

NACHI

NACHI-FUJIKOSHI CORP.



Environmental
Report
2024

Recognizing the importance of coexistence with the global environment, NACHI-FUJIKOSHI Toyama, Namerikawa, and Higashi-Toyama Plants will promote improvement activities for a better global environment by contributing to the development of the world of monozukuri (manufacturing) in cutting tools, machine tools, robots, bearings, hydraulic equipment, automotive hydraulics, special steels, and Thermo-Tech.

- 1. We will consistently be aware of the environmental impact of our business activities and continuously improve our environmental management system (EMS) to prevent pollution, promote the use of sustainable materials, and mitigate climate change.**
- 2. We will continuously improve our EMS to improve our environmental performance.**
- 3. We will focus on the following key issues as our environmental targets and goals and periodically review their progress:**
 - (1) Development of environmentally friendly, proprietary products
 - (2) Contribution to a decarbonized society
 - (3) Contribution to a recycling-oriented society (reduction of landfill waste and promotion of recycling)
 - (4) Managing and reducing environmentally hazardous materials
- 4. We will comply with environmental regulations and agreements applicable to our business activities and establish and control our voluntary standards, as needed.**
- 5. We will inform all employees working at/for our facilities of the importance of our environmental policy and raise their awareness through environmental education and in-house information activities.**
- 6. We will externally disclose our environmental policy to improve communication with regional communities.**

March 15, 2024

NACHI-FUJIKOSHI CORP.

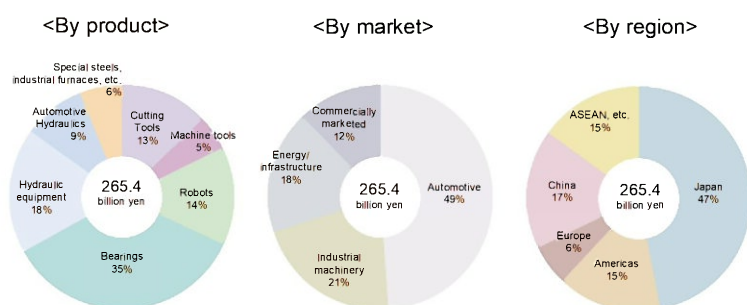
Environment Administrator **Kohei Anada**

Corporate outline

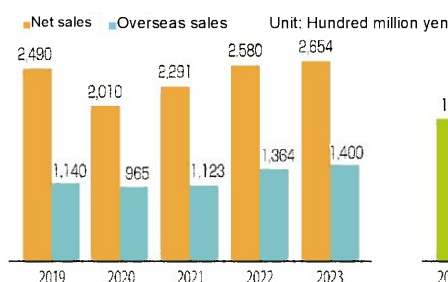
Outline

Company name	NACHI-FUJIKOSHI CORP. Trademark: NACHI	
Established	December 21, 1928 Account settled on November 30	
Chairman	Hiroo Honma	
President	Tsutomu Kurosawa	
Head office	Shiodome Sumitomo Bldg. 17F 1-9-2 Higashi-Shinbashi, Minato-ku, Tokyo 105-0021, Japan Tel.+81-3-5568-5111	
Major offices	Toyama Plant 1-1-1 Fujikoshi-Honmachi, Toyama 930-8511, Japan Tel.+81-76-423-5111	
Capital	16.0 billion yen	
Consolidated net sales	265.4 billion yen (including overseas sales 140 billion yen)	
Consolidated subsidiaries	51 companies including 22 domestic companies (comprising 3 engineering companies, 5 sales companies, 12 manufacturing companies, and 2 service companies) 29 overseas companies (comprising 14 sales companies and 15 manufacturing companies)	
Consolidated number of employees	7,200 with 52 companies (including 3,150 with parent entity)	
Major products	Mechanical equipment	Cutting tools, forming tools, cutting saws, machine tools, and machining systems
	Robotics	Robots, robot systems, and electronic equipment
	Components	Bearings, hydraulic equipment, and automotive hydraulics
	Materials	Special steels, coating, and industrial furnaces

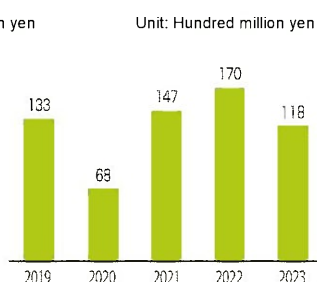
Breakdown of net sales (consolidated)



Net sales (consolidated)



Operating income (consolidated)



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Leading innovations in manufacturing using world-class

As a comprehensive machinery manufacturer with the robotics business at its core, NACHI-FUJIKOSHI will provide various solutions and contribute to the development of the world's industries.

