

PYROBAN®

**HOW TO REMOVE
“PLATE TYPE”
EXHAUST FLAME
ARRESTORS
FROM ATEX
CATEGORY 3G
ENGINES**

WHITE PAPER

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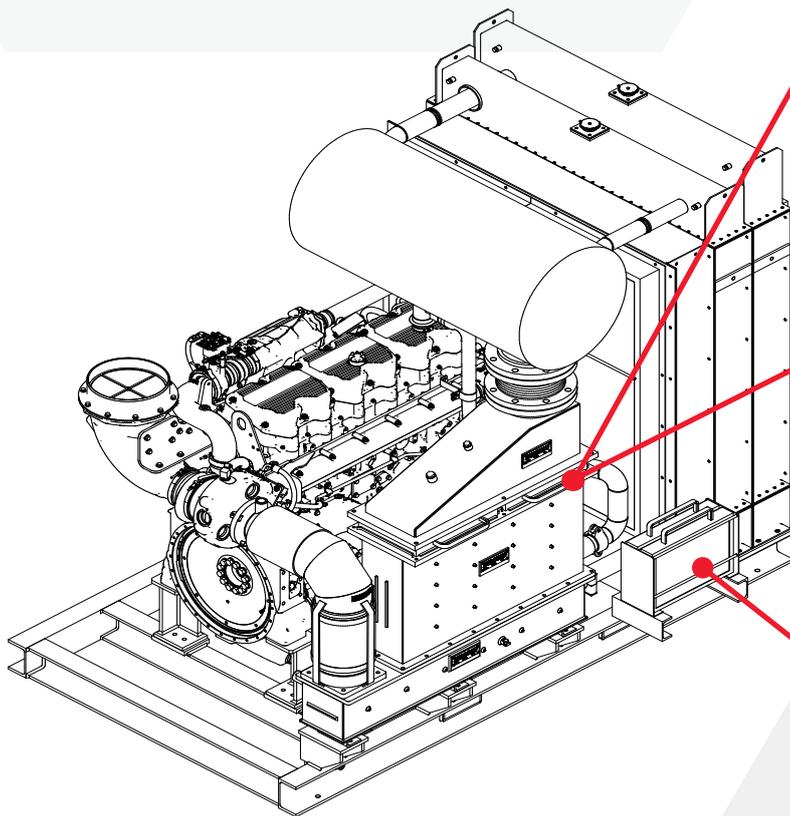
EXHAUST FLAME ARRESTORS

Exhaust flame arrestors are a critical component part of the explosion proof system found on diesel engines used in Zone 2 hazardous areas. They make the engine flameproof.

“Plate type” flame arrestors* have been the industry standard for decades.



Typical “plate type” exhaust flame arrestor



Exhaust flame arrestors

- Allow the engine exhaust gases to pass through small passages
- Stop a flame in the event of hydrocarbon gas ingestion. The heat of the flame is absorbed and the flame cannot survive or propagate

Dummy flame arrestors

- Dummy flame arrestors are for safe area operation

Example of a typical explosion proof engine which features air inlet shut-off valve, air inlet flame arrestor, water-cooled turbocharger and exhaust manifold, thermal control and treatment, exhaust gas heat exchanger, exhaust flame arrestor, spark arrestor and more

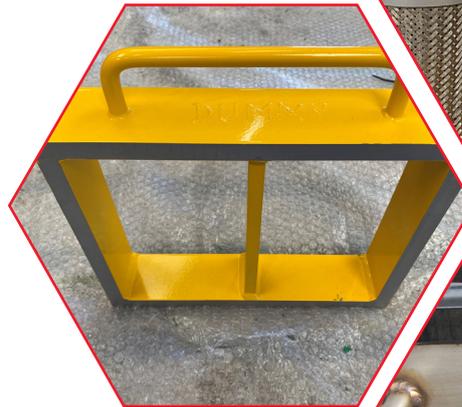
The potential ignition sources on an unprotected diesel engine include electrical, mechanical or static sparks, overspeed or flame transmission from inlet or exhaust, and hot surfaces.

