



Doosan Engine

# ***DOOSAN*** *Premium Engines*



Doosan Engine

## Introduction



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# Industry Leader

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## No. 1 Engine in the World

*The diesel engines built by Doosan Engine are the hearts that beat inside countless large vessels that traverse the seven seas.*

We have advanced in step with the evolution of diesel engines, taking the lead in next-generation, electronically controlled models. Today, our product quality is second to none, and we are committed, through constant change and innovation, to being the “No. 1 Engine Maker in the World” in the 21st century.



CEO's Message



# Industry Leader

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## No. 1 Engine in the World

### *Doosan Engine: Pillar of Korean Shipbuilding.*

Doosan Engine has specialized in building very large diesel engines for more than thirty years, playing a key role in Korea's emergence as the world's leading shipbuilding nation. Our business lines include low and medium speed marine engines, diesel power plant construction and maintenance, as well as engine parts supply and after-sales services, and our operations are now world-class in every respect. The technology and know-how that we have acquired over the past three decades allowed us to reach the 80 million-bhp milestone in aggregate production faster than any other marine engine maker in history. We continue to achieve industry firsts, including being the earliest to complete the next-generation, electronically controlled marine diesel engine.

### *Doosan Engine is creating the first vibration-controlled engine.*

Doosan Engine's better technology and know-how, topnotch people, as well as the excellent quality assurance and services necessary to deliver the world's best premium engines. By creating the first vibration-controlled engine, Doosan Engine is making a new paradigm in the diesel industry.

### *Doosan Engine is rising as a global leader and the "No. 1 Engine Maker in the World."*

The 21st century is ushering in a borderless global society and is being called the "age of the seas." Engines built by Doosan Engine are already powering many of the vessels plying the world's oceans, but we are not complacently satisfied with our success to date. We aim to rank "No. 1 in the World" for both engine quality and global market share. I can assure you that we will continue to make the changes and innovations necessary to supply you with the very best engines at the time you need them. We also remain dedicated to providing you with after-sales services that are unmatched anywhere else.

*Kim Dong-chul, CEO  
Doosan Engine Co., Ltd.*



Company History



# Industry Leader

## No. 1 Engine in the World

*We are rising fast as the leader of the global diesel engine industry!*

Technology and quality have powered Doosan Engine's advance toward global engine industry leadership.



**1983**  
Aug. Diesel engine business begun.

**1984**  
Oct. First engine (6L60MC, 9,173 kW) completed.

**1994**  
Apr. Chinese joint venture (DHD) established.

**1999**  
Dec. HSD Engine established.



**2000**  
Mar. Technology R&D center established.

**2002**  
Mar. Integrated assembly shop completed.

**2003**  
Mar. Diesel power plant completed in Eritrea.  
Nov. Grand Prize in Traditional Industries category won at Korea e-Business Awards.

**2004**  
Oct. World's largest-capacity electronically controlled engine (12K98ME-C, 12RT-flex96C) completed.

**2005**  
Jan. New corporate vision (No.1 Engine in the World) announced.  
Mar. Company renamed Doosan Engine Co., Ltd.  
Apr. Worker health & safety management system certified (KOSHA 18001, OHSAS 18001).  
Jun. Technology Center completed.  
Nov. World's largest electronically controlled marine diesel (14RT-flex96C) commissioned.

**2006**  
Nov. Subsidiary Doosan Marine Industry (DMI) completed at Dalian, China



**2007**  
May. Presidential Commendation received in Superior Parent Company category for "Single PPM" quality innovation campaign.  
Jun. Assembly Shop No. 3 completed.  
Jun. Environment management system ISO 14001 certified.  
Sep. Gold medal received in National Quality Circle Competition in Six Sigma category for 3rd straight year.

**2008**  
Sep. Assembly Shop No. 4 and medium speed engine factory completed.  
Nov. Fair trade production agreement signed with subcontractors.

**2009**  
Feb. Doosan Engine selected as a "Model Company of Fair Trade with Subcontractors."  
Oct. GHG inventory verified to comply with world standard.

**2010**  
Jan. Medium speed engine factory reaches 1M kW in aggregate production.  
May. Unique eco-friendlier, vibration-controlled engine completed.

**2011**  
Jan. Successful Listing on the Korea Exchange.  
Apr. Presidential Commendation received in Growing Together Best company.

**2012**  
Jan. Aggregate production reaches 80M bhp in world-record time.





DOOSAN

Doosan Engine

# Premium Engines

# Premium Engines

Our development of premium engines is creating a new paradigm in the diesel engine industry.

Doosan Engine has earned the loyalty and respect of numerous customers by providing exceptional performance and quality, made possible by technology acquired over many years as well as by very strict production processes and quality standards. Our dedicated people applied excellent proprietary technology and rigorous quality control to create the industry's first vibration-controlled engine.