Mechanical equipment

Cutting Tools



Machine tools



Heat treatment,
surface modification

Cutting, cutting-off, shaping



Contribution

Materials

Special steels



Thermo-Tech

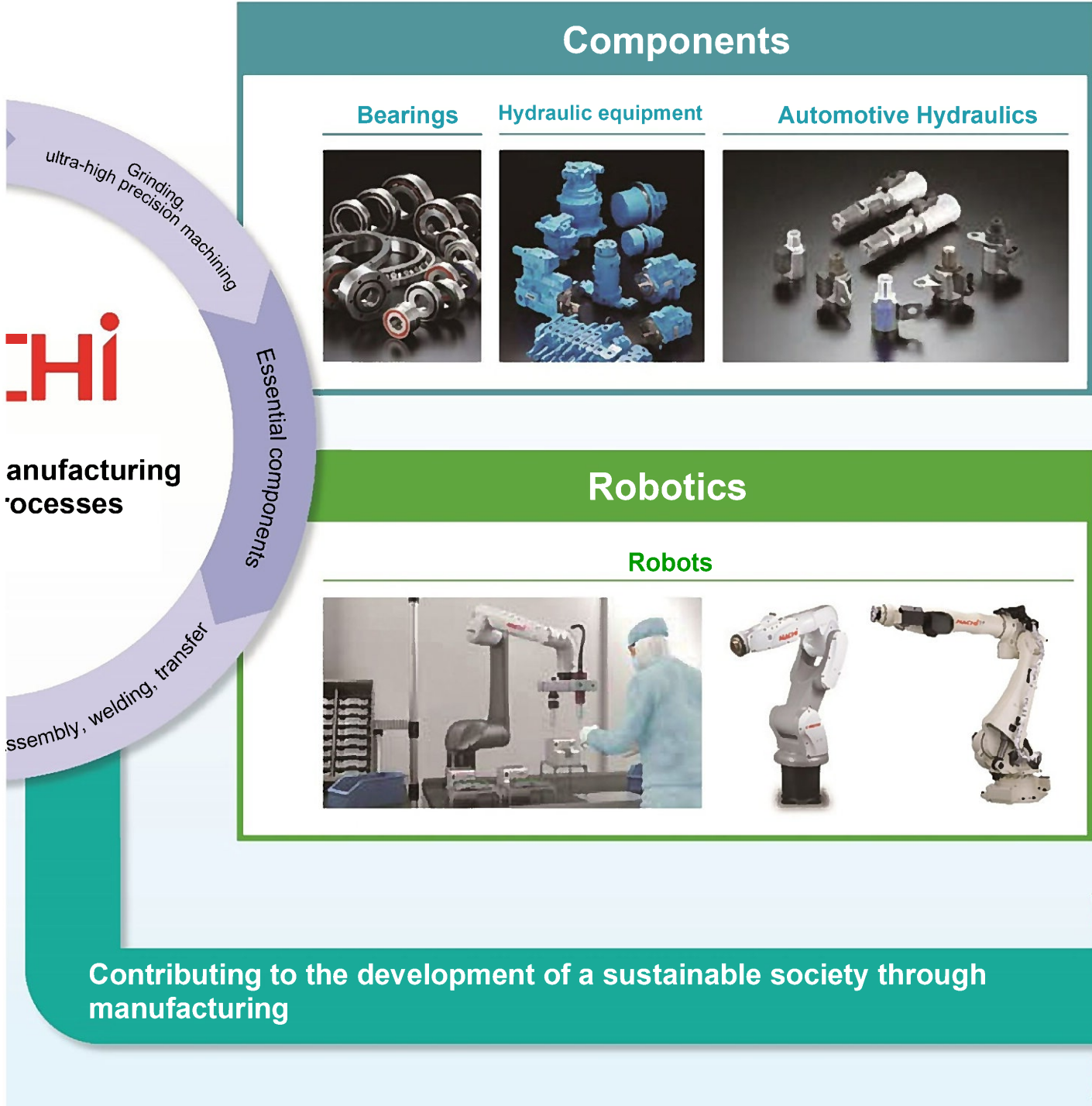


Materials, heat treatment
near-net shape

Corporate mission

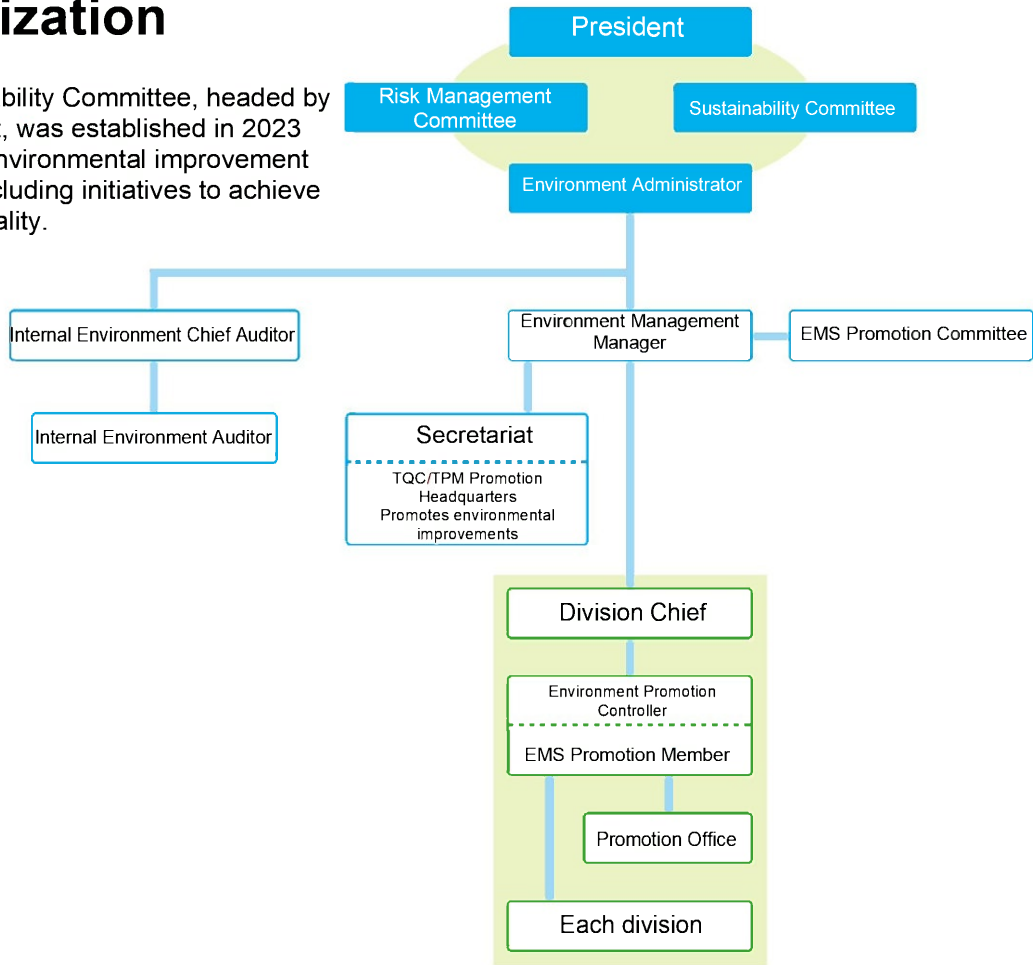
Contributing to the progress of the world of manufacturing

Technologies with robotics at its core



Organization

The Sustainability Committee, headed by the President, was established in 2023 to promote environmental improvement initiatives, including initiatives to achieve carbon neutrality.



Audit and assessment

Through internal audits performed by our own staff and external audits performed by a third-party organization, we continuously strive to reduce our environmental footprint and enhance our improvement activities.

- **Internal environment audit**

Once a year, our internal auditors mutually audit each workplace to verify the implementation situation of environmental management programs, and maintenance and inspection of environment-related facilities.

- **ISO 14001 periodical audit by an external audit organization**

To date, our Toyama, Namerikawa, and Higashi-Toyama plants have obtained ISO 14001 certification from the Japan Audit and Certification Organization for Environment and Quality (JACO).

- **Training of internal environment auditors**

We cultivate internal environmental auditors and enhance their capabilities through internal and external training and education.

Number of qualifiers in environmental management (As of January 2024)

(Unit: Number of persons)

Qualification name	Qualified persons	Required number
Pollution Control Manager (Air)	19	4
Pollution Control Manager (Water Quality)	33	4
Pollution Control Manager (Noise)	30	4
Pollution Control Manager (Vibration)	27	4
Pollution Control Manager (Dioxin)	10	1

Qualification name	Qualified persons	Required number
Licensed Electrical Engineer (Class 2 and 3)	22	3
Qualified Energy Manager	15	6
Certified Environmental Measurer (Concentration)	2	1

NACHI's efforts to date

1991	Our cutting tools and vacuum heat-treatment furnaces received the Award of the Director-General of the Agency for Natural Resources and Energy.
2000	We published our Environmental Basic Policy and established the Environmental Manual.
2001	Our Toyama Plant obtained ISO 14001 certification. A grinding sludge solidification system was introduced.
2002	The Toyama and Namerikawa plants obtained ISO 14001 certification.
2003	Our Toyama, Namerikawa and Higashi-Toyama plants obtained ISO 14001 certification.
2004	Our 10 domestic subsidiaries obtained ISO 14001 certification.
2005	One domestic subsidiary and one overseas subsidiary obtained ISO 14001 certification. We established NACHI-FUJIKOSHI Corp. Citizen Rules, created the Chemical Analysis Office, and abolished the use of chlorine cleaner.
2006	Two overseas subsidiaries obtained ISO 14001 certification.
2007	The Toyama Plant received the Award of the Commissioner of the Fire and Disaster Management Agency.
2008	Our hydraulic variable pump units received the JMF President Award for Excellent Energy-Efficient Machinery from Japan Machinery Federation (JMF). The Toyama Plant received the Toyama Prefectural Governor Award for Excellent Energy Management Factory.
2009	The Higashi-Toyama Plant's Material Plant received the Toyama Prefectural Governor Award for Excellent Energy Management Factory.
2010	The Toyama, Namerikawa, and Higashi-Toyama plants and 10 domestic subsidiaries received the third periodic audit and renewed their ISO 14001 certification.
2011	We started the disclosure of CO ₂ emissions reductions achieved by our customers when they use our eco-friendly products in our environmental report. We received the Award for 10 Consecutive Years of ISO 14001 Certification from an external audit organization.
2012	We received the Special Incentive Award for excellent environment-conscious companies from the Japan Machine Tool Builders' Association. We received the Sixth Environmental Contribution Award (Eco-Factory Division) from the Japan Solid Cutting Tools' Association (JSCTA).
2013	We received the Seventh Environmental Special Award (prevention of global warming) and Environmental Contribution Award (Eco-Products Division) from the Japan Solid Cutting Tools' Association (JSCTA).
2014	We received the Eighth Environmental Contribution Award (Eco-Product Division) from the Japan Solid Cutting Tools' Association (JSCTA).
2015	We received the First Environmental Activity Award (reduction of landfill disposal rate for industrial waste by expanding recycling of grinding stone) from the Japan Solid Cutting Tools' Association (JSCTA).
2016	We received the Second Environmental Special Award (99% achievement of Zero Emissions) and Environmental Activity Award (deoiling treatment of oil-based metal grinding powder) from the Japan Cutting & Wear-resistant Tool Association (JTA).
2017	We received the audit for the new ISO 14001:2015 version and the certification. We received the Third Environmental Activity Award (reduction of groundwater consumption by introducing circulation systems) from the Japan Cutting & Wear-resistant Tool Association (JTA).
2018	Our screw parts for fluoropolymers received the "CHO" MONODZUKURI Machinery & Robot Component Award. We received the FY2018 Environmental Activity Award (reduction of air conditioning energy by sprinkling water over factory roofs) from the Japan Cutting & Wear-resistant Tool Association (JTA).
2019	Our collaborative robot CZ10 received the Monozukuri Award of the Best 10 New Products Award. Our ultra-small compact robot MZ01 received the Monozukuri Award of the 2019 Best 10 New Products Award. We received the FY2019 Environmental Activity Award (energy conservation by switching to LED lighting in plants) from the Japan Cutting & Wear-resistant Tool Association (JTA).
2020	Our carbide drill AquaREVO Drills Oil-Hole received the Encouragement Award of the "CHO" MONODZUKURI Innovative Parts and Components Award.
2021	Our small robot MZ25 received the Monozukuri Award of the Best 10 New Products Award.
2022	Our high-speed, high-precision robot MZ F series/ultra-compact controller CFDq received the Monozukuri Award of the Best 10 New Products Award.
2023	Our carbide endmill Aqua REVO Mill for Stainless Steel received the Encouragement Award of the "CHO" MONODZUKURI Innovative Parts and Components Award. Our high-speed, high-precision robot CMZ05/Teaching system Nachi Tablet TP received the Monozukuri Award of the Best 10 New Products Award. We established the Sustainability Committee.

ISO 14001 certification

Registered businesses

Development, design and manufacture of tools, machine tools, bearings, hydraulic equipment, robots, solenoid valves for automobiles, industrial furnaces, coating, and special steels

Registered organization

Japan Audit and Certification Organization for Environment and Quality (JACO)

Registration No.

EC01J0025

Registered facilities

Toyama Plant, Namerikawa Plant, Higashi-Toyama Plant
NACHI Machinery Engineering Co., Ltd.
NACHI Hokuriku Co., Ltd.



