

# Heightened Awareness as an Environmentally Friendly Brand

Kawasaki believes that one of its important responsibilities is to make its environmental policies and initiatives easy to understand and to disclose those policies with transparency. We conduct Kawasaki Green Product Promotion Activity that includes the registration of products based on an assessment of product performance and the manufacturing process in consideration of the environment, with the aim of broadly communicating and instilling our support for the environment through our products. In addition, we work to appropriately disclose information regarding our environmental activities to stakeholders by disclosing information in the Environmental Report and on our website, and by proactively responding to questionnaires, etc., from external evaluation organizations.

## Key Strategies and Targets under Ninth Environmental Management Activities Plan (FY2017–FY2019)

### Heightened awareness as an environmentally friendly brand

Targets

- ① Leverage Kawasaki Green Product Promotion Activity**  
→ Register Kawasaki-brand Green Products every year and release data to public
- ② Enhance image through external evaluations and rankings**  
→ Announce results of third-party verification, improve evaluations from external organizations such as CDP, and sustain placement in Dow Jones Sustainability Index

## Kawasaki Green Product Promotion Activity

To realize our Group Mission: “Kawasaki, working as one for the good of the planet,” we will draw on high-level, comprehensive technological capabilities over the Kawasaki Group’s extensive range of business pursuits to create new value for coexisting with nature and building a brighter, more comfortable future for generations to come. We have launched Kawasaki-brand Green Products, a program in support of the Group Mission objective and through which we will boost the environmental performance of products and accelerate the reduction of environmental impact caused by associated manufacturing processes. The products selected for this program must meet self-established criteria and are categorized as either Kawasaki Green Products or Kawasaki Super Green Products. The products are then labeled compliant with ISO 14021, and the list is made public.

The program logo embodies the Group’s commitment to environmental sustainability through products and manufacturing. The three pillars in the logo represent our primary business areas—land, sea and air transport systems, energy and environmental engineering, and industrial equipment—and the innovative and advanced technological capabilities in these respective areas form a firm foundation for these pillars, which together support the global environment.



