

Solutions and Technology for Today's Marine Industry

In today's world it is inevitable that the IMO directive will be to continue pushing governments and industry to reduce greenhouse gases. There is no questions that the marine businesses will be required to install scrubbers or purchase lower sulphite fuels in the future. These same clients will be required to report and document on a continuous bases the levels in which they emit into the atmosphere. The solutions and technology are available. In the case of Hydroflo Controls Ltd. and Procal Analytics we have the most current technology that allows the clients to monitor and report all forms of emissions. These systems are in place to protect your investment, both from a process point of view or costly fines for emission accidents.

Get the best CEM's Equipment that is Proven for the Marine Industry.



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Marine Industry Needs to Change As IMO Sets New Limits for Lower SO2 limits in Fuels

The Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) unanimously adopted amendments to the MARPOL Annex VI regulations to reduce harmful emissions from ships even further. The main changes to MARPOL Annex VI will see a progressive reduction in sulphur (SOx) emissions from ships, with the global sulphur cap reducing initial to 3.50% (from the current 4.50%) effective from 1 January 2012: then progressively to 0.50% effective from 1 January 2020, subject to feasibility review to be completed no later than 2018.

The limits applicable in Sulphur Emission control Areas will be reduced to 1.00% beginning on July 2010 (from the current 1.50%); being further reduced to 0.10% effective from 1 Jan 2015.

Progressive reductions in nitrogen oxide (NOx) in Nitrogen oxide (NOx) emissions from marine engines were also agreed, with the most stringent controls on so-called "Tier III engines, i.e. those installed on ships constructed on or after 1 January 2016, operating in Emission Control areas. The revised Annex VI will allow for an Emission Control Area to be designated for SOx and particulate matter, or all three types of emissions from ships, subject to a proposal, from a Party or Parties to the Annex, which would be considered for adoption by the Organization, if support by a demonstrated need to prevent, reduce and control one or all three of those emissions from ships.

The MEPC also adopted amendments to the associated NOx Technical code, to give a revised NOx Technical code 2008. The amended Code includes a new chapter based on the agreed approach provisions for direct measurement and monitoring methods, a certification procedure for existing engines, and test cycles to be applied to Tier II and Tier III engines.

Revised guidelines for Exhaust Gas Cleaning Systems and Guidelines for the development of a VOC management plan we also adopted.

MARPOL Annex VI

MARPOL Annex VI sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances. The annex includes a global cap of 4.5% m/m of sulphur content of fuel oil and call on IMO to monitor the worldwide average sulphur content of fuel.

Annex VI contains provisions allowing for special SOx Emission Controls on sulphur emissions. In these areas, the sulphur content on fuel oil used onboard ships must not exceed 1.5% m/m. Alternatively, ships must fit technological method to limit SOx emissions. The Baltic Sea Area is designated as a SOx Emissions area in the Protocol.

Principles for the Marine Industries Success

The marine industries must be proactive and ready as changes prescribed by the IMO come into effect. With the proper measurements in place many operators can properly monitor the emission levels from their fuel. Therefore when purchasing fuels with low SO₂ content one can operate to the highest allowable limit if the right measurement tools are in place. Additionally if scrubber technology is installed, higher sulfite fuel can be used while emission levels are maintained within limits. The cost savings associated with being able to use fuels with higher SO₂ levels will be massive compared to the cost of the scrubbers and the analyzer equipment.

This approach will allow marine operators to optimize their fuel cost while still being environmentally compliant.

This is a win/win for both industry and the environment.

PRIDE OF KENT FIRST SHIP TO INCORPORATE SO₂ SCRUBBER TECHNOLOGY UTILIZING PROCAL'S DESIGN TO MEASURE EMISSIONS



With the changes being made and implemented by the IMO (International Marine Organization), the Marine industry has two basic options: either purchase lower sulphur fuels; or incorporate new scrubbing technologies that will reduce the emission levels. In both cases there will be a requirement to monitor and report emission levels to authorities. That dictates the need for robust measurements by the marine industry.

The Pride of Kent, owned by P&O European ferries (Dover) Ltd, is one of the first to try both on-line SO₂ scrubbing systems as well monitoring systems.

The initial attempts had mixed results, as evolving the design of the scrubbers was a learning process. However, as pilot projects go, these issues have been resolved and the current scrubbers are functioning. When using salt water scrubbers to reduce emissions, it will be mandatory to have a

CEMs unit to insure that the vessel is not exceeding its limits and the that the scrubber system is operating and performing.

At Procal, we have created a standard package for the Marine industry to measure both SO₂ & CO₂ in the same probe. The unit can be set up to provide independent output readings or as a SO₂ to CO₂ ratio.

Another feature that is exclusive to the Procal unit is the capability to measure H₂O or water vapour. One scrubber manufacturer pointed out that excess water vapour is an issue and with that measurement the scrubber could be optimized. Additionally, excess water vapour is visible and it leaves deposits on the deck. This moisture is unappealing to the public and it can be quite corrosive.

In the case of the Pride of Kent these were all considerations. Initially an extractive type of analyzer was tried. Unfortu-

nately this design was not successful in the Marine application.

When manufacturing an analyzer, one must consider the service condition in which it needs to operate. Typically there is very little space for installations of CEM equipment. Therefore the design must be compact and simple. Also, because the ship is not stationary, it must be robust and simple with very little maintenance.

The Pride of Kent has installed one of Procal's P-200 infra-red analyzers that was packaged for the marine application. The unit is operational and data and results have been collected for both scrubbed and non scrubbed operations.

Procal has it M-certs for all applications, but has applied for the Marine M-cert and Lloyds of London approval.

