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and discover our
expertise!
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PINPOINT



DISCOVER WÄRTSILÄ'S EXPERTISE IN AN INNOVATIVE WAY

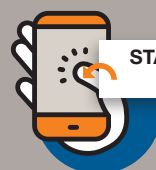
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INSTALL THE 'WÄRTSILÄ
BENELUX' APP ON YOUR
SMART PHONE



START THE WÄRTSILÄ
APPLICATION



PLACE YOUR SMART PHONE IN
THE VR GOGGLES TO VIEW THE
ORANGE PINPOINTS



OR VIEW THE BLUE AND
ORANGE PINPOINTS USING
JUST YOUR SMART PHONE.

The global leader in advanced technologies and complete lifecycle solutions for the marine and energy markets

Wärtsilä's 19,000 employees generate a net turnover of amounting to 5 billion euro, and currently has approximately 200 business locations in some 70 different countries around the world. We believe in equal opportunities for our employees, and support them in achieving their personal career growth at Wärtsilä.

Our solutions are based on advanced technologies that maximise the economic performance of our customers' ships and power plants in an environmentally friendly manner. Wärtsilä has achieved a leading global position by emphasising high efficiency, sustainability, innovation, and through being able to provide lifecycle support to its installations. In the marine industry, our nearly 200 years of experience and accumulated know-how is combined with an extensive portfolio of products, systems and integrated solutions that is unmatched by any other single company. One in every three ocean going vessels has a Wärtsilä solution onboard.

SERVICE RIGHT THERE AT ROTTERDAM HARBOUR

Our service facilities are available for maintenance, service, spare parts and repairs to your Wärtsilä equipment. Whether this involves planned (contractual) maintenance, inspections or emergency repairs, we are ready to help 24/7.

The service location in Schiedam coordinates service activities in the Benelux region. Here, we have all the necessary information on our customers' ships and installations. This data enables us to provide fast help in finding the right components needed for the best solution, especially for your propulsion machinery.

TAKE A NEW LOOK AT WÄRTSILÄ

With a virtual reality headset, you can experience Wärtsilä in another dimension - literally. At particular points, indicated by orange pinpoints, you'll encounter surprising and appealing videos by viewing them with the VR headset.

You can also discover extras without the glasses by scanning the blue pinpoints with your telephone.

An internet connection or wifi is required to use the app.

For your own safety, we request that you not walk around while using the VR headset.

Vraag
de receptie om
een wifi-code

“ We aim to provide our customers with the optimum result ”

Pioneering solutions



By keeping an open mind and being ready to address the customer's specific needs, the most advanced solutions can be achieved. We work efficiently, diligently, and with an entrepreneur's attitude. In this way, every Wärtsilä employee contributes to providing the customer with the right answers.



- Wärtsilä was founded nearly 200 years ago, and has been in the Netherlands for most of this time.
- No other company can match our portfolio of products, systems and solutions.
- Wärtsilä's roots are in Finland.

Wärtsilä is well positioned to respond to the increasing demand for environmentally sound solutions and to changing energy demands. We strive for growth by offering innovative, energy-efficient lifecycle solutions, and by leveraging our leading position in technologically advanced innovations.

AHEAD OF THE CURVE

Wärtsilä makes every effort to ensure that its products and services are in compliance with the increasingly stringent regulations governing environmental issues and energy use in both the marine and energy sectors. By staying ahead of the curve, we serve our customers better.

MAKING A DIFFERENCE

The world of power is changing rapidly. Sustainable, energy-efficient products and services are becoming increasingly important. This certainly goes for us as well. Our products are developed to meet the demands imposed by the worldwide energy transition. For example, our innovative technologies make ship propulsion increasingly more efficient. Wärtsilä has always been at the forefront in developing systems capable of operating on environmentally friendly Liquefied Natural Gas (LNG). We are accelerating our digital approach to the maritime industry.

As a manufacturer, we are extremely adapt at converting data into valuable recommendations. We don't report deviations in the data, but go much further by indicating which components have problems and what needs to be done to rectify the situation. Together with our subsidiary Eniram, we offer a complete range of "performance optimisation services". Our 'Genius' services combine condition-monitoring of the most important products and components, along with services designed to optimise the ship's performance. Furthermore, with our Online Services, customers can also gain insight into their own data themselves.

PASSION TO PERFORM

Wärtsilä is a proud and involved global player that provides its employees every opportunity to grow professionally and personally. Wärtsilä cherishes the dedication and passion of employees who work hard every day to improve their craftsmanship. We believe in the power of diversity within our company: in terms of gender, culture, background, education and more. Every individual, every experience, everyone's contribution is valuable and ultimately results in the best and most sustainable result for the customer.

Wärtsilä's headquarters are in Helsinki, Finland. Worldwide, Wärtsilä has 200 locations, eight of which are in the Netherlands. In total, nearly 19,000 people work at the company; nearly 1,000 in the Netherlands.

“ We believe in market-focused, sustainable solutions and valuable career opportunities. ”

COLOPHON

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Please tell us what you think. Your comments and suggestions will help us to shape this publication to meet our readers' needs. Send your e-mail to communicationsbenelux@wartsila.com.

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MARINE SOLUTIONS



Wärtsilä contributes to the success of its maritime and oil & gas industry customers by providing innovative products and integrated solutions that are safe, environmentally friendly, durable, efficient, flexible and economical. As a global technology leader, we are able to offer bespoke solutions based on our vast experience, in-house expertise, and proactive approach.

SERVICES



Wärtsilä Services supports its customers throughout the entire lifecycle of their Wärtsilä products and installations. With nationwide service coverage and an extended worldwide service network of some 11,000 professionals in 160 locations, we support our customers quickly, professionally and with personal attention, wherever they are in the world. This attention to providing the best support possible enhances the reliability of the installation while keeping maintenance costs to a minimum.

The portfolio of services – from rapid delivery of original parts to complete repairs, maintenance and rebuilds – undergoes continuous development. Wärtsilä offers Online Services with technical knowledge, an ordering portal for parts, support for technical questions and insight into guarantee claims. We also offer Wärtsilä's Genius Services to serve customers optimally with digital solutions such as insight into real-time data, analyses and monitoring.

ENERGY SOLUTIONS



Worldwide, Wärtsilä Energy Solutions is the largest supplier of ultra-flexible power plants up to 600 MW running on various gas and fluid fuels. Our portfolio comprises unique solutions for base and peak loads operations, emergency storage and grid-regulating power plants; also for balanced-load periodical and renewable (green) energy.

Furthermore, Wärtsilä Energy Solutions also delivers bespoke solar energy solutions based on photovoltaic applications, suitable for delivery to utilities, along with LNG charging stations and distribution systems. To date, Wärtsilä has delivered power plants to 176 countries around the world with a total power output of 60 GW.



Our expertise

Wärtsilä is subdivided into **marine solutions**, **energy solutions** and **services**, with various products and services in these divisions.

MARINE SOLUTIONS					
Engines	Propulsion	Flow & gas	Environmental solutions	Electrical & automation	Ship design
SERVICES					
4-stroke Engine Services		Propulsion System Services		Environmental Services	Digitalisation
ENERGY SOLUTIONS					

Our extensive product portfolio

BALLAST WATER TREATMENT SYSTEMS

2 differing technologies: filter with UV or EC



COMPRESSORS

High-pressure air and gas compressors and CNG solutions



NAVIGATION, AUTOMATION AND COMMUNICATION SERVICES

From integrated automation systems to various VSAT, SAT TV, entertainment and infotainment systems and more



MOTORS AND GENERATORS

An extremely broad portfolio of engines for both maritime and energy applications



EMISSIONS PURIFICATION

Cleaning exhaust gases in order to reduce NOx and SOx emissions



GAS TREATMENT

Oil separators, gas systems and process solutions - also for LNG



INERT GAS SYSTEMS

To prevent explosions



INTEGRATED SOLUTIONS

Connecting various elements that contribute to the most efficient and cost-effective operational result



PROPULSION PRODUCTS

A broad range of propulsion products, with all of the knowledge and development in-house



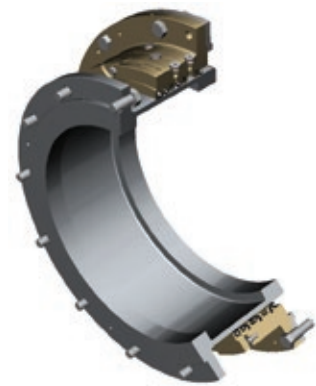
PUMPS AND SHUT-OFF VALVES

Various products for the maritime and offshore industries



PROP SHAFT BEARINGS AND SEALS

Original products for your equipment



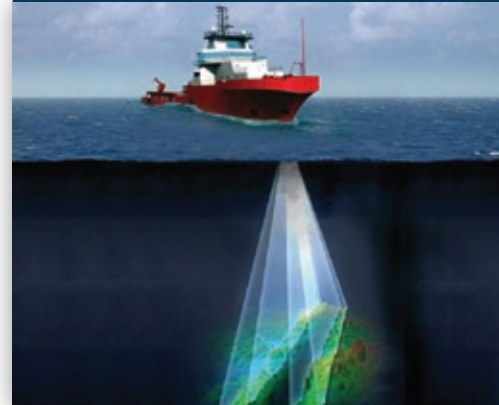
SHIP DESIGN

In addition to the complete propulsion - from engine to propeller - ship design is also part of our core activities.