# What the Premium Engine is...

## Vibration-controlled Engine

Doosan Engine has applied in-house vibration analysis and optimized engineering design to reduce engine vibration greatly, resulting in a premium model.

## Low Maintenance Cost

We use top quality parts from government-certified suppliers and adhere to strict quality control during assembly to improve parts durability and reduce their failure rate. As a result, the cost of engine maintenance is lowered.

## Exceptional Services

Doosan Engine operates a worldwide service network to deliver the services that customers need anywhere and anytime. Moreover, the NICE (for “Necessary Information for Customers Expectation”) service system provides customers with maintenance pre-notices and technical information throughout the lifetime of the engine, even after warranty expiration.



# Premium Engines

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*We combined know-how acquired over years with an intensive technology development effort to complete a unique premium engine that generates less vibration than conventional models.*

## Our Patented Technology

We apply unique know-how related to research, engineering design, and production as well as original technologies to build engines of premium quality and performance.

## Outstanding Technological Expertise

Doosan Engine has acquired core technologies and know-how in the process of building large diesel engines for more than 30 years. This expertise has been systematically organized and mapped out. In addition cutting-edge analysis and precision measurement methods have been applied in R&D activities, enabling Doosan Engine to now boasts some of the world's very best diesel engine technologies.

## Cultivation of Technology Experts

Our DODAL (for "Designer Oriented Design Ability Level-up") program and R&D school offer specialized training opportunities, while the Genom Technology Expert program certifies specialists. These programs enable us to cultivate experts in specific core technologies related to marine engines. Our ongoing investment into human resources and constant training efforts have enabled Doosan Engine to acquire some of the world's very best engineers in the field.



# Vibration-controlled

## Vibration-controlled Design Technology

Our inspections are conducted by analyzing the forces that affect the overall vibration of the engine design, including the vibromotive force, natural frequency characteristics, lubrication, explosive forces, and fluid pulsation.

## Optimized Design

We use the results of overall vibration analysis to create the optimal designs and stop excessive vibration at the source.

## Excess Vibration Inspection

Measuring the vibration generated while the engine is in operation enables us to adhere strictly to the permissible standards.

(Permissible Vibration Levels: 50mm/s; Doosan standard: 25mm/s)



Permissible  
Vibration Levels  
50mm/s

Doosan  
standard  
25mm/s



# Premium Engines

*Doosan Engine has creatively applied technology to build an environment-friendlier vibration-controlled engine that has set a new standard for the industry.*

## Eco-friendly

### Engines that Comply with NOx Emission Standards

Specialized technologies are being applied to raise the pressure of the turbocharged air, adjust camshaft timing and optimize fuel injection in order to satisfy the IMO standard, which goes into effect on January 1, 2011.

### Efforts to Mitigate GHG Emission

Thermo-efficiency systems, turbocharger cut-out solutions, and exhaust gas bypass technologies are helping to reduce the volume of CO<sub>2</sub> generation, resulting in environment-friendlier engines.

### Low-emission Technologies

We are helping protect the planet by developing ways lower exhaust emissions through the use of scrubbers, exhaust gas recirculation (EGR), selective catalytic reduction, water-in-fuel detection and other technologies.



# High-tech Diagnostic System

## MEASUTAL (Digital Crankshaft Deflection Gauge)

Measutal measures crankshaft deflection wirelessly and generates crankshaft alignment data automatically, expediting work processes and providing greater reliability. As such our proprietary digital crankshaft deflection gauge has become an indispensable tool when conducting maintenance and repair work.

## B-WACS (Bearing Warning and Control System)

Our proprietary system measures the wear of the three major bearings in real time via non-contact proximity sensors equipped with a high-speed signal processor and 1/100mm accuracy. Our unique design employs signal processing modules for each sensor inside the chambers, resisting noise and ensuring maximum precision.

## O-WACS (Oil Warning and Control System)

O-WACS was developed in-house specifically for use on engines built by Doosan Engine. The system precisely measures the water content in the main lubricant oil, preventing undue bearing wear. The tolerance for error is just 0.02aw (Water Activity).



# Premium Engines

*Doosan Engine crafts premium engines that can minimize customers' maintenance and repair costs.*

## Cost-effective Upkeep Expenses

### **Engines are made with outstanding parts produced by suppliers certified by the Korean government**

The quality of the parts is fundamental to determining the quality of a finished engine. At least 80% of the major parts suppliers for Doosan Engine are certified by the Single PPM Quality program, which is recognized by the Korean government. We accept only the very best parts for the engines we build, and the quality of these parts is certified in advance.

