Halyard

The Science of Silence

Pleasure Craft

Product Index

The Science of Silence

ANTI-VIBRATION - Aquadrive

WHY FIT AN AQUADRIVE?

An Aquadrive will reduce structure borne noise and vibration by up to 90% as well as reducing the overall noise levels by up to 75% and the shaft alignment problems will cease on installation, as it allows the engine to be installed flat. The Aquadrive allows angles between the engine and the shaft and problems will be eased when re-engining.

AQUADRIVE TO SUIT ALL ENGINES

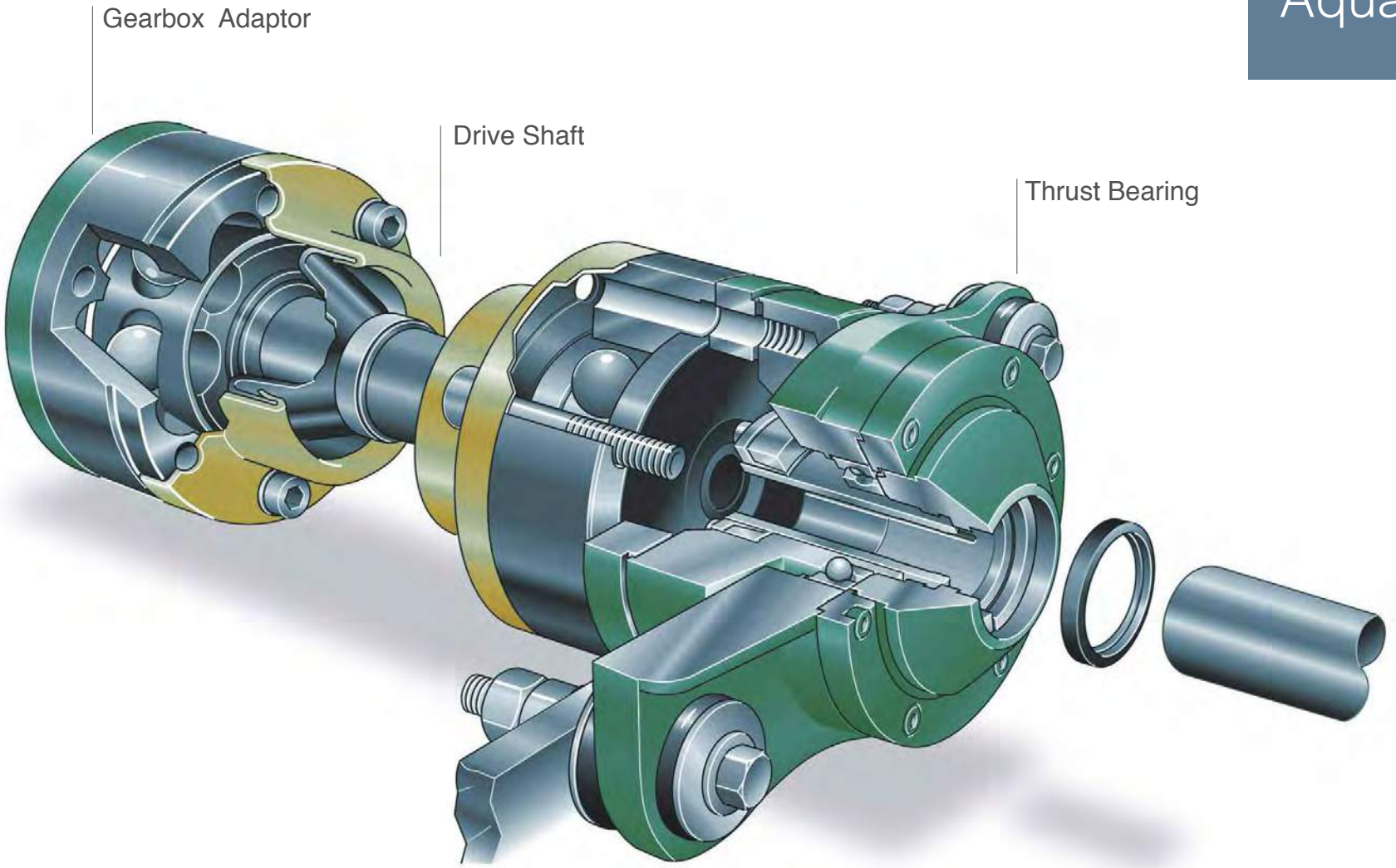
Moduline Aquadrive

Twenty years of development has produced a completely new range with less weight, less length, more power capacity, and all the advantages of the original concept. The Aquadrive special drive shaft has been up-rated to take more power. The thrust bearing assembly is now cast from specially treated alloys to reduce weight. The shaft coupling is hidden away inside the thrust bearing to reduce length and weight dramatically.

Long Shaft Aquadrives

Systems with longer Aquadrive special drive shafts allow the engine position to be varied enormously. Shafts up to 4 metres long allow engines to be raised or lowered relative to the propeller shaft, or even moved over to one side.

Aquadrive



What's Inside an Aquadrive?

The Aquadrive has four main components. The gearbox adaptor is ready made to couple our drive to your gearbox. Behind this comes the Aquadrive special drive shaft, with a tough constant velocity joint at each end. Then the thrust bearing, engineered to take forward and reverse thrust, and rubber mounted to reduce noise. Finally the shaft coupling, produced for a wide variety of shaft diameters.