Figure 25: Program logo

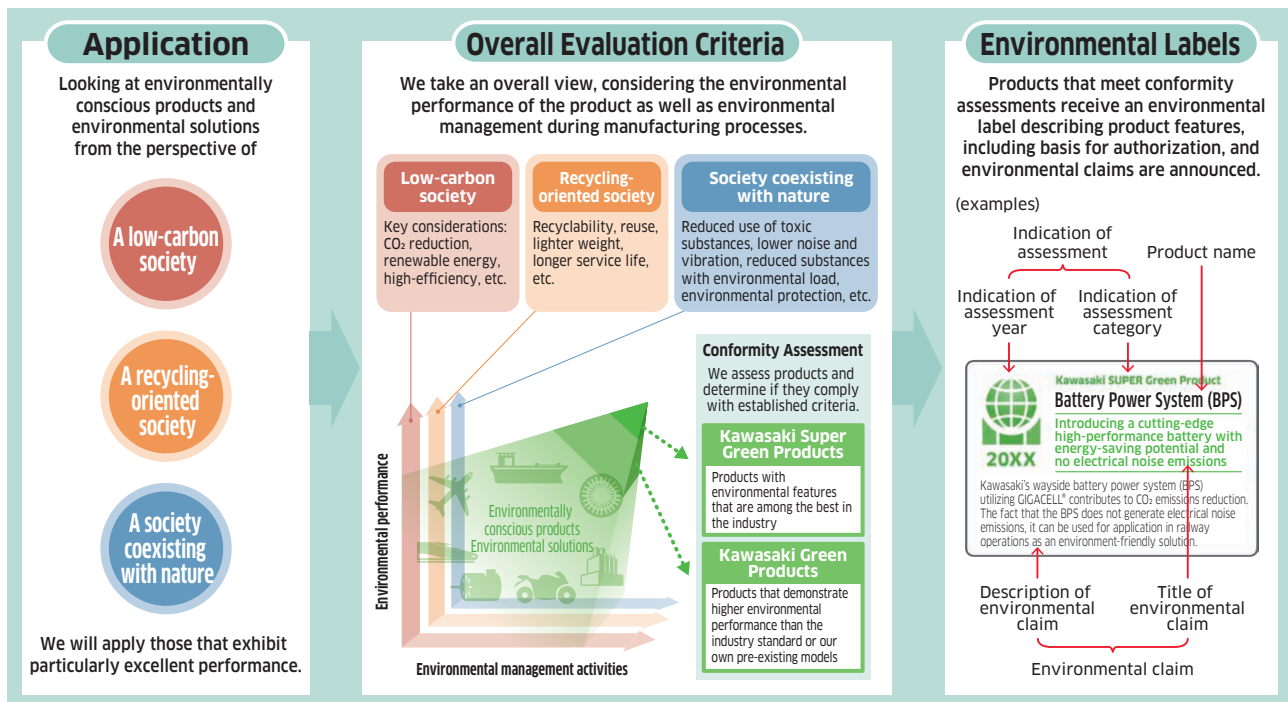


Figure 26: Conformity Assessment Procedure

## External Information Disclosure

Kawasaki discloses information to our stakeholders through means such as the Kawasaki Report, the Environmental Report, and our website. In addition, we receive questionnaires from many external evaluation organizations, including: the CDP Climate Change Information Request, published by the CDP; the Environmental Management Survey, conducted by Nikkei Research Inc.; the Toyo Keizai CSR Survey; and the Dow Jones Sustainability Index, which we view as the voice of stakeholders representing investors, and we vigorously pursue the disclosure of environmental information by responding to such questionnaires.

As a result, we have continuously been selected as a stock for investment for the DJSI Asia Pacific Index, and the SNAM Sustainable Investment Fund, which is managed by Sampo Japan Nipponkoa Asset Management Co., Ltd. (SNAM).

## Product Assessment

For newly developed and designed products, as well as for particularly important products, Kawasaki assesses products according to such criteria as resource and energy savings and recycling potential, with the goal of reducing the environmental impact of our products during their life cycles. Because specific evaluation techniques vary depending on the type of product, each business segment draws up product assessment rules appropriate to the characteristics of the respective product. The main evaluation items of product assessment are shown below.

- ① Product weight reduction
- ② Product energy saving
- ③ Longer product life
- ④ Product safety and environmental conservation effectiveness
- ⑤ Measures for product disposal and recycling
- ⑥ Environmental impacts when problems or other extraordinary circumstances occur
- ⑦ Provision of information for use and maintenance
- ⑧ Compliance with regulations

## 2017 Kawasaki-brand Green Products

[New]

### Large LNG Carrier with Newly Developed Tank

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Powering your potential

Boil-off Rate (\*)

<b>Competitor's product</b>	0.08%/day
<b>Our product</b> <small>(Thermal insulation panel only)</small>	0.075%/day
<b>Our product</b> <small>(Thermal insulation panel with partial re-liquefaction)</small>	0.05%/day

(\*)An indicator of the cargo tanks' thermal insulation performance to show the rate of LNG volume that vaporizes spontaneously from the cargo tanks per day. Smaller value indicates better thermal insulation performance.

**Large Moss-type LNG carrier with industry-leading thermal insulation performance, and fuel and volumetric efficiencies**

Achievement of the world's lowest real BOR of 0.05%/d by combining a Kawasaki Panel System with excellent thermal insulation performance, fitted on newly developed non-spherical cargo tanks, with a partial re-liquefaction system. Improvement of fuel efficiency by about 15%, compared with our previous ships, due to the combination of a unique hull form with dual fuel engines.

**Product Description**

In addition to improving fuel efficiency and reducing environmental impact, this large LNG carrier features a hull size capable of entering LNG terminals worldwide and passing through the newly expanded Panama Canal. Furthermore, the adoption of non-spherical cargo tanks greatly increases its LNG transport capacity.