### **Better Quality Assembly for Lower Maintenance Cost**

Our ongoing 3 Zeroes (Zero Defects, Zero ORIs, Zero Claims) quality innovation program and 3C plus activity (Clean Factory, Clean Mind, Clean Engine) enables us to deliver engines of consistently high quality. As a result, shipowners suffer lower unexpected expenses that can result from breakdowns at sea.

### **Reduced Outlays for Parts from Vibration-controlled Engines**

Lower engine vibration extends the lifetime of all instruments, pipes and other equipment. The possibility of parts failure is reduced, which lowers the cost of engine maintenance and repair.

### **State-of-the-art electronic diagnostic system cuts maintenance costs**

Advanced systems such as the proprietary Bearing Warning & Control System and Oil Warning & Control System provided by Doosan Engine minimize unnecessary maintenance work and lessens the costs that such work entails.





# Premium Power

The dynamic power of Doosan-built engines is felt globally!

Doosan Engine is helping Korea to remain a shipbuilding powerhouse. We produce a wide range of low and medium speed marine engines, which are essential for the shipbuilding industry, and we build as well as maintain diesel power plants. Our total annual diesel engine production capacity stands at 14 million bhp, the most of any company.





# 450 | 12,000,000

Annual output capacity for low speed engines: 450 units, 12 million bhp



| DOOSAN-MAN Diesel Engines |

Low speed diesel engines are a mainstay business that commenced production in 1983. Doosan Engine, with technology from MAN Diesel & Turbo and Wartsila has produced two-stroke low speed diesel engines ranging from 7,900~85,000 kW for the main propulsion system of containerships, bulk carriers, VLCCs, ULCCs and other crude oil carriers. The top priority is always to deliver the top quality engines that customers require precisely at the time they are needed. In addition, an optimized production system is in place that can annually build low speed engines with a combined capacity of 12 million bhp.



# Low Speed Diesel Engines

*We are rewriting the history of diesel engines.*

## 14RT-flex96C

The 14RT-flex96C is the world's largest (80,080kW) marine engine ever.

Doosan Engine has also pioneered the production of electronically controlled engines, a next-generation product segment. We built the world's first large ME engine in 2003, and in November 2005 we completed the world's largest marine engine, the 14RT-flex96C. ME engines feature electronically controlled hydraulic activation of the fuel injection valves, reducing fuel consumption as well as noise, vibration and exhaust emissions. As such they are friendlier to the environment than other engine types are.



| DOOSAN-Wartsila Engines |



1,000 | 2,000,000

Annual output capacity for medium speed engines: 1,000 units, 2 million bhp



Doosan Engine started operation in 1983 under a technical license with MAN Diesel & Turbo. Since then, the company has continued to supply a wide range (450-24,000kW) of four-stroke medium speed diesel engines for use as the main or auxiliary engine for passenger ships and special-purpose vessels, for emergency power generators on land and for commercial power plants. Doosan Engine completed a medium speed engine factory with an annual capacity of 1,000 units. It is outfitted with the latest commissioning facilities and includes a crankshaft shop to help ensure stable growth of the medium speed engine business and satisfy diverse customer needs.



# Medium Speed Diesel Engines

*We are responding to diverse customer needs by producing medium speed 4-stroke diesel engines.*

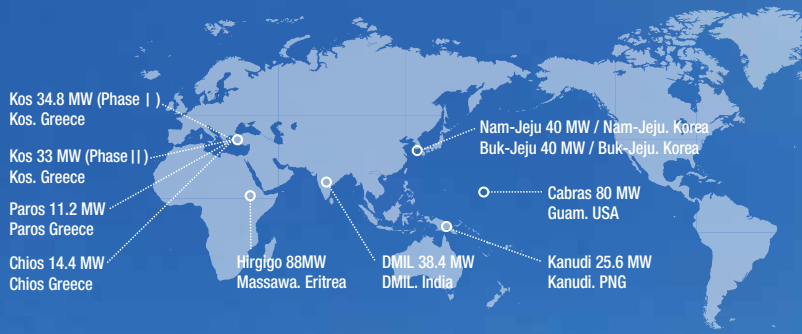
## Four-stroke GenSet, Propulsion Engine

The four-stroke GenSet engine is part of the ship's auxiliary power system, providing onboard electricity rather than propulsion. Doosan Engine produces various models (L32/40, L28/32, L23/30) ranging from 500kW to 4,300kW in output capacity. Meanwhile, the company's four-stroke propulsion engines have been used on passenger ships, various special-purpose ships (drillships, FPSOs) and naval vessels. Available output ranges from 7,300 bhp to 23,900 kW.