** Sometimes called exhaust flame traps*

CLEANING, LIFTING AND DUMMIES

There are three main drawbacks with “plate type” exhaust flame arrestors

1. The exhaust gas has to flow through the restrictive narrow gaps in the flame arrestor, so it clogs up with soot very quickly. This means they must be removed every 8-12 hours of operation to be cleaned. This causes downtime affecting the efficiency of the operation offshore.
2. “Dummy” flame arrestors are usually shipped with an explosion proof engine which are an empty casing. These are only supposed to be for testing purposes and for when the engines are used in safe areas. Wrongly using a “dummy” in a Zone 2 hazardous area exposes the operation to sources of ignition and invalidates the whole Pyroban Zone 2 system certification.



Example of a “dummy” flame arrestor



Example of a 34kg exhaust flame arrestor

3. Exhaust flame arrestors look small, but they are extremely heavy. They typically weigh over 25kg and are usually located above waist height making them hard to handle safely. This leads to manual handling compliance issues every day that they are changed.

The working temperature is 200degC and so manual handling is a challenge. To compound this the chemicals that are needed to clean the flame arrestor must be disposed of correctly.

Example of a “plate type” exhaust flame arrestor ready for cleaning



HOW TO REMOVE EXHAUST FLAME ARRESTORS FROM YOUR OPERATION

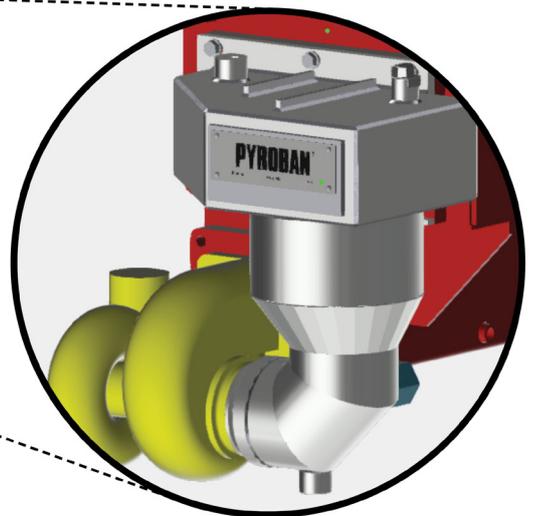
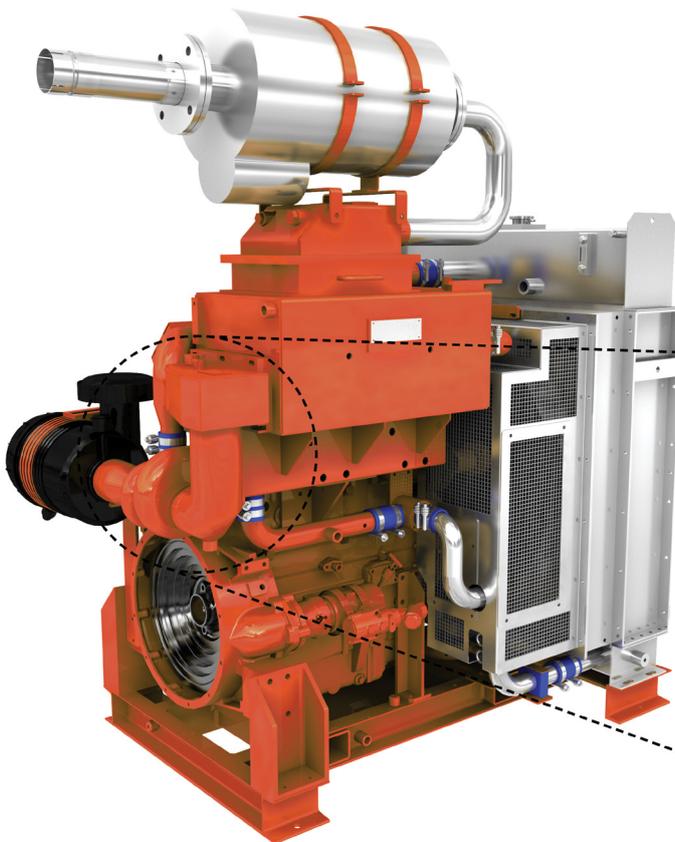
There are now two different ways to eliminate the “plate type” exhaust flame arrestor from the explosion proof diesel engine design.