FY2023 performance and environmental targets for FY2024

Achieved Not achieved

Theme		FY2023 target	FY2023 performance	Rating	FY2024 target
1	Development of environmentally friendly, proprietary products	Development of environmentally friendly products FY2023 eco-friendly products 14 or more certified products (182 or more products in cumulative total)	Development of environmentally friendly products FY2023 eco-friendly products 14 or more certified products (cumulative total of 182 products)		Development of environmentally friendly products FY2024 eco-friendly products 14 or more certified products
2	(1) Contribution to a decarbonized society	Reduction of CO₂ emissions Per unit gross value-added emissions 2.44 t-CO₂/million yen or less (Emissions: 121,242 t-CO ₂ /year or less)	Reduction of CO₂ emissions Per unit gross value-added emissions 2.84 t-CO₂/million yen (Emissions: 116,085 t-CO ₂ /year)		Reduction of CO₂ emissions Per unit gross value-added emissions: 2.75 t-CO₂/million yen or less [3% decrease from FY2023 performance] (Emissions: 112,602 t-CO ₂ /year or less)
	(2) Reduction of groundwater consumption	Reduction of groundwater consumption Groundwater consumption 1,624,000 t/year or less	Reduction of groundwater consumption Groundwater consumption 1,655,000 t/year or less		Reduction of groundwater consumption Groundwater consumption: 1,624,000 t/year or less
3	Contribution to a recycling-oriented society Reduction of landfill waste and promotion of recycling	Company-wide landfill disposal rate: 1.0% or less (Final disposal: 181.0 t/year or less) Waste yard evaluation score 5.8 points or higher (out of 6)	Company-wide landfill disposal rate: 0.9% (Final disposal: 167.9 t/year)Waste yard evaluation score 5.9		Company-wide landfill disposal rate: 0.9% or less (Final disposal: 164.0 t/year or less) Waste yard evaluation score 5.8 or higher
4	Managing and reducing environmentally hazardous materials	Per unit consumption of PRTR-designated substances related to coating 2.65 kg-substance/t or less	Per unit consumption of PRTR-designated substances related to coating 2.61 kg-substance/t		Per unit consumption of PRTR-designated substances related to coating: 3.19 kg/t-substance or less (The impact of PRTR Law revision is taken into consideration)
5	Developing eco-conscious communities/human resources	<ul style="list-style-type: none"> Liaison meeting with neighborhood associations: once a year or more Cleaning of factory surroundings: three times a year Environmental education Environmental education: four times a year Environmental news: six times a year Disclosure of environmental information Promotion of participation in external environmental activities: at least once a year Due execution and review of emergency drill 	<ul style="list-style-type: none"> Liaison meeting with neighborhood associations: twice a year/Cleaning of factory surroundings: three times a year Environmental education Environmental education: four times a year Environmental news: six times a year Disclosure of environmental information Tree planting activities were not conducted Execution and review of emergency drill 		<ul style="list-style-type: none"> Liaison meeting with neighborhood associations: twice a year Cleaning of factory surroundings: three times a year Environmental education Environmental education: four times a year Environmental news: six times a year Disclosure of environmental information Promotion of participation in external environmental activities: once a year Due execution and review of emergency drill Regular environmental patrols

Note 1: CO₂ equivalent is consistently based on the following rate: [0.360 t-CO₂/1,000 kWh]

Development of environmentally friendly, proprietary products

We utilize a wide variety of technologies accumulated over the years to provide high-quality, eco-friendly products that meet various automation needs at manufacturing sites.

Robotics



To respond to various automation needs at production sites, we offer a lineup of industrial robots for a wide variety of applications, helping to sustain a broad range of manufacturing sites, from automobile to industrial machinery.

In addition to achieving high functionality and high performance, we also pursue energy conservation by downsizing equipment and increasing operational speed.

We will continue to develop eco-friendly products and contribute to automated manufacturing in various fields, including electric and electronic products, EMS, and industrial machinery.

Industrial robot SRA300

Features

Lightweight and energy-efficient vertical multi-joint robot with large payload capacity. The demand for aluminum welding has grown, partly due to the increasing adoption of EVs.

Welding guns are becoming larger to accommodate the high current required for aluminum welding. However, there is still a solid demand for lightweight and energy-efficient aluminum welding robots.

Weight reduction

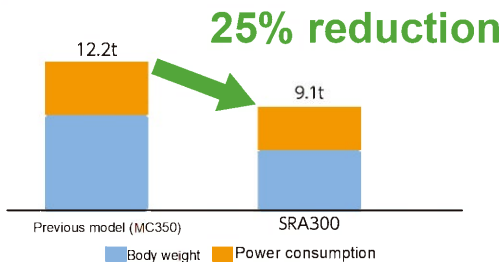
➔ This robot weighs 1,130 kg, 490 kg lighter than the previous model (MC350).

Power consumption reduction

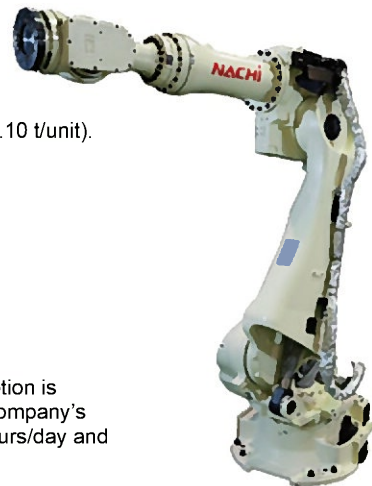
➔ The decrease in power consumption resulted in a 16% reduction of CO₂ emissions (*) compared to the previous model (MC350).

The reduction in weight and power consumption resulted in a 25% reduction in CO₂ (3.10 t/unit).

Annual CO₂ Emissions



* Operating power consumption is calculated based on the company's operation pattern of 16 hours/day and 250 days/year.



Industrial robot EC10

Features

High-speed, lightweight horizontal multi-joint robot

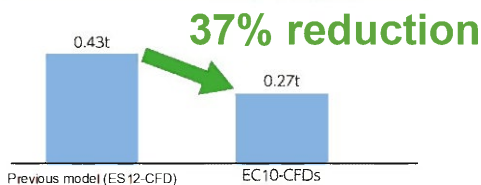
The demand for high-speed horizontal multi-joint robots is growing in the electrical and electronics industry.

Weight reduction

➔ This robot weighs 44 kg, 25 kg lighter than the previous model (ES12). The reduction in weight totals 33 kg when the controller unit is included.

The weight reduction resulted in a 37% reduction in CO₂ (0.16 t/unit)

Annual CO₂ Emissions



Mechanical Equipment <Cutting Tools>



Manufacturing sites are constantly striving to meet diverse needs, including improving production efficiency, reducing costs, and performing high-precision machining. In the field of cutting tools, NACHI-FUJIKOSHI contributes to the improvement of productivity by developing/commercializing high-precision and high-functional tools that can streamline processes. We also provide high-speed and high-feed tools that can raise processing efficiency.

AquaREVO Drills Burrless (AQRVDBL4D)

Features

The introduction of the Radius (R) Edge that eliminates burrs and the Center (C) Point reduced burrs at the exit hole and totally eliminated burrs at conical chips, minimizing the deburring process.

Burrless

- ➔ Compared to general-purpose drills, the burr height is now less than one-tenth that of general-purpose drills for general penetrating hole and cross hole drilling. The AquaREVO Drills Burrless completely eliminates the umbrella-shaped burrs that occur in more than 50% of cutting holes drilled with general-purpose drills. These burrless functions can eliminate or minimize the secondary deburring processes.



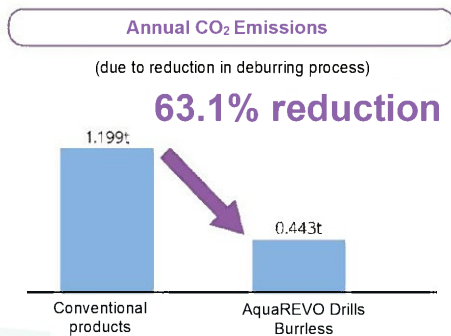
Stability and long life

- ➔ The cutting edge configuration, including the R edge, provides excellent chip separation and eliminates problems caused by chip elongation. The AquaREVO Drills Burrless ensures long life and stable burr control in the range of cutting conditions equivalent to those of general-purpose drills.

CO₂ reduction

- ➔ CO₂ emissions reduction by 63.1%

The CO₂ emissions reduction for 10 h x 240 days/year was 0.443 t, a reduction of 63.1% compared to conventional models.



CO₂ emissions reduction results

	Conventional products	AquaREVO Drills Burrless	Results
Power consumption (kWh/year)	2755	1018	▲1737
CO ₂ emissions (t/year)	1.199	0.443	▲0.76

Mechanical Equipment <Cutting Tools>

AquaREVO Mills Burrless (RVMBL4G-2.5D)

Features

The AquaREVO Mills Burrless introduces a double helical configuration, with the right helical cutting edge on the tool end and left helical cutting edge on the shank end. Regardless of the material being machined, the mill minimizes surface burrs and shortens the overall deburring process.

Burrless

➔ The double helical configuration with the right and left helical cutting edges provides stable processing, and the downward cutting force is generated on the top working surface to minimize surface burr.

Stable, chatter-free machining of the sides of thin sheets is made possible by offsetting the cutting resistance in the vertical working directions.

This has made it possible to shorten the deburring process.



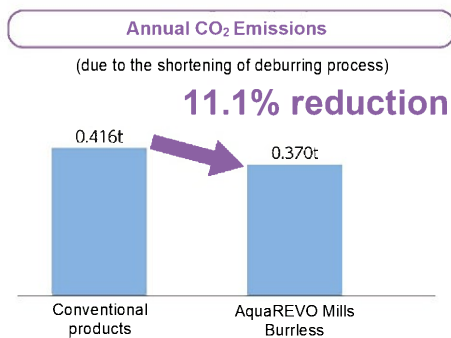
Long life

➔ The introduction of carbide materials and coating specially designed for end mills resulted in maintaining burrless performance on the top surface even when the cutting length is extended, achieving long tool life equivalent to that of general purpose end mills.

CO₂ reduction

➔ CO₂ emissions reduction by 11.1%

The CO₂ emissions reduction for 10 h x 240 days/year was 0.370 t, a reduction of 11.1% compared to conventional models.