ALI SHEHAB  
PROJECT MANAGER

## I Performance Record



100%

100% of the emergency diesel generators for nuclear power plants in Korea.



Doosan Engine has supplied diesel power plants to remote areas and islands (Guam, Greece, Eritrea, Papua New Guinea) that require local power generation. This track record has bolstered our position as a power plant supplier recognized worldwide. In 2005, we delivered the world's first 40MW selective catalytic reduction (SCR) system as part of a diesel power plant built in north Jeju Island. This breakthrough has heightened our stature as a leader in the environment-friendly diesel power plant segment as well. Meanwhile, our proven technological expertise and know-how have enabled us to deliver all the diesel-powered emergency backup systems for nuclear power plants in Korea, starting with those for Units 3 and 4 at the Youngkwang Complex back in 1996.

# Diesel Power Plants

*We provide our customers with environment-friendlier diesel power plants and the maximum energy efficiency.*

## Operation & Maintenance and Technical Service

Our first operation and maintenance (O&M) project for a diesel power plant was in Kanudi, Papua New Guinea. Another project of this type followed for the Cabras diesel power plant on the island of Guam. We provide efficient and systematic supervision of diesel power plant operation and maintenance, and we train O&M technicians for our customers, maximizing the operation rate. Our thorough maintenance of the engine, generator and various auxiliary systems help to prevent unscheduled down time from breakdowns. The reliability of the diesel power plant is raised, while O&M costs are minimized.







# 3 Best

Best Price, Best Delivery, Best Service



Our “3 Bests” policy is a firm commitment to customers. We pursue our parts supply and technical service business by always striving to outdo the competition in price, delivery and services.

## [Unparalleled Service](#)

Replacing parts in time and optimizing engine performance through maintenance are critical to our business. We sell our own parts and can quickly source any other requested items at the best price available. Reliability is integral to the “Best Price” policy; we only supply parts that have passed our strict quality assurance program.



# Parts Supply & Technical Service

*The 3 Bests: Price, Delivery & Service*

*We aim to deliver the best price, best delivery and best services in the industry to ensure full customer satisfaction.*

"Best price" refers to engines built exclusively by Doosan Engine using our in-house quality management system. "Best delivery" is our policy of processing customer requests within one day of receipt and completing delivery by the fastest means available. And "best service" is our commitment to satisfying customers by proving the best quality in the shortest possible time. This "3 Bests" spirit is driving us toward the goal of being the world's very best engine maker. We provide the parts that customers need when they are needed, and our services are designed to prevent problems from ever occurring so that our customers' engines are always performing at their peak.





# Premium Innovation

Ongoing innovation provides the power to lead the world!

Wherever you see we are, you will find forceful strength. We provide the equipment to generate electrical power and we develop the power of innovation. Our company has built the equivalent of 70 million bhp in diesel engine capacity faster than any other in history, and we now have the capacity to build the equivalent of 14 million bhp in engines each year. As such Doosan Engine stands as one of the world's very best diesel engine makers today. Premium operational innovation has been the key to these successes.





# Operational Innovation

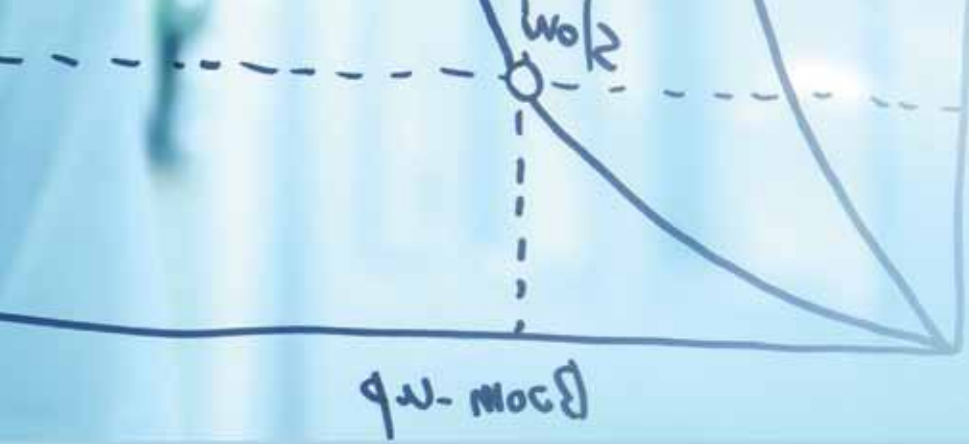
*Our ongoing operational innovation program has paid off handsomely with major gains across the board, productivity, product and service quality, and work process efficiency. At the same time, we are fostering a corporate culture that is very responsive to change.*

## Premium Operational Excellence

Our operational innovation program is in step with an organizational culture that fosters a passion for excellence among our people. All employees participate in projects to improve work methods and operational quality in the interest of maximum customer satisfaction and value generation. Ongoing efforts and innovation activities are conducted with the goal of realizing our "No. 1 Engine in the World" vision. In the process we have created a unique corporate culture that can adapt skillfully in a changing market environment.

