

**Supporting the marine industry all the way**



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**One of the most important considerations for marine engineers when designing and specifying a ship is the level of comfort it will provide for its passengers and crew. A key factor in achieving a high quality working and living environment on board any vessel, is the reduction of vibration and structure-borne noise.**

As marine design has evolved, so too has the technology that can be deployed to drastically reduce vibration and noise, whatever the source, regardless of the type of ship. Leading the way in the development of new and innovative solutions in this crucial area of marine technology is **Trelleborg Industrial AVS**.

Trelleborg specialises in the design, application and manufacture of rubber to metal bonded engineered products, antivibration mountings and suspension components. We manufacture and market the Metalastik® product range, one of the world's leading brands in antivibration technology – a brand that has become synonymous with safety, longevity and reliability.

Our products are specified by leading shipbuilders, marine engine builders and manufacturers of ship-borne equipment and machinery. We also work closely with the Ministry of Defence and the Royal Navy in the development of high-performance antivibration and shock mountings for use on surface fighting ships, submarines and supply vessels.

Marine designers insist on Trelleborg because we deliver the consistent quality, reliability and outstanding performance they demand.

Our pioneering heritage of design innovation and engineering excellence is without equal. Consequently we will remain at the forefront of the vibration, shock and noise control industry by embracing the challenges of the future and exploring new horizons in antivibration technology.



# EXPLORING NEW HORIZONS

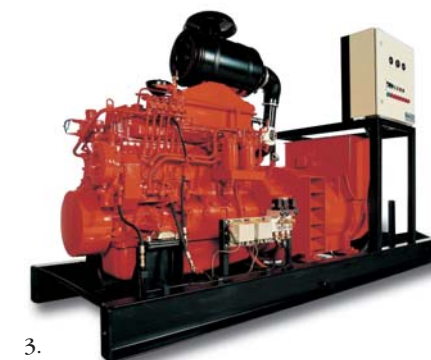




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The standard Trelleborg marine product range is extensive. It includes mounting systems for use with main propulsion engines of all weights, generator sets, auxiliary machinery and exhaust systems. Our technology isolates deckhouses and cabins from the hull on cruise liners, ferries, workboats and luxury yachts, greatly improving conditions in accommodation areas. In the defence industry, our antivibration and shock mountings protect vital and sensitive equipment as well as improving comfort and safety levels for the ship's crew.

Each product we manufacture is the result of years of research and evolutionary development. For a wide variety of routine vibration control and acoustic needs, a standard Metalastik® product will meet and often exceed the required performance criteria. However, for many individual and technologically challenging applications, only a custom-designed solution can achieve the level of performance demanded by the customer. We call it purpose-driven design and it's an area of expertise in which Trelleborg excels.

## Partnership ethos

We believe in working closely with our customers' technical teams from the outset, pooling our respective skills and experience in pursuit of the optimum solution. Through our Marine Application Team, you will gain access to Trelleborg's unrivalled technical expertise and vast global knowledge base.

The team we assign to a project begins by making a thorough assessment of the application and the demands that will be placed on the product. In close collaboration with the customer's teams at every stage, design proposals are submitted, developed, refined and tested. Throughout this process, work at Trelleborg is co-ordinated and driven forward by experienced Project Managers to ensure that all the required performance objectives are achieved and supply deadlines are met.

## World-class resources

Trelleborg Industrial AVS has all the resources you would expect from a market leader. Our Leicester head office in the UK encompasses a research and development centre as well as a purpose-built, state-of-the-art manufacturing facility. Trelleborg also has production facilities in Sweden.

Materials and product development are carried out in our own laboratories equipped with the very latest compound formulation, modelling and simulation technologies. We also have our own advanced mixing facility that prepares rubber compounds on site under clean and rigorously controlled environmental conditions.

## Technical expertise

Our technical staff are the best in the industry. They are the key to our success – past, present and future. It is their skills and expertise, their knowledge and commitment, that enable us to deliver quality solutions that add substantial value to our customers' products and services. This is why we invest in our people at all levels and in all functions of our business through a programme of continuous personal development.

With Trelleborg specialists in design, engineering and product development working alongside you, your project is in very safe hands. Therefore, you can be certain that your investment will yield outstanding performance benefits.

1. Victoria Class Submarine, Canadian Navy  
©Crown Copyright / MOD
2. Predator Yacht, Sunseeker
3. Scania Marine Genset by Sandfirden Technics,  
The Netherlands
4. BNS Godetia A960, Command Support Ship,  
Belgian Navy
5. Wärtsilä 12v 32 on Metalastik® Cushymount™  
'K' Mounts





Our products are synonymous with quality. Comprehensive testing regimes, 'right first time' manufacturing, outstanding performance ensure long service life, establishing Trelleborg as a leading name in the marine antivibration and suspension systems market.

Our commitment to quality is not limited to products alone. It drives everything we do. Our standards provide a benchmark of excellence in research and development, customer service, the efficiency of our manufacturing processes, the scope of our technical support and in our initiatives for environmental improvement.

Trelleborg Industrial AVS is approved to ISO 9001. Most of the mountings we produce have Lloyds Register Approval and are covered by Det Norske Veritas Type Approval. We are also accredited to a wide variety of OEM international quality standards.

## Research and development

Marine design and shipbuilding is dynamic and fast-moving. Like the marine industry, Trelleborg can never afford to stand still, nor are we content simply to track the pace of change. Instead, we aim to drive performance improvement by anticipating future challenges and developing new, innovative solutions.

Continuous investment in our products and the materials we use has resulted in a wide range of rubber compounds specifically developed for marine applications. Based on the highest quality polymers, our products combine high strength and shock protection with excellent acoustic properties, fatigue resistance and low creep properties. The stiffness characteristics of our engine mountings provide a high degree of vibration isolation whilst keeping engine motions within strictly defined limits.