**Special Features**

- Adoption of Kawasaki Panel System with industry-leading thermal insulation performance
- World's lowest real BOR (boil-off rate) achieved through partial re-liquefaction system
- Improvement of fuel efficiency by adopting twin-skeg, SEA-ARROW-type bow shape and dual fuel low-speed diesel engine (ME-GI engine)
- Adoption of non-spherical cargo tank with excellent volumetric efficiency

2017

Kawasaki  
SUPER Green Product

Kawasaki Heavy Industries, Ltd.

### efACE Standard Railcar

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Powering your potential

Application of friction stir welding (FSW) on structure

Side plates joined using FSW

**Achieves energy and resource savings through relentless pursuit of recycling and reuse, and thorough weight reduction**

The railcar uses stainless steel as a structural material and aluminum composite plates in the interior panels, both recyclable materials, and promotes use of monoalloys in the aluminum structure. Reduced weight decreases electricity consumption. Friction stir welding (FSW), which requires less heat than MIG welding, is applied during manufacture.

**Product Description**

This standard commuter railcar is a clean form of mass transport from the perspectives of energy saving and reduced environmental impact. Its core concepts are "flexibility" supporting both stainless-steel and aluminum cars; "rationality" of quality and price; and "added value" of comfort and environmental performance.

**Special Features**

- Adoption of recyclable stainless-steel structure and interior panels
- Adoption of "harmonica" construction in the aluminum structure and twist bolts in the SUS structure makes the body easy to update, including changing the seating and equipment layout
- Weight reduction achieved through adoption of aluminum composite plates and chamberless ducts

2017

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SUPER Green Product

Kawasaki Heavy Industries, Ltd.

## BK117 D-2 Helicopter (Airbus Helicopters Model: H145)



Kawasaki Heavy Industries, Ltd.

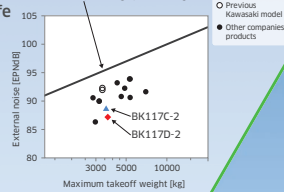
### Achieves the quietest helicopter in its class, providing outstanding hovering performance and longer service life

The introduction of a new tail rotor system and other features contributes to the reduction of external noise, and environmental performance throughout the life cycle is also greatly enhanced, including longer service life through a significantly extended overhaul interval. Also, the increased main gearbox rating contributes to improve energy efficiency by 18%.



Through introduction of a Fenestron® and increasing the number of blades, higher noise frequency reduces the noise level. In addition, introduction of unequal blade spacing design contributes to further noise reduction due to canceling of harmonic noise peak.

International Civil Aviation Organization (ICAO)  
Upper limit of average values of noise requirements  
at takeoff, level flight, and landing



#### Product Description

The introduction of a new tail rotor system and other features achieves the quietest helicopter in its class. In addition, the introduction of a high-power engine and improved main gearbox greatly enhances hovering performance, making this helicopter suitable for multipurpose missions such as firefighting, disaster relief, law enforcement, emergency medical service, TV broadcasting, and passenger transport.

#### Special Features

- Achievement of world's quietest helicopter in its class
- Notable increase of rated power through introduction of high-power engine and improvement of main gearbox
- Notable extension of tail rotor gearbox overhaul interval to 5,000 hours instead of 1,500 hours for the C-2

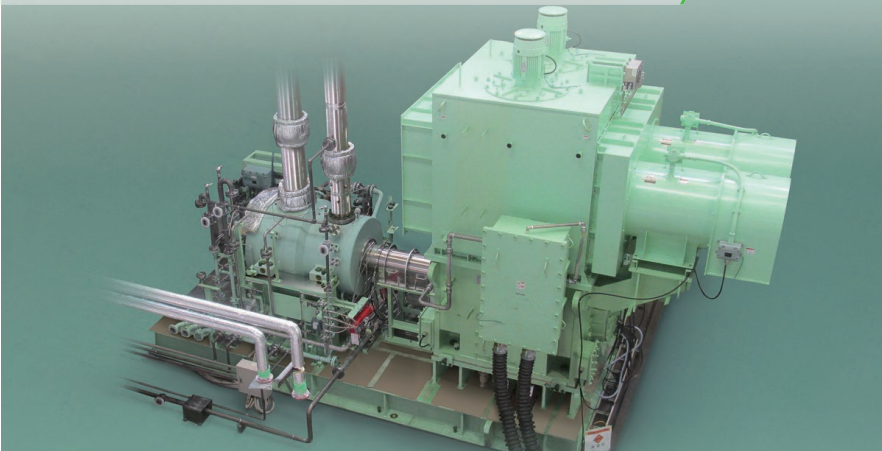
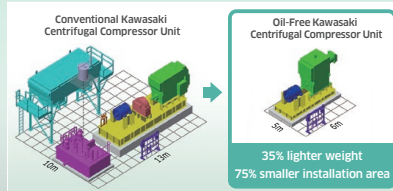
## Oil-Free Kawasaki Centrifugal Compressor