## Innovation Activities: Path to Change and Growth

Doosan Engine has, since its establishment, engaged in operational innovation projects, innovation tasks, knowledge management, and worksite improvements. These efforts have created many tangible results, including better customer satisfaction, improved improvement, higher productivity, and greater operational efficiency. Today, we have taken our innovation to the next level, adding special innovations to our procurement, technology and production in order to achieve ever higher operational excellence. In the process they have developed the ability to get things done, come together as a close-knit team and developed a strong, innovation-focused mindset. Innovation activities are also linked to strategic tasks at the corporate level. Selected key problems are resolved through companywide innovation projects, allowing us to respond to a fast-changing



# Doosan Engine

Our premium operational excellence has generated synergy within and among various organizational units, contributing to our development of premium engines.



environment and advance as an industry leader. We have graduated from the initial stages of our corporate development and are now at the stage where we serve as a model in our industry. The results of our innovation activities, both inside and outside the company, have been recognized as Best Practices and are being benchmarked by many other companies.

## Cultivating Experts through Operational Innovation Activities

People are the key to reaching objectives, so cultivating topnotch people is the fastest way for us to innovate our operations. All Doosan Engine employees attend classes on Six Sigma belt development each year, and more than half the workforce holds a Green Belt, Black Belt or Master Black Belt. These people continuously pursue operational innovation activities that put the customers first.

**" No.1 Engine in theWorld "**





# Quality Management

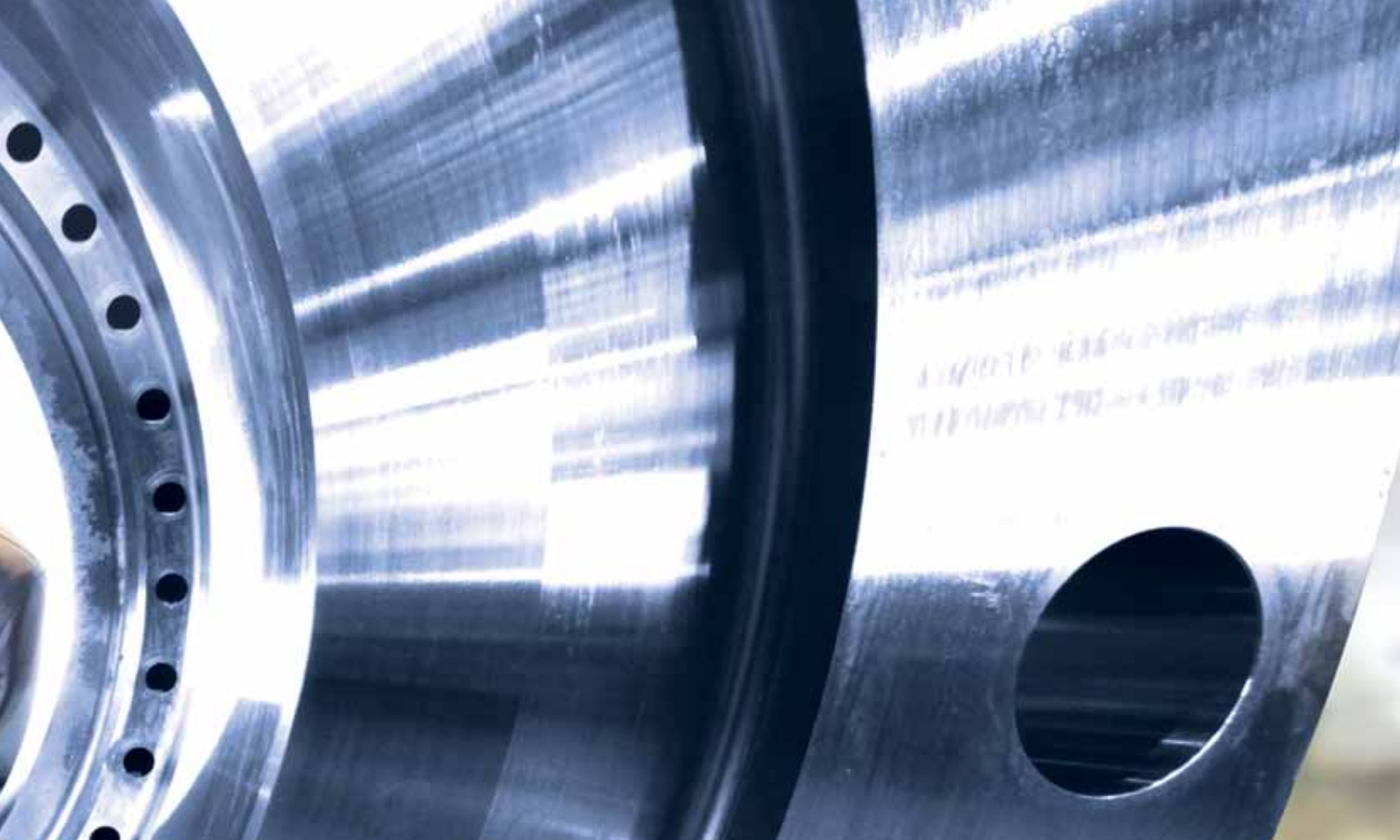
*We leverage the trust our customers have in us to conduct the “3 Zeroes Quality Innovation Campaign” (Zero Defects, Zero ORIs and Zero Claims). This is the cornerstone of our commitment to achieve the best quality in the industry. In the process, we have contributed significantly to Korea’s reputation as a shipbuilding powerhouse.*