CO₂ emissions reduction results

	Conventional products	AquaREVO Mills Burrless	Results
Power consumption (kWh/year)	741	659	▲82
CO ₂ emissions (t/year)	0.416	0.370	▲0.046

SG Spiral Tap Burrless (SGSPBL) SG Spiral Tap Burrless (Left hand) (SGSPBLL)

Features

The introduction of the shaving edge, which helps to form the shape while constraining the internal thread and the thread flank surface, succeeded in completely eliminating burrs on the internal thread. Eliminates the deburring process and reduces the reworking process.

Burrless and stable machining

- ➔ The introduction of the shaving edge served to eliminate burrs on the internal thread.
Eliminates the deburring process and reduces the reworking process.
Stabilizes the internal thread diameter during consecutive machining and eliminates substandard threads.

Long-life/Multi-purpose

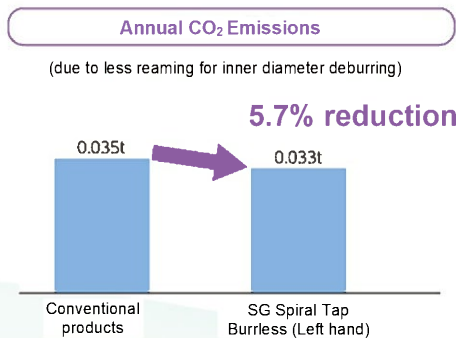
- ➔ Eliminates inner thread burrs on a wide range of work materials from general steel to stainless steel and aluminum.
The lineup includes spiral taps for through holes and blind hole drilling.



CO₂ reduction

- ➔ CO₂ emissions reduction by 5.7%

The CO₂ emissions reduction for 10 h x 240 days/year is 0.033 t, a reduction of 5.7% compared to conventional models.



CO₂ emissions reduction results

	Conventional products	SG Spiral Tap Burrless (Left hand)	Results
Power consumption (kWh/year)	80.00	75	▲5
CO ₂ emissions (t/year)	0.035	0.033	▲0.002

Mechanical Equipment <Cutting Tools>

Forming rack for hollow parts

Features

Enables roll-forming of hollow thin-walled shafts with very small modules (m0.3 to 0.4).
Minimizes the deformation of hollow holes, eliminating the need for post-process drilling.

Roll-forming of parts with hollow holes

➔ The special tooth configuration designed for hollow parts, combined with repetitive, two-way roll forming method, controls the deformation of hollow holes and ensures the dimensional accuracy of ultra-small modules, even with hollow parts.

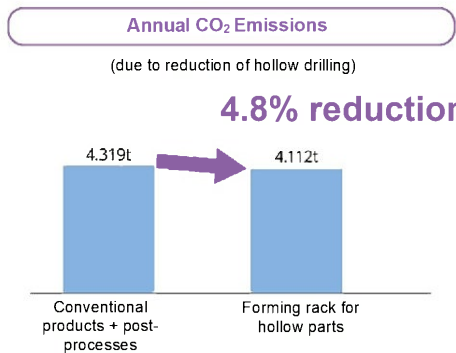


Reduction of post-process machining

➔ Enabled the roll forming of hollow parts, eliminating the need for post-process drilling of hollow holes, which was previously necessary, and reducing the number of processes from two to one.

CO₂ reduction

➔ CO₂ emissions reduction by 4.8%
The elimination of the post-processes reduces power consumption and CO₂ emissions.
The CO₂ emissions reduction for 10 h x 240 days/year is 4.112 t, a reduction of 4.8% compared to conventional models.



CO₂ emissions reduction results

	Conventional products + post-processes	Forming rack for hollow parts	Results
Power consumption (kWh/year)	9928	9453	▲475
CO ₂ emissions (t/year)	4.319	4.112	▲0.207

Mechanical Equipment <Machine Tools>



We have pursued human- and eco-friendly, high-speed advanced machine tools, and developed Japan's first broaching machines and a wide range of machine tools that are essential for ever-evolving production systems. In recent years, we have combined our comprehensive technologies to meet the diversified processing needs, including the commercialization of process-intensive, small-scale gear cutting machines that best match our proprietary cutting tools.

FS-C31, dedicated to FSW machining

Features

Stable welding accuracy is achieved by Power Meister's pressure control and position feedback control.

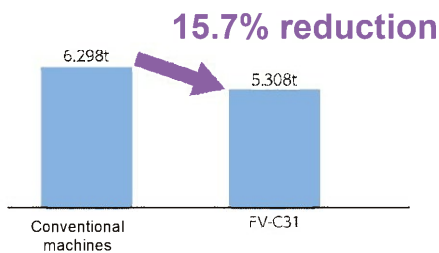
CO₂ reduction

➔ CO₂ emissions reduction by 15.7%

* The amount of reduction is calculated in comparison with conventional machines after converting power and oil consumption into CO₂ emissions.



Annual CO₂ emissions



CO₂ emissions reduction results

	Conventional machines	FV-C31	Results
Power consumption	6.160	5.193	▲0.967
Oil consumption	0.138	0.115	▲0.023
Total	6.298	5.308	▲0.990

* CO₂ equivalent (tCO₂e)

Components <Automotive Hydraulics>



We are working to develop compact, lightweight and high-efficiency solenoid valves for automobiles, pumps, and actuators to contribute to the development of more environmentally friendly vehicles. We strive to create environmentally friendly products through high-precision manufacturing using our machining technologies and efficient design using CAE.

Change in the configuration of proportional valve spacer

Features

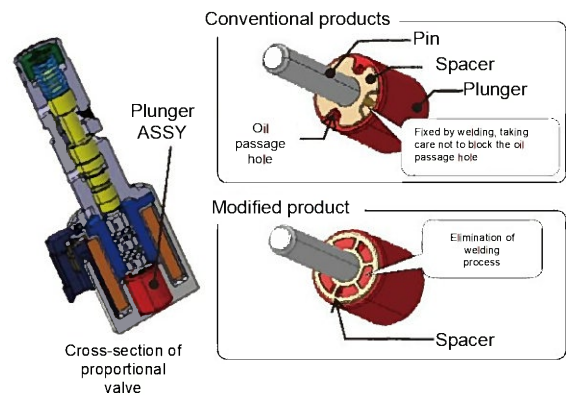
Elimination of welding process by changing the spacer configuration

Elimination of spacer welding

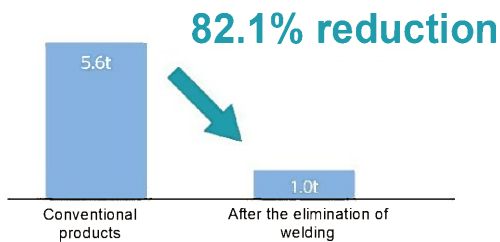
➔ In the conventional product, the spacer was fixed by welding, taking care not to block the oil passage hole. In the modified product, the spacer configuration has been revised so that the oil channel hole is open in each rotation phase, eliminating the need for welding.

CO₂ reduction

➔ Spacer weight reduction, elimination of welding, and other factors resulted in an 82.1% reduction in CO₂ emissions from spacer assembly processes.



Annual CO₂ emissions



CO₂ emissions reduction results

	Conventional products	After the elimination of welding	Results
CO ₂ emissions from spacer welding processes (t/year)	5.6	1.0	▲4.6

Components <Bearings>



Bearings make the movement of rotating parts of machines smooth and accurate. Bearings are used in many types of mechanical equipment: transport equipment such as automobiles, Shinkansen trains, ocean-going vessels, and aircraft; household appliances such as air conditioners; FA equipment such as robots and machine tools; large industrial equipment; and artificial satellites, substantially contributing to the reduction of energy loss caused by the friction of rotating parts. NACHI-FUJIKOSHI offers products that contribute to various fields, including automobiles and industrial machines, by using its technologies to extend bearing life, achieve high efficiency and downsize products.

Electrolytic corrosion-resistant bearings for electric vehicles

Features Bearing life is extended by using low-cost insulation technology developed for electric vehicles.

Longer life

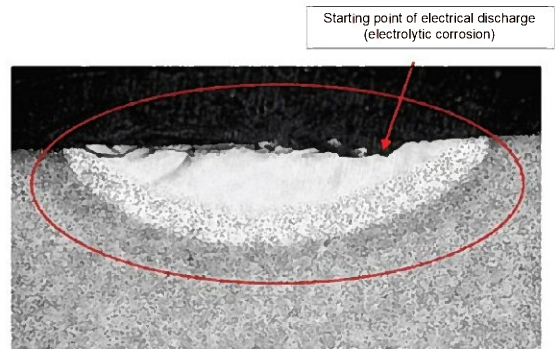
- ➔ Bearing life is extended by the use of low-cost insulation technology comprising solely of bearings developed for electric vehicles, even in conditions prone to electrolytic corrosion.
- ➔ Longer bearing life contributes to improvements in lifecycle CO₂

CO₂ reduction

- ➔ The electrolytic corrosion-resistant bearings are used in electric vehicles, contributing to CO₂ reduction.



Energization evaluation test results



Cross-sectional structure of electrolytic corrosion on the track surface

The standard product is energized during the energization evaluation test, but the newly developed product is not. By replacing conventional products with the newly developed product, premature bearing failure caused by electrolytic corrosion can be reduced at low cost and extend their service life.

Components <Hydraulic Equipment>



As a comprehensive hydraulic equipment manufacturer, our Hydraulics Division produces and sells various types of hydraulic equipment and offers products for various industries, ranging from machine tools to molding, forging press, and construction machines, etc.

Based on the concept of energy conservation, compactness, and high functionality, we offer eco-friendly hydraulic equipment that meets the needs of every industry.