Kawasaki Heavy Industries, Ltd.

### Completely oil-free compressor achieved through adoption of a high-speed motor and magnetic bearings

The adoption of a high-speed motor and magnetic bearings improves efficiency and reduces weight and footprint, achieving 3% lower power consumption, 35% lighter weight, and 75% smaller installation area compared to conventional models. Elimination of the need for lubricant oil also reduces environmental impact.



#### Product Description

Completely oil-free compression is achieved through the adoption of a high-speed motor and active-control magnetic bearings. The Kawasaki Centrifugal Compressor delivers both industry-leading energy efficiency and a wide, stable operating range.

#### Special Features

- Mechanical loss greatly reduced through direct motor drive and contactless support
- Elimination of the need for lubricant oil system greatly reduces equipment weight and installation area
- In addition to not using lubricant oil, it reduces noise and vibration

## LNG Tank (New safety factor applied)

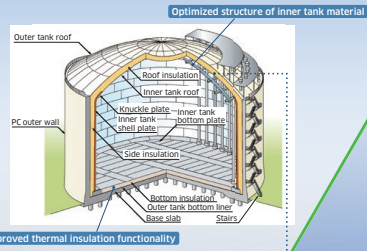


**2017**  
Kawasaki  
Green Product

Kawasaki Heavy Industries, Ltd.

### Application of new safety factor and optimized structure reduces product weight and improves cold-storage functionality

The application of a new safety factor and streamlined structure reduces product weight per unit of volume by 13% compared to tanks delivered in 2010. Enhanced cold-storage functionality and other improvements reduce BOG (boil-off gas) rate by 21%.



#### Product Description

One of the world's largest aboveground LNG tanks, with a dual-tank consisting of an inner tank directly storing LNG at -162°C and a PC (prestressed concrete) outer wall. In addition to its superior cold-storage functionality, the lighter weight of the LNG tank reduces construction period and improves transportation efficiency.

#### Special Features

- Application of new safety factor and streamlined inner tank structure reduces product weight per unit of volume compared to previous tanks
- Lighter weight and increased prefabrication in the factory optimize transportation and construction efficiency
- 25% larger than tanks delivered in 2010, with its construction period remaining unchanged
- Reduced BOG rate through larger size and improved cold-storage functionality

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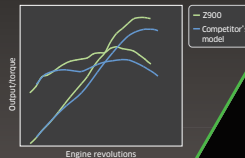
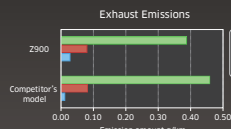
## Z900 (2017MY)

**2017**  
Kawasaki  
SUPER Green Product

Kawasaki Heavy Industries, Ltd.

### Achieves excellent fuel performance and low exhaust emissions with world's highest level of environmental performance

Worldwide-harmonized Motorcycle Test Cycle (WMTC) mode fuel efficiency is top in its class, with 9% better output than a competitor's model. It is compliant with EUROIV, European emission regulations and R41-04, Europe's new noise emission regulations.



#### Product Description

This new-generation naked model motorcycle delivers a high level of quality in the three areas of styling, powerful engine performance, and a comfortable easy-to-handle chassis that can be expressed by the word "Sugomi" (meaning "awe-inspiring energy and intensity"), for an exciting and responsive riding experience.