1. REPLACEMENT PART

A replacement part can be bolted into the exhaust system between the turbo and gas cooler, on the hot side of the exhaust flow.

The technology was only launched in 2020 as a direct replacement for the “plate type” flame arrestors.

They are low in cost and can easily be fitted in the field to existing equipment. This means that the maintenance requirements every 8-12 hours are removed as soon as it is fitted.



Backwards compatibility to existing ATEX certified Pyroban equipment

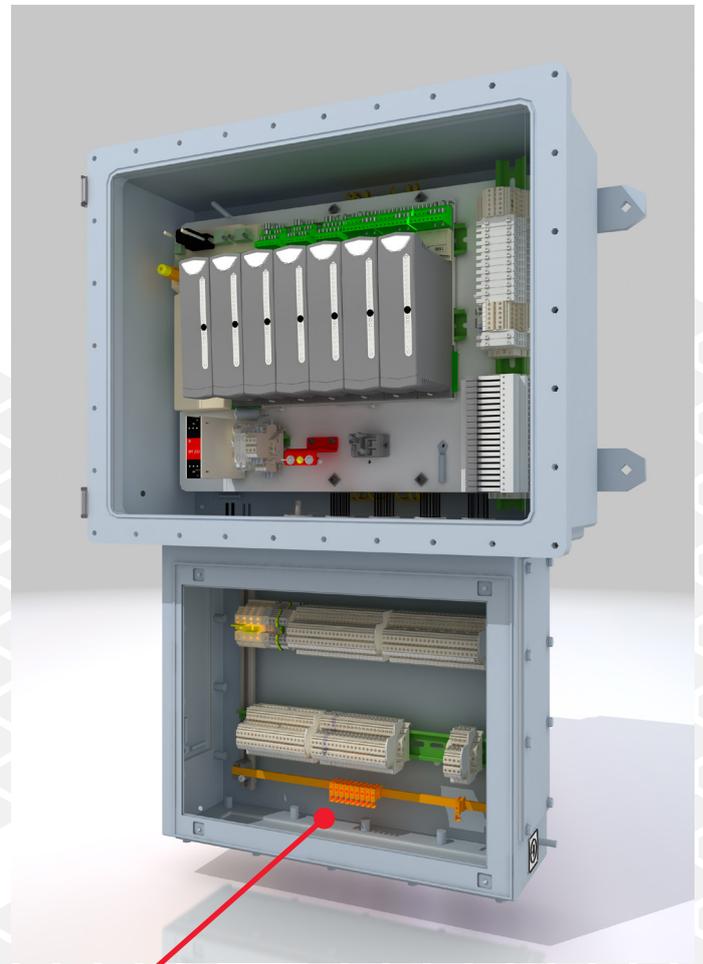
2. ACTIVE CONTROL SYSTEMS

As a more advanced alternative, it is possible to take an active approach to the overall safety system and combine safety shutdown with diesel engine control and monitoring.

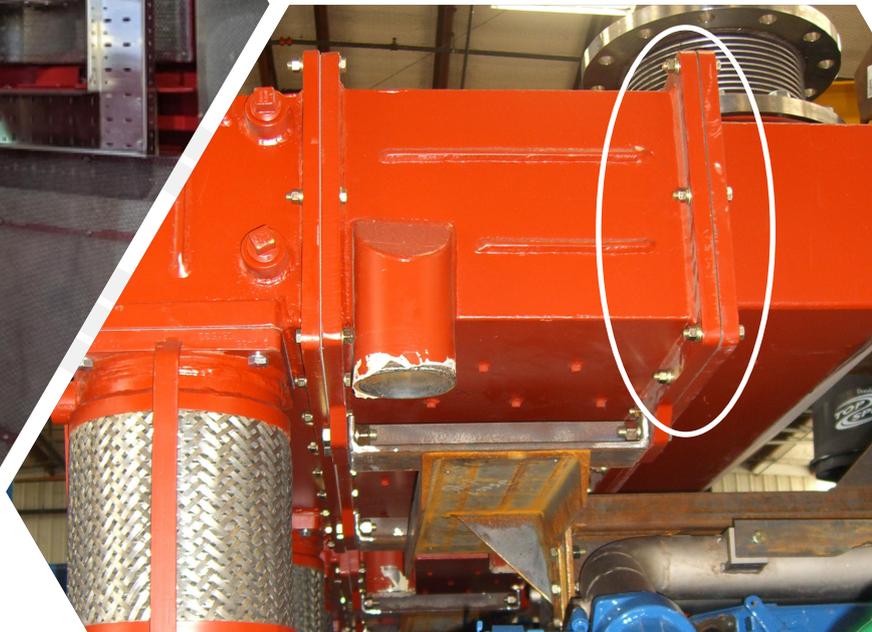
Gas detection is introduced into the engine inlet tract at a certified position and also within the equipment DNV 2.7-1 enclosure.