The thrust bearing is incredibly tough and built with races which can be replaced even after many years running. Sealed ball bearing races require zero maintenance on smaller Aquadrives. Taper roller units are built into the larger systems.

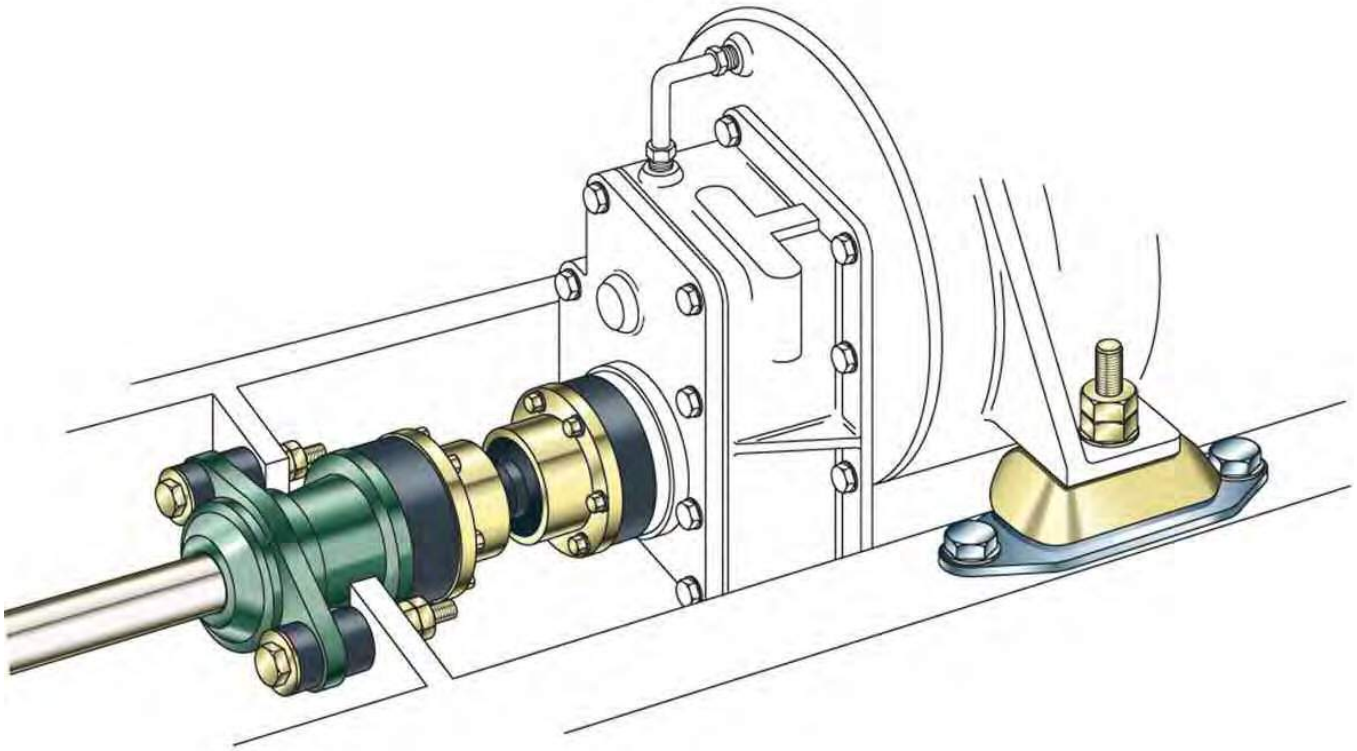
The Aquadrive special drive shaft will take an angle of up to 8˚ at each end, and then take even more movement due to vibration. It will even take fore and aft movement – it is easy to forget that an engine vibrates fore and aft as much as it does up and down.

Gearbox adaptors are produced for almost every gearbox on the market today. They are supplied with all the correct nuts, bolts and washers.

AQUADRIVE ENGINE MOUNTS COMPLIMENTING THE AQUADRIVE'S FLEXIBILITY

The Aquadrive system creates free movement between the engine and the shaft. One result is that the engine's mountings can be much softer than normal, partly because the engine can vibrate freely relative to the shaft, and partly because no propeller thrust reaches the mounts and strains them forwards. Aquadrive engine mounts are used with engines of four cylinders or more, and our expert staff will rapidly select the correct rubber stiffness for the machinery involved.

Aquadrive



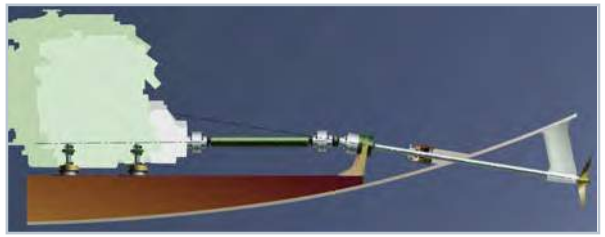
How does it solve shaft alignment problems?

Marine engines are supported on timber or steel bearers fixed into the hull. These bearers are positioned to allow the engine to line up roughly with the shaft. The engine is then adjusted on its mounts so that it lines up with the propeller shaft coupling within a few thousands of an inch. All this takes hours of painstaking work. And then when you launch the boat, or tighten the backstay on a yacht, it all moves slightly and needs to be done again.