#### Special Features

- Liquid-cooled parallel four-cylinder engine delivers a power feel that smoothly increases at mid to high rpm, with strong torque feel and sharp throttle response at low rpm
- New steel-frame design achieves comfort and ease of handling through uncompromising commitment to reducing weight
- Excellent fuel performance conforms to EUROIV, European emission regulations



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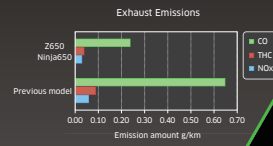
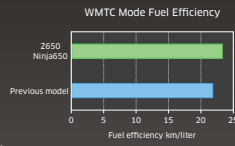
## Z650/Ninja650 (2017MY)



Kawasaki Heavy Industries, Ltd.

### Improved fuel efficiency, reduced power/weight ratio, and greatly reduced exhaust emissions

Compared to the previous models (ER-6n/6f), Worldwide-harmonized Motorcycle Test Cycle (WMTC) mode fuel efficiency is 7% better and power/weight ratio is 4%/3% lower. CO, THC and NOx in exhaust emissions are also reduced by 63%, 56%, and 50%, respectively.



WMTC: Worldwide-harmonized Motorcycle Test Cycle



#### Product Description

These mid-range, new-century naked/full cowlings model motorcycles have styling with a sense of presence comparable to large models. They are easy for beginners to handle and a joy to ride for intermediate to advanced riders.

#### Special Features

- Liquid-cooled parallel two-cylinder engine provides a seamless throttle response focused on a flat torque feel at low to mid rpm, and a power feel that increases smoothly
- New steel-frame design achieves comfort and ease of handling through uncompromising commitment to reducing weight
- Excellent fuel performance conforms to EUROIV, European emission regulations

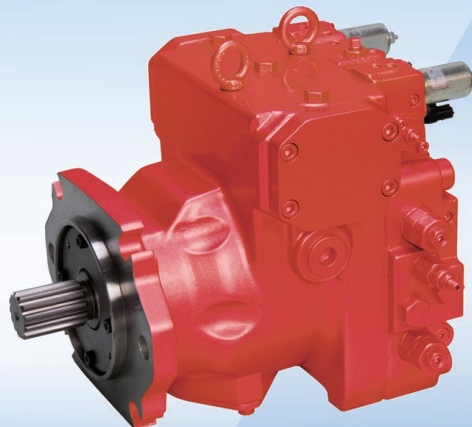
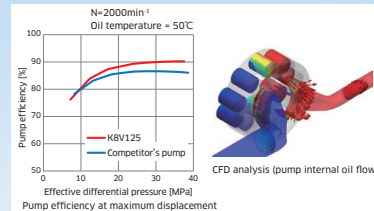
## HST Pump K8V Series



Kawasaki Heavy Industries, Ltd.

### Delivers world's top-class pump efficiency, low noise, and high reliability

Achieves world's top-class pump efficiency and a low noise level, both of which surpass competitors' products. (HST: continuously variable transmission with hydraulic pump and hydraulic motor)



#### Product Description

This dual-tilting hydraulic pump is suitable for closed circuit systems such as HST drive systems for various industrial vehicles. The world's top-class pump efficiency and low noise improve vehicle fuel efficiency and the working environment.

#### Special Features

- Optimized design developed with the K7V, hydraulic pump for excavators, achieving the world's top-class pump efficiency and low noise
- Adoption of slide bearing on swash plate supporting structure and other improvements deliver high reliability

