



NACHI-FUJIKOSHI CORP.

Environmental Report 2023

Recognizing the conservation of the global environment as a critical issue for all human beings, NACHI-FUJIKOSHI Toyama, Namerikawa, and Higashi-Toyama plants will promote improvement activities for a better global environment through monozukuri (manufacturing) of cutting tools, machine tools, robots, bearings, hydraulic equipment, automotive hydraulics, special steels, industrial furnaces, and so forth.

- 1. We will consistently be aware of the impacts caused by our business activities on the environment and continuously improve our environmental management system (EMS) to prevent pollution, promote 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 world-class eco-friendly 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.**

December 1, 2022

NACHI-FUJIKOSHI CORP.

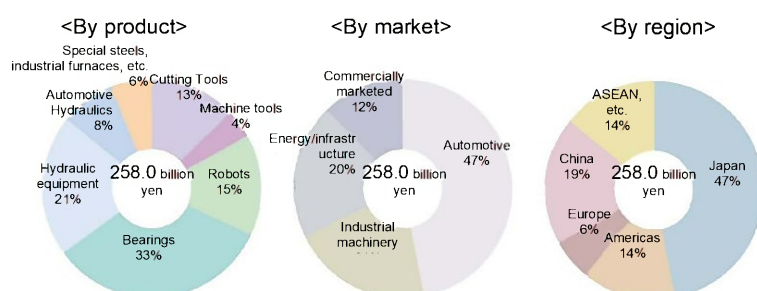
Environment Administrator **Shinichi Momonoi**

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	258 billion yen (including overseas sales 136.4 billion yen)		
Consolidated subsidiaries	52 companies 22 domestic companies (comprising 3 engineering companies, 5 sales companies, 12 manufacturing companies, and 2 service companies) 30 overseas companies (comprising 14 sales companies and 16 manufacturing companies)		
Consolidated number of employees	7,260 with 53 companies (including 3,230 with parent entity)		
Major products	Mechanical equipment	Cutting tools, forming tools, cutting saws, machine tools, and machining systems	
	Robots	Robots, robot systems, and electronic equipment	
	Components	Bearings, hydraulic equipment, and automotive hydraulics	
	Materials	Special steels, coating, and industrial furnaces	

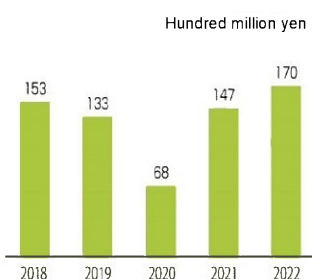
Breakdown of net sales (consolidated)



Net sales (consolidated)



Operating income (consolidated)



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Leading innovations in manufacturing using world-class

As a comprehensive machinery manufacturer with its 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