SONAR & ECHO SYSTEMS

A variety of products for submarines, research & commercial vessels, and for offshore wind farms



WASTEWATER DECONTAMINATION AND WATER MAKERS

Systems for dirty water, oil and bilge; also freshwater makers



Check out our detailed product portfolio of Wärtsilä solutions for the maritime, oil and gas industries in this brochure.

Services & support in a nutshell

ALWAYS READY TO SERVE YOU - WHEREVER, WHENEVER, 24/7

REMOTE MONITORING

- Have contact with a technical expert remotely, from anywhere in the world
- In 61% of the cases, the problem is resolved before an engineer has to go onboard
- 24/7 service: service agreements



REPAIRS TO SHIPS' PROPELLERS

- Both standard and emergency repairs
- Every type of propeller (fixed and adjustable)
- Also for waterjets
- Mobile workplace using a container with specialised equipment



ENGINE SERVICES

- Rebuilds, maintenance and (emergency) repairs
- Two-stroke engines



ONLINE SERVICES

- Technical knowledge at the ready
- Ordering parts online
- Technical questions and answers
- Online guarantee
- Customer support centre



TURBOCHARGER SERVICES

- Turbo rebuild facilities in Schiedam
- Certified specialists



SERVICE AGREEMENTS

- Bespoke and transparent
- Reports and insight
- Various possibilities



RETROFITS AND UPGRADES

- Ballast water
- Bearings and seals
- Propeller design
- Scrubber systems
- Engine upgrade
- Dirty water treatment
- Fuel savings
- Control systems
- Turbo upgrades



FIELD SERVICES

- Rebuilds and resolution of malfunctions on all Wärtsilä products such as engines and propulsion systems
- Analysis and resolution of malfunctions
- Repairs
- In-situ repairs, alignment
- And much more



PUMPS AND SHUT-OFF VALVE SERVICES

- Wärtsilä Hamworthy products
- Wärtsilä Svanehoj products
- Deep well pumps



TRAINING

- Bespoke
- Both onboard and at any desired location or at the Wärtsilä Land & Sea Academy in Drunen
- Wärtsilä SAM Electronics for bridge navigation, communication, etc.



PARTS SERVICES

- For Wärtsilä engines, Wärtsilä SAM Electronics and QuantiParts, as well as engine parts for brands, such as Stork Werkspoor, Deutz, Boies etc.
- New and rebuilt parts. Parts rebuilding too.



PROP SHAFT BEARINGS AND SEALS

- Original products for all prop shafts, waterjets and thrusters



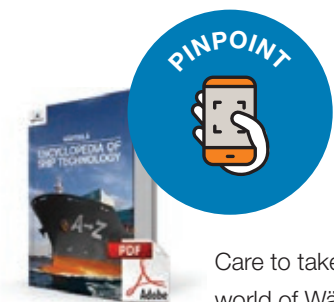
NAVIGATION, AUTOMATION AND COMMUNICATION SERVICES

- Wärtsilä SAM Electronics, Rotterdam
- Nacos Platinum bridge concept
- Integrated automation
- Dynamic Positioning
- Diverse VSAT, SAT TV entertainment and infotainment systems



REBUILDS & MAINTENANCE

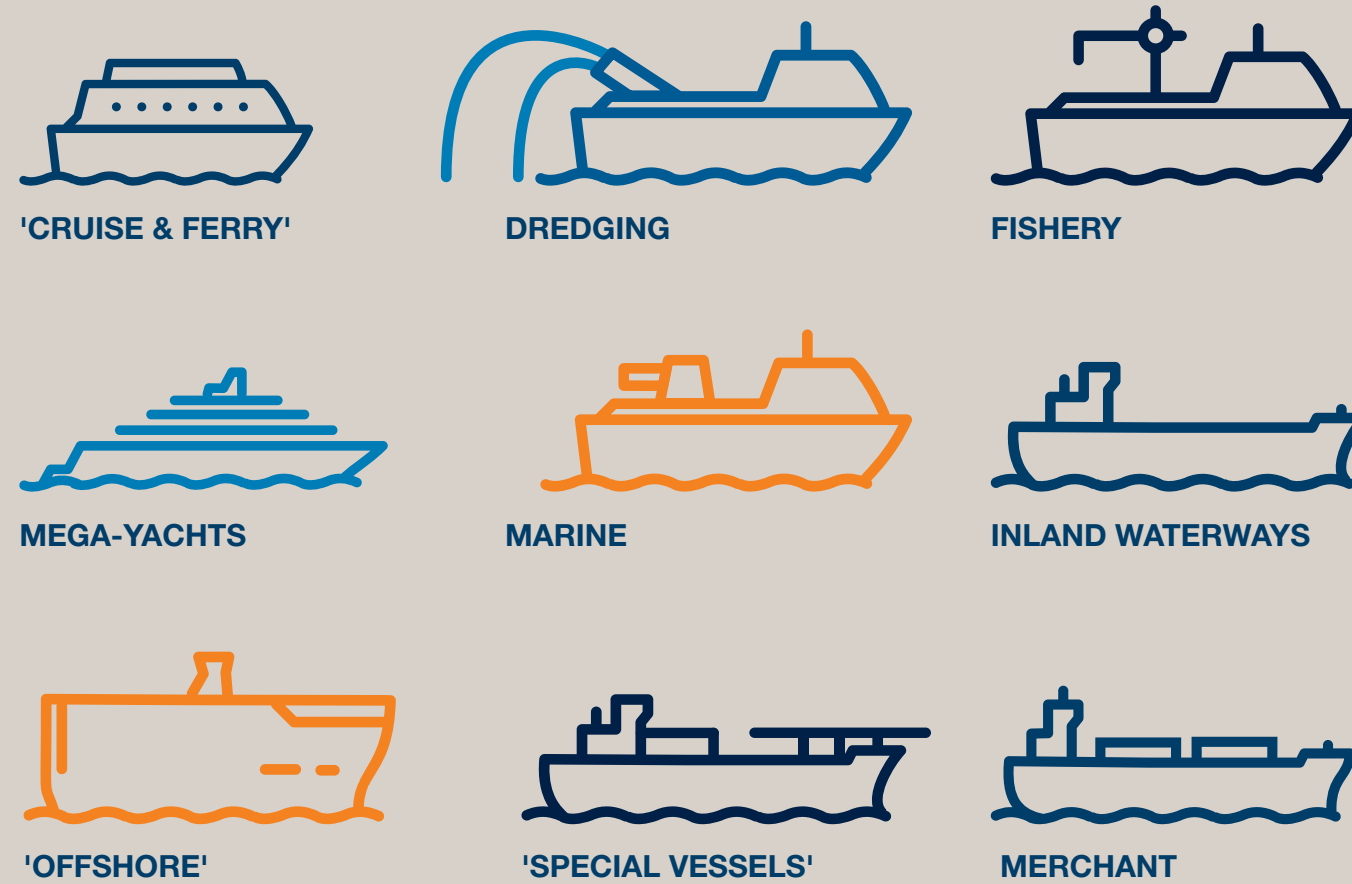
- Wärtsilä Field Services
- Wärtsilä specialist workshops in Schiedam (propeller, bow thruster repairs, honing, turbocharger balancing equipment, etc.)
- QuantiServ: rebuilds for two-stroke engine components, etc.



Care to take a closer look at the world of Wärtsilä? We have a beautiful and extensive online encyclopaedia for what you want to know about Wärtsilä's offering. From A to W (OK, there's a Z in there, too).

WWW.WARTSILA.COM/ENCYCLOPEDIA

The maritime markets we serve



Integrated solutions

We are at the forefront of a new era in shipping. This can be seen in Wärtsilä's unique capability to embed innovation and digitalisation into its customers' solutions. Simply said, it is no longer sufficient to be able to deliver just a particular product or system. The need for optimum efficiency and minimum risk demands that all the individual components cooperate with each other as a fully integrated system to create an harmonious entity. Wärtsilä has the skills, the experience, and an unmatched portfolio of products to create fully integrated solutions that deliver the most efficient and cost-effective operational result.

No single company can match our portfolio of products, systems and solutions. The widely ranging assortment, together with our nearly 200 years of experience and accumulated know-how, enables Wärtsilä to provide the best and most efficient integrated solutions. This 'sole supplier' capability provides the customer with simpler and faster design and procurement processes. Furthermore, it facilitates precise and accurate logistics and reduces scheduling and installation risks for shipyards and owners during project management and implementation.

“We provide 'turnkey' solutions with 100% project management and risk management”

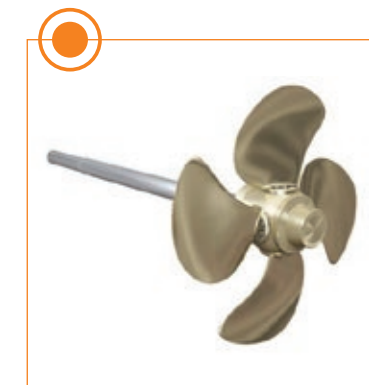


Wärtsilä propulsion solutions - all under one roof

DEVELOPED AT THE WORLDWIDE TECHNOLOGY & SERVICES CENTRE IN DRUNEN



The orange, grey and blue dots below provide a global indication of where the various products are located on a ship. These products, and information about them, is available from Wärtsilä's Schiedam location.