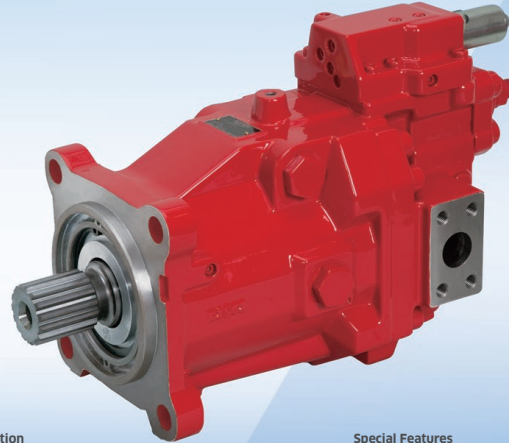
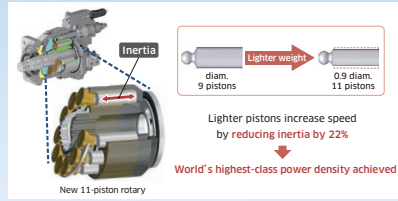
## HST Motor M7V Series



Kawasaki Heavy Industries, Ltd.

High power density (theoretical output horsepower/product weight) easily beats competitors' products

Power density ranks among the highest in the world. Noise level is lower than competitors' products. Bearing life is 90% better than our previous model. (HST: continuously variable transmission with hydraulic pump and hydraulic motor)



### Product Description

This compact hydraulic motor, featuring one of the world's most outstanding high-speed performances as a swash plate motor, can be used for HST drive systems for various industrial vehicles, winches, and other applications. It starts up efficiently to ensure smooth operation, while its low-speed performance delivers precise handling even when fine control is required.

### Special Features

- World's highest-class power density
- Longer bearing life
- Smooth start-up and stable speed during slow travel
- Compact shape through swash plate

## Extra-Large Payload Robot MG Series

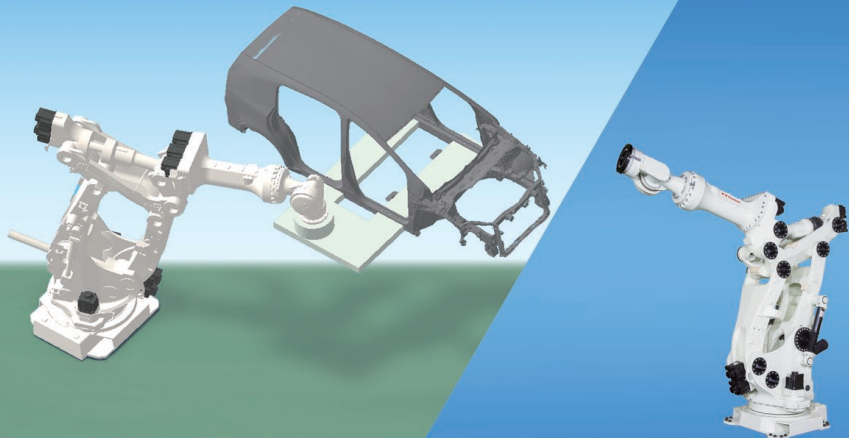


Kawasaki Heavy Industries, Ltd.

Weight reduced to be lighter than industry standards for 1-ton-plus payload class

Unique arm construction, which features hybrid link and partial use of ball-screw drive, realizes payloads of 1 to 1.5 tons and lighter chassis without use of counterweight

	MG15HL	Competitor
Maximum payload (kg)	1,500	1,200
Maximum reach (mm)	4,005	3,734
Main unit mass (kg)	6,550	8,600



### Product Description

This extra-large payload robot with a capacity of 1 to 1.5 tons realizes both high rigidity and accuracy achieved through its unique construction (parallel two-reducer mechanism on the first axis, ball-screw mechanism on the second and third axes)

### Special Features

- Achieves 1-ton-plus payloads through adoption of hybrid link mechanism and dual servos
- Reduces arm deflection and achieves high positioning accuracy by adopting ball screws with high rigidity and minimal backlash
- Hybrid link mechanism and counterweight-less arm deliver a wide work envelope for practical use



[Renewal]

After registration, products are reassessed every three years, and registration is renewed for products that meet the criteria.

### Battery Power System (BPS)

**2017**  
Kawasaki  
SUPER Green Product  
Initial registration: 2014

Kawasaki Heavy Industries, Ltd.