Materials

Special steels



Thermo-Tech



Heat treatment,
surface modification

Cutting, cutting-off, shaping

Materials, heat treatment,
near-net shape

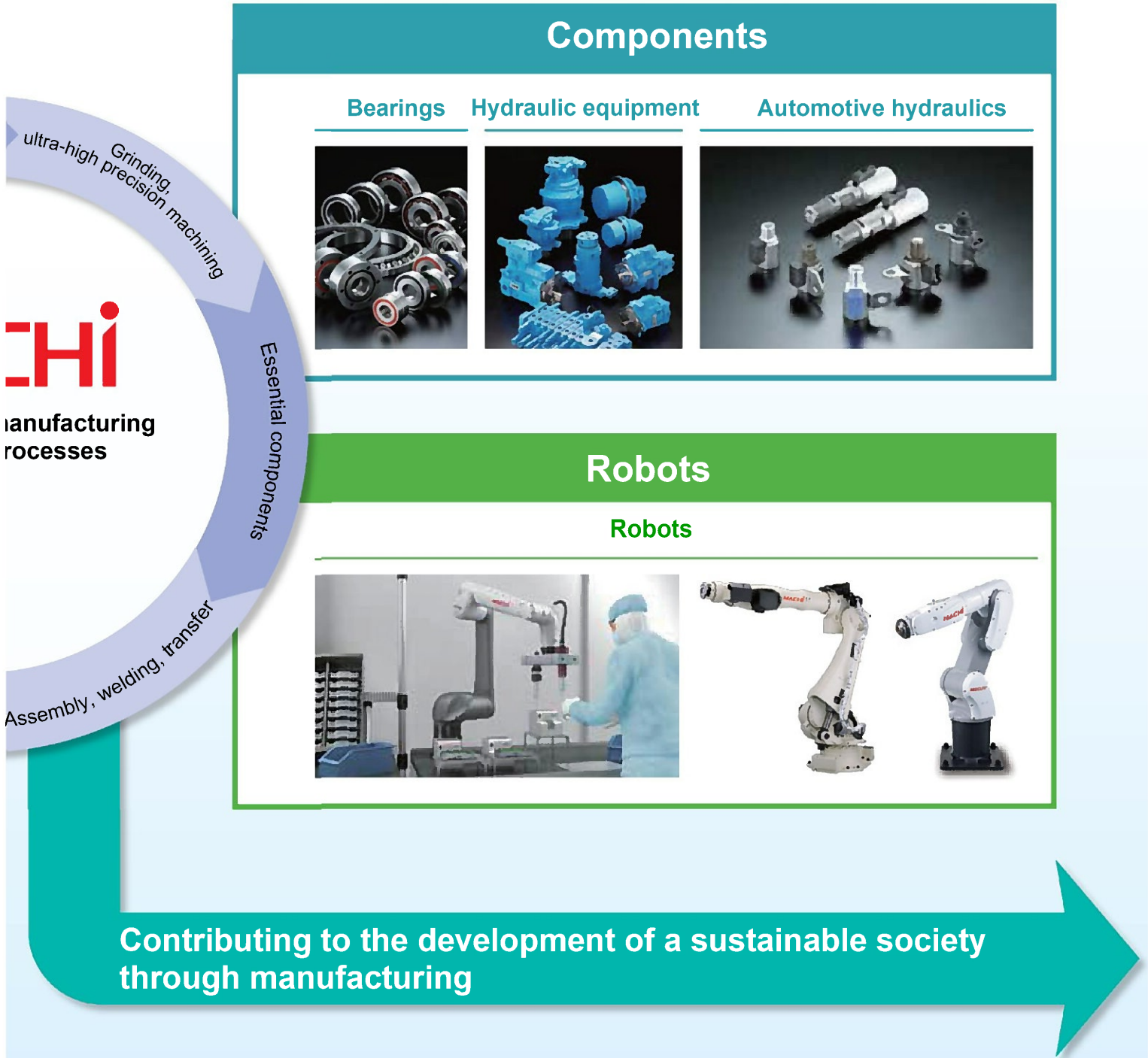


Contribution

Corporate mission

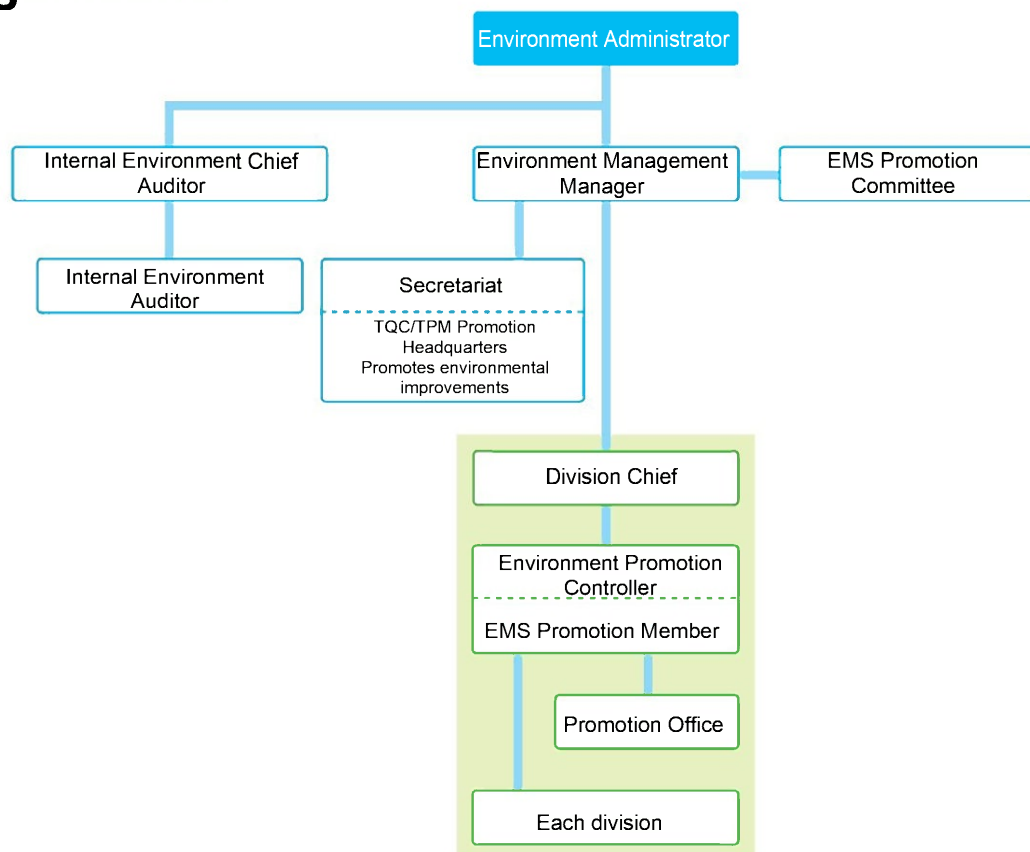
Contributing to the progress of the world of manufacturing

technologies with robotics at its core



Environmental management

Organization



Audit and assessment

Through internal audit performed by our own staff and external audit performed by a third-party organization, we continuously reduce our environmental burden 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**

Through education and training inside and outside of the company, we support internal environment auditors and enhance their capabilities.

Number of qualifiers in environmental management

(As of January 2023)

Qualification name	Qualified persons	Required number
Pollution Control Manager (Air)	18	4
Pollution Control Manager (Water Quality)	32	4
Pollution Control Manager (Noise)	29	4
Pollution Control Manager (Vibration)	25	4
Pollution Control Manager (Dioxin)	7	1

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

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. We introduced a grinding sludge solidification system.
2002	Our 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 of our 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	Our two domestic subsidiaries obtained ISO 14001 certification.
2007	Our Toyama Plant received the Award of the Commissioner of the Fire and Disaster Management Agency.
2008	Our hydraulic variable pump units received the JMF's President Award for Excellent Energy-Efficient Machinery from Japan Machinery Federation (JMF). Our Toyama Plant received the Toyama Prefectural Governor Award for Excellent Energy Management Factory.
2009	Our Higashi-Toyama Plant's Material Plant received the Toyama Prefectural Governor Award for Excellent Energy Management Factory.
2010	Our Toyama, Namerikawa, and Higashi-Toyama plants and 10 domestic subsidiaries received the third periodic audit and renewed their ISO 14001 certification.
2011	We started disclosing the reduction of CO ₂ emissions achieved by our customers using 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-Product 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 Cutting & Wear-resistant Tool Association (JTA).
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	The NPR-FX25 screw parts for fluoropolymers received the "CHO" MONODZUKURI Innovative Parts and Components 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 compact 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.

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

Auditor

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., and NACHI Hokuriku Co., Ltd.



FY2022 performance and FY2023 targets

BM: benchmark



Achieved;



Partially achieved;



Not achieved

Theme		FY2022 target	FY2022 performance	Rating	FY2023 target
1	Launching eco-friendly new or improved products	Development of eco-friendly products FY2022 eco-friendly products 13 or more certified products (167 or more products in cumulative total)	Development of eco-friendly products FY2022 eco-friendly products 14 certified products (168 products in cumulative total)		Development of eco-friendly products FY2023 eco-friendly products 14 or more certified products
2	Contribution to a decarbonized society	Reduction of CO₂ emissions Per unit gross value-added emissions: 2.32 t-CO₂/million yen or less (Emissions: 126,182 t-CO ₂ /year or less)	1. Reduction of CO₂ emissions Per unit gross value-added emissions 2.52 t-CO₂/million yen (Emissions: 124,542 t-CO ₂ /year)		1. Reduction of CO₂ emissions Per unit gross value-added emissions: 2.44 t-CO₂/million yen or less 3% decrease from FY2022 performance (Emissions: 121,242 t-CO ₂ /year or less)
	Reducing groundwater consumption	Reduction of groundwater consumption Groundwater consumption: 1,624,000 t/year or less	2. Reduction of groundwater consumption Groundwater consumption: 1,673,000 t/year		2. 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: 170.1 t/year or less)	Company-wide landfill disposal rate: 1.0% (Final disposal: 186.1 t/year)		Company-wide landfill disposal rate: 1.0% or less (Final disposal: 181.0 t/year or less)
4	Managing and reducing environmentally hazardous materials	Per unit consumption of PRTR-designated substances related to painting: 2.67 kg-substance/t or less	Per unit consumption of PRTR-designated substances related to painting: 2.44 kg-substance/t		Per unit consumption of PRTR-designated substances related to painting: 2.65 kg-substance/t or less
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 have not been 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 world-class eco-friendly 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.