The Aquadrive changes all the rules. The propeller shaft fits into the Aquadrive's thrust bearing, which is fixed firmly into the hull. The engine is connected using the Aquadrive's special drive shaft. This allows misalignment of 12.5mm (1/2") – or more on larger Aquadrives. Engine alignment can even vary while running, so the movement on an older or timber hull is not a problem.

Can the engine be installed flat?

Marine engines are normally lined up with the propeller shaft, which has to angle down through the bottom of the boat. The engine therefore ends up with its front higher than its back, wasting precious headroom.



Fit an Aquadrive between the engine and the shaft and suddenly you have an angle of 10° or more, allowing the engine to be fitted horizontally. The Aquadrive thrust bearing takes the propeller shaft and the special drive shaft is simply installed with the desired angle at each end. The maximum angle depends on the shaft speed.

Will Aquadrive help me re-engine?

The biggest problem in choosing a new engine is fitting it in the existing space, with the fewest possible changes to the craft. Just imagine the flexibility if you could put an angle between the new engine and the existing shaft. Or use a longer Aquadrive to lower the whole engine. Or fit the Aquadrive to take out movement between a new engine with flexible mounts and traditional solid sterngear.

Wavestream

BILGE WATER FILTRATION - WAVESTREAM

A development of world-wide importance which prevents oily bilge water being pumped into the sea.

All types of boats risk polluting their surroundings when they pump out their bilges. Bilge water invariably contains fuel oil, lubricating oil and grease which cannot be separated and is dumped into the seas and rivers of the world. Legislation to prevent this operates in most parts of the world, and is being progressively tightened.

Wavestream has been developed for the oil and shipping industries. XOil is a filter material which bonds with oil. It is processed into sheet form and converted to simple filter cartridges which fit easily and neatly into the pipework from bilge pumps. So effective is XOil that each filter cartridge will adsorb 3 times its own weight of oil. So efficient is XOil that even the smallest system will handle 40 litres per minute. So welcome is the technology that the entire BT Global Challenge fleet adopted it. So important is the development that Lloyds Register has given Type Approval to the basic product.

Watermaker protection. The Wavestream filter is ideal for watermaker protection, preventing oils causing fatal damage to delicate reverse osmosis membranes.

Wavestream Micro System

Designed for the bilges of day boats, RIBs and small sports boats or where minimal space is available, the Micro unit is easy to connect into the bilge water system, using ¾" BSP connections. The unit takes a space only 190mm high by 120mm diameter. Filter cartridges can be replaced in seconds.

Wavestream 1000 System

The 1000 system has a larger filter element to cope with the demands of larger pleasure boats up to 20m. 3/4" BSP connections are used, and the flow rate, at 40 litres, is the same as the Micro system but filter cartridge replacement intervals double.

Wavestream 2000 System

Recommended for large pleasure craft and commercial boats, the 2000 system will handle bilge pump flow rates up to 265 litres per minute with a 117mm diameter filter cartridge and 1 1/2” BSP connections.

Wavestream 3000 System

The 3000 is designed for large commercial craft and ships. It incorporates a massive filter cartridge almost 500mm long, with significantly increased capacity. The flow rate and BSP connectors are common with the 2000 series.

Wavestream Stainless Systems

These multi-cartridge systems were born in the oil industry but can be used for even larger vessels than the 3000 system. Each unit is produced to meet a defined need. Details of the flow rates are needed to specify.

* All systems have Lloyds Approval.

ENGINE PROTECTION – EXHAUST ALERT

Why fit an Exhaust Alert?

Marine diesel exhaust systems are designed to take temperatures of only 120°C. The exhaust gases, however may reach more than 500°C. To cool the gases, the exhaust depends on the free flow of cooling water from the engine. This flow can be cut off, by a plastic bag or seaweed being sucked into the intake or by a problem with the water pump. The exhaust temperature will rise immediately to around 450°C, the exhaust will overheat and may be seriously damaged. In most situations the Exhaust Alert will warn you before serious damage occurs.

What makes Exhaust Alert so different?

An exhaust temperature alarm system must measure temperature inside the exhaust system to be effective. Sensors fitted on the outside of the exhaust cannot respond quickly as they must wait for the heat to work through the hose to reach the sensor.

Will it protect my engine?

The Exhaust Alert is designed to protect only the exhaust. The system should not be regarded as an engine protection device, although it may beat the engine temperature sensors when the engine is cold.

How does it work?

The Exhaust Alert works with a 12V or 24V supply and it has three main components.

Temperature Sensor

A stainless sensor which screws through a 10mm hole in the exhaust hose, placing a temperature sensor right in the gas flow about 100mm behind the engine. Up to three sensors can be used, covering twin engine craft and generators.