**Introducing a cutting-edge high-performance battery with energy-saving potential and no electrical noise emissions**

Kawasaki's rechargeable battery power system (BPS) utilizing DIGACELL™ contributes to CO<sub>2</sub> emissions reduction. The fact that the BPS does not generate electrical noise emissions, it can be used for applications in railway operations as an environment-friendly solution.




**Product Description**

The new concept of Kawasaki's latest rechargeable DIGACELL™ which converts energy into the flow of current from AC to generate power for the electric power and electric power to AC to generate power for the electric power of high speed train during lower load. Furthermore, the electric system is able to charging only using surplus power.

**Social Features**

- Energy conservation
- Energy saving and emission reduction: regeneration of energy use, the charge stop phenomenon, and the use of surplus power
- Contribution to environment and disaster emergency power: power saving when power goes out
- Safety: protection to the main power line without overhead or conductor, facilitating good site performance, high energy conversion efficiency, high charging and discharging efficiency, and so on.

### M1A-17D Gas Turbine

**2017**  
Kawasaki  
SUPER Green Product  
Initial registration: 2014

Kawasaki Heavy Industries, Ltd.

**Highest power generation efficiency in its class with lowest NOx emissions, made possible by KHI's integrated technology**

With improved generating efficiency 2.4% higher than the previous model, the M1A-17D is among the most efficient gas turbines in its power class and has the industry's lowest level of NOx emissions, at 25 ppm (lowered at 0% O<sub>2</sub>).




**Product Description**

Power generation gas turbine boasting higher efficiency than 17 other models in the power class and lowest NOx emissions, achieved by KHI's integrated technology.

**Social Features**

- Higher performance in its class: thanks to emission efficiency through the use of KHI's integrated technology
- Lower NOx emissions: achieved by KHI's integrated technology
- Lower NOx emissions: achieved by KHI's integrated technology
- High efficiency and low environmental impact: thanks to the use of KHI's integrated technology
- High efficiency and low environmental impact: thanks to the use of KHI's integrated technology

### Green Gas Engine

**2017**  
Kawasaki  
SUPER Green Product  
Initial registration: 2014

Kawasaki Heavy Industries, Ltd.

**The world's highest power generation efficiency in its class**



The Green Gas Engine boasts the world's highest power generation efficiency of 49.4% with a variable turbine nozzle area (VTN) for high-speed combustion performance.

**Product Description**

Using 100% natural gas, the Green Gas Engine achieves the world's highest level of power generation efficiency to date and has the lowest emissions among all gas engines. It is also the only gas engine to be certified for use as a power generation engine in the world.

**Social Features**

- The world's best in terms of power generation efficiency: 49.4% in its class, as of April 2014.
- Low emissions: environmental performance with low emissions of less than 200 ppm of NOx and CO, and low SOx emissions.
- High efficiency and low environmental impact: thanks to the use of KHI's integrated technology.

### MAG Turbo

**2017**  
Kawasaki  
SUPER Green Product  
Initial registration: 2014

Kawasaki Heavy Industries, Ltd.

**Domestic industry's highest level of efficiency and low environmental impact achieved through use of magnetic bearings**

Featuring a high-speed motor with magnetic bearings, the MAG Turbo outperforms overall efficiency of existing generation turbines in all air volume ranges domestically.




**Product Description**

The MAG Turbo generator is a high-speed motor with magnetic bearings, which is a high-speed motor with magnetic bearings. It is a high-speed motor with magnetic bearings, which is a high-speed motor with magnetic bearings.

**Social Features**

- Higher efficiency and low environmental impact: thanks to the use of KHI's integrated technology
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### Centrifugal Chiller Using Water as Refrigerant

**2017**  
Kawasaki  
SUPER Green Product  
Initial registration: 2014

Kawasaki Heavy Industries, Ltd.

**Epoch-making HFC-free, high-efficiency chiller cuts greenhouse gas emissions**



This HFC-free chiller, using water as a refrigerant, delivers efficiency comparable to existing chiller models. Its compact design makes it a viable alternative to existing chillers.

**Product Description**

This HFC-free chiller, using water as a refrigerant, delivers efficiency comparable to existing chiller models. Its compact design makes it a viable alternative to existing chillers.