Robots

CONCEPT

To respond to various automation needs at production sites, we offer a lineup of industrial robots for a wide variety of uses, 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 developing eco-friendly products and contribute to automated manufacturing in various fields, including electric and electronic products, EMS, and industrial machinery.

Industrial robot MZ10LF

Features

The MZ10LF, a lighter model (55 kg) with long reach (1202 mm) and 10 kg maximum payload, is added to the MZ series launched in 2013.

High precision

➔ High precision position repeatability at ± 0.025 mm

CO₂ reduction

➔ CO₂ reduction of 43% from conventional model MZ12 is achieved by reducing weight and operating power consumption.

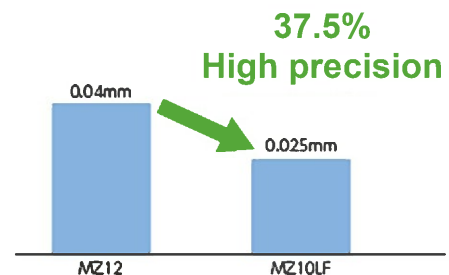
* Operating power consumption is calculated based on the company's operation pattern of 16 hours/day and 250 days/year.



Annual CO₂ emissions



High precision



Robot controller CFDq

Features

The CFDq, the world's smallest controller for small robots, is being introduced to the market. The controller can be used in combination with robots to build more compact production lines.

Controller model	CFD	CFDs	CFDq
Volume L	31	12	6
Weight kg	17	9	5



Mechanical Equipment <Cutting Tools>

CONCEPT

At manufacturing sites, efforts to respond to various needs, such as improvement of production efficiency, cost reduction, and high-precision machining, are always required.

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 improve processing efficiency.

DLC drill with diminishing helix angle (DLCDL-4D)

Features

High precision and long life are achieved with the adoption of an excellent chip evacuation flute for high feed machining for lathe machining and at machining centers that are prone to chip jamming.

High-efficiency processing

- ➡ Ultra high feed is achieved by gradually reducing the helix angle midway through the flute to improve drill rigidity and chip evacuation.

High precision and long life

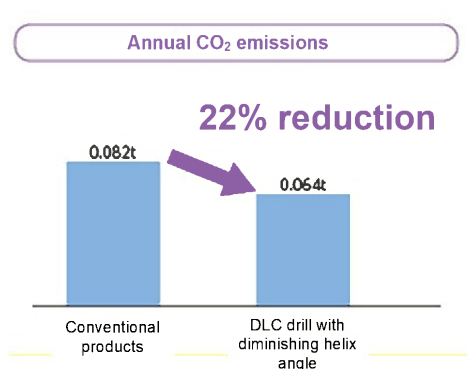
- ➡ High precision and long life are achieved with high feed processing for lathe machining and at machining centers that are prone to chip jamming.



CO₂ reduction

- ➡ CO₂ emissions reduction by 22%

(1 year: reduction of 0.064 t in 240 days with 10 hours of operation/day)



CO ₂ emissions reduction results			
	Conventional products	DLC drill with diminishing helix angle	Results
Power consumption (kWh/year)	149.00	116.00	▲33.00
CO ₂ emissions (t/year)	0.082	0.064	▲0.018

Annual operation time (10 hours/day x 240 days/year)

Mechanical Equipment <Cutting Tools>

Aqua Drill EX Oil-Hole, Small Diameter (AQDEXOH 25D/30D/35D/40D)

Features

Stable drilling and long life are achieved by reduced cutting force and improved chip evacuation in this oil-hole drill, which enables high-efficiency drilling of deep and small-diameter holes.

Stable machining

- ➡ The cutting edge and flute shape with excellent chip division allow drilling in wet and MQL conditions, realizing stable drilling of deep and small-diameter holes.

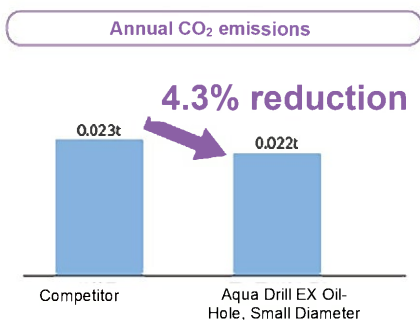
Long-life

- ➡ Chip evacuation is improved with the adoption of a cutting-edge shape that divides chips into small fragments. The drill can be used with a wide range of work materials from carbon steel to alloy steel and stainless steel.

CO₂ reduction

- ➡ CO₂ emissions reduction by 4.3%

(1 year: reduction of 0.022 t in 240 days with 10 hours of operation/day)



CO₂ emissions reduction results

	Competitor	Aqua Drill EX Oil-Hole, Small Diameter	Results
Power consumption (kWh/year)	42.00	40.00	▲2.00
CO ₂ emissions (t/year)	0.023	0.022	▲0.001

Annual operation time (10 hours/day x 240 days/year)



Aqua REVO Mill for Stainless Steel (RVMSUS4G-2.5D)

Features

Higher efficiency and longer tool life are achieved with the adoption of a newly developed flute shape called the Air Flute, resulting in improved chip evacuation and heat reduction.

High grade and high efficiency

- ➡ The cooling flute limits the length of contact between the chips and the rake face, reducing cutting force by 20% compared to conventional products. Stable machining surface, free of scratches caused by chip biting, can be achieved even with higher cutting speed and feed per revolution.

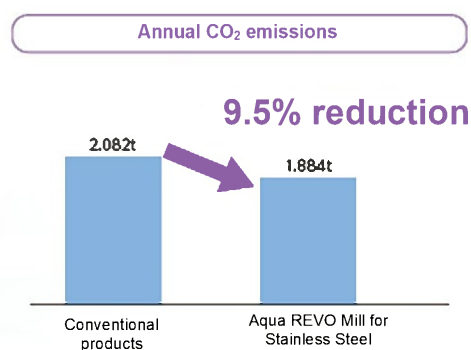
Long-life

- ➡ Improved chip evacuation and removal suppress cutting force and machining heat, achieving long tool life with less chipping and wear.
Can be used with a wide range of work materials including stainless steel.

CO₂ reduction

- ➡ CO₂ emissions reduction by 9.5%

(1 year: reduction of 1.884 t in 240 days with 10 hours of operation/day)



CO₂ emissions reduction results

	Conventional products	Aqua REVO Mill for Stainless Steel	Results
Power consumption (kWh/year)	3712.00	3358.00	▲354.00
CO ₂ emissions (t/year)	2.082	1.884	▲0.198

Annual operation time (10 hours/day x 240 days/year)



Mechanical Equipment <Cutting Tools>

Hyper Z Low Spiral Tap (ZSP-LS)

Features

Designed to machine high hardness steel and ductile cast iron that present increasing difficulties in cutting. Stable performance is achieved with excellent chip evacuation even with horizontal machining centers.