## 3 Zero | Zero Defect, Zero ORI, Zero Claim

Doosan Engine has launched the “3 Zeroes Quality Innovation Campaign” to provide a new paradigm and action plan for quality enhancement. The “Zero Defects” aspect is an all-out effort to ensure that all parts are reliable and that suppliers deliver parts of consistently high quality. “Zero Owner Requested Items” (ORIs) describes the goal of meeting all quality requirements during engine fabrication, assembly and commissioning so that the customer has no objections upon delivery. Finally, “Zero Claims” is the ongoing effort to build trust and eliminate the causes of demands for compensation. Action plans are in place for each of these three areas, and feedback is collected to enable constant performance improvement. In addition, we regularly analyze customer feedback and have achieved a 43% preference rating from customers and the top ranking for customer satisfaction. As such our quality is recognized as being the world's best.

## Three Methods for Achieving the Best Quality

Our quality management-centered approach consists of three aspects: producer quality assurance, upgraded preventative maintenance, and quick response via customer-centric quality management. Producer quality assurance refers to system-directed maintenance, a stricter certification program for suppliers to perform in-house inspections, minimal ORIs, quality forums for suppliers, and in-house training on quality issues. Preventative maintenance has been bolstered in numerous ways, too. Top quality is maintained at critical control points, along with impeccable overall cleanliness, strict worker safety, and outstanding delivery. This way, quality is assured when the engine is delivered to the shipyard for installation. Technical guidance is provided on products with frequent defects, on-board



The "3 Zeroes Quality Innovation Campaign" (Zero Defects, Zero ORIs and Zero Claims) is the cornerstone of our commitment to achieve the best quality in the industry. In the process, we have contributed significantly to Korea's reputation as a shipbuilding powerhouse.



engine inspections are performed, and steps are taken to verify that all revisions to the design drawings are implemented. Finally, our quality management system focuses on the customer, responding to requests fast.

### Results of "3 Zeroes" Quality Innovation

Doosan Engine received a Presidential Commendation for its Single PPM program at suppliers. The quality control system is ISO 9001 certified and engines for use at nuclear power plants comply with KEPIC quality assurance stipulations.

## 3 Zero

### Zero Defect

- Flawless parts received
- Parts durability improved
- Design quality upgraded

### Zero ORI

- Produce flawless engines
- Improve shop test quality
- Improve installation quality at shipyard

### Zero Claim

- Preventative system bolstered
- Rapid and accurate services provided
- Lifetime monitoring system implemented





# Warranty Services

*Doosan Engine operates a World Service Network and engages in preventative quality assurance activities.*

**24hr** | 24 Anycall : Company representatives are standing by 24 hours a day, 365 days a year / World Wide Service Network : service is available wherever the customer may be.

The Doosan Engine Customer Service Team's warranty services are designed to maximize customer satisfaction. Branches in Hamburg and Singapore are ready to immediately address problems discovered while the engines are under warranty. The worldwide service network provides customers anywhere with quick access to after-sales services. Their emergency requests are also received anytime day or night, any day of the year, for immediate response. Inventories of key parts are carefully managed to ensure availability for delivery whenever they are needed to replace defects.

## Inspections at Sea for Preventative Maintenance

We are now focused on preventative maintenance services. Under this policy we dispatch our service engineers to ships at sea to inspect the engines while they are in operation. This way they can eliminate problems before they occur. The onboard visits are also an opportunity for our engineers use technology and experience acquired over decades to train crewmembers on engine operation and maintenance.