**Social Features**

- HFC-free: no greenhouse gas emissions
- High efficiency: thanks to the use of KHI's integrated technology
- Compact design: thanks to the use of KHI's integrated technology

### CKK System

**2017**  
Kawasaki  
SUPER Green Product  
Initial registration: 2014

Kawasaki Heavy Industries, Ltd.

**Conserving energy and resources through effective use of waste**



The CKK System (Circulating Kawasaki Kih-San System) integrates a waste incinerator into existing cement plants, requiring 70% lower compensation than the installation of a waste incinerator alone would require. It effectively uses heat energy and ash generated from waste incineration to reduce CO<sub>2</sub> emissions.



**Product Description**

The CKK System (Circulating Kawasaki Kih-San System) integrates a waste incinerator into existing cement plants, requiring 70% lower compensation than the installation of a waste incinerator alone would require. It effectively uses heat energy and ash generated from waste incineration to reduce CO<sub>2</sub> emissions.

**Social Features**

- Lower CO<sub>2</sub> emissions: thanks to the use of KHI's integrated technology
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## Ninja ZX-6R

**New model revamped for lower CO<sub>2</sub> emissions and enhanced recyclability**

Starting with the 2009 model, the Ninja ZX-6R's displacement was increased by 270cc for greater output while fuel consumption was lowered by 2%. The model was also designed for better environmental performance, particularly enhanced recyclability.

**Engine Performance Comparison**

**Product Description**

This model features a revised engine and emission control systems, performance for the low-to-high speed range and better fuel efficiency. Engine torque and displacement were increased to provide better acceleration on the corners as well as the new 270 cc fuel injection system. Another feature is the use of a new cylinder head design which allows clean to enjoy high performance and power reliability.

**Special Features**

- Lower CO<sub>2</sub> emissions
- Good balance of response, performance and better fuel efficiency
- Lower fuel consumption
- Lower maintenance (oil) filter life
- Higher fuel economy
- Low profile and slimline intake of surface treatment
- Improved safety
- Fuel-injected, automatic transmission, ABS

**2017 Kawasaki Green Product**  
www.kawasakimotor.com

Kawasaki Heavy Industries, Ltd.

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## Hydraulic Pump for Excavators (K7V)

A world leader in environmental performance, offering higher efficiency and lower noise.

The K7V's pump efficiency is improved by 1.5 points and its noise level reduced by 2.0 dB(A) compared with the K5V series. Its widely popular predecessor, to make it one of the world's top environmental performers in both counts.

**Pump Casing Deformation Analysis**

**Product Description**

Good ability to coordinate machinery performance, hydraulic components for the K-series hydraulic system, and low maintenance for high efficiency, low noise, compact size and high reliability.

**Special Features**

- Improved efficiency, because linkage from shafting parts and better use of the volume
- Lower noise and pressure, thanks to the improvement of shaft design and higher fitting rigidity
- Compact design of discharge pipe, thanks to the use of shafting
- Longer service life achieved through use of thicker shaft and large capacity bearings

**2017 Kawasaki SUPER Green Product**  
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## Spot Welding Robot (BX200L)

Industry's lightest, slimmest and most compact spot welding robot minimizes footprint

The BX200L has a smaller footprint and is more lightweight than any comparable model in the industry. Since cables and hoses can be stored in the robot's arm and axle, interference with adjacent robots or peripheral devices is minimized. This allows for installation in higher-density applications compared with earlier models.

**Product Description**

This energy- and resource-saving tool-saving robot features a large device installation and easy production efficiency. Cable coils in the robot's arm and axle, interference with adjacent robots or peripheral devices is minimized. This allows for installation in higher-density applications compared with earlier models.

**Special Features**

- Interplay with cables
- Smaller footprint
- Compact design
- High reliability
- Light weight
- Compact design and reduced number of components make this the industry's most lightweight spot welding robot in its class

**2017 Kawasaki SUPER Green Product**  
www.kawasakimotor.com

Kawasaki Heavy Industries, Ltd.