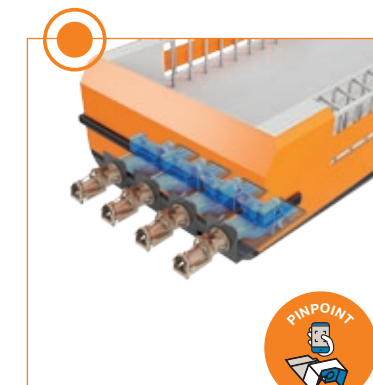
Wärtsilä Controllable Pitch Propeller Systems



Wärtsilä Underwater Mountable Thrusters



Wärtsilä Mid-size Waterjets



Wärtsilä Modular Waterjets



Wärtsilä Energopac



Wärtsilä Steerable Thrusters



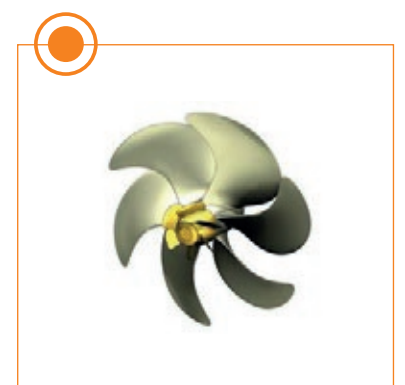
Wärtsilä Built-Up Propellers



Wärtsilä Fixed-Pitch Propeller Systems



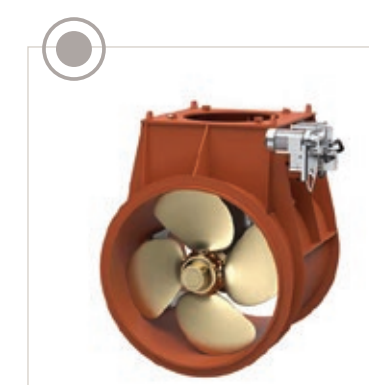
Wärtsilä Coastal and Inland Waterway Propellers



Wärtsilä EnergoProFin



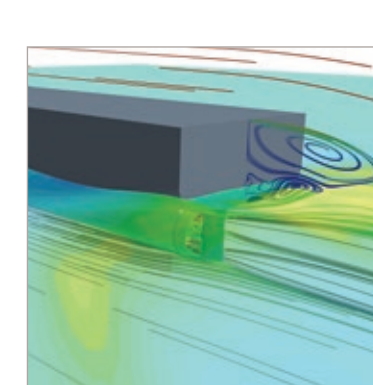
Wärtsilä Retractable Thrusters



Wärtsilä Transverse Thrusters



Wärtsilä Propulsion Control Systems



Computational Fluid Dynamics Calculation



3D Printing

A leading position in technological innovation and digitalisation for marine sector applications



WÄRTSILÄ GENIUS SERVICES

The Wärtsilä Genius Services programme has been introduced with the aim of optimising the performance of our customers' installations through exploiting the opportunities offered by digitalisation. The concept has been set up in such a way that a customer's entire installation is extensively optimised, instead of focusing solely on maintenance issues. Wärtsilä has concluded various maintenance contracts that use Wärtsilä Genius Services, with real-time data and analyses forming the basis of the concept. For all owners and operators, cost efficiency and fully functioning equipment is of paramount importance, since they are directly linked to profitability. The development of Wärtsilä Genius Services emphasises the need to provide profitable operations for our customers in a safe and environmentally sustainable way.

Wärtsilä Genius Services means:

—Motor efficiency monitoring service

With this service, customers can monitor their fuel consumption and change the RPM of their engines according to real-time data. This also goes for dual-fuel engines. This service monitors the efficiency of the engine in a standardised way (ISO-specified fuel and oil consumption).

—Monitoring the condition of propulsion equipment

This service offers the customer real-time recommendations and intermediate reports about the condition of the machinery, along with information for efficient maintenance scheduling.

—Cyber security patching service

This is a subscription-based service offering options for maintaining control throughout the entire lifecycle of a control system. This service delivers updates, repairs and "hot fixes" for applications, systems in use, devices and servers.

—Offline vibration analysis service

This is a service for propulsion equipment and rotating equipment. This specialist service analyses equipment measurements in order to determine their condition and any maintenance requirements. In this manner, defective parts, or problems with alignment and balance are tracked down and resolved before they have the chance to cause considerable damage.

WÄRTSILÄ ONLINE SERVICES

Using the Wärtsilä Online Service, you can keep track of your system and manage the installation for efficient operation by accessing all relevant information at all times, and from anywhere. Wärtsilä Online Services consists of the following components: Technical Knowledge, Online Parts, TechRequest and Online Guarantee.

Technical knowledge

Access to information about your equipment such as bulletins, interactive manuals and FAQs, 24/7. You can easily search for specific technical documentation.

Online Parts

With Online Parts, you can check the availability of parts and their prices, request a quote for spare parts, and track orders and deliveries. Ordering history is archived automatically.

TechRequest

By submitting a TechRequest, you can ask technical questions directly from Wärtsilä Technical Services. This is an efficient and time-saving service, since your questions are automatically sent to the appropriate technical experts enabling a fast and accurate response. The complete history of all technical questions and relevant answers can be seen here.

Online Guarantee

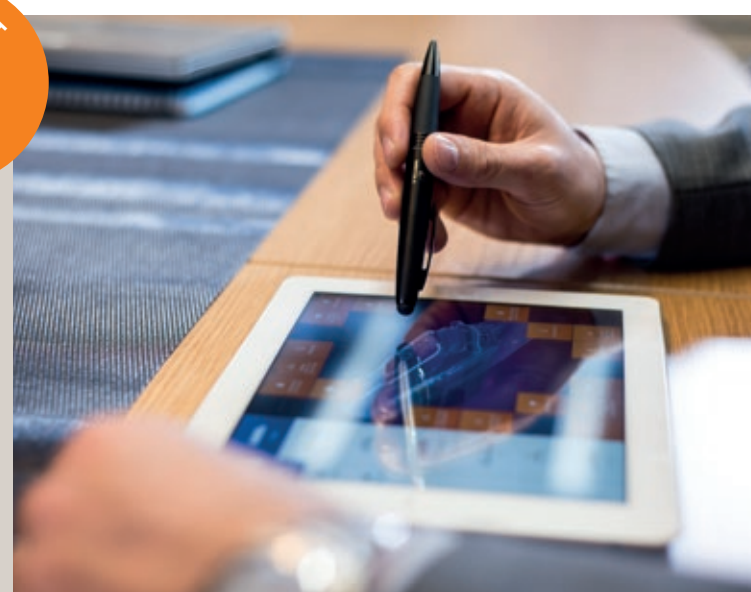
With Online Guarantee Services, you can simply and efficiently see and manage guarantee claims during their handling, such as current status and claim history.

Through our extensive know-how and complete line of propulsion solutions, we are uniquely capable of interpreting data collected from any Wärtsilä propulsion drivetrain. This data can then be transposed into valuable recommendations to ensure the onboard system runs smoothly, and that possible malfunctions are avoided. Wärtsilä Genius Services and Wärtsilä Online Services are examples of our digital offering.

DIGITALISATION AT WÄRTSILÄ SERVICES

Wärtsilä's digitalisation programme aims to speed and simplify maintenance services through the use of the latest technologies, thereby creating added value for our customers. In almost everything we do, digitalisation is an important aspect. This includes not only ways of processing data extracted from our products and installations, but also the way in which we approach

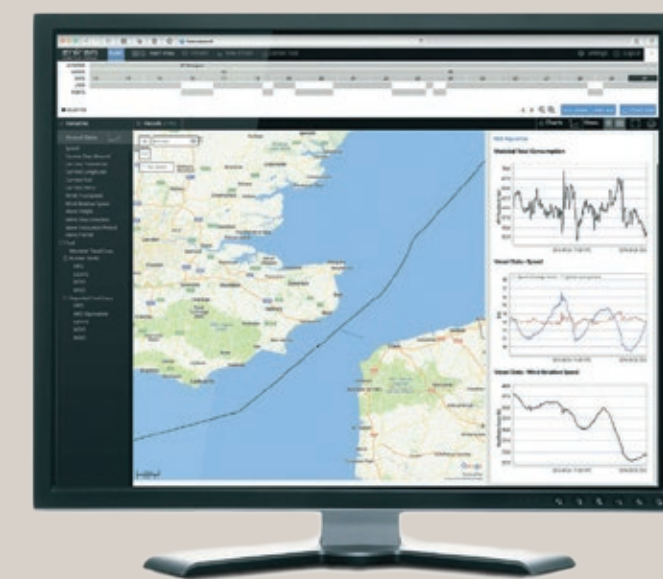
our clients. Wärtsilä is busy setting up a large-scale, digital approach for optimising our work activities and for growing together with our customers. Digitised maintenance services provide significant added value since they allow for better security, more transparency, greater availability, higher efficiency, higher revenues and, ultimately, growth.



Eniram: promoting ship efficiency

Together with our subsidiary Eniram, a Finnish technology company that delivers energy management systems and analysis solutions to the maritime industry, Wärtsilä provides specialist technologies that create greater ship efficiency. These include onboard systems enabling the trim, speed, and engine capacity are deployed in the most efficient way possible.

Eniram's expertise allows us to offer a broad range of services that lessen fuel consumption and reduce exhaust emissions. The offering includes not only individual ship solutions, but also extensive fleet analyses. The acquisition of Eniram has given Wärtsilä a leading position in digital solutions for the marine industry.



Monitoring and direct remote service

ON DEMAND REMOTE SERVICES & MONITORING

Should an issue occur with the onboard machinery (an engine won't start, sputters on gas, temperatures are not correct and such things), then a Wärtsilä technical expert is called. In principle, this expert can be anywhere with his laptop and, after authorisation, he can access the engine's automation system. He can then view the readings, discuss things with the customer and make recommendations. In practice, some 60% of these cases result in no engineer having to be sent to the ship, thus saving the customer time and delay. This is a 24/7 service. And it is part of a service agreement for optimised maintenance or optimised operations.