A safety shutdown is then triggered on detection of a flammable gas in the engine air inlet or in the atmosphere, diesel engine over speed, high exhaust gas and coolant temperatures, low oil pressure or if there is a manual emergency stop activation for example.

This active approach makes it easy to incorporate additional driven equipment controls such as pumps, generators, transmissions, or the well head platform's DCS (distributed control system).



There is no need for any type of exhaust flame arrestor, as seen here



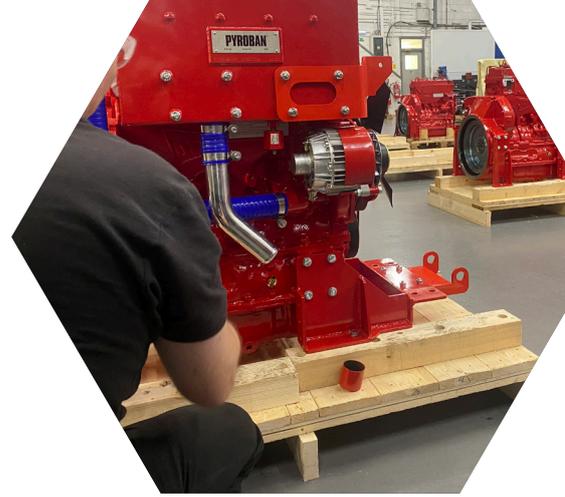


With either approach, operators can now get on with the job, enjoy longer operation and reduce unproductive downtime.

Furthermore, operators are no longer exposed to sources of ignition if a 'dummy arrestor' is used.

Manual handling and environmental compliance issues also disappear because you have taken away the need to regularly change and solvent clean the heavy flame arrestors.

Rob Double, Business Development Director, Pyroban Ltd ”



Explosion proof kits being fitted at the UK Pyroban factory for operations in the Middle East

EVER CLEAR™ EXHAUST FLAME ARRESTORS

Ever Clear™ Exhaust (ECE) Flame Arrestors developed by Pyroban are a direct replacement for the plate type flame arrestors found in Pyroban explosion protected diesel engines.

Costing as little as half the annual cleaning costs of a plate type exhaust flame arrester, they are suitable for new, or existing, Pyroban protected turbo diesel engines above 100bhp. Tested in accordance with EN1834-1:2000 and suitable for T3, IIA & IIB gas groups.

EX SCS™

Pyroban's Ex SCS™ is an active approach combining flame arrester elimination, safety shutdown and diesel engine control and monitoring into one flexible package. It features infrared gas detection and is a 100% stand-alone safety control system for ATEX 2014/34/EU compliance.

A colour touchscreen HMI (Human Machine Interface) displays the current safety status and the diesel engine control and monitoring screens can also be integrated. For example equipment controls, pump sensors, as well as fire and smoke detectors can all be fed into Ex SCS.



QUALITY

Additional to the ISO9001:2015 quality standard certification, each Pyroban Group company attains the required level of 3rd party certification for the business markets it serves including ATEX, IECEx, GB and NEC.

ABOUT PYROBAN

Pyroban provide explosion protection solutions for materials handling equipment and diesel engines.

For nearly 50 years we have been at the forefront of the industry developing products to protect your people, your site and equipment when operating in hazardous areas.

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