The Helm Display

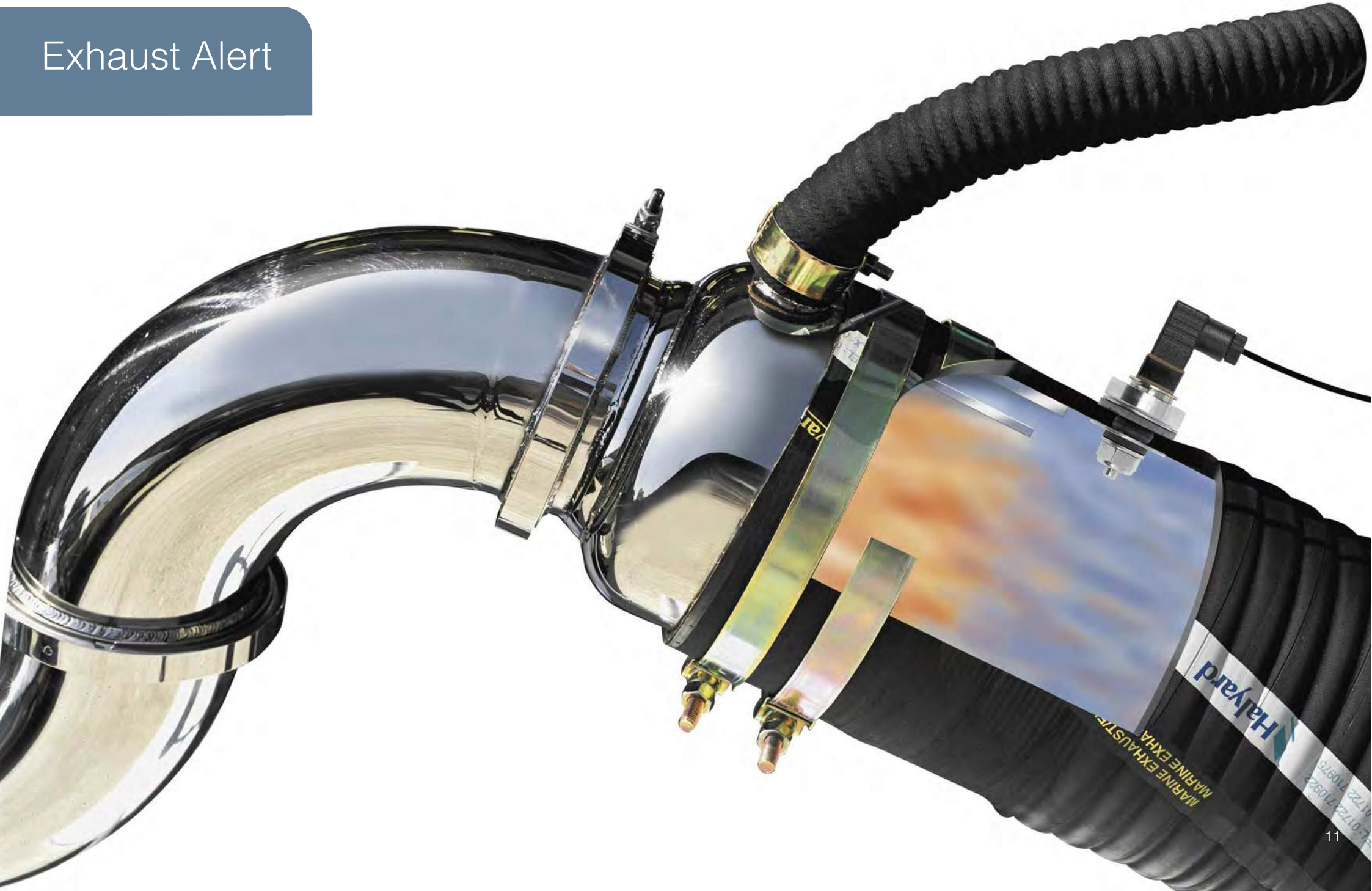
This display fits near the helm and had light indicators for ready and warning lights for each engine and a small buzzer. A 120dB siren can be connected. The display self-tests when the engine is turned on, flashing lights and sounding the buzzer. If the senor overheats the relevant light will flash and the buzzer will sound. A button allows you to shut down the buzzer.

Another system is available without a helm display – an OEM kit which experts can wire into their own systems.

Junction Box

The junction box mounts in the engine space. This compact unit fits on the bulkhead of the engine space. Wires from the sensors and the helm display connect to it. It connects to the power supply (which must be live when the ignition is turned on).

Exhaust Alert



Sea Strainer Alarm

Sea Strainer Alarm
with a Helm Display

Sea Strainer Alarm with
OEM Control Box

Engine Protection – The Sea Strainer Alarm System

Why?

Marine engines are cooled by raw sea water, drawn in through the bottom of the hull and pumped through the heat exchanger. Block this vital supply and problems follow immediately. The water pump impeller fails almost instantly and engine overheating follows. In extreme situations really serious damage can be done. Halyard's Sea Strainer Alarm buys you precious seconds to deal with the problem before any damage occurs. Impede the flow of water through the strainer, or start the engine with the seacocks turned off, and the Sea Strainer Alarm tells you instantly.

How?

The Sea Strainer Alarm spots the restricted water flow in the hose between the strainer and the pump. Too great a restriction and the sensor loses current. The control box instantly picks this up, and the alarm system is set in train. Halyard has taken three years to research the Sea Strainer Alarm, studying the flow between sea strainer and pumps for engines of over a hundred different sizes and types. With the aid of a significant EC grant, we've plotted these to ensure we can specify a sensor which alarms immediately the water flow is seriously impeded – but doesn't alarm unnecessarily. All you need tell us are the engine size and the inside diameter of the pipe from the sea strainer to the engine pump.

Fitting?