Furthermore, our condition-monitoring system now has the possibility to make daily notifications if one or more parameters goes beyond the (stringent) tolerances we set. Our technical experts can then zoom in on the data and contact the ship or customer's office, as necessary, if immediate action is required. This allows us to concentrate on issues having to do with engine reliability, but which also affect efficiency. Wärtsilä provides specific services with Condition-Based Maintenance (CBM) for 4-stroke engines, thrusters and reverse gears.

Shipping in the future

WÄRTSILÄ PRESENTS ITS VISION FOR THE FUTURE OF SHIPPING

Wärtsilä's vision of shipping in future years is based on the growing demand for energy and increasingly stringent environmental legislation, and the effect that these will have on the marine industry. Moreover, Wärtsilä closely follows emerging trends such as sharing economies, new business models resulting from the digital era, the enormous growth in storage capabilities for energy and new, affordable forms of "green" energy. These developments present the shipping industry with both challenges and opportunities.

READY FOR TOMORROW'S WORLD

"We accept the challenges arising from current developments. Wärtsilä is "rediscovering" itself at a rapid rate - not only internally, but also in cooperation with our customers and partners, so that they can be assured that new technologies are available and that they comply with new requirements", says Roger Holm, President of Wärtsilä Marine Solutions.

In its publication 'Visions of Future Shipping', Wärtsilä presents various scenarios of the ways in which shipping companies may work in the future. Each scenario is defined under its own project name:

CONVOY

By exploiting advanced control and communication systems among autonomous components, systems and vessels, ships could be operated in convoys. By sailing close together, it is easier for the ships at the rear to maintain the same speed. After all, the suction force of the water acts less on the ships at the rear than it does on those at the front. Sailing at a constant speed provides significant savings in fuel consumption.

In addition, by using autonomous systems, artificial intelligence and improved connection capabilities, fewer crew members are required. Advanced communication technologies will also simplify sharing information, providing time savings, and the optimisation of designating freight to ships.

ZERO – FLOATING DISTRIBUTION ISLANDS

Another scenario might be the creation of artificial islands along the most important sailing routes. These islands could produce emissions free fuels from solar or wind for powering green energy sources. Clean energy is becoming a global priority, and the consequences for the shipping industry will become increasingly noticeable in the near future.

EXERGO – UNLIMITED ENERGY STORAGE

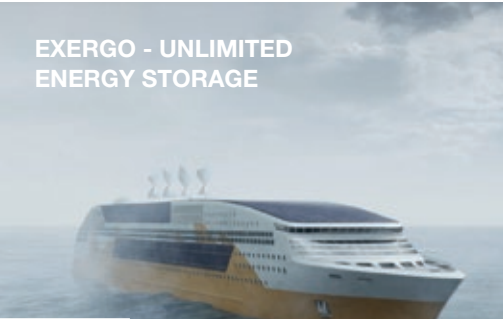
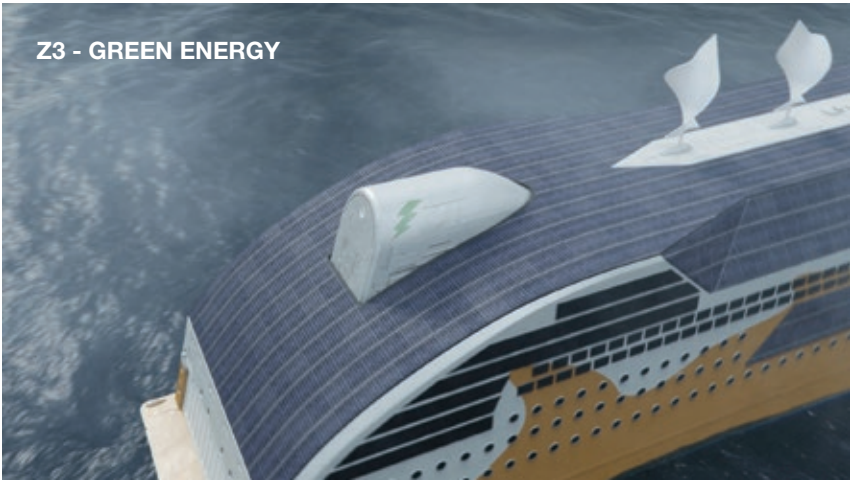
Huge investments are being made in the improvement of energy storage. Wärtsilä believes that battery energy density will increase substantially during the coming years. This will allow ships to operate in sensitive areas silently and with no exhaust emissions.

Z3 – GREEN ENERGY

Wärtsilä can develop a lease program for a zero-emissions power supply onboard ships. An advantage of this is that operators need not invest, while reliability remains guaranteed. Updates can be supplied with improvements in the technology. The operator pays only according to consumption.

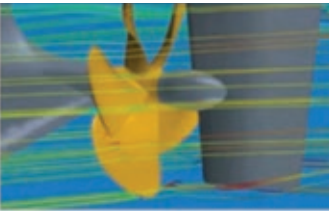
LIITOS – COLLABORATION

For efficient cargo sharing, access to the same information by all global operators would ensure, for example, that no container ship sails cargo free. This sharing of assets could be achieved by use of a digital tool.



Environmentally friendly solutions and products

YOUR REQUIREMENT	OUR RECOMMENDATION	YOUR REQUIREMENT	OUR RECOMMENDATION
Exhaust emissions purification	'Wärtsilä NOx reducer' catalytic converter	Dirty water treatment	Wärtsilä Hamworthy - black water and grey water treatment (both bio and membrane technologies)
Scrubber systems	'Wärtsilä Inline' and 'Hybrid Scrubber System' for SOx reduction	Dirty water treatment	Wärtsilä Scrubber water purification system
Optimised propeller design	Wärtsilä OPTI Design (optimised propulsion yield)	Dirty water treatment	Wärtsilä bilge water cleaner (OWS)
Fuel system with LNG tank and a tank connection system	Wärtsilä LNGPac™	Clean water onboard	Wärtsilä fresh water makers
Fuel flexibility by means of dual-fuel engines	Wärtsilä 20DF, 34DF, 31DF*, 46DF, 50DF	Compliance with Ballast Water regulations	Ballast water treatment systems (UV and EC)
Energy-saving propeller 'cap'	Wärtsilä Energo ProFin	Energy efficiency	Wärtsilä SAM Electronics - as generator / PTO
Integrated propeller and rudder systems	Wärtsilä Energopac	Energy efficiency	Wärtsilä SAM Electronics – as generator / PTO



OPTI design



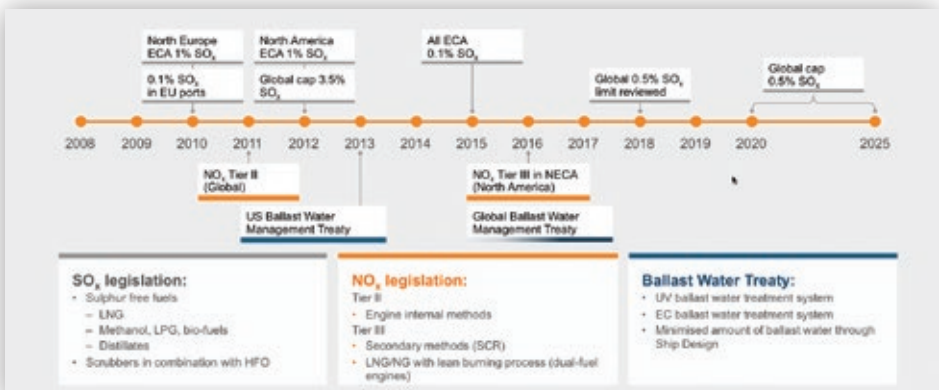
W31 Dual Fuel motor



Energo Profin



Ballast water management system



“ Our solutions comply with global environmental legislation. ”



BALLAST WATER MANAGEMENT SYSTEMS

Our products are developed specifically to have our customers comply with the requirements set by global ballast water regulations.

- 2 differing technologies: a filter with UV or electro-chlorination (EC)
- Certified (type approval) systems that comply with the IMO guidelines and USCG AMS.
- 'Turnkey' solutions: 100% project management and risk management
- Extensive experience and expertise
- A retrofit team, including naval architects, are ready to assist you.

Nearly 200 years of history

When it comes to ships and shipbuilding, the Netherlands has a long and storied history, of course. From 1939 through 2010, the former LIPS company produced ships' propellers. In 2013, the company was sold to Wärtsilä. Today, Wärtsilä operates from multiple locations throughout the Benelux region, each with its own specialisation.