Stable machining

- ➔ Chips are cut into small pieces with the adoption of low helix flute and optimized helix angle. Stable tapping is achieved even with horizontal machining centers, which are prone to problems such as chip clogging and entwining.

Long-life/Multi-purpose

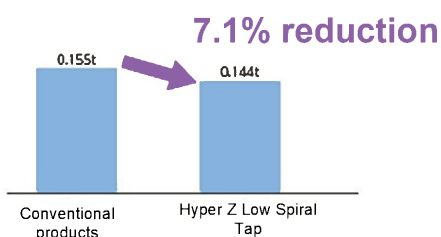
- ➔ These taps are designed with a proprietary material that offers a unique combination of hardness and toughness, along with a special surface treatment. This exceptional combination allows them to effortlessly cut through even ductile cast iron without chipping or wear, ensuring a prolonged service life.

CO₂ reduction

- ➔ CO₂ emissions reduction by 7.1%

(1 year: reduction of 0.144 t in 240 days with 10 hours of operation/day)

Annual CO₂ emissions



CO₂ emissions reduction results

	Conventional products	Hyper Z Low Spiral Tap	Results
Power consumption (kWh/year)	282.00	263.00	▲19.00
CO ₂ emissions (t/year)	0.155	0.144	▲0.011

Annual operation time (10 hours/day x 240 days/year)



Hyper AP1 Hob for water-soluble hobbing

Features

Hobbing can now be done using eco-friendly water-soluble coolant. The optimized design of the coating minimizes wear (thermal fatigue damage) specific to high-speed hobbing with water-soluble cutting fluid, and extends service life.

High-speed hobbing

- ➔ The optimized design of the coating minimizes thermal fatigue damage that occurs during high-speed hobbing with water-soluble cutting fluid, and realizes high-speed hobbing.

Compatibility with multitasking machines

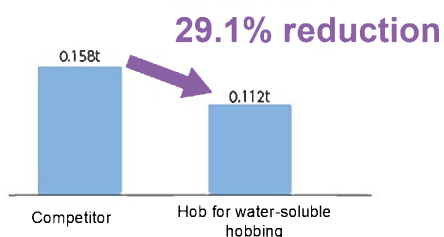
- ➔ Service life is extended in hobbing with a multitasking machine under the recommended hobbing conditions on multitasking machines compatible with high-speed cutting.

CO₂ reduction

- ➔ CO₂ emissions reduction by 29.1%

(1 year: reduction of 0.112 t in 240 days with 10 hours of operation/day)

Annual CO₂ emissions



CO₂ emissions reduction results

	Competitor	hob for water-soluble hobbing	Results
Power consumption (kWh/year)	287.00	203.00	▲84.00
CO ₂ emissions (t/year)	0.158	0.112	▲0.046

Annual operation time (10 hours/day x 240 days/year)



Mechanical Equipment <Machine Tools>

CONCEPT

We have pursued human- and eco-friendly, high-speed advanced machine tools, and developed Japan's first broaching machines and various machine tools that are essential for ever-evolving production systems.

In recent years, we have combined our comprehensive technologies to meet diversified processing needs, including the commercialization of process-intensive, small-scale gear cutting machine that best match our proprietary cutting tools.

FH-4000, a busbar* dedicated to FSSW machining

Features

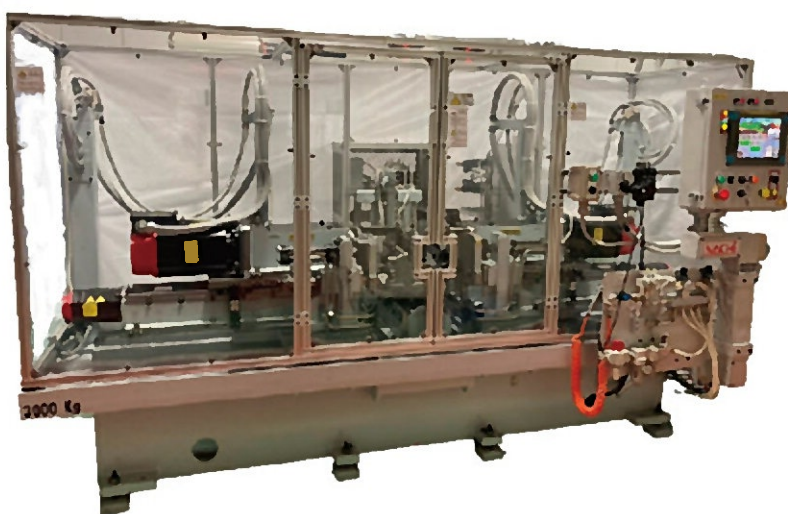
The creation of a dedicated model helped cut non-machining time and achieved high efficiency in machining.

* A busbar is a conductor used in switchboards (cubicles), control panels, batteries, etc., for distributing high current power.

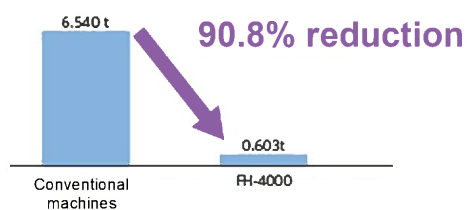
CO₂ reduction

➡ CO₂ emissions reduction by 90.8%

* 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	FH-4000	Results
Power consumption	5.924	0.498	▲5.425
Oil consumption	0.616	0.105	▲0.511
Total	6.540	0.603	▲5.936

* CO₂ equivalent (tCO₂e)

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 friction of rotating parts.

NACHI-FUJIKOSHI offers products that contribute to various fields, including automobiles and industrial machines, by using its technologies to extend machine life, achieve high-efficiency and downsizing.

Large diameter, thick 4-point contact ball bearings

Features

Weight reduction and longer tool life are achieved by changing from cylindrical roller bearings to 4-point contact ball bearings.

Weight reduction

- ➡ Weight reduction of the bearings was achieved by switching the structure from cylindrical roller bearings to 4-point contact ball bearings.

Longer tool life

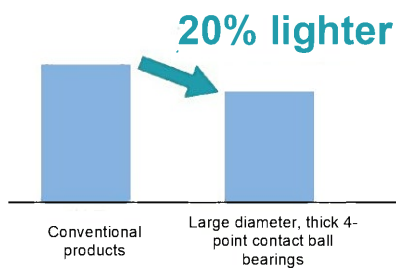
- ➡ Longer tool life in foreign oil is realized by load dispersion based on multi-point contact and special heat treatment.