The sea strainer alarm fits neatly into the water supply between the sea strainer and the engine raw water pump. The unit is supplied complete with fittings for the appropriate hose diameter. You simply cut the supply hose, fit the "T" piece into the hose and secure with hose clips. You then connect the sensor, to the control box (up to 3 sensors can be connected, covering boats with single or twin engines and a generator). The control box requires a 12 V or 24 V supply. You then connect the simple helm display to the control box. If you prefer, you can fit the OEM control box, allowing you to incorporate your own dashboard lights instead of the standard helm display. You can also connect an optional alarm siren, supplementing the simple buzzer supplied in the helm display.

Exhaust Systems

Exhaust Systems - Sprayheads/Risers

Spray heads

Many engine manufacturers make a standard spray head for use when a high riser is not needed, if not then Halyard can help. We can also produce spray heads with particular spray patterns for installations where cooling is critical.

Modular spray head and high riser

This modular spray head rotates at three points along its length, so that the riser can be incorporated in the exhaust in the easiest possible way. Once positioned, special clamps on each joint are tightened to fix the position permanently, and the heat resisting jackets are fitted.

Silencers & Exhaust Systems

Lift Silencer

Oval Inline Silencer

Water Separater

Why we use Silencers?

Noise can be tiring and cause sea sickness. Our objective is to achieve an exhaust noise reduction of around 40% with our basic silencers, 70% with our specialist dual chamber silencers, or 80% with silencers and our exhaust water separation units.

What is marine exhaust achieving?

A marine engine exhaust system injects the cooling water as well as silencing the engine's combustion noise and removing the exhaust gasses. The system must create minimal restriction to the flow of exhaust gasses, known as back pressure, or the engine may be damaged.

There are four main objectives:

1. To minimise the risk of water running back up the exhaust and into the engine cylinders, causing serious engine damage.
2. To cool the exhaust and eject the engine cooling through the exhaust without excessive back pressure.
3. To reduce noise by between 40% and 90%.
4. To site the outlets at the stern of the boat to minimise exhaust fumes on board.

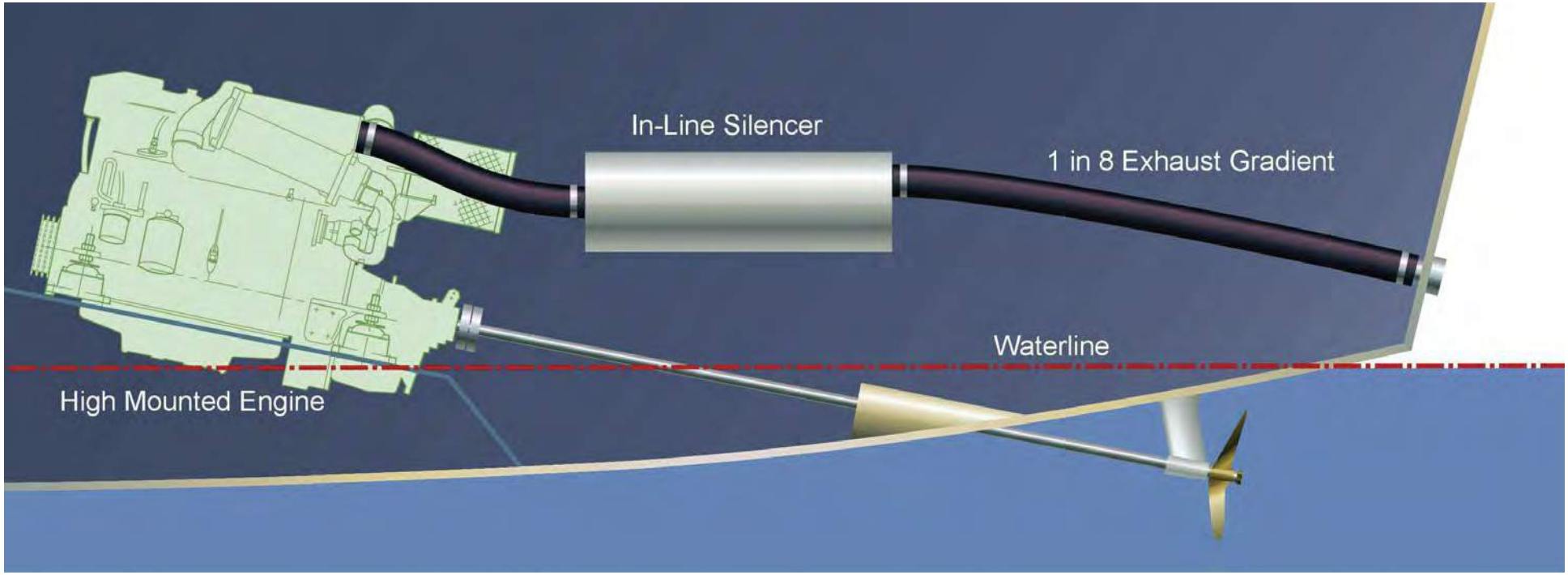
Silencers & Exhaust Systems

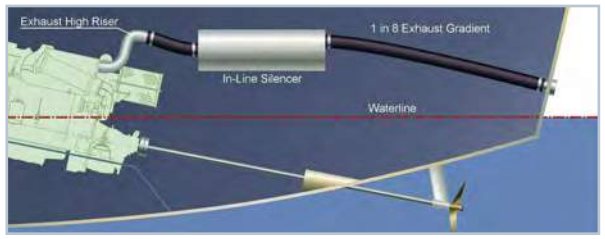
Designing an Exhaust System

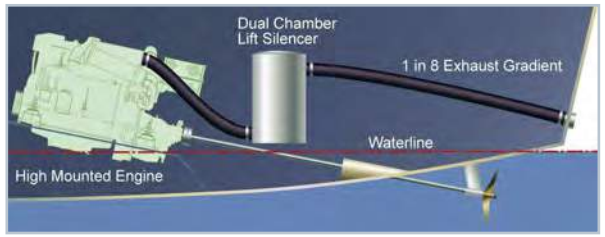
The most vital question when designing an exhaust – Where's the waterline?