UVN Series Variable Volume Vane Uni-pump in 13 designs

Features

Optimizes the gap inside the pump to improve energy efficiency performance

Controls the increase in oil temperature

- ➔ Controls the increase in oil temperature by reducing leakage from the inner gap. Prevents the deterioration of hydraulic operating fluid due to rising oil temperatures and extends the life of operating fluid.

	Conventional machines (UNV12 design)	Newly developed product UVN13 design	Results
Oil temperature (°C)	39.2	35.4	▲ 3.8

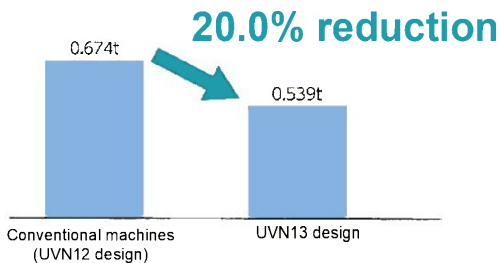
* Conditions: Saturated oil temperature during continuous full cut-off operation
 Tank capacity: 20 (L), ambient temperature: 20 (degrees), pressure: 5 (MPa).
 Specific heat of hydraulic oil: 0.45 (kcal/kg °C), specific gravity of hydraulic oil: 0.87



CO₂ reduction

- ➔ Improved power consumption during pump operation reduces CO₂ emissions by 20% compared to conventional pumps.

Annual CO₂ emissions



CO₂ emissions reduction results

	Conventional machines (UNV12 design)	Newly developed product UVN13 design	Results
CO ₂ emissions (t/year)	0.674	0.539	▲ 0.135

* Annual operating conditions: 10 hours/day x 240 days

Components <Hydraulic Equipment>

Two-Pressure Reducing Modular Valve OGS-G01 Series in 30 designs

Features

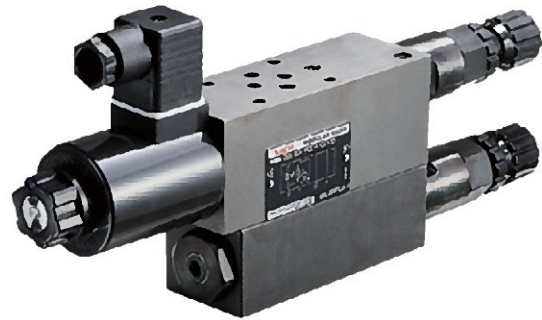
Improvements in energy efficiency lead to lower power consumption during use

Reduces power consumption during operation

- ➔ Model change of the solenoid section (improved efficiency of the electromagnetic circuit) reduces coil power consumption to 19.8W, which is 25% less than conventional models.

CO₂ reduction

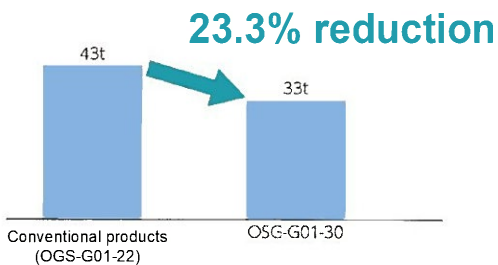
- ➔ CO₂ emissions are reduced by 23.3% compared to conventional products, including in the manufacturing phase of iron and copper, which are the main materials used.



Conventional products



Annual CO₂ emissions



CO₂ emissions reduction results

	Conventional products (OGS-G01-22)	OGS-G01-30	Results
Power consumption during operation (W/unit)	26.4	19.8	▲ 6.6
CO ₂ emissions (t/year)	43	33	▲ 10.0

Materials <Special Steels>



Our Material Division commercializes the DURO series for precision metal molds and highly functional materials EXEO series, etc., which leverage high-speed tool steels that are used as raw materials for cutting tools, cemented carbide materials, and special melting. In recent years, we have been developing materials that meet the technology needs of next-generation vehicles (EV, lightweight, and high-performance parts).

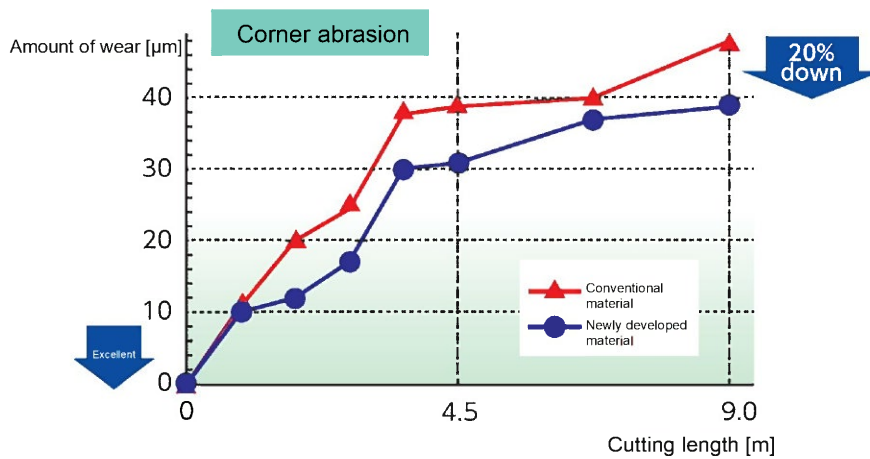
Diamond-coated drill material

Features

Wear resistance is improved compared to conventional materials by adjusting the amount of Co and additive elements.

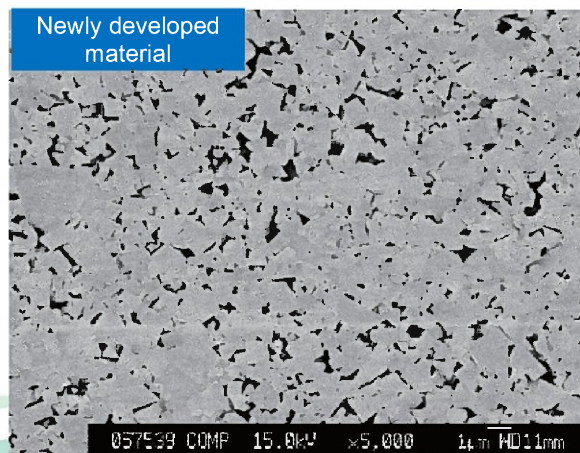
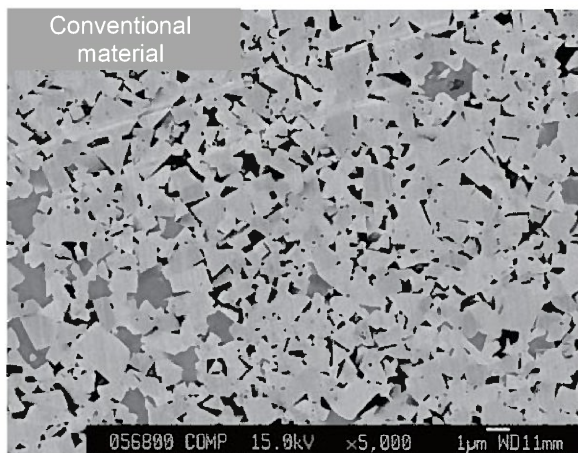
The life of diamond-coated drills that use the newly developed cemented carbide is 1.2 times longer than that of conventional drills.

The product achieves 20% less wear and 1.2 times longer tool life than conventional materials.



[Evaluating conditions]

Work material	Cutting speed (m/min)	Number of rotations (min ⁻¹)	Feed speed (mm/min)	Feed volume (mm/rev)	Feed rate %Dc	Depth of hole (mm)
CFRP	183	12000	1200	0.1	0.021	9 Penetrating hole



Materials <Thermo-Tech>



The Thermo-Tec Division manufactures industrial furnace products that are essential for metal production and PVD equipment for coating tools and molds to extend their service life. These heat treatment products are being enhanced with a focus on energy and resource conservation to reduce greenhouse gas emissions.

SMVP-1020 DLC coating equipment with MVP

Features

High-speed DLC coating equipment capable of handling small volume and large varieties.

Short treatment time with high speed processing

- ➔ Compared with conventional DLC coating equipment, SMVP-1020 achieves:
 - Up to 150 times faster processing speed (than conventional machines)
 - Approx. 35% reduction in power consumption

The compact model offers the same mass production performance as conventional machines.

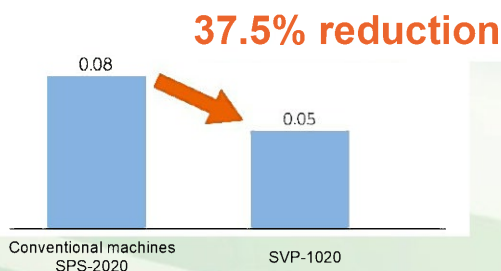
- ➔ Despite its compact size, SMVP-1020 achieves the same mass production performance as conventional machines with its ability to repetitively process small lots in a short time.



Enables the coating of the inner surface of small holes

- ➔ Equipped with the MVP method* that uses microwaves
SMVP-1020 is now capable of coating the inner surface of small holes, a task that was difficult in the past.
- * MVP (Microwave-sheath Voltage combination Plasma) is a film deposition technology using microwaves.