WÄRTSILÄ'S SCHIEDAM PLANT



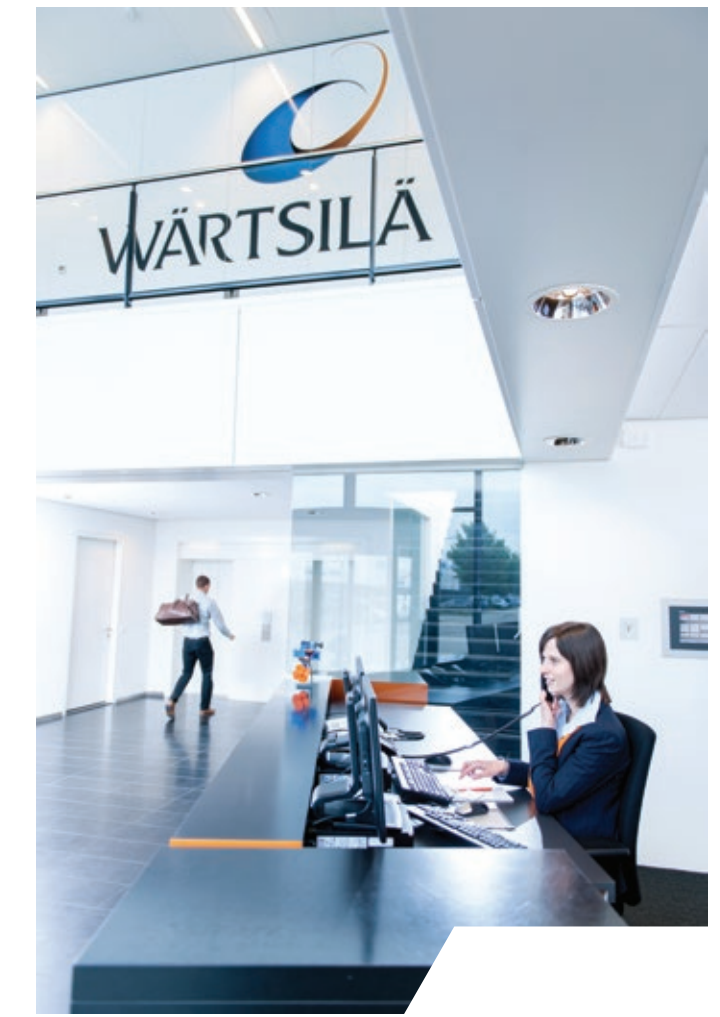
Wärtsilä Benelux office in Schiedam



Wärtsilä today

In addition to Schiedam, there are seven other Wärtsilä locations in the Netherlands.

From here we serve not only Dutch and Belgian customers, but also clients around the world. Our locations in Kruiningen (QuantiServ) and in Harlingen focus primarily on assisting customers to find the optimal answer to their needs for products, offers, maintenance and parts. Rotterdam is the location for Wärtsilä SAM Electronics. Our repair and maintenance operations are located at Rotterdam harbour, close to where they are most needed. The global knowledge centre (Technology & Services Centre) for propulsion is located in Drunen. As is one of the 10 worldwide Land & Sea Academies. Zwolle is the location of the office occupied with energy solutions for Africa and Europe. Our subsidiary company, QuantiParts, is also located in Zwolle and provides spare parts and know-how support for the 'classic' Wärtsilä engine brands. Wärtsilä's highly automated worldwide logistics centre is located in Kampen.



Facts & figures about Wärtsilä in the Benelux region

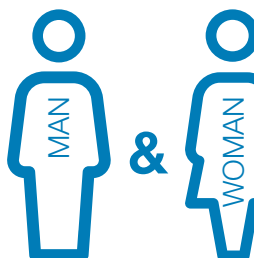
APPROXIMATELY
1000
EMPLOYEES WORK IN
THE NETHERLANDS



23
NATIONALITIES



OF WHOM
85% MAN & **15%** WOMAN



81,8%
SERVICES

16,2%
MARINE SOLUTIONS

0,8%
ENERGY SOLUTIONS

0,9%
SUPPORTING DEPARTMENTS

*Status gegevens per oktober 2016



Focus on LNG and Dual-Fuel propulsion

A COMPLETE PROPULSION SYSTEM THAT BENEFITS INLAND WATERWAY OPERATIONS

97%
LNG

+3%
Diesel

More than
3000
Dual Fuel
engines

>14.000.000
operating
hours

Focus on Dual-Fuel flexibility

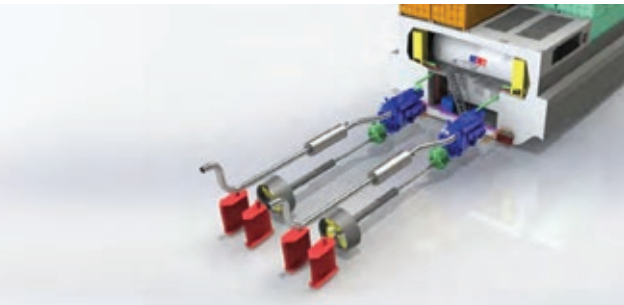
The Wärtsilä W20 DF Dual-Fuel engine is state-of-the-art and can handle both types of fuel. And it does so in an extraordinarily economical way. I.e., LNG is used as the primary fuel (97%) with only 3% diesel as pilot fuel.

A complete propulsion system based on LNG fuel

The system includes the Wärtsilä LNGPac for storing, delivering, and controlling the fuel supply to the engine. The overall propulsion system ensures low fuel consumption and greatly reduced emissions, making it very suitable for inland waterway navigation.

The full propulsion drivetrain

The LNG fuelled propulsion system is a complete package from Wärtsilä. It comprises a 6-cylinder Wärtsilä 20DF main engine, a Masson or Reintjes reverse gear, an LNGPac fuel handling system, a propeller with an HR jet nozzle, and the engineering required for each vessel.



Take a look at our solutions for inland waterway shipping in this brochure.



Wärtsilä Dual-Fuel technology for EU NRMM Stage V inland waterway shipping emission requirements*

*November 2016

“Inland waterway shipping is the cleanest form of transport.”

SERVICE & MAINTENANCE

Service options: fixed costs per operating hour

Wärtsilä offers maintenance packages, some at a fixed low cost per operating hour. With our subsidiary QuantiParts, we have more than 40,000 classic parts in stock.

Broad service coverage

Wärtsilä can monitor the engines remotely. This allows us to track and diagnose the condition of a vessel's engine. The service organisation is set up in such a way as to provide help in the Benelux countries, Germany and Switzerland within 3 hours, supported by the dealer Koedood. The service location in Schiedam is the support hub for the entire inland waterway shipping sector.

As you know, EU rulings have established the new emission-level limits with which the inland shipping sector must comply starting in 2019/2020. These new requirements contain considerable reductions in NOx emissions, methane slip and fine particulates in comparison with the current EU Stage IIIa / CCR 2 requirements. Wärtsilä supports these new requirements from the standpoint of making the inland shipping sector much more environmentally friendly, confirming inland shipping's position as the cleanest form of transport.

Stage	Unit	NOx ⁽¹⁾	PM	CO	THC/ NMHC	PN
CCNR 1: 2003 Diesel only	g/kWh	10,9	0,54	5,0	1,3	–
CCNR 2: 2007 Diesel only	g/kWh	7,9	0,2	3,5	1	–
EPA Tier 4 cat 1/2 Diesel & gas US flag ships	g/kWh	1,8	0,04	5	0,19 (NMHC)	–
EU Stage V: 2020 IWP -c/v-4 P>300kW Diesel & gas	g/kWh	1,8	0,014	3,5	0,19+A (6,19 as THC)	10 ^{A12}
Reduction stage V from CCNR1	%	83	97			
Reduction stage V from CCNR2	%	77	93			

Figure 1: Summary of emissions requirements incl. EU Stage V

Using LNG as fuel delivers proven savings in terms of NOx (80%) and fine particulate emissions (60-70%). This is especially important for local air quality. LNG also yields a significant reduction in CO2 emissions - approximately 25%. Unburned natural gas, or methane slip, is often cited as limiting the environmental advantages of LNG. However, this is now being effectively dealt with (see below).

Wärtsilä has supplied Dual-Fuel (DF) engines for ocean-going vessels since the late 1990s. In 2013, this technology was adapted to the inland waterway shipping sector. The ships "Eiger-Nordwand" (Danser) and the "Sirocco" (Chemgas Barging) have now both been equipped with Wärtsilä 20DF engines. These vessels continue to operate successfully and the experience gained is part of our 'continuous improvement' strategy for dual-fuel engines. The figure below illustrates this development.

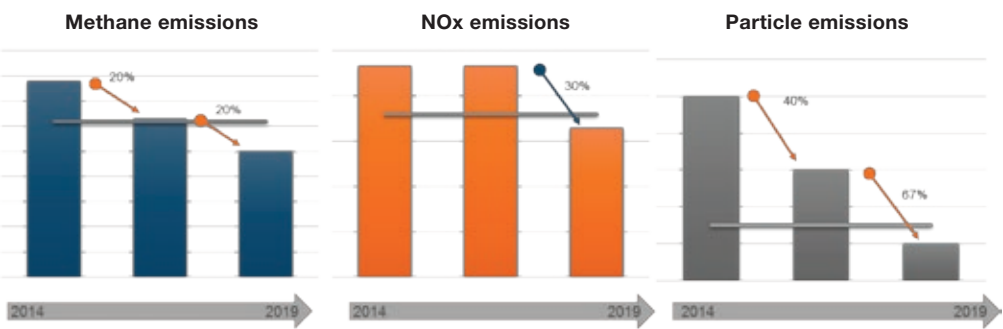


Figure 2: Development of the Wärtsilä 20 Dual-Fuel engine: NRMM Stage V (without after-treatment)

Reduction of methane slip

Recent developments, focused on the reduction of methane slip, have yielded significant results. During testing in our 'Engine Laboratory', the new Stage V limit values for methane slip and fine particulates have already been achieved! This means that Wärtsilä's technology for meeting the new emissions requirements is now both known and feasible. Wärtsilä Dual-Fuel engines can comply with these standards without requiring additional after-treatment. Figure 2 also indicates that further reduction of the emissions - e.g. methane slip < 5 gr/ kWh, (E3 Test Cycle) - is the goal. Emissions of methane slip from larger Wärtsilä Dual-Fuel engines (series 34 and higher) are already well below the Stage V limit.