CO₂ reduction

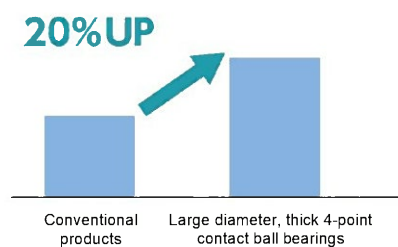
- ➡ Weight reduction of bearings led to a lighter, more compact unit, contributing to CO₂ reduction.
- ➡ Longer bearings life contributed to improvements in lifecycle CO₂.



Weight reduction



Longer tool life



Components < Hydraulic Equipment >

CONCEPT

As a comprehensive hydraulic equipment manufacturer, our Hydraulics Division produces/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, compact, and high functionality, we offer eco-friendly hydraulic equipment that match the needs of each industry.

DIN connector with built-in digital amp for solenoid proportional valves

Features

By downsizing the amp for proportional valves and mounting it on the DIN connector, the output density is now almost twice as high.

Improvement of output density

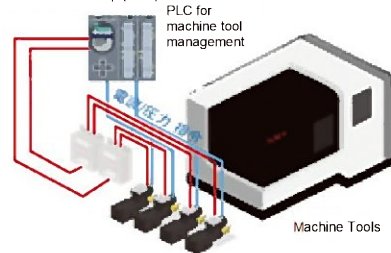
- By building the downsized amp for proportional valves in the DIN connector, it can now be mounted directly on the valves. Compared to the conventional digital amp (ERD-PA5D6-D2-20), the output density of EDX-CA2D1-D2-10 is approximately twice as high, saving space and reducing the number of cables.

CO₂ reduction

- The downsizing of the device led to CO₂ reductions during production and transportation phases.



Configuration of DIN connector with built-in amp (EDX)



Output density results

	Conventional products	EDX-CA2D1-D2-10	Results
Output density (A / cm ²)	0.00618	0.01252	0.00635

Small-size, high-pressure variable piston pump PZH-1B

Features

Compatibility with high pressure of 35 MPa leads to downsizing.

Improvement of output density

- Compatibility with 35 MPa rated pressure has improved the output density of the pump alone by 12.5%.

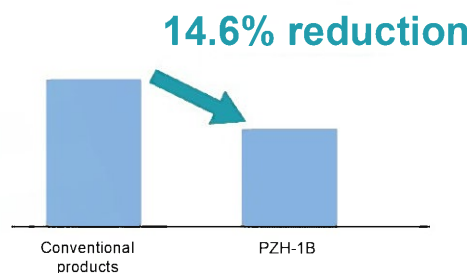
Machine downsizing

- Higher pressure enables the downsizing of the cylinder diameter even while maintaining the thrust, realizing a more compact pump as well as the entire machine.

Use of less steel in machine production leads to 14.6% CO₂ reduction including the pump.



Annual CO₂ emissions



CO₂ reduction

	Conventional products	PZH-1B	Results
CO ₂ emissions (t/year)	0.548	0.468	▲0.080

Materials <Special Steels>

CONCEPT

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, reduced weight, and high performance parts).

Small-diameter carbide drill materials

Features

The use of our proprietary carbide material extends the life of small diameter drills by 1.4 times compared to those that use conventional materials.

High durability

➡ Improved impact and abrasion resistance that exceeds conventional materials is achieved by using optimized ultra-fine grain hard WC particles.

Cutting conditions

Test cutting tool configuration: AQMD $\phi 1.1 \times 14 \times 47 \times \phi 3$

Work material: S50C (180HB)

Cutting speed: 60 m/min

Number of rotations: 17,370 min⁻¹

Feed speed: 345 mm/min

Feed rate: 0.020 (1.8%D) mm/rev

Step: 0.22 mm

Depth of hole: 5.5 mm blind hole

Cutting fluid: water-soluble (external lubrication)

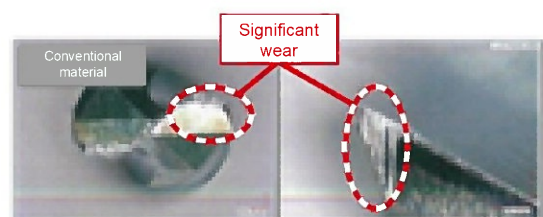
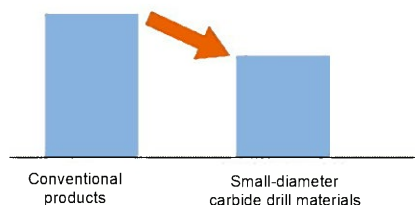
Machine: Vertical M/C V22HSK32

Protrusion: 20 mm



CO₂ reduction with longer tool life

28.6% reduction



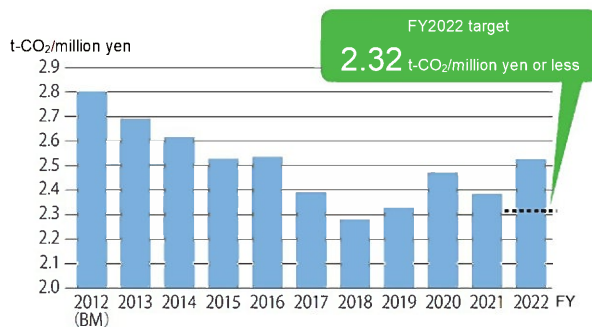
Contribution to a decarbonized society

All our plants work to reduce total CO₂ emissions by optimizing equipment operation and installing energy-saving equipment.

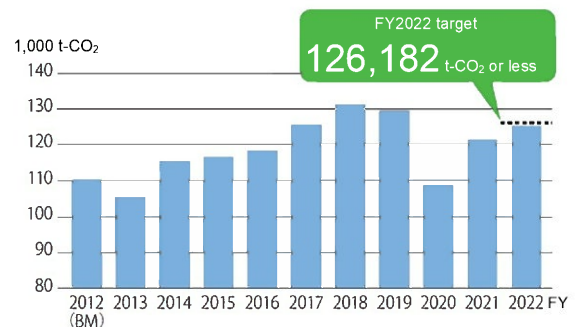
In FY2022, we achieved our target for CO₂ emissions. However, our figures for per unit gross value-added emissions exceeded the target due to the effects of rising raw material prices and other factors.

In FY2023, 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.