CO₂ emissions (per unit of treated product)



CO₂ emissions reduction results

	Conventional machines SPS-1020	SMVP-1020	Results
Power consumption (MWh/year)	8.9	5.8	▲ 3.1
CO ₂ emissions (t/year)	3.2	2.0	▲ 1.2

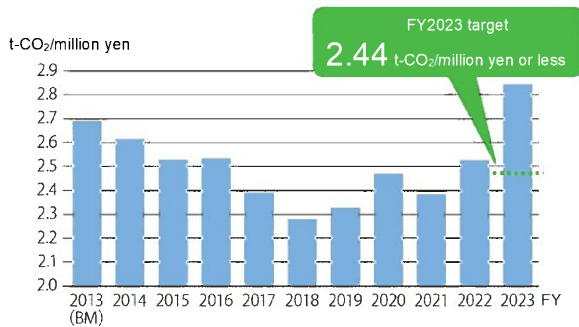
40,000 units treated in one year

Contribution to a decarbonized society

All our plants work to reduce total CO₂ emissions by optimizing equipment operation and installing energy-saving equipment. In FY2023, we achieved our target for CO₂ emissions. However, our figures for per unit gross value-added emissions exceeded the target due to the effects of higher energy and raw material prices.

In FY2024, we will do our best, based on the medium-term energy conservation plan, to make capital investment and conduct energy-saving activities to reduce energy consumption.

Per unit gross value-added CO₂ emissions (per year)



Trends in total CO₂ emissions (per year)



[FY2023 performance]

Per unit CO₂ emissions

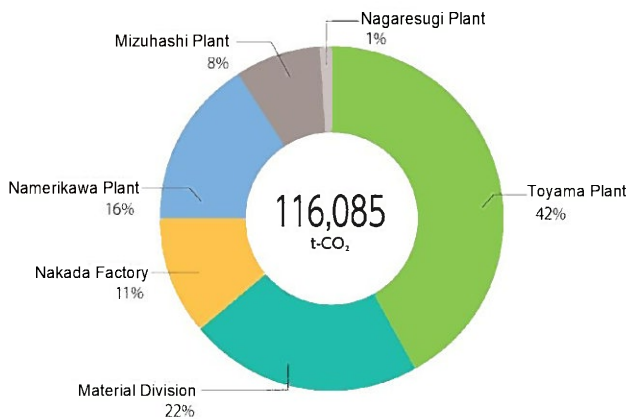
2.84 t-CO₂/million yen
(+16.4% compared to the plan)

CO₂ emissions

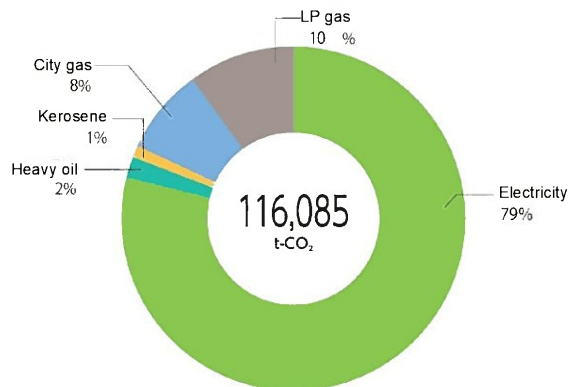
116,085 t-CO₂/year
(- 4.3% compared to the plan)

We did not achieve our target for per unit CO₂ emissions.
We achieved our target for CO₂ emissions.

Ratio of CO₂ emissions by plant (FY2023)



Ratio of CO₂ emissions by energy (FY2023)



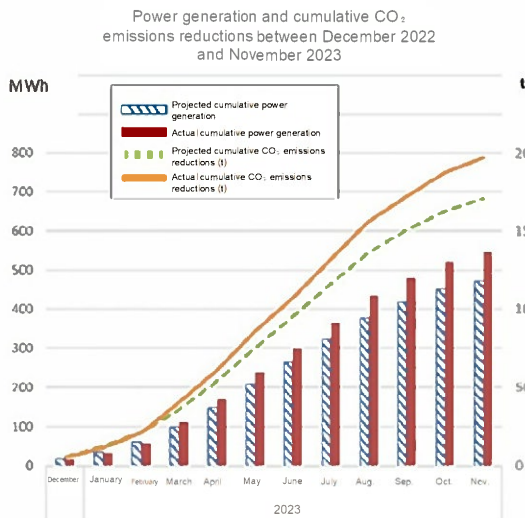
[Energy conservation efforts]

- Shift to LED lighting equipment
- Replacement of lighting equipment in plants (1,819) with LED (reduction of 121.8 t-CO₂/year)
- Strict enforcement of turning off processing machinery and equipment in accordance with operating conditions (reduction of 296.8 t-CO₂/year)
- Replacement of electrical room transformers with energy-saving models (reduction of 10.6t-CO₂/year)
- Reduction of CO₂ emissions with the use of renewable energy (on-site solar power generation) (reduction of 197 t-CO₂/year)

As a contribution to a decarbonized society, efforts beyond the level of conventional energy conservation are required.

(1) Promotion of the introduction of solar power generation

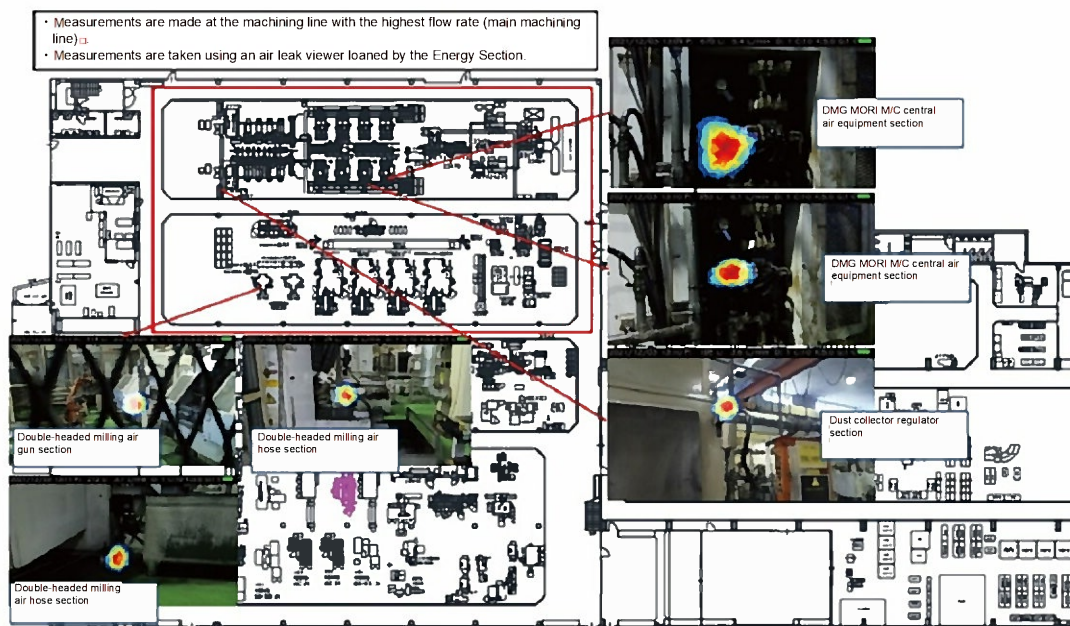
As part of our efforts to decrease our environmental footprint, we installed solar power generation facilities on the roof of the robot assembly plant at our Toyama Plant, which resulted in a reduction of 197 t-CO₂ per year. We plan to expand such facilities further in the future.



(2) Air leak repairs

Air leak viewers facilitated the detection of air leak locations, which further promoted air leak repairs. In FY2023, we conducted air leakage surveys at all 40 of our plants, with 574 cases detected and 563 cases repaired (98.1%).

Improvements will be made to promptly repair any locations where air leaks are detected.

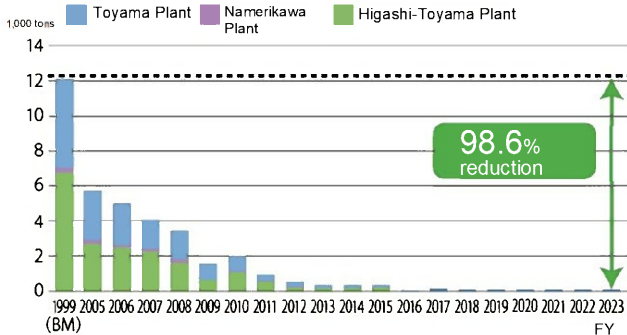


Contributing to a recycling-oriented society (Reduction of landfill waste and promotion of recycling)

Continued and enhanced efforts for recycling

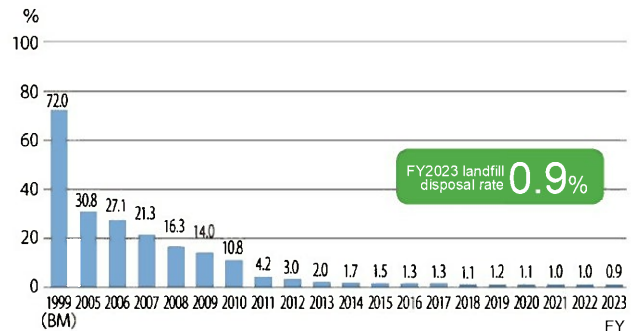
The waste collected from green stations (primary segregated waste storage within each factory) installed at each workplace is sorted and transported to the green yard (final segregated waste storage within the factory). From there, the waste is consigned to the contracted companies for disposal.

Trends in waste landfill disposal (per year)



To effectively use resources and save landfill space, we are working to minimize the landfill disposal volume. In FY2023, we successfully reduced the volume of landfill disposal by 98.6% compared to the benchmark (BM).