Thanks in part to these rapid technological Dual-Fuel developments, using LNG as fuel is the most effective path toward a cleaner environment. Not just in terms of air quality, but also concerning the worldwide reduction of CO2 emissions.

Benelux Services



Wärtsilä backs its products and solutions with full service support. Whether the need is for repairs, maintenance or spare parts, we are ready to serve you quickly and efficiently. This support applies to our full offering, including engines, propellers, pumps, turbochargers, bridge navigation and all sorts of communication and other equipment. This applies to both Wärtsilä products and to the classic engine brands.

The Schiedam service facility is fully equipped to provide expert service and maintenance of your equipment. We have our own quay at Rotterdam harbour where ships of up to 200 m length and 8 m draft can berth. We take care of planned maintenance and rebuilds, and we also remedy urgent malfunctions.

We coordinate service activities for the Benelux region from this location: from recommendations to quotes and from contracting to scheduling. At Havenstraat 21 (harbour number 519), we have three specialised workplaces.

- Engine components: we repair, rebuild and recondition engines, fuel pumps and loading pumps and components. Also: alignment, welding and finishing
- Propulsion systems: prop shafts, propellers, seals and bearings
- Metallurgical repairs: repair and adaptation of propellers and other equipment made of steel, bronze CuNial and other alloys.

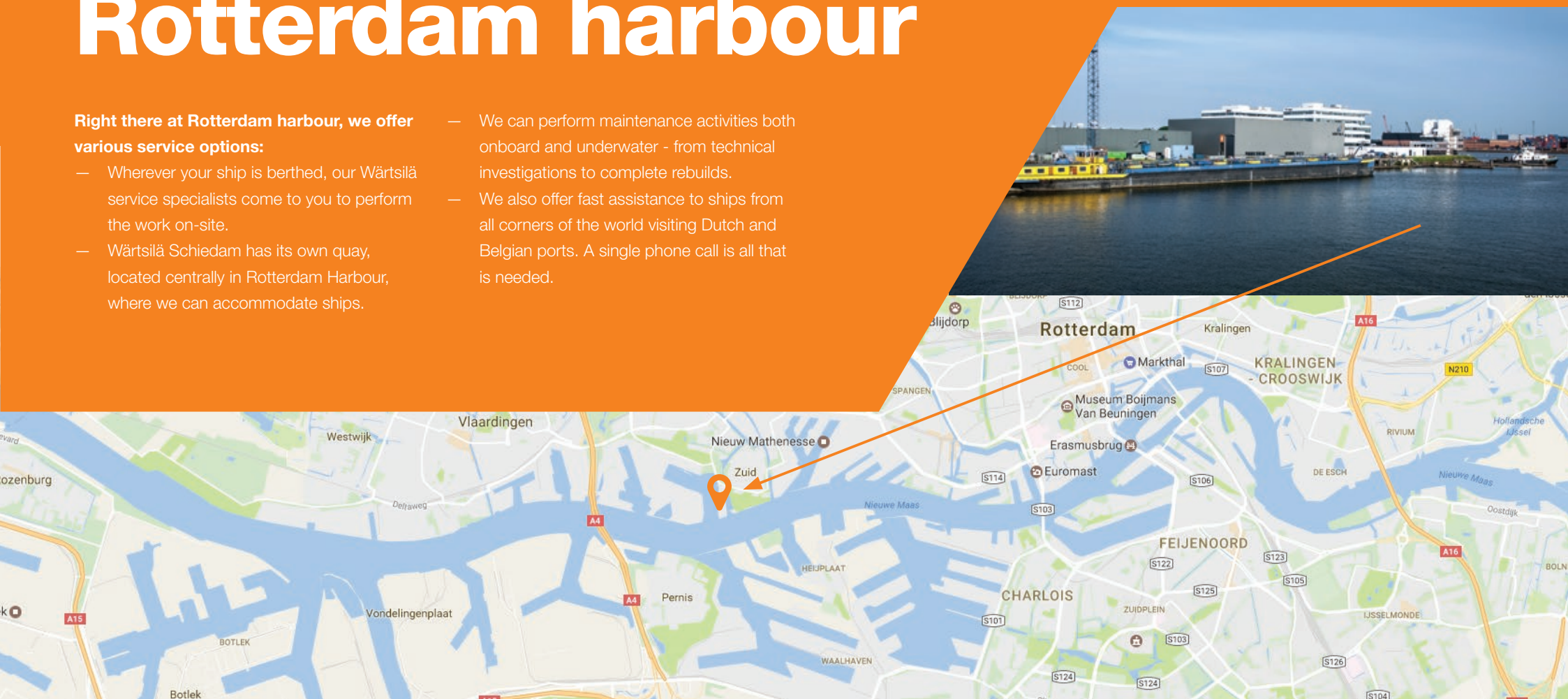
We also have workplaces in Harlingen and Kruiningen for all component-processing: from cylinders to pumps and from turbochargers to air coolers.

Our mobile service technicians can be deployed throughout the region, either onboard ship, at the yard, and they can even sail along with the ship if necessary in order to lose as little time as possible. We are standing by 24/7. In total, we provide service for more than 94 different types and models of Wärtsilä equipment. Both 2-stroke and 4-stroke engines, and regardless of the fuel used. We have the knowledge in-house and the parts in stock to handle your needs. For propeller repairs, we have a mobile workplace with specialist tools. We act fast to keep you operating.

Right there at Rotterdam harbour

Right there at Rotterdam harbour, we offer various service options:

- Wherever your ship is berthed, our Wärtsilä service specialists come to you to perform the work on-site.
- Wärtsilä Schiedam has its own quay, located centrally in Rotterdam Harbour, where we can accommodate ships.
- We can perform maintenance activities both onboard and underwater - from technical investigations to complete rebuilds.
- We also offer fast assistance to ships from all corners of the world visiting Dutch and Belgian ports. A single phone call is all that is needed.



Service on location

(Field Services)

Wherever our customers are, that's where Wärtsilä is. You can find us on every continent and in 70 countries. So we're always on-site rapidly for emergency repairs or parts. We have 4500 specially-trained specialists who know how to get things done. They can make a diagnosis quickly on site and, possibly with the support of a local workshop, implement a workable solution. If necessary and feasible, they can sail with the ship to the next port to save downtime.

The possibilities for service on location are extensive.

The activities performed most often are:

- Rebuilds of engines, parts and pumps
- Analysing and resolving malfunctions
- Repairs at the nearest workshop
- In-situ repairs, alignment
- Inspection of mechanical, electrical and automated installations
- Measuring and analysing installations
- Upgrades and retrofits

Service agreements and performance guarantees

With bespoke service agreements, you as a customer can yourself determine what your organisation requires. For example, there are technical management agreements with regular inspections, monthly reports and exchange programmes for spare parts. But entire operational and/or management and maintenance services are also among the possibilities. As are performance guarantees for installations.

So you never pay too much. You also know beforehand what you're facing. We agree to fixed prices beforehand for inspections, technical support, maintenance, parts and training.

'OPTIMISED MAINTENANCE'

- Minimising unplanned maintenance and malfunctions through monitoring, among other means.
 - Adjusting and optimising operational decisions based on the actual condition of your Wärtsilä equipment.
 - Identification of malfunctions before these lead to a stoppage.
 - Extending maintenance intervals that have been approved by classification bureaus.
 - Safety and reliability are increased
 - More insight into maintenance costs
 - Delivery and availability of original parts
- Everywhere, no matter where 18-months guarantee on parts and 6-months guarantee or more on service

PREDICT

- Exporting and recording all important parameters on the engines and propulsion systems (PCMS)
- Dynamic maintenance planning™

OPTIMISED MAINTENANCE + 'OPTIMISED OPERATIONS'

- Optimising energy efficiency for ships
- Recommendations based on "real-time" monitoring
- Predicting the performance of equipment and thereby limiting risks
- Maintenance based on efficiency
- "Performance improvement plan"
- Ship Energy Efficiency Management Plan (SEEMP) according to the MARPOL regulations

PREDICT

- Exporting and recording all important parameters on the engines and propulsion systems (PCMS)
- Dynamic maintenance planning™

OPTIMISE

- Recommendations and optimisation of propulsion-system maintenance based on monitoring
- Recommendations and optimisation of engine maintenance based on monitoring

SOLVE

- Online service and remote technical support

OPTIMISED MAINTENANCE & OPTIMISED OPERATIONS + 'GUARANTEED ASSET PERFORMANCE'

- Guarantee of the availability of the Wärtsilä equipment on board
- 100% project management and risk management
- Operational cost savings

PREDICT

- Exporting and recording all important parameters on the engines and propulsion systems (PCMS)
- Dynamic maintenance planning™

OPTIMISE

- Recommendations and optimisation of propulsion-system maintenance based on monitoring
- Recommendations and optimisation of engine maintenance based on monitoring

SOLVE

- Online service and remote technical support

Parts for classic brands

We continue providing service for our products, even if they are no longer in production. This includes engines, propellers, shafts, pumps, hydraulic equipment and more.

We are available to serve you at any time from both Wärtsilä and QuantiParts, 24/7. Take advantage of our technological expertise, skilled recommendations, and our full array of services including maintenance, repairs and rebuilds.

