

RISK ALERT



Scrubber overboard connection-Severe Corrosion



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Introduction:

Corrosion in the exhaust gas scrubber system is a recognised issue requiring adequate corrosion protection measures in the installation. Despite this several cases of acidic corrosion within the scrubber discharge piping system have been reported and this is an increasing cause for concern.

Of particular concern is the case of severe corrosion in the section of the discharge piping outboard of the scrubber overboard valve – the distance piece. Wastage and failure of this piping section could, in worst case scenario, lead to flooding of the engine room.

In the event of failure, arresting water ingress by temporary means is also difficult given the size and location of the discharge connection. Depending on the circumstances, and the area of the vessel operation at the time of a failure, outboard plugging and repairs to the connection may not be an immediately available option.

Reason for failure

The vulnerability of seawater piping due to pitting, galvanic reaction and cavitation is well known. Similarly, the corrosion of discharge piping associated with the inert gas systems on tankers is also a known issue. The difference with the exhaust gas scrubber system is that it is a far more corrosive environment with the lower pH values (higher acidity) of discharge washwater, higher temperatures and variation in flow in the drain piping.

The continuous operation of the scrubber system, improper selection of material and poor workmanship are also identified as likely causes for

early failure of the piping.

Given the number of instances of the wastage of the distance piece; some classification societies have issued requirements and recommendations for enhanced inspection and assessment of the discharge connection.



Scrubber overboard discharge connection

Sea connections and overboard discharge valves, including the attachment to the shell plating, are required to be inspected during the periodical docking surveys. Thickness gauging of the distance piece is to be carried out if wastage is noted and renewed as required.

Recommendation

It has now been suggested that the thickness gauging of the connection should be carried out annually, to ascertain the rate of any diminution in the piping thickness. Diminution could suggest damage to the applied corrosion protection where such is provided.

It is, however, recommended, that where possible, the thickness measurement is undertaken at 6 monthly intervals and that a diver inspection of the overboard discharge connection is undertaken to ascertain the condition of the diffuser, attachment and any protective coating that might have been applied.

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Members and their crew are encouraged to take note of these potential risks and the Class recommendations and to review their current procedures for inspection and renewal of piping systems and sea connections.

A criterion specified in section 10.1.2 of [MEPC 259\(68\)](#), which updates the 2015 Guidelines For Exhaust Gas Cleaning Systems, requires that the pH of washwater must be at least 6.5 at a distance of 4m from the overboard discharge. This means that the discharge washwater pH could potentially be lower than 6.5 at the outboard connection, with dilution occurring outboard of the vessel. The dilution being facilitated through the incorporation of a diffuser arrangement at the overboard section of the discharge piping. The lower pH levels have the potential to enhance the extent of corrosion to which the piping could be exposed. The erosion or wastage of the diffuser could also have an adverse impact on the effectiveness of this required dilution to meet the discharge criteria.

It is apparent that the design, material selection and the quality of installation has a significant influence on the corrosion resistance of the scrubber piping system. Appropriate selection of material, taking into consideration galvanic corrosion, corrosion allowance for the piping and corrosion protection application, such as the use of epoxy coating or cladding arrangement, are some of the measures that could be considered. Further careful consideration should be given to the method of attachment of the discharge overboard connection to the hull plating and to where a diffuser is to be incorporated. The Club suggests that consultation with the scrubber manufacturer with regard to understanding potential issues with the overboard discharge, the design for incorporating suitable corrosion protection measures and the appointment of appropriate supervision for the actual installation are imperative.

In conclusion, taking into consideration the above concerns in regard to the corrosion of overboard discharge pipes, it is recommended that the referenced design and installation aspects are carefully considered for new installations, and is reviewed in the next scheduled drydocking for

existing installations, in order to avoid flooding risk and expensive unscheduled repairs.



Scrubber installation-exhaust connection

The below notices issued by Class NK and DNV provide useful information and guidance on some incidents and the remedial actions that can be considered to prevent early failure of the exhaust gas scrubber piping system.

[Corrosion of distance pieces associated with SOx scrubber discharge waterlines -Class NK](#)

[SOx Scrubber Overboard Pipe Failure -DNV](#)

Further reference is also drawn to:

[‘An Advisory for Singapore-Registered Ships’ issued by the Singapore MPA](#)