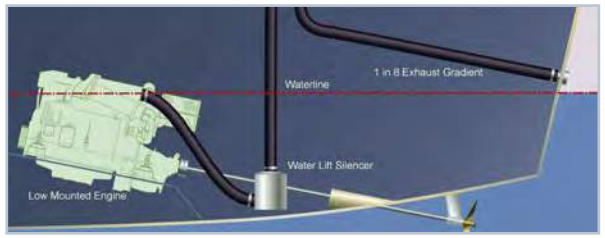
Engine well above Waterline?

The engine is sited well above the waterline, with a gradient steeper than 1 in 8 to the back of the boat. The water will run naturally down the exhaust to the stern. To reduce noise by up to 40% a straightforward in-line silencer should be used. To reduce noise by around 70% a dual chamber unit could also be used.









Engine only just above the Waterline?

Water could run back into the engine if the vessel pitches with the engine not running. There are two solutions and both need to be checked.

Fit a High Riser

Stainless high risers raise the exhaust above the back of the engine before the cooling water is injected. This forms a steeper slope to the stern and may achieve the 1 in 8 gradient required. A standard in line silencer can then be fitted to achieve a noise reduction of around 40% or a dual chamber silencer achieving up to 70%.

Fit a Dual Chamber Silencer

The dual chamber silencer means the hose slopes steeply down from the engine to the silencer and again from the silencer to the stern. The geometry needs careful checking, but it can solve the problem and offers a noise reduction up to 70%.

Engine near or below Waterline?

Most displacement craft have their engines low down. The hose from the engine runs down to the silencer, trapping the water inside the silencer. The hose from the silencer runs straight up to a gooseneck and then gradually down to the stern. Water in the system drains into the silencer when the engine is stopped. A wave coming up the stern is unlikely to climb over the gooseneck. Syphon breakers should always be used in the cooling water supply to installations of this type. Normal lift silencers reduce noise by 40% or so. You can add a water separator to increase this to around 80%.

Lift Silencers

Horizontal Lift Silencers

These low lying units can be very useful in sailing yachts, where the silencer needs to be secured alongside the propeller shaft.

Side In, Top Out Lift Silencer

These low lying units can be very useful in sailing yachts, where the silencer needs to be secured alongside the propeller shaft.

Top In, Top Out Lift Silencer

In many applications a top inlet unit will be easier to use. The noise result and cost are the same as the side inlet units, the same rigorous quality tests apply.

Horizontal Lift Silencer

Side In, Top Out Lift Silencer

Top In, Top Out Lift Silencer

Silencers

Round In-Line Silencer

These silencers are made from strong filament wound tube, giving the maximum possible protection if the exhaust back-fires. Every unit is pressure tested before being gel-coated. They must be installed within 5° of horizontal towards the stern.

Oval In-Line Silencer

These oval silencers are hand-moulded for use where the round body unit cannot be accommodated. Twin Inlet In-Line Silencers are built on an individual basis for V engines. The angles can be angled to ease the connection to the engine and positioned on the end or on the side.

Twin Inlet Dual Chamber Lift Silencer

Some dual chamber silencers have two inlets to accept the exhaust hose from a V engine. Each inlet has been specifically angled to suit the particular craft and the outlet points straight to the positioned provided on the hull.

Dual Chamber Silencer

Exhaust noise reduction of up to 80% can be achieved and the back pressure created by the unit is minimal. Most units are hand built with inlet and outlet positioned to suit the particular craft.

*All Silencers have Lloyds Approval.

All of our silencers can be custom made to specification.

Separators

Water Separators

Mid-Size Separator

The larger separator is designed for use where the generators cooling water flow rate exceeds 40 litres per minute and the generator exhaust is up to 90mm diameter. Individual applications must be checked for correct sizing and it can also be used with propulsion engines.

Mid-Engine Separator

The mid-engine separator is an easy solution for most engines with exhausts from 90mm upwards. The units are produced using the same proven technology as seen with our silencers, with every one pressure tested. The unit comes with differing body sizes to match a variety of exhaust inlets. Two water drains are provided on most units, so that yachts can have an outlet for both angles of heel.

Millennium Separator

This separator is available in four sizes covering exhaust diameters of 40mm, 50mm, 63.5mm and 75mm. This can be positioned pointing left or right and can offer a choice of a horizontal or vertical outlet from the top at the side.