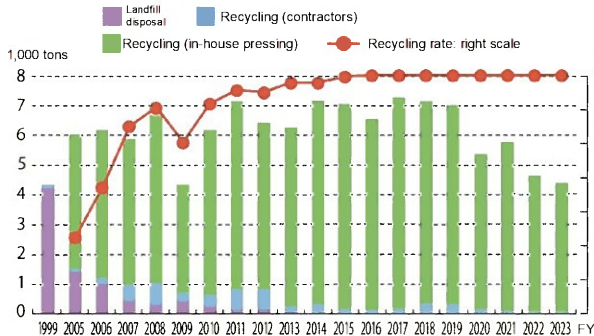
Trends in waste landfill disposal rate* (per year)



The landfill disposal rate* is substantially reduced from 72.0% (BM) to 0.9% after the reduction of residuals enabled by changing the intermediate treatment methods for waste liquid and sludge, dehydration presses for grinding sludge, and the recycling of soot dust.

* Definition: Landfill disposal rate = (Landfill disposal volume / Total waste generation volume) x 100

Trends in grinding sludge generation and recycling (per year)



Promotion of recycling by strictly segregating grinding sludge

Grinding sludge accounts for nearly one-third of the total waste generated. We recycle 98.8% of our grinding sludge by solidifying it within our company and consigning the remainder to external contractors. We continue to recycle 100% (no landfill disposal) of metal grinding powder. In preparation for unexpected stoppage of press machines, we supplied spare parts and carried out maintenance in a planned manner to recycle metal grinding powder and contribute to profits.

$\frac{\text{In-house recycling of metal grinding powder} + \text{In-house solidification (valuables)}}{\text{Metal scraps generated (metal grinding powders)}}$	$\frac{\text{Recycling of metal grinding powder} = \text{Recycling by contractors (waste)} + \text{In-house solidification (valuables)}}{\text{Metal scraps generated (metal grinding powders)}}$
------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Metal grinding powder sludge is recycled as a steel material.

Major efforts to reduce the residual landfill rate and contribute to profits

(1) Efforts to recycle soot dust

We continue to recycle soot dust, which accounts for approximately 60% of the company's total landfill volume. Of the total landfill volume of 150 tons, we have recycled approximately 21.9 tons/year as a raw material for concrete.

(2) Cost reduction by promoting the separation of confidential documents

We reviewed the method of separating and disposing of confidential documents. By promoting awareness of document separation and introducing shredders, we have made progress in turning waste paper, which would otherwise incur disposal costs, into a valuable resource, resulting in a reduction in the amount of waste generated and disposal costs.

Amount of confidential documents generated in FY2023

53.8% (2.1t/month) reduction in FY2022
Disposal costs: 45.1% reduction in FY2022

Assessment of management status of GY (green yard)/GS (green station) and efforts to raise environmental awareness

We have been working to raise awareness on sorting, tidying and cleaning waste at waste yards for various departments.

Our performance score was 5.6 in 2022, failing to achieve our target score of 5.8. We therefore strengthened our improvement activities to improve the management of waste yard conditions. As a result, our evaluation score improved in FY2023 to 5.9, achieving the target. In future, we will continue to promote educational activities and the evaluation of GS/GY management status.



On-site inspection of waste disposal contractors

When conducting on-site inspections of waste disposal contractors, we prepare a site inspection plan and ensure that waste is being disposed of responsibly. In FY2023, considering the COVID-19 infection conditions, we conducted on-site inspections of four waste contractors, primarily in neighboring prefectures.



Managing and reducing environmentally hazardous materials

Reduction of chemical substances

We have consistently worked to reduce the use of PRTR-designated substances.

We completely eliminated the use of ozone-depleting dichloropentafluoropropane contained in degreasers in FY2003 and potentially human-hazardous dichloromethane contained in oil cleaners, coating materials, and test agents in FY2005.

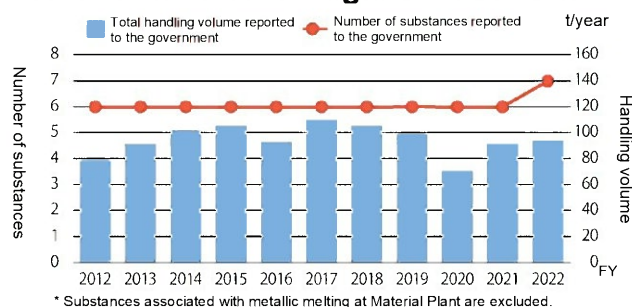
We have also promoted the replacement of other PRTR-designated substances with safer materials and successfully reduced the number of hazardous items and handling volume until the FY2009 notification.

Following the revision of the PRTR Law in November 2008, the number of substances that require us to manage their handling volume increased from the fiscal year ended March 2009. As a result, the list of managed substances was expanded to six with the addition of three substances: methylnaphthalene, 1,2,4-trimethylbenzene, and N,N-dicyclohexylamine, which are found in Heavy Oil A, certain grinding fluids and anticorrosive agents, to the three substances already subject to management (toluene, xylene, and ethyl benzene, which are found in coating materials and cleaning oil or kerosene). The number of substances that require reporting had remained the same at six since FY2010, but n-Hexane, which is used in processes experiencing production increase, was added in FY2022.

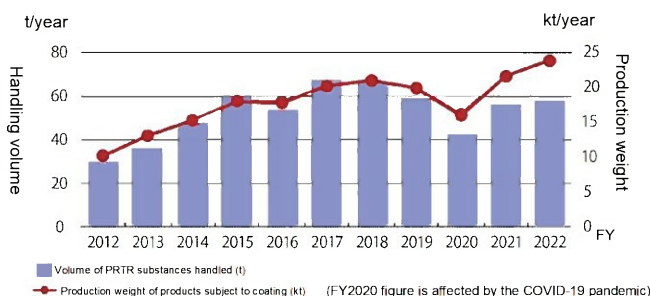
In terms of the handling volume, coating accounted for the largest share by application (approximately 60% in the last eight years), which had a significant impact on the trends of the overall handling volume. In FY2012, the handling volume experienced a temporary decrease due to the replacement of certain paints with TX (toluene/xylene)-free alternatives. However, between FY2013 and FY2017, the volume increased as a result of higher production levels. Starting from FY2018, we have made deliberate efforts to resume the use of an alternative coating agent and minimize the use of thinners in the coating preparation process. These efforts have yielded some positive results.

The new, revised law came into effect on April 1, 2023. Three substances (diethanolamine, ethylene glycol mono-n-butyl ether, and methyl isobutyl ketone) are expected to be added to the notification list, which we estimate will increase the volume handled by at least 17 tons per year, especially for grinding applications. In FY2023, we will ensure that our tabulation will include these new substances.

Trends in PRTR-designated substances



Trends in the handling volume of PRTR substances in coating processes



FY2022 PRTR report summary

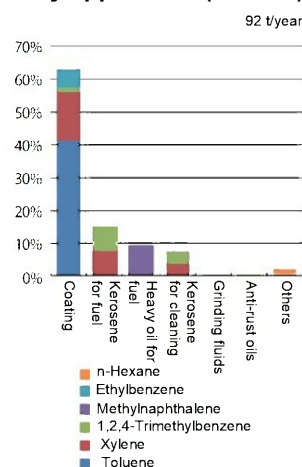
(Unit: kg)

Subject facility	Chemical substance	Handling volume (t/year)	Main usage	Discharge to air	Discharge to water	Amount of waste
Toyama Plant	Xylene	3,223	Cleaning and painting	3,208	0	1
	N,N-Dicyclohexylamine	2,569	Grinding	0	0	2,569
	1,2,4-Trimethylbenzene	4,135	Cleaning and rust-proofing	4,135	0	0
	Toluene	4,077	Coating	4,064	0	0
Namerikawa Plant	Methylnaphthalene	1,357	Fuel	7	0	0
	Ethylbenzene	1,725	Coating	1,720	0	0
Higashi-Toyama Plant (Nakada Factory)	Xylene	7,104	Coating and fuel	6,735	0	21
	Toluene	18,592	Coating	18,536	0	0
	Ethylbenzene	3,652	Coating	3,641	0	0
	Xylene	7,085	Coating and fuel	5,662	0	18
	1,2,4-Trimethylbenzene	2,086	Fuel and coating	710	0	0
Higashi-Toyama Plant (Material Plant)	Toluene	16,141	Coating	16,093	0	0
	n-Hexane	1,427	Others	0	0	610
	Xylene	5,364	Fuel	27	0	0
[Metallic melting processes]	1,2,4-Trimethylbenzene	6,189	Fuel	31	0	0
	Methylnaphthalene	7,575	Fuel	38	0	0
	Chromium and trivalent chromium compounds	—	—	0	0	8,210
	Cobalt and its compounds	—	—	0	0	1,187
	Manganese and its compounds	—	—	0	0	7,796
	Molybdenum and its compounds	—	—	0	0	5,383

Calculation period April 1, 2022 - March 31, 2023
 PRTR-designated substance group PRTR Law (Class 1)
 Handling volume 1,000 kg or more

* PRTR Law: Act on Confirmation, etc., of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (promulgated in July 1999, enforced in April 2000, and revised in November 2008)
 PRTR (Pollutant Release and Transfer Register): Pollutant Release and Transfer Register Report to the government: 462 items of designated chemical substances under PRTR Law Class 1 (content: 1% or more; handling volume: 1 t/year or more)

Breakdown of substances by application (FY2022)



Efforts to prevent pollution

In addition to regulatory requirements, the Toyama Plant and the Higashi-Toyama Plant (Material Plant) have concluded an agreement on pollution prevention with Toyama City. These two plants set limits for wastewater, air, vibration and noise pollution that are equal to or stricter than the regulatory requirements, regularly monitor their emissions, and report the findings to Toyama City. The Namerikawa Plant has also concluded a comprehensive agreement on pollution prevention with Namerikawa City.