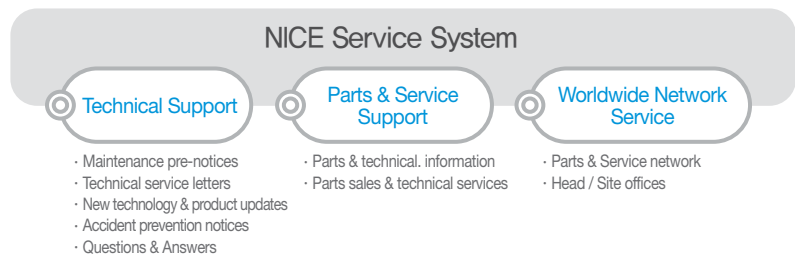


Customer satisfaction demands our ability to respond 24 hours a day, 365 days a year. Doosan Engine's worldwide service network and preventative inspections onboard vessels at sea are part of this firm commitment to customers.



## Communication with Customers via the NICE Service Program

Our NICE program (for “**Necessary Information for Customers Expectation**”) offers in real time data on the services and maintenance that customers need. This generates greater value for customers and enables meticulous maintenance to be carried out throughout the engine lifetime of the engine. NICE efficiently addresses the requirements of customers who use engines built by Doosan Engine. The program also serves as a channel for staying closer to customers and enhancing customer satisfaction.





# R&D

*The Doosan Engine Technical Research Institute is dedicated to developing new technologies regarding diesel engine performance and architecture, “mechatronics” (mechanical/electronics interface), vibration reduction, materials, and tribology. Our team of engineering specialists applies core technologies to add new kinds of value to the engines we produce.*

The first major research area, performance, concerns analysis and measurement methods for optimizing engine combustion and output. We also develop structural analysis and measurement methods for optimizing engine architecture and fatigue analysis methods for assessing the engine’s structural integrity. In the “mechatronics” area, we focus on the development of electronic control system as well as diagnostic systems for engines. Next are the analysis and measuring methods used to reduce the noise and vibration generated while the engine is in operation. We are also developing new technologies for engine materials and lubricants. In addition to securing competitiveness in core technologies for these R&D areas, we respond proactively to the changing business environment and diversifying customer needs by engaging in the following activities:

## (1) Product Value Creation through Technology

We analyze and quantify engine combustion, vibration and load, constantly working to uncover the ultimate engine specifications. This effort helps to create the premium engines.

## (2) Leveraging Technologies to Solve Problems Rapidly

We use fluid flow, vibration and structural analysis technologies to meet customer requirements quickly, improving our product quality and raising customer satisfaction.



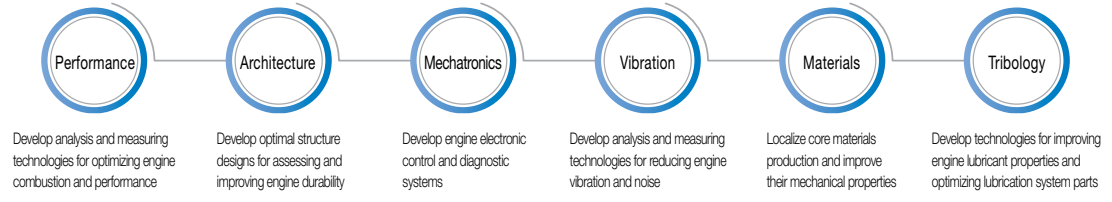
The Technical Research Institute acts as the heart and the brains of the company. Here, specialists in various fields are working to acquire core technologies, laying the groundwork for Doosan Engine to achieve its corporate vision: "No. 1 Engine in the World."

### (3) Developing "Mechatronics" Systems to Lead the Engine Industry

We are commercializing specialized technologies for developing "mechatronics" systems. A prime example is Measutal, our proprietary digital crankshaft deflection gauge that measures crankshaft distortion wirelessly. Creative technology applications such as this have demonstrated the value of our technology to the world.

### (4) Providing Suppliers with Technology Support

We provide our suppliers with technologies they need in their fabrication processes and quality improvement programs. Our support bolsters their technological expertise and builds long-term trust by strengthening "win-win" relationships. The Doosan Engine Technical Research Institute continues to secure distinctive technology competitiveness in support of the company's vision of being the world's top diesel engine maker.





# Premium People

Doosan Engine, a company that's full of life!

Doosan Engine employees are passionate and professional. We pursue the ideals of fellowship, partnership and frontiership to improve the corporate culture constantly.





# Organizational Culture

*Doosan Engine has been producing the hearts that beat inside the world's oceangoing vessels for more than thirty years. We are now well on the way to becoming the world's No. 1 diesel engine maker, and our competencies are focused on achieving this ambitious goal. Our corporate culture, an intangible asset, is playing an important role in this endeavor:*

Doosan Engine has established a unique organizational culture, forming a solid cultural and ethical core that promotes synergy among the company's human and physical resources. This force has helped to propel Doosan Engine into the ranks of the world's very best.