Trends in per unit gross value-added CO₂ emissions (per year)



Trends in total CO₂ emissions (per year)



FY2022 performance

Per unit CO₂ emissions

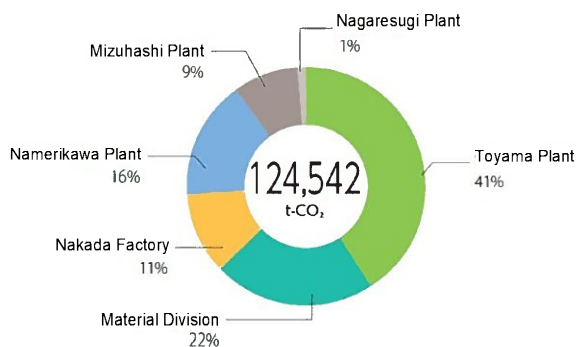
2.52 t-CO₂/million yen
(+8.6% compared to the plan)

CO₂ emissions

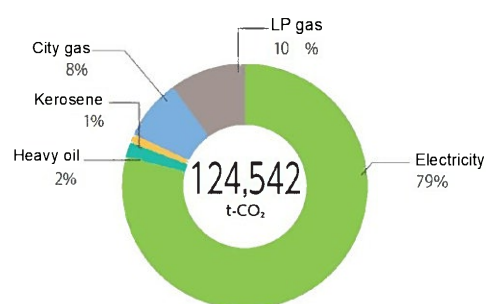
124,542 t-CO₂/year
(-1.3% compared to the plan)

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

Ratio of CO₂ emissions by plant (FY2022)



Ratio of CO₂ emissions by energy (FY2022)



Energy conservation efforts

- Shift to LED lighting equipment
Lighting equipment (550 lamps) in factories were switched to LED lighting (reduction of 6 t-CO₂/month).
- Air leak viewer is used to effectively discover air leaks from plants and reduce the consumption of compressed air.
- Reduction in compressor capacity, compared to existing compressors, by lowering the discharge pressure and increasing the air volume
- CO₂ emissions reduction by solar power generation (2022 performance: 81 t-CO₂)

Measures for carbon neutrality

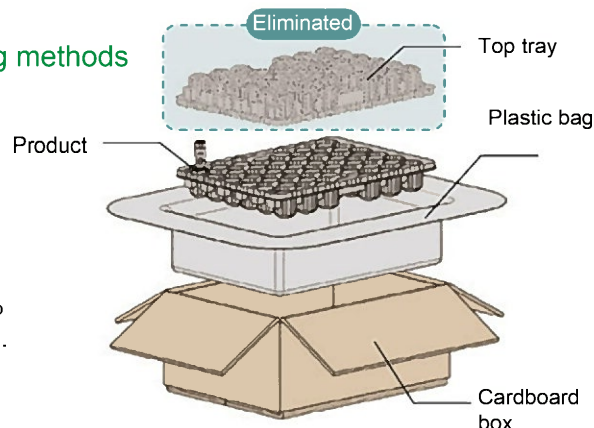
As a contribution to a decarbonized society, efforts beyond the level of conventional energy conservation are required.

① Efforts to reduce CO₂ by changing packaging methods

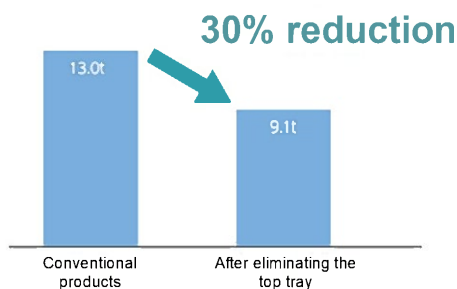
After eliminating the top tray, the upper part of the plastic bag is folded to stop the product from jumping around.

CO₂ reduction

- ➡ Decrease in the amount of trays used led to 30.2% reduction of CO₂ during plastic material production.



CO₂ emissions



CO₂ emissions reduction results

	Conventional products	After eliminating top tray	Results
CO ₂ emission during top tray production (t/year)	13.0	9.1	▲3.9

*1 CO₂ emissions reduction was calculated based on the power consumption, component weight, and number of units produced (100,000 units) compared to conventional benchmark products (SS/SA-G01-31).

② Introduction of solar power generation

A solar power generation system that employs the PPA model (third-party ownership model) was introduced in the robot assembly factory No. 3 at Toyama Plant, and operation began in July 2022.

Local consumption of locally generated renewable energy is expected to reduce CO₂ emissions from electric power by approximately 280 t per year.

The recently installed system, which is the first of its kind at a Japanese site, enables the use of electricity during power outages by utilizing the emergency outlet as long as sunlight is available. This feature enhances resilience during disasters and emergencies.

We plan to build more power generation facilities and systematically reduce CO₂ emissions.



Solar panels installed on the roof of the robot assembly factory No. 3

Power generation plan for and performance in 2022		July	Aug.	Sep.	Oct.	Nov.
Power generation (kWh/year)	Plan	57,000	62,000	47,900	38,500	25,300
	Performance	57,564	53,317	44,816	39,258	30,217
CO ₂ reduction (t-CO ₂ /month)	Plan	20.5	22.3	17.2	13.9	9.1
	Performance	20.7	19.2	16.1	14.1	10.9

Contribution to a recycling-oriented society

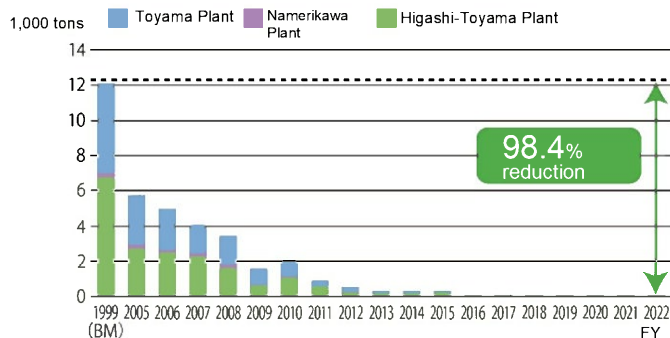
Reduction of landfill waste and promotion of recycling

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 waste disposers.

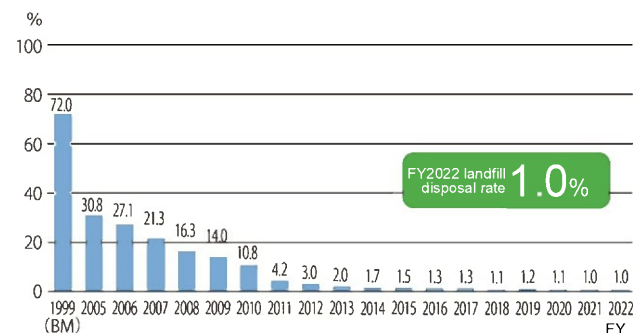
Similar to last year, we were able to recycle nearly all of the grinding sludge by utilizing our in-house equipment to compress it and ensuring proper sorting techniques were used.