● Prevention of air pollution

Sulfur oxide (SOx), nitrogen oxide (NOx), soot dust and other substances

Boilers and furnaces in factories generate sulfur oxide (SOx), nitrogen oxide (NOx), and soot dust. In addition to daily inspection of equipment, we periodically monitor and analyze the exhaust air to ensure that limits are not exceeded.

The Toyama Plant is a specified factory with exhaust gases of less than 40,000 m³/hour, and the Higashi-Toyama Plant (Material Plant) is a specified factory with exhaust gases of more than 40,000 m³/hour. The two plants do not have a specified facility for hazardous substances.

Restrictions on volatile organic compounds (VOCs)

Some substances contained in paints, thinners, and cleaning oils are discharged into the air as VOCs.

Although we do not have a facility subject to regulatory restriction (100,000 m³/hour or more), we voluntarily measure VOC concentration at least once a year at our facilities that discharge VOC.

In addition, since a large amount of VOCs are discharged from the coating process, we are making efforts to reduce the amount discharged by considering changing the coating agent used in water-based agents and changing the thinners used for cleaning in water-based cleaning fluids.

Limit agreed with Toyama City

Major measurement items	Toyama Plant		Higashi-Toyama Plant (Material Plant)		
	Liquid-combustion boiler	Gas-combustion boiler	Boiler	Electric furnace	Heating furnace
Sulfur oxide (SOx)	According to the Atmospheric Environment Control Plan of Toyama Prefecture				
Nitrogen oxide (NOx)	180ppm	100ppm	130ppm	-	150ppm
Soot dust	0.15g / Nm ³	0.08g / Nm ³	0.10g / Nm ³	0.10g / Nm ³	0.20g / Nm ³

In FY2023, we did not exceed the emissions standard.

● Prevention of water pollution

Both Toyama Plant and Higashi-Toyama Plant (Material Plant) are specified factories that discharge less than 10,000 m³/day of wastewater. The two plants have a specified facility for hazardous substances.

The primary environmentally hazardous substance contained in waste water is oil. In addition to control measures at the source, we collect and dispose of trace amounts of oil in wastewater using an oil-water separation tank and absorption mat. Other alkaline, iron-rich waste liquids are appropriately treated with neutralization and flocculation before discharging.

(Unit: mg/l)

Major measurement items	Agreed limit	Voluntary standard [Same for Toyama and Higashi-Toyama]	Result (normal times)	
			Toyama Plant (Main gate north drainage) Approx. 7,000 m ³ /day	Higashi-Toyama Plant (Material Plant) Approx. 3,000 m ³ /day
Hydrogen-ion concentration (pH)	6.0 to 8.0	6.8 to 7.8 / 6.5 to 7.8	7.1 to 7.4	6.7 to 7.6
Biological oxygen demand (BOD)	20	16 / 10	5.0 to 16	0.7 to 2.2
Suspended solids (SS)	50	25	1 to 7	2 to 6
Normal hexane extracts content (Mineral oils)	3	3 / 2.4	0.3 to 1.3	0.2 to 1.4
Soluble iron content	3	0.9 / 1.5	<0.1* to 0.2	<0.1* to 0.6
Chromium content	0.5	0.15	<0.04*	<0.04*
Cyanogen compound (as cyanogen) hazardous substance	0.1	0.05	<0.01*	-

In FY2023, we did not exceed the factory effluent standard.

* Smaller than the detection limit

● Prevention of noise and vibration

The Toyama Plant and the Higashi-Toyama Plant (Material Plant) are adjacent to residential areas. We therefore periodically monitor noise and vibration on the boundary line of the sites and report the results to Toyama City.

This measurement is not required by law.

At the Materials Plant, regular voluntary noise measurements at fixed points on the premises have been conducted continuously since FY2018 to detect signs of abnormal noise during nighttime operations.

* Agreed limit: Regulation value 1: Toyama Plant north side, Higashi-Toyama Plant (Material Plant) east, west and south sides
Regulation value 2: Toyama Plant east, west and south sides, Higashi-Toyama Plant (Material Plant) north side
In FY2023, we did not exceed the noise and vibration standards.

Legal regulatory limit at the boundary line of the site (Unit: dB)

Time zone	Agreed limit 1	Agreed limit 2
Daytime 8:00 to 19:00	70	65
Morning and evening 6:00 to 8:00, 19:00 to 22:00	65	60
Night-time 22:00 to 6:00 next day	60*	55

Developing eco-conscious communities/human resources

Received the 2023 Encouragement Award of the “CHO” MONODZUKURI Innovative Parts and Components Award

The “CHO” MONODZUKURI Innovative Parts and Components Award is selected and presented by the Monodzukuri Nihon Conference and the Nikkan Kogyo Shimbun to support the enhancement of the competitiveness of Japanese manufacturing. The award recognizes components and parts that have been developed and commercialized by the applicant companies and that have contributed "behind the scenes" to the advancement of industry and society.

The demand for stainless steel is growing worldwide, spurred by its use in various applications, including household appliances such as washing machines and dishwashers, industrial equipment such as power generation and chemical plants, and even hydrogen stations. This is due to its superior corrosion resistance, heat resistance and durability. On the other hand, it is known as a material that is difficult to machine due to several problems: chips tend to get caught and jammed, work hardening occurs easily, increasing cutting resistance, and thermal conductivity is low, resulting in heat accumulation on the cutting edge of the tool.

Our carbide end mill, AQUA REVO Mill for Stainless Steel, features a newly developed groove shape called the Air Flute, which achieves high efficiency and long tool life when machining stainless steel. This is made possible by its exceptional chip removal and cooling effect.

The award was given in recognition of its extended tool life, which is three times that of other general purpose end mills, improved surface finish, high efficiency and versatility in machining a wide range of work materials, including titanium alloys and heat-resistant alloys in addition to stainless steels.



AQUA REVO Mill for Stainless Steel

Received the 2023 Monozukuri Award of the Best 10 New Products Award

Our high-speed, high-precision collaborative robot CMZ05 and Teaching system Nachi Tablet TP were selected for 2023 Monozukuri Award of the Best 10 New Products Award.

●Nachi Tablet TP offers intuitive smartphone-style usability. Equipped with a screen design and easy-to-follow instructions to help users unfamiliar with robots, the tablet reduced the setup time for beginners from approximately 20 minutes to 10 minutes.

●The CMZ05 is a compact collaborative robot with greatly improved safety and operability, while maintaining the high-speed, high-precision performance of the best-selling industrial robot on which it is based. Its maximum speed is 1,000 millimeters per second during collaborative operation and 2,500 millimeters per second during non-collaborative operation. Its position repeatability is ± 0.02 mm, which means it can be used in assembly and other processes that require precision. As a start-up robot, the CMZ05 contributes to productivity improvements through its leading-edge high speed and high precision.

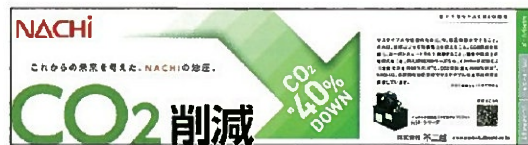


Japan Industrial Advertisement Award

In November 2023, our NSPi Series, Powermeister, SE/SED Series G01-40 Design received an Honorable Mention in the Series Advertising Award in the Newspaper category, while our Aqua REVO Mill for Stainless Steel received an Honorable Mention in the Newspaper Category, Part 4 and Magazine Category at the 2023 (58th) Japan Industrial Advertising Awards, which is selected by the Nikkan Kogyo Shimbun, Ltd.

Honorable Mention in the Series Advertising Award in the Newspaper category

Honorable Mention in the Newspaper Category, Part 4



Participation in Forestation Volunteer Activities

On May 27 and June 11, 2023, the Toyama Branch of OISCA organized a forestation event called the "Green Satoyama Conservation Forestation Activities 2023" in Iwakuraji Tenbayashi area in Tateyama Town. On May 27, under the early summer sun, 38 people, including our employees, worked hard to cut the undergrowth that had grown up to their waists. On June 11, in the pouring rain, 90 people, including Boy and Girl Scouts, planted 150 tree saplings, including konara, cherry, chestnut, and beech. We will continue to engage in activities aimed at achieving a sustainable future.



Contribution to local environment

With the aim of contributing to the local environment and raising awareness of environmental management, our employees participate in cleaning activities around the plants.



National Examination for Pollution Control Managers

Designated factories are required to improve the layout of facilities that generate noise and/or vibration, control the pollution level of wastewater and underground seepage water, the amount of soot dust and concentration of specified dust, and the level of dioxins in exhaust gases and water to meet the standards. Entities are required to appoint a manager from among those qualified by the national examination for the proper management and operation of the relevant facilities and execution of measurements

Although we are meeting our commitments in terms of the number of qualifiers, we are providing support to those who wish to obtain a qualification in order to address the growing age disparity among qualifiers. In FY2023, five of our employees passed the examinations for Class 1 Pollution Control Manager (water quality, 1 person), Pollution Control Manager (noise and vibration, 2 people), and Pollution Control Manager (dioxin, 2 people).

The logo for NACHI, featuring the word "NACHI" in a bold, red, sans-serif font. The letter "A" is stylized with a triangle inside it.

NACHI-FUJIKOSHI CORP.

TQC/TPM Promotion Headquarters (promotion of environmental improvement)

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