of MAN D&T



# GulfSea SDA Insights

## Scavenge Port Inspection Guidelines



Graph Courtesy of MAN D&T

Prior to taking any Scrape Down Samples, please ensure that the scavenge space/piston under side is clean; that ensures that the samples taken are indicative of the unit. Refer to Gulf Oil Marine Technical Bulletin on Scrape Down Analysis – Procedure on the recommended way to take scrape down samples.

Please consult Gulf Oil Marine Technical Engineers at [technical.engineer@gulf-marine.com](mailto:technical.engineer@gulf-marine.com) for any queries.

[Updated on May 2019]