The range also benefits from: no joints or seals, which reduces the potential risk of leaks

- No joints or seals, which reduces the potential risk of leaks
- The outlet is at maximum height, facilitating a safe exhaust design
- A high temperature material, which reduces the risk of melting in an exhaust overheat situation
- Water separation is almost 100% apart from condensation in the dry hose run behind the separator

*All Separators have Lloyds Approval.

Exhaust Hose & Silicone

We stock hose in a variety of sizes ranging from 40mm to 300mm and is generally Lloyds approved. Almost all our hose passes the stringent tests on temperature and ozone deterioration. The design of the hose offers very tight corners , but the wall thickness remains heavy enough to give security. Only real T Bar exhaust clamps should be used when fitting the hose.

Our hose is also available with a high temperature liner, allowing the hose to handle temperatures reaching 140°. For high temperatures, Silicone can be provided in two grades and handling temperatures of 170° and 260°. Exhaust hose should be fitted using tough T Bar clamps, doubled wherever possible. We stock clamps to suit hose up to 300mm, both in stainless steel and zinc passivated steel.

GRP Exhaust Tube

We also manufacturer our own filament wound GRP tube for use in silencers. Diameters from 50mm upwards are made, ranging right through to 600mm, with all the tubes made in 3m lengths. High temperature resins are used allowing normal operating temperatures of up to 85° and brief exposure to temperatures as high as 300° will not cause a problem.

GRP Bends & Adaptors

We manufacturer a full range of GRP bends and adaptors, which are all fabricated from our special high temperature GRP tube and are designed to get you around 45°, 90° and 180° bends or to couple hoses of differing diameters.

Flexible EPDM Rubber & Silicone Bellows

Will enable you to get around tight corners in the exhaust system, with less back pressure than a GRP fabricated bend. The standard units take up to 100°, and the silicone up to 180°.

*All Standard Hose have Lloyds Approval.

Bellows & Accessories

Silicone Bellows

Flexible exhaust bellows are important to isolate engine vibration from the exhaust system, particularly where a silencer or rigid section is close to the engine. Our bellows cover a wide up to 300mm exhaust systems and they will take temperatures up to 170°.

Jumpers

Wherever you connect a bellows or a rubber elbow, back into an exhaust hose you need a short length of GRP exhaust tube to couple them up, jumpers are made up to 300mm in diameter.

Siphon Breakers

The siphon breaker plays a crucial role in the marine exhaust system, preventing the cooling water backing up into the engine when this is low in the hull. The siphon breaker is cast from bronze and incorporates a tapping point for some cooling water to be drawn off to feed the stern tube bearings.

Hotlag

Hotlag is designed to wrap hot pipes with thermal insulator which is asbestos free, with a range of special clamps to hold it firmly and permanently in place.

Exhaust Transom Fittings

When the Thru Hull fitting was designed, the brief was to make a product which was infinitely stronger than the plastic and GRP units that were already available and tougher than most stainless units.

Our Thru Hull fitting uses 3mm thick 316 stainless to ensure that the risks of damage when manoeuvring a craft are reduced to the absolute minimum. All units are designed so that the flap, at rest, is shrouded by the stainless rim to prevent damage if the vessel nudges a harbour wall.

Thru Hull Fittings – Neoprene Flap

Units to accept exhaust hose up to and including 100mm hose have neoprene flaps. Each has a generous tail allowing T Bar exhaust hose clamps to be used to secure the hose. Smaller sizes have three countersunk fixing holes. The 90mm and 100mm units have four bolt holes and a bolting flange which fits right around the unit inside the hull.

Thru Hull Fittings – Stainless Flap

Units from 125mm upwards all have stainless flaps lined with neoprene. All have tails with plenty of space to use proper T Bar clamps to secure the hose. Between four and eight bolt holes are provided and all units have bolting flanges to fit around the unit inside the hull. Sizes to suit up to 300mm hose are currently manufactured and they are a normal stock item up to 254mm

Noise Insulation

Benefits of Noise Insulation?

Marine diesels create very high noise levels – often well over 100 decibels. Engines are always located close to the boat user, generally in engine spaces made from GRP, timber, or steel. Engine noise is then amplified by bouncing around between the hard bulkheads and the steel of the actual engines. Noise contributes seriously to fatigue and seasickness, as well as spoiling life on board.

Noise insulation changes all this. It adds a soft facing to hard bulkheads to absorb noise and stop it bouncing around and growing. It adds weight to the bulkhead to reduce noise transmission. It features a clever multi-layer construction to make a thin material more effective than simple insulations many times thicker.

If you cocoon the engine with noise insulation you can reduce airborne noise by 85% and transform the comfort for all on board. Remember structure borne noise and exhaust noise are separate subjects, and Halyard can help with both. Halyard offers three material thicknesses 12mm, 32mm and 45mm.

The Isolation Layer

This thin layer of foam has a crucial function: It acts like the gap in double glazing and stops the noise which hits the transmission layer being carried through to the bulkhead – just like the gap in double glazing.