● 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 FY2022, we successfully reduced the volume of landfill disposal by 98.4% compared to the BM.

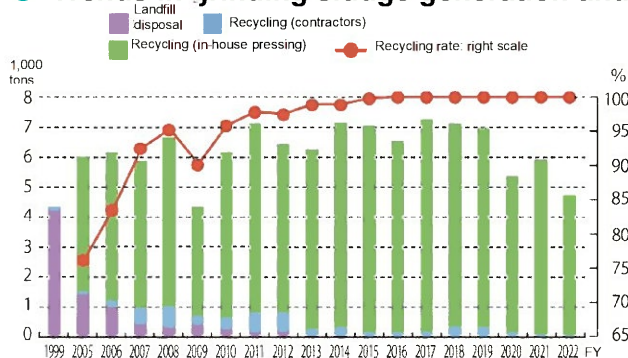
● Trends in waste landfill disposal rate* (per year)



The landfill disposal rate* is substantially reduced from 72.0% (BM) to 1.0% by changing the intermediate treatment methods for waste liquid and sludge, which reduced residuals and promoted the compression of grinding sludge.

* 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 constitutes almost a third of total waste generation. We recycle 98.9% 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.

In-house recycling of metal grinding powder =
In-house solidification (valuables)
Total generation of metal scrap (metal grinding powders)

Recycling of metal grinding powder =
Contractor's recycling (waste) + in-house solidification (valuables)
Total generation of metal scrap (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

Efforts to recycle soot dust

We will work to recycle soot dust, which accounts for approximately 60% of the company's total landfill volume and totals approximately 150 t per year. By processing the emitted raw dust without chemical treatment, we successfully recycled approximately 12 t/year as raw material for concrete.

Efforts to recycle waste carbon

We will make efforts to recycle carbon used for trial punching and furnace-resistant carbon. Previously, all waste carbon was sent to landfills as it was considered a challenging material to recycle. However, this year, we were able to recycle 200-400 kg of waste carbon by utilizing it primarily as a raw material for carbon production.

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

We are working to improve awareness on cleanliness, tidiness and organization as well as waste sorting at waste storage sites for each department.

In FY2022, we failed to achieve the target, registering 5.6 points, short of the target score of 5.8 points.

We will carefully examine the results and improve the management status in FY2023.

We will continue to promote the assessment of GS/GY management status and awareness activities.

Assessment points of management items			
	Target: company-wide score of 5.8 or higher	First assessment	Second assessment
	Month of February	Month of June	Month of October
1. Signboard displays	5.8	6.0	5.5
2. Management of containers or storage areas	5.7	5.9	5.4
3. Segregation management of combustibles	5.0	5.9	5.7
4. Segregation management of flammable waste	5.7	5.8	5.7
5. Cleaning status	5.8	6.0	5.7
6. Utilization of environmental conservation mechanisms	5.8	5.8	5.6
Total	<5.6	<5.9	<5.6

Managing and reducing environmentally hazardous materials

Reduction of chemical substances

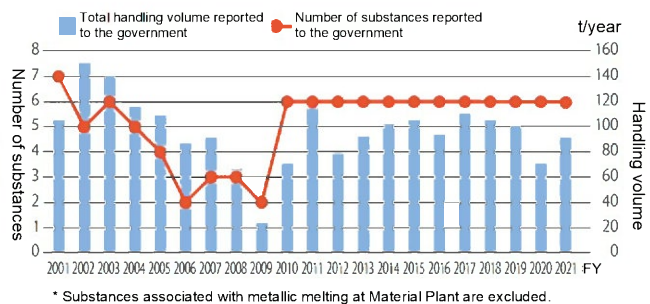
We have worked to reduce the use of PRTR-designated substances.

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.

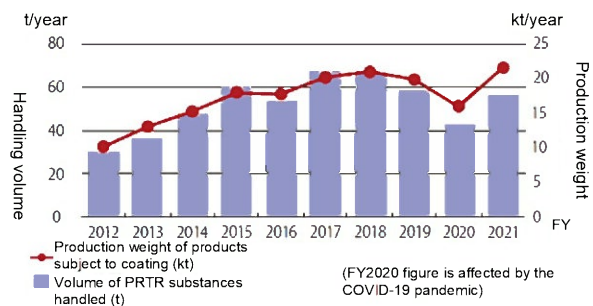
We have also promoted the replacement of other PRTR-designated substances with safer materials and successfully reduced the number of hazardous items and handling volume until the FY2009 notification.

The PRTR Law was revised in November 2008, resulting in an increased number of substances that require us to manage their handling volume. These changes went into effect in March 2009. As a result, the list of managed substances was expanded with the addition of methylnaphthalene, 1,2,4-trimethylbenzene, and N,N-dicyclohexylamine. These substances are found in Heavy Oil A, certain grinding fluids and anticorrosive agents. Along with the three conventional substances already subject to management (toluene, xylene, and ethyl benzene contained in coating materials and cleaning oil or kerosene), the total number of substances requiring reporting since FY2010 is now six. In terms of the handling volume, coating accounted for the largest share by application (approximately 60% in the last seven 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 paint switching and minimize the use of thinner during the coating preparation process. These efforts have yielded some positive results. Based on the revised laws and regulations enforced on April 1, 2023, two substances (diethanolamine and ethylene glycol monobutyl ether) were added to PRTR-designated substances. In particular, we expect to be handling 20~30 tons per year of the former substance, which is mainly used for grinding.

Trends in PRTR-designated substances



Trends in the handling volume of PRTR substances in coating processes



FY2021 PRTR report summary

Subject facility	Chemical substance	Handling volume (kg/year)	Main usage	Discharge to air	Discharge to water	Amount of waste
Toyama Plant	Xylene	3,935	Cleaning and painting	3,924	0	1
	N,N-Dicyclohexylamine	2,985	Grinding	0	0	2,985
	1,2,4-Trimethylbenzene	5,091	Cleaning and rust-proofing	5,091	0	0
	Toluene	3,287	Coating	3,277	0	0
	Methylnaphthalene	1,174	Fuels	7	0	0
Namerikawa Plant	Ethylbenzene	1,652	Coating	1,647	0	0
	Xylene	7,602	Painting and fuels	6,930	0	21
	Toluene	17,480	Coating	17,428	0	0
Higashi-Toyama Plant (Nakada Factory)	Ethylbenzene	3,675	Coating	3,664	0	0
	Xylene	7,956	Painting and fuels	6,231	0	19
	1,2,4-Trimethylbenzene	2,408	Fuels and painting	709	0	0
	Toluene	14,654	Coating	14,610	0	0
Higashi-Toyama Plant (Material Plant)	Xylene	5,725	Fuels	29	0	0
	1,2,4-Trimethylbenzene	6,605	Fuels	33	0	0
	Methylnaphthalene	7,513	Fuels	38	0	0
	Chromium and trivalent chromium compounds	—	—	0	0	9,085
[Metallic melting processes]	Cobalt and its compounds	—	—	0	0	1,175
	Manganese and its compounds	—	—	0	0	9,101
	Molybdenum and its compounds	—	—	0	0	5,778