All our products are designed to provide long service life. In pursuit of even greater longevity, we are constantly exploring the potential of new and alternative materials such as composites and special metals.



1.

## Extensive testing facilities

Trelleborg's testing facilities are quite simply, world-class. We operate a comprehensive programme of static, dynamic and fatigue testing in state-of-the-art laboratories at our Leicester headquarters.

We use advanced simulation techniques such as Finite Element Analysis (FEA) and multi-body vibration analysis software. FEA has proved to be extremely effective for the prediction of stiffness characteristics and the evaluation of stress distribution.

Newly developed components also undergo rigorous and extensive field trials. These are designed to mirror the operating environments in which the products will be required to perform.



2.

## Environmental improvement

At Trelleborg Industrial AVS, we take our environmental responsibilities very seriously indeed. We are constantly reviewing our manufacturing processes in the drive for year-on-year environmental improvement. Our strategy includes the continued elimination of solvent, significantly reducing emissions into the atmosphere. We are leading the way in our industry in the increased use of aqueous metal degreasing methodology, water-based bonding agents and protective finishes.

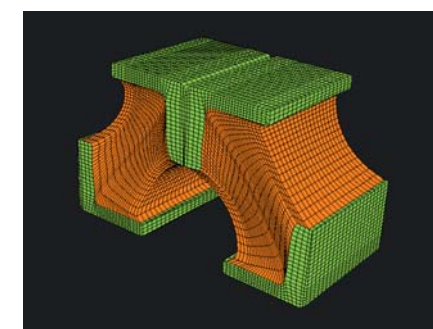


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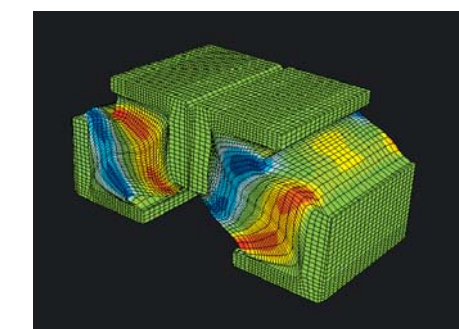


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1. Rolls Royce B32 40
2. MAN D2842 LE404 Marine Diesel Engine
3. Vetus M 4.17 Engine on Metalastik® Cushyfloats™
4. Astute Class Submarine, © Crown Copyright / MOD
5. Metalastik® type Super D Mount undergoing FEA Analysis



5.





# PRODUCTS

## FROM TRELLEBORG INDUSTRIAL AVS



### Cushyfloat™

Ideal general purpose unit designed to provide effective isolation of vibration and noise arising from both static and mobile equipment. Used predominantly for mounting medium and high-speed marine propulsion units.



### HT Cushyfloat™

This new range of Cushyfloat™ mountings are designed for high-performance engine applications where the need to accommodate the thrust and load transfer on the mounts due to torque, dominate the performance requirements. Features include higher longitudinal stiffness and a vertical stiffness characteristic, which is controlled over a wider deflection range.



### 'DX' Mountings

This latest addition to our 'D' Series range of mountings offers similar benefits to 'D' and Super 'D' mountings together with a modular design to accommodate varied load configurations, customer specific fixing points, improved acoustic performance and shock displacement of up to 75mm in all directions.



### Rectangular Mountings or 'Sandwich' Elements

These products are used in a vee arrangement for the suspension of medium speed propulsion engines and generator sets. In this configuration, they provide a very stable mounting system, minimising movement at flexible connections, whilst maintaining soft spring rates for the best vibration and noise isolation.



### SIM™

This mounting is ideal for mobile applications. The soft vertical stiffness combined with the high stiffness in the longitudinal direction makes it suitable for suspension of marine engines both with and without thrust. Used predominantly for vibration isolation of small to medium sized machines.



### 'D' Series and Super 'D' Mountings

These mountings are particularly suitable for applications such as marine propulsion engines, diesel generators and heavy machinery where isolation of low frequency vibration is required. They are commonly used for shock isolation on board military vessels and have a displacement capacity of up to 50mm in all directions.



### Large Equi-Frequency Mounts

This range of mounting is designed to support and isolate marine propulsion engines, generator sets, gas turbine engines and machinery rafts. They all have similar horizontal and vertical stiffness characteristics, with two sizes of mounts produced in four rubber compounds, it is possible to support static loads from 40 to 215 kN per mount.



### Cushymount™ and Cushymount™ 'K' Mountings

Large load capacity, large deflection and long life characterise these antivibration mountings. They are ideally suited for the suspension of medium speed diesel engines used for marine main propulsion and auxiliary power generation applications. Integral buffers limit maximum movement in the vertical and horizontal axes. Also used for exhaust systems and deckhouse suspensions.



# SUPPORTING YOU ALL THE WAY

Trelleborg Industrial AVS is a global leader in developing and producing antivibration components and systems for marine applications.

Our unrivalled product portfolio clearly reflects this status, along with our ability to provide superior system design and applications consulting.

We have the reach, range and resources to deliver standard or customised solutions beyond customers' expectations – worldwide.

Our products are specified by leading shipbuilders, marine engine builders and manufacturers of ship-borne equipment and machinery.

We pride ourselves on delivering the consistent quality, reliability and outstanding performance demanded by our customers.

With Trelleborg specialists in design, engineering and product development working alongside you, be confident that your project is in very safe hands.

## Where to find us

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'Trelleborg Industrial AVS operates a policy of continuous improvement and development. We reserve the right to change design and specification of our products without prior notification or alteration of literature. We will not be held responsible for any danger or damage incurred through improper use or installation.'

Brochure designed by Colbear - Doncaster, UK