CLASSIC ENGINE BRANDS – QUANTIPARTS



SEALS AND BEARINGS – WÄRTSILÄ



PUMPS AND VALVES – WÄRTSILÄ



BRIDGE NAVIGATION, COMMUNICATION AND ENTERTAINMENT – WÄRTSILÄ



Ship propeller repairs

'Wärtsilä Propulsion' offers specialised services and extensive repairs for fixed and adjustable propellers. Our team performs both standard and emergency repairs to propellers and thrusters. This goes for all kinds of propellers, also for water jets. Wärtsilä engineers and specialists are certified in a broad range of materials, approved by classification bureaus. We have experience dealing with everything made of stainless steel and nickel, aluminium bronze, bronze and duplex manganese.

Polishing propellers or thrusters, combined with repairs to damage at the edges, considerably improves a propeller's operational efficiency - generally from 2-5%.

Metallurgical repairs wherever you need us

Special tools and equipment are required for metallurgical repairs. This is why Wärtsilä uses 20-foot storage containers placed at strategic locations around the world. With these, we can ensure that we can distribute equipment quickly and efficiently to the location where your repair must be made. In Schiedam, we also have a specialist workshop for metallurgical repairs. A specialised team is standing by for you.



“The payback time for your repair can be between one and three months.”



Wärtsilä's workshops in Schiedam

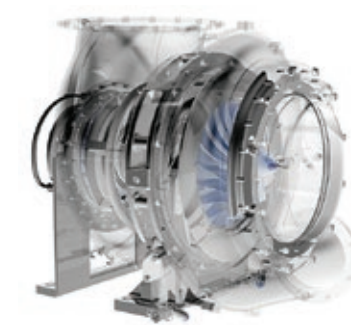


Turbocharger Services

In order to save fuel, turbocharger maintenance is extremely important. As both a manufacturer and a service provider, we are uniquely capable of ensuring that the turbocharger and engine are properly balanced.

Our engine and turbocharger specialists ensure that your engines and turbochargers are maintained in accordance with the highest quality requirements. Furthermore, we keep you up-to-date about the most recent changes and updates that guarantee the greatest yield.

Maintenance procedures, both onboard (disassembly and assembly) and in our turbocharger rebuild workshop (cleaning and balancing), is carried out efficiently and with the best possible cost/quality ratio. The combination of in-house expertise and a worldwide service network, plus warranty support, enables Wärtsilä to deliver the best possible turbocharger support.



TRAINING



Training

Good maintenance starts with the people who work with the engines every day. To train and instruct your crew (as well as the maintenance technicians in your own technical service, for example), you can count on the Wärtsilä Land and Sea Academy. With 10 specialised training centres around the world, we can always provide you with bespoke training. Wherever and whenever it suits you.

Drunen is the location of one of Wärtsilä's 10 Land and Sea Academies. Training and instruction are provided here on the maintenance and operation of engines, propulsion systems, electrical systems and control systems. The 1200 m2 building has all of the facilities: modern training rooms with accessories and equipment, testing rooms and simulators. Training sessions can be bespoke: both in terms of content and in terms of where and how the training can be done - e.g., onboard or at another location you desire.

An indication of our training offering:

- Adjustable propellers (including control system)
- Gearboxes
- Seals, bearings and prop shaft housings
- Steerable thrusters (including control system)
- Transverse thrusters (including control system)
- Water jets (including control system)
- Propulsion Control System retrofit
- Propulsion training for shipyard employees
- Dual-Fuel engines
- Engine operation UNIC C2/C3
- Electro-technical & Automation
- Propulsion Condition Monitoring
- Service (PCMS)



WÄRTSILÄ LAND & SEA ACADEMY IN DRUNEN

Engine services

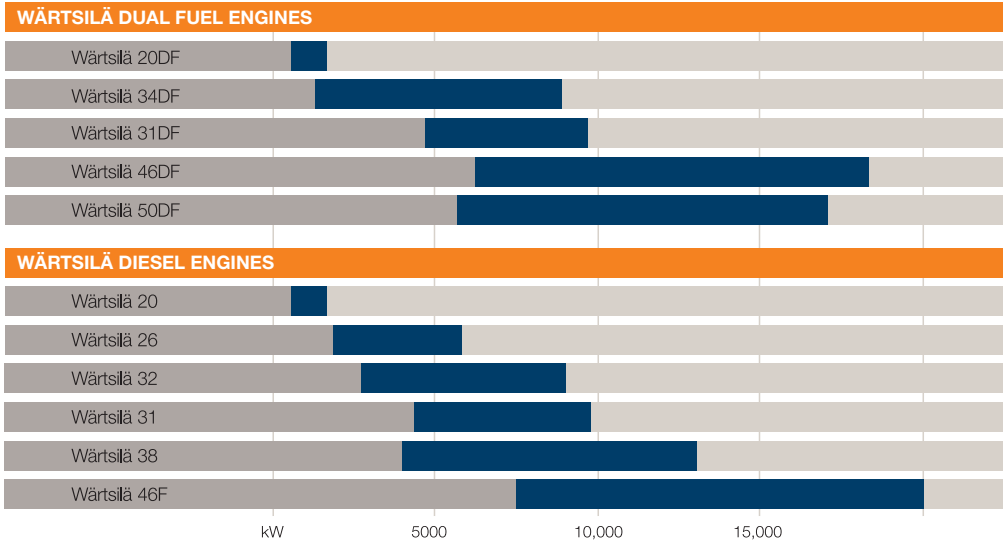
Wärtsilä is one of the largest manufacturers of ships' engines in the world. We are known for our years of knowledge and experience with marine engines, both 2- and 4-stroke.

Our advanced technologies are based on years of experience, and we have been a leader in the development of dual-fuel engines enabling LNG to become a viable marine fuel. We are skilled at modifying engines to achieve greater efficiency, thereby saving fuel and, consequently, reducing harmful exhaust emissions. We are fully acquainted with, and able to keep you informed on, the latest developments, updates and possible focal points that must be kept in mind when performing repairs, rebuilds or maintenance of ships' engines. Wärtsilä Online Services is also available to keep you up-to-date, as well as providing information on the availability of spare parts. Our engine service specialists are fully trained and experienced to provide high quality service.

Gas and dual-fuel engines

Wärtsilä invests heavily in the development of new engines. The focus is primarily on clean-burning gas and dual-fuel engines. Ships operating in gas mode can operate without restrictions in SECA's (sulphur emission control areas).

Furthermore, dual-fuel engines offer ship owners a high degree of flexibility in their choice of fuels. Depending on the sailing area and the price of fuel, you can choose the most inexpensive fuel. For propulsion using LNG or a combination of LNG and diesel, Wärtsilä offers a complete solution for the propulsion drivetrain. For each vessel, this consists of the main engine, the reverse gear, the LNGPac fuel system, the propeller and an HR jet nozzle.



Wärtsilä W31 engine

With the W31, Wärtsilä has launched the first of a new generation of medium-speed engines. The fuel efficiency is such that Guinness World Records recognised the W31 as being 'the world's most efficient 4-stroke diesel engine'. With low fuel consumption and better environmental performance, the W31 is an excellent choice for a variety of vessels requiring a main engine with a power output of 4.2 to 9.8 MW.

Pumps and shut-off valves

We offer a wide range of pumps and shut-off valves.

A selection:

- Deep well cargo pumps
- Deep well gas pumps
- Deep well balanced pumps
- Centrifugal pumps
- Sea water pumps
- Fire extinguishing pumps
- Fuel pumps
- Ball valves
- Butterfly valves
- Port valves

Propeller shaft bearings and seals

Wärtsilä supplies complete seals, bearings and gaskets.

Opt for security and reliability. Also for the environment - for this is how you prevent leaks.

We have all OEM bearings and seals for the following brands of prop shafts, water jets and thrusters:

- John Crane - Lips
- Japan Marine Technologies
- Cedervall
- DSS
- Lips
- JMT

Bridge navigation, communication and entertainment

WÄRTSILÄ SAM ELECTRONICS

Navigation has to work at all times and communication must be seamless - both onboard and with the outside world. Wärtsilä SAM Electronics Nederland can supply and install all equipment, software, controls, connections and wiring. A unique product/service combination is the fully-integrated bridge, which combines various products, including:

- Radar
- ECDIS
- Autopilot
- Depth sounder
- VDR
- AIS
- Dynamic Positioning
- Alarm and Monitoring

We provide a single point of contact for all these systems, which are developed in-house. With flexibility, solutions tailored to your exact needs and excellent performance, they represent the best choice available.

Dynamic Positioning

Dynamic Positioning is vital to certain ship operations, such as on working vessels, crane and installation ships that are active on the open sea. Precise positioning based on satellite data is today a standard requirement.

Entertainment & Infotainment

For relaxation and entertainment onboard, Wärtsilä SAM Electronics Nederland has various systems for television, internet, e-mail and video (on-demand). These systems increase passenger enjoyment and crew comfort. We supply complete systems, just as extensive as the client wishes.

We supply satellite receivers (VSAT) for internet, e-mail and telephony on board. We don't produce these ourselves, but purchase them from leading manufactures.

- KVH
- Cobham
- Intellian



WÄRTSILÄ SAM ELECTRONICS, ROTTERDAM



Integrated bridge concept: NACOS Platinum

The fifth generation of NACOS Platinum represents a fully integrated, ethernet based, bridge concept. This provides seamless connections, more rapid data availability and prevents malfunctions.

Furthermore, all information can be presented on all workstations. This combined functionality can then be viewed on a single screen.

Every bridge is bespoke work. This applies to the equipment selected, its location, the dimensions and the type of console. Design and engineering are carried out in consultation with the ship's owner and the shipyard.