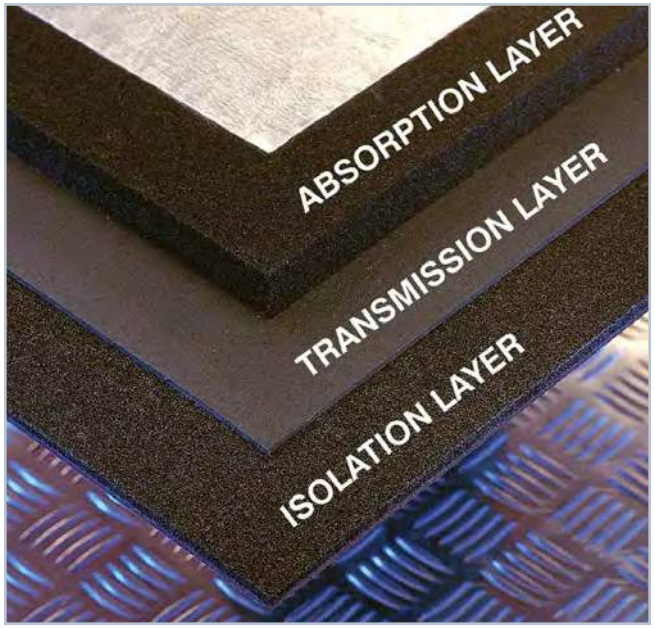
The multi-layer construction used in HMI materials offers the best possible acoustic result in thicknesses which can be accommodated in the tightest engine space, beating simpler materials many times as thick.

The absorption layer

A thick layer of fire zero rated foam which soaks up noise and stops it bouncing around the engine space.

The transmission layer

A high density barrier provides the highest possible mass and gives the best noise reduction. The HMI damping layer weighs 5kgs per square metre – more than the lead sheet used in older materials.



Material Types

Maritex

A tough fibreglass cloth, with a sealed metallised skin, so it cannot absorb oil. It won't tear or fray. It looks heavy duty, and it is fire zero rated. Maritex is simply the best facing in the HMI range. Maritex is fire zero rated to BS 476 parts 6 and 7.

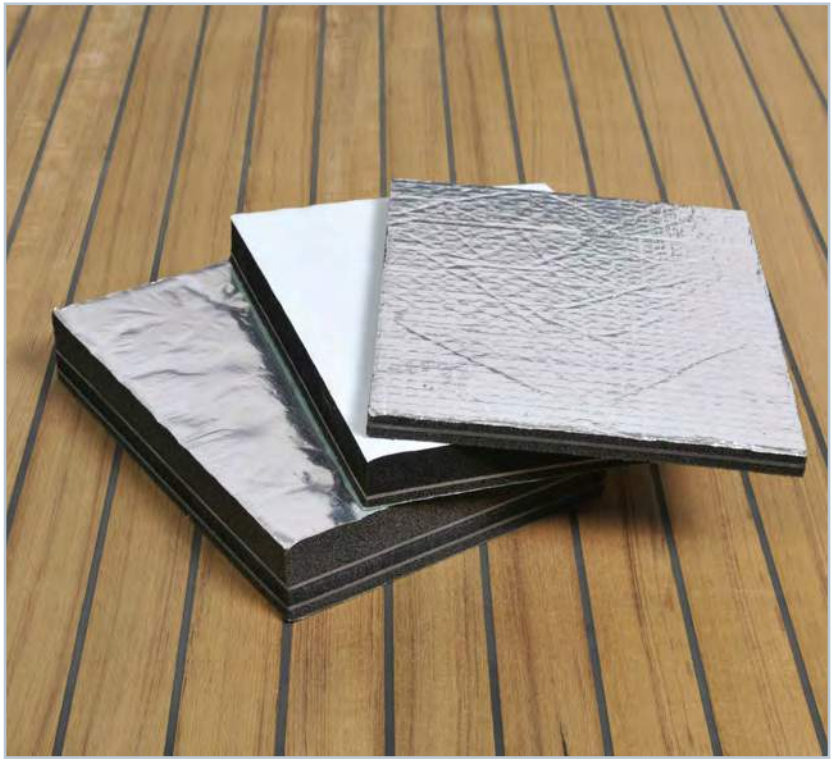
Seaglass

A tough off-white glass cloth, sealed against oil. The cloth is extremely tough and will not tear. The sealant will burn off in a fire. The material meets the ISO 9094 fire requirements of the EU Recreational Craft Directive.

Re-enforced Silver Polyester

This facing meets the requirements of the Recreational Craft Directive. It provides a seal to keep oil out. You can pierce it, but it has a re-enforcing layer behind it. It will burn, but once laminated in place it meets the ISO 9094 fire requirements of the EU Recreational Craft Directive. In a fire the facing will burn, but not the foam behind it.

For more detailed information on all our products, then please visit our website www.halyard.eu.com where product manuals, installation guides, datasheets and drawings can be obtained via our Downloads section.



Distributors, Warranty & Support

Distributors

Halyard has a strong international presence with successful installations in almost every corner of the globe. All our distributors have great knowledge of our range and many years' experience within the marine industry. With our Technical Sales team are based in the UK, we are always on hand to deal with any queries or questions directly.

Warranty & Support

All our standard products come with a full 12 month warranty. Our customer service team based in the UK, will be happy to offer advice regarding product selection or installation advice.

Please feel free to contact us at:

w. www.halyard.eu.com
e. techhelp@halyard.eu.com
t. +44 (0) 1722 710922


Halyard
The Science of Silence
w. www.halyard.eu.com
e. techhelp@halyard.eu.com
t. +44 (0) 1722 710922

Global Support & Distribution

w. www.halyard.eu.com
e. techhelp@halyard.eu.com
t. +44 (0) 1722 710922