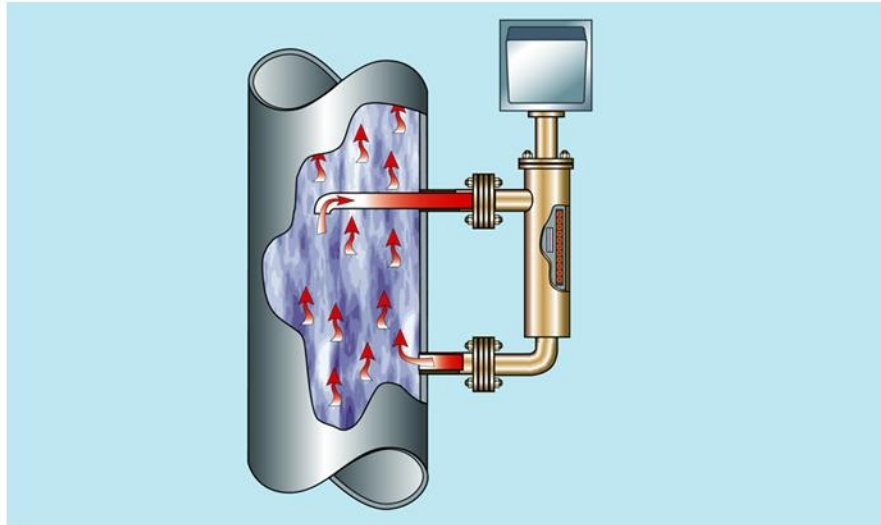
P&O is now pursuing other Procal installations.

CEM'S DESIGNED FOR MARINE REQUIREMENTS

The Procal P-200 infrared emissions analyzer has an infrared source which generates infrared radiation from 2 to 12 μm and a series of narrow band filters that are used to select specific wavelengths. The wavelengths are dependent on the gas species to be monitored as each gas has a separate absorption characteristics. By comparing the energy of each wavelength after passing through the in-situ cell the concentration of the gas can be calculated. Other factors which will affect the

absorption, such as path length, temperature and pressure are either fixed or measured, and automatic compensation is applied. In addition due to the wide absorption characteristic of both water vapour and carbon dioxide (CO_2) these gases are also monitored and compensated for, this also gives the ability to report on a wet or dry bases dependent on the requirements.

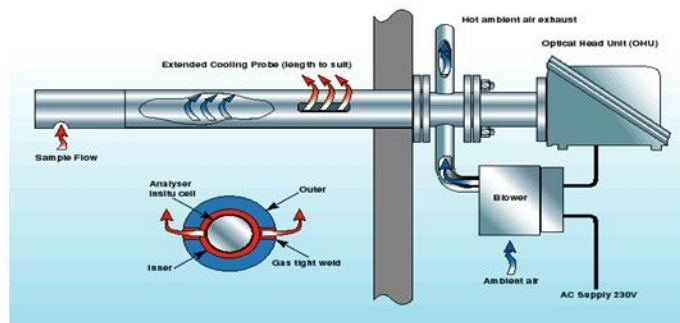
Procal's design for Diesel and Marine applications is instantaneous, continuous and requires no support equipment (pumps, valves, etc.). Typically when the scrubber is not in service flue gases are in the range of 300F. Procal's design utilizes a bypass system that controls the gas temperature to about 200F. When the scrubber is in service the stack temperatures are drastically reduced. To accommodate this mode the bypass chamber is fitted with a heater that maintains the 200F temperature. All types of measurement are affected by temperature. Procal units are calibrated for 200F and it is proven that controlling temperature is easier and more accurate than trying to compensate for it. The implementation design and installation is quite often more important than the measurement technology. A successful system is one that works with very little maintenance and can operate in extreme conditions such as Marine applications.



The Procal operating system is called ACWn. This software utilizes Microsoft operator interface Windows 2000 and XP. For the marine applications we are using an industrial panel PC that can handle the rigorous environment.

By incorporating both a simple and compact design with almost no moving parts and an industrial PC, the system is the most robust and maintenance free CEMs system currently available in today's industry. This is an extremely important advancement for the Marine industry.

As an additional feature, because the Procal system is PC based it is capable of incorporating GPS signalling which allows reports to be position and time stamped.



EYE ON IT Current Industry Trends

For the marine industry there will be requirement to measure emissions, whether or not you are scrubbing. Monitoring agencies will want to see your logs. These will have to be time stamped and correlate with GPS location. Third-party GPS software can be added to the Windows operating program to give the Marine industry a complete system.

SOFTWARE Procal's latest operator interface

For many years analyzer manufactures have had black box technology as the interface to their systems. Recently Procal has developed a new software package called ACWn. This software resides in a standard PC. Microsoft Windows 2000, xP and, in the near future, VISTA is the standard operating platform. The software operates up to 8 separate Procal probes with only one software license. The system communicates via RS485 to the analyzer heads. The heads are then daisy-chained. In all cases the software stores all data and displays the current readings with trending.



Professional Services

In Canada Hydroflo Controls Ltd has been supply and servicing Procal Analytic equipment for close to 20 years. Our office in Central Canada can supply technical and engineering services as well as both replacement parts and field services.

WHY PURCHASE PROCAL CEM's FOR YOUR MARINE REQUIREMENTS

- To be compliant to the new IMO rulings
- Multiple gases in one measurement that is continuous.
- Low Maintenance compared to extractive type analyzers
- Only working design for Marine applications
- Proven design for both scrubbed and none scrubbed application
- Special installation design suited for marine and diesel engine installations.
- A design that allows control changes during scrubbing periods and even during not scrubbing periods.

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