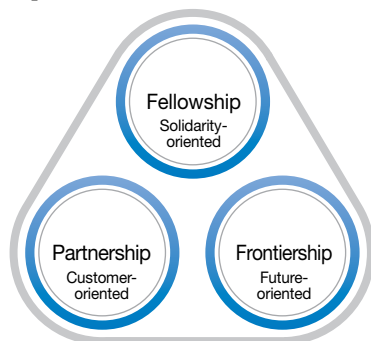
## Professionalism & Passion; Fellowship, Partnership & Frontiership

The fundamental philosophy guiding the Doosan Engine organizational culture can be summarized as "Professionalism and Passion." Our core values are "Fellowship, Partnership and Frontiership," which refer to a forward-looking view that covers both internal and external customers.

"Fellowship" promotes solidarity and creates a work atmosphere of mutual trust for the good of the entire organization. We cultivate group solidarity and open-mindedness to optimize the whole instead of just the parts.

"Partnership" is customer-oriented. It describes our commitment to offering customers products and services that surpass their expectations and thereby earning their loyalty and respect. We build enthusiasm and tightly knit relationships in order to foster a global mindset that is up to global standards.

"Frontiership" is forward looking. This is the process of endless change and innovation in order to grow into one of the world's very best enterprises. Our willingness to take on any challenge and our determined execution enable us to discover the growth engines that can allow us to lead in an era of unrestricted competition.



Going forward with the customer





# Environmental & Safety Management

*Doosan Engine is getting closer to customers by executing a global environmental and safety management program. We produce environment-friendly electronically controlled engines and build cleaner operating diesel power plants to help protect the environment. We also maintain pleasant and safe working conditions as part of our commitment to satisfying customers and ensuring employee wellbeing.*



The Doosan Engine environmental and safety management program is in effect at every worksite as an embodiment of our commitment to true customer satisfaction, human wellbeing and global environmental preservation. Program implementation continues to be expanded, helping to earn customer trust. We also provide our customers with the very best engines in order to remain close to them.

## Environmentally-friendly, Electronically Controlled Marine Engines and Clean Operating Diesel Power Plants

Electronically controlled marine engines are able to reduce fuel consumption when the load is low. They also operate more quietly, vibrate less and emit less exhaust than other models do. As such, this class of engine is seen as the next generation for the industry. Doosan Engine completed the world's first large (6S70ME-C) electronically controlled engine in July 2003. In October of the following year, we completed the world's largest electronically controlled (ME) marine engine. Thus we boast the industry's best in terms of technology and production capability. Meanwhile, we supplied a high-efficiency selective catalyst reduction (SCR) de-NOx system to the 40MW diesel power plant operating on northern Jeju Island. Our company also engages in environmental protection activities within the community, including regular cleanup drives of steams and mountains in the vicinity of our worksites.

## Respect for People by Putting Safety First

Our first priority is on worker safety rather than production performance, for human life is the most precious thing of all. We ensure that our workplaces are safe and pleasant in order to satisfy our "internal customers" (employees). Our environmental, health and safety (EHS) management systems have been KOSHA 18001, OHSAS 18001 and ISO 14001 certified. In addition, our Safety Improvement Committee, safety compliance program and JUMP safety observation activities have also encouraged all workers to adhere to safety rules willingly and voluntarily.



# Social

## Contributions

*Doosan Engine is engaged in diverse community service activities, including assistance to teenaged household heads and support for local cultural development.*

*This is a company that cares, and one that is doing its part to make a better world.*

Corporations must develop together with the communities in which they operate. The people at Doosan Engine consider social development to be the cornerstone of corporate advancement and returns part of profits to society through various community service programs. For example, we support athletics and the arts, and we participate in programs that assist persons in need.

### Support for Local Culture & Art Organizations, Athletic Organizations

Doosan Engine engages in diverse programs to promote social development locally. For example, we sponsor the Gyeongnam Opera Company and Doosan Bears professional baseball club.

### Community Service, Helping Children with Leukemia

Doosan Engine donates to charity each year and regularly takes part in various community service activities. One such program includes visits child leukemia victims in hospitals, visits to their families and financial assistance for medical care and blood donations. The company also supports an in-house group of community service volunteers. Jakeun Saranghoe was formed in 2000 to assist elderly persons living alone and orphaned teenagers with younger brothers and sisters to care for.

Doosan Engine currently pays school the expenses each month by an orphaned teenager, and the company continues to expand the scope of its community service programs and support for local culture and arts.







## Global Network

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### Head Office / Factories

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