



# Cold Corrosion Test Kit



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The oil used to lubricate the cylinders of large 2-stroke marine diesel engines has to contend with high temperatures and acidic products formed during the combustion of sulphur-rich bunker oils; for this reason cylinder oil is used on a continuous loss basis.

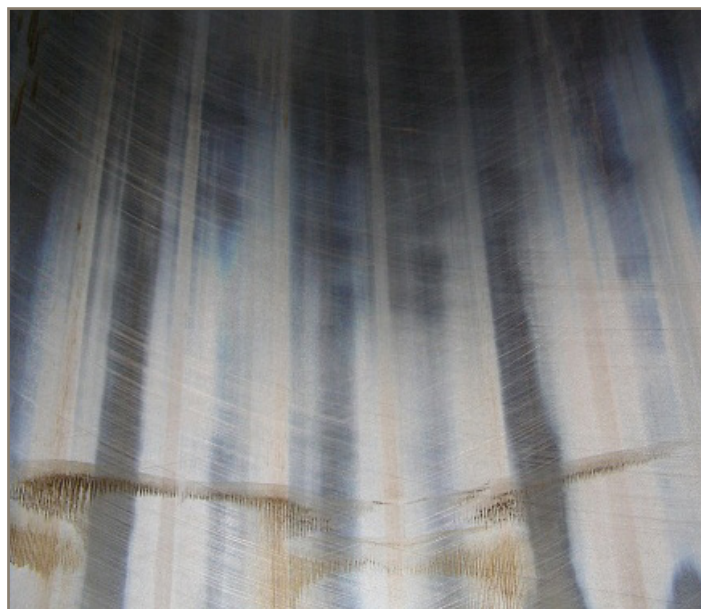
In recent times ship operators have taken to running engines at reduced speeds (so-called slow steaming) as a means of improving fuel consumption. Unfortunately slow steaming is accompanied by a drop in engine temperature which allows acid to build up on the cylinder liners thereby promoting their "cold corrosion". The iron compounds formed by this process are then flushed from the engine by the cylinder oil. This is leading to excessive liner wear, requiring expensive replacement.

The iron found in used cylinder oil samples typically exists in various forms, each one having its own particular properties. For example, metallic iron particles worn off the cylinder liner by cat fines exhibit strong ferromagnetism and may be detected using the Parker LinerSCAN. On the other hand, compounds such as iron sulphate and rust, which are formed during the combustion process by reactions involving the cylinder liner, cannot be detected magnetically.

One way of mitigating the effects of cold corrosion is to increase the scrape down oil feed rate. Not only does this increase the use and therefore cost of the oil used, over lubricating can have a detrimental effect due to fouling of the rings and calcium deposit build up. Knowing the exact operating conditions and wear mechanisms within the cylinders allows fine adjustment of the feed rates to minimise wear and reduce costs. Engine Original Equipment Manufacturer's (OEM's) have recently issued service letters giving guidance as to acceptable levels of corrosive wear.



**Deposit build up on piston due to over lubrication (too high feedrate)**



**Cold Corrosion on liner surface**

Parker's patent pending new Cold Corrosion Test Kit is a quick, simple to use chemical test that provides an accurate measure of the parts per million (PPM) value of  $Fe^{2+}$  and  $Fe^{3+}$  compounds in used scrape down oil. Rather than simply giving a figure for the total iron (including metallic compounds), which other tests provide, knowing the specific PPM of corroded iron allows informed decisions to be made in adjustments to feed rates and the Base Number (BN) of the oil used. The quick test (<5 minutes per cylinder) allow rapid analysis of the whole engine. No long waiting periods are required to obtain accurate measurements. Coupled with tests to measure the metallic content (such as Parker LinerSCAN or Analex Alert), the cause of high levels of iron can accurately be determined. High Iron levels caused by scuffing incidents or Catalytic Fines in bunker fuels can be isolated from cold corrosion issues. Conversely, corrosion caused by sulphuric acid corrosion of the liners can be isolated from other wear mechanisms in the cylinder chamber.

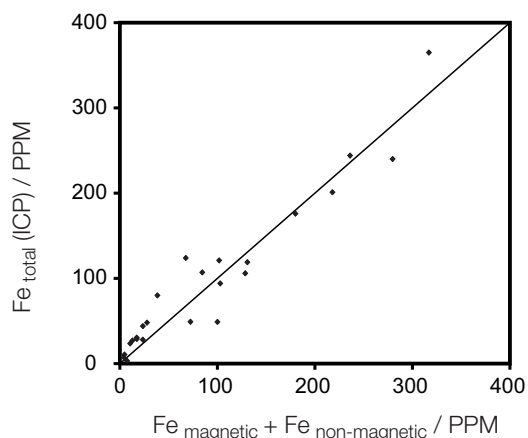
Major OEM's recommend a maximum cold corrosion figure of 200PPM. Ideally this should be kept below 100PPM within the engine to maintain low wear levels.

Used in conjunction with other onboard testing recommended by engine OEM's, such as regular residual Base Number BN testing, an accurate picture of the operating conditions can be quickly determined and the correct course of corrective actions implemented. Parker's BN test kits and metallic wear debris meters make the perfect companion to the Cold Corrosion Test Kit.

## Key Features of the Cold Corrosion Test Kit

- Excellent correlation between field measurements and lab Inductively Coupled Plasma (ICP) results (see graph)
- Monitors products of corrosion that cannot be detected magnetically
- Provides early warning that cold corrosion is underway
- Gives a running commentary on internal corrosion as the operator adjusts the cylinder liner jacket temperature or oil feed rate
- When used in conjunction with the Parker LinerSCAN, it is possible to monitor abrasive and corrosive wear independently
- Each test is simple, cost effective and quick (<5 minutes) to complete

Graph showing correlation between ICP (total Iron) and combined Magnetic and Non-Magnetic Fe as measured by Analex Alert and Parkers Cold Corrosion Test Kit:



## Specification

Measurement Range	0 - 400 PPM (Accuracy +/- 20 PPM)	Parts Per Million (PPM)
	0 - 800 PPM (Accuracy +/- 40 PPM)	Parts Per Million (PPM)
Ambient Temperature	20 - 55	°C

## Units



## Benefits

- Reduced scrapedown oil usage and cost
- Increased Liner change interval
- Accurate knowledge of operating conditions

Product Code	Description
FG-K19763-KW	Cold Corrosion Test Kit (CCTK) including 1 Reagent Pack (100 tests)
FG-K19875-KW	Reagent Pack (100 tests)



**EMEA Product Information Centre**

**Free phone: 00 800 27 27 5374**

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**US Product Information Centre**

**Toll-free number: 1-800-27 27 537**

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