Schiedam/Rotterdam Harbour area, Wärtsilä indicated in orange

Your advantage, our power

OPERATIONAL RELIABILITY THROUGHOUT THE
ENTIRE LIFECYCLE OF YOUR WÄRTSILÄ EQUIPMENT

INNOVATIVE SOLUTIONS

- LNG technology
- Environmentally friendly solutions and products
- Own digitalisation developments in the maritime sector

For new vessels (Life Cycle Solutions) and existing vessels (Mid Life Cycle Upgrades)

DIGITALISATION AND MONITORING OF YOUR WÄRTSILÄ EQUIPMENT

- Eniram: Ship efficiency**
Engine efficiency monitoring service, monitoring of the condition of your propulsion equipment, cyber security patching service, offline vibration analysis service, online services, customer support.
- Wärtsilä Genius Services**
Access to technical knowledge, online parts, TechRequest, online guarantee.
- Online Services**
Access to technical knowledge, online parts, TechRequest, online guarantee.

Monitoring and direct remote service

TOTAL RANGE

Wärtsilä: not just for engines, but for the entire propulsion drivetrain
A single point of contact, 100% project management and risk management The global knowledge centre (Technology & Services Centre) for propulsion is located in Drunen. As is one of the 10 worldwide Land & Sea Academies.

Wärtsilä SAM Electronics
Including bridge navigation, automation, communication and entertainment.

QuantiParts
Service and parts facility for classic engine brands from our QuantiParts subsidiary.

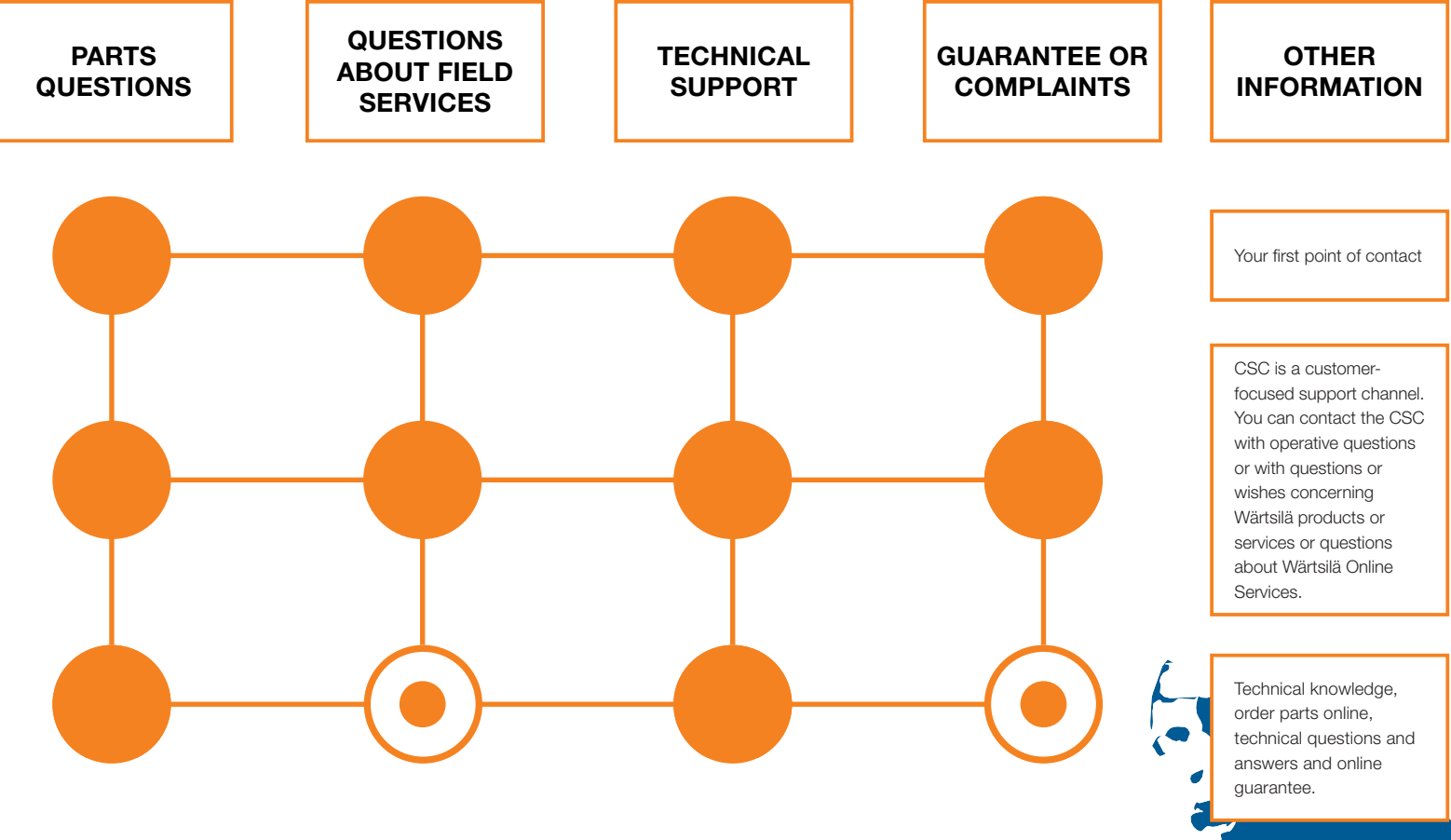
RELIABLE BUSINESS PARTNER

- In-house technical knowledge since 1827.**
- Both a manufacturer and a supplier**
High quality at competitive prices
- Worldwide service network 24/7**
Excellent coverage in the Benelux region
- Service wherever and whenever you want it**
On-demand and via service agreements

Please contact us however you like

GENERAL TELEPHONE NUMBER, 24/7 SERVICE: +31 88 980 2000

- COMPLETE SUPPORT
- PARTIAL SUPPORT



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Call +31 88 980 2000
sales.benelux@wartsila.com
parts.ukandbenelux@wartsila.com

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KRUININGEN, QUANTISERV
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Call +31 187493826
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WWW.SAM-ELECTRONICS.NL

ZWOLLE, QUANTIPARTS
Call +31 88 980 2500
sales@quantiparts.com

WWW.QUANTIPARTS.COM



WWW.WARTSILA.COM/NLD



SERVICE FOR INLAND WATERWAY SHIPPING

- Service response time < 3 hours for inland waterway shipping

(FIELD) SERVICE IN THE BENELUX REGION FROM SCHIEDAM

- A** North Netherlands area < 3 hours' response time
- B** Amsterdam area < 2 hours' response time
- C** Rotterdam area < 1 hour's response time
- D** Antwerp area < 2 hours' response time

TOGETHER WE CAN KEEP THINGS SAFE

Our employees' safety and that of our guests is always paramount.
By following instructions, we can jointly ensure everyone's safety.

The following regulations apply on the Wärtsilä premises to both employees and visitors.
We expect you to read, use and apply these regulations.
So please read the text in this flyer carefully.

Visit to the office

- Upon arrival, you announce yourself at the reception desk in the office building, Havenstraat 21, and register as a visitor.
You will then receive a visitor badge. We request that you wear this visibly.
- Upon departure, you must notify the reception and turn in the badge.
- Should you encounter any unsafe situation, please notify your Wärtsilä contact person.
- We request that you follow the instructions of corporate emergency responders in the event of an emergency. You can recognise these employees by their fluorescent jackets (with BHV on the back).
- Hold the bannisters when using the stairs.
- No bags allowed in the warehouse.
- Don't use the elevator during emergencies.
- **+31 (0)88 - 980 1112 Emergency number**

Delivery and pick-up of goods

- Approved suppliers are familiar with the applicable regulations for loading and unloading goods and equipment. If you are not familiar with these regulations, please announce your arrival at the Wärtsilä office reception area at Havenstraat 21.
- In order to enter the office building, you must first register with reception. This is not necessary if you're only dropping off goods or picking them up. Follow the applicable instructions for loading and unloading goods.
- To pick up and/or deliver goods and/or equipment for the 'Services' workplace, use the one-way street via the Harding office, near entrance #3 on Havenstraat 24.
- To pick up and/or deliver goods and/or equipment for the 'Propulsion' workplace, use entrance #1 on Havenstraat 28.

GENERAL SAFETY REGULATIONS



Smoking is only permitted
in the designated areas



No access to the premises
for children under 16



Emergency number:
+31 (0)88 - 980 1112



The speed limit is 15 km/h



Taking pictures is only
permitted with
Wärtsilä permission



Please dispose waste in
the waste bins



Wear your visitor
badge visibly



Parking in the designated
areas



As a visitor, you are to
be accompanied by a
Wärtsilä employee



Meeting point. Follow the
instructions of the corporate
emergency responder (Dutch:
BHV-er), recognisable by their
fluorescent vest with BHV on
the back

In addition to the general safety regulations, other additional
guidelines also apply when entering the workshop.



Hearing protection is
mandatory in certain
areas



Safety shoes
mandatory



Safety goggles
mandatory



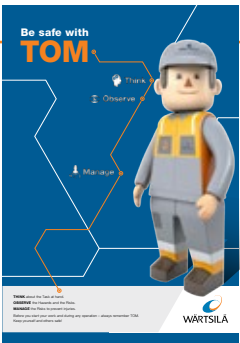
Safety vest
mandatory



Do you have a pacemaker? Notify
your Wärtsilä contact of this
before entering the workshop
- this, because of machines
operating at 380 volt



AEO (Authorised
Economic Operator) area.
Strict regulations for
international trading apply
accordingly



Be safe with TOM

Think
Observe
Manage

Wilhelminahaven

Own 200 m-long quay

Havenstraat 24
Entrance 3