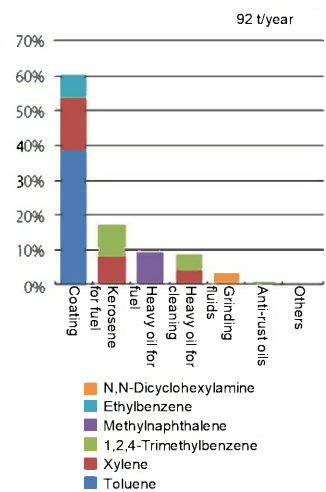
Calculation period April 1, 2021 - March 31, 2022

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, 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; volume: 1 t/year or more)

Breakdown of substances by application (FY2021)



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 the limit of discharging water, air, vibration and noise equivalent to or stricter than regulatory requirements, regularly monitor their emissions, and report 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), and soot dust

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 discharging air to not exceed the limit.

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

Restriction 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 VOC is discharged from the painting process, we are making efforts to reduce the amount discharged by considering changing the paints used to water-based paints and changing the thinners for cleaning to water-based cleaning fluids.

Limit agreed with Toyama City

Measurement item	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 FY2021, we had no exceedance of emission 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. Both plants have a specified facility for hazardous substances.

The main environmentally hazardous substance contained in discharging water is oil. In addition to limit the volume of discharging water, we also recover a small amount of oils in discharging water by using an oil-water separating tank and absorption mat. Other alkaline, iron-rich waste liquids are appropriately treated with neutralization and flocculation before discharging.

(Unit: mg/liter)

Measurement item	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)	6.0~8.0	6.8~7.8 / 6.5~7.8	6.9~7.6	7.2~7.8
Biological oxygen demand (BOD)	20	16 / 10	5.8~16	<0.5 * ~2.8
Suspended solids (SS)	50	25	1~5	2~16
Normal hexane extracts content (Mineral oils)	3	3 / 2.4	0.1~1.2	0.4~1.6
Soluble iron content	3	0.9 / 1.5	<0.1*~0.2	<0.1*~0.4
Chromium content	0.5	0.15	<0.04*	<0.04*
Cyanogen compound (as cyanogen) hazardous substance	0.1	0.05	<0.01*	—

In FY2022, we had no exceedance of factory effluent standard.

* Less than detectable limits

● 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 Material Plant, in order to detect a sign that leads to abnormal noise during operation at night, regular voluntary noise measurement has continuously been made at fixed points within the premises since FY2018.

* Agreed limit 1- 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 FY2022, we had no exceedance of noise and vibration standards.

Regulatory limit at the boundary line of the site

(Unit: dB)

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

Developing eco-conscious communities/human resources

Received “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 Nikkan Kogyo Shimbun's Best 10 New Products Award 2022.

The Best 10 New Products Award is a program designed to acknowledge products that contribute to the advancement of manufacturing and enhance Japan's global competitiveness. The award is selected by Nikkan Kogyo Shimbun from products that have been developed or implemented by applicant companies within the same year.

The MZ F series provides customers with high-speed and high-precision robots that are capable of meeting their demands for higher productivity and precision that accompanies the downsizing of electrical and electronic components. The CFDq is an ultra-compact controller that belongs to the world's smallest class and is designed to work seamlessly with the MZ F series.

The award was presented in recognition of its exceptional high-speed and high-precision operation, which leads to increased productivity. The series is also highly versatile and can operate in diverse environments, with an extensive lineup that meets various on-site needs. Additionally, the series contributes to reducing total costs by downsizing the entire facility, including peripheral equipment.



Ultra-compact controller CFDq

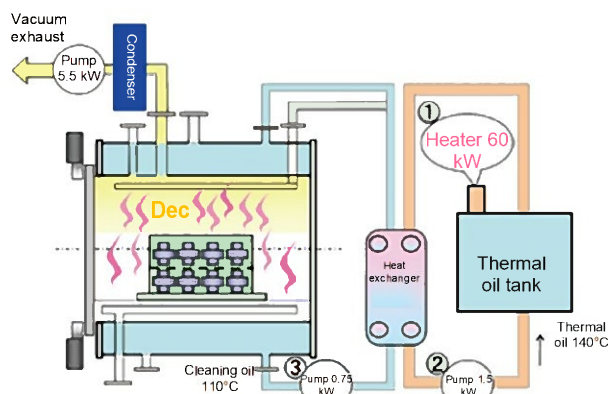


High-speed, high-precision robot MZ07F

Received “Environmental Activity Award” from the Japan Cutting & Wear-resistant

The Cutting & Wear-resistant Tool Association assesses and evaluates the efforts of various companies in relation to the objectives outlined in their voluntary environmental action guidelines. The association recognizes facilities that set an example for other members through their exceptional results and specific activities that have been acknowledged for their outstanding achievements.

Our company was recognized for its efforts in reducing CO₂ emissions. By reviewing the operating conditions of our electric heating washers' heater pumps, we were able to reduce standby power consumption by 18% per hour, thus making a significant contribution to this accomplishment. We approached the reduction of standby power consumption by focusing on the use of electricity when products are not being cleaned by electric heating washers. As a consequence, we achieved reductions of 2.1 kWh per hour of electricity, or approximately 550 kWh per month, which totaled 6,600 kWh per year.



Schematic diagram of electrically heated cleaner

Excellent employee for appropriate disposal of industrial waste

TOYAMA sanpai (Toyama Industrial Resources Recycling Association) conducts research, information sharing, training, and other activities related to the appropriate treatment, reuse, and recycling of industrial waste as resources. Its objective is to promote the sound development of industry, preserve the living environment, and improve public health towards building a recycling-oriented society and enhancing the welfare of the citizens of the prefecture. TOYAMA sanpai commended Mr. Masaki Asai (NACHI Logistics Co., Ltd., a related company of Fujikoshi), who has been engaged in industrial waste treatment for many years and has contributed to the promotion of appropriate treatment of industrial waste as a person engaged in appropriate treatment of industrial waste.



Contribution to global environment

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



Execution of emergency drill and review

For LP gas facilities, etc., that require a prompt response in the case of natural disasters, we periodically conduct and review emergency drills. In addition, we have also implemented recurrence prevention measures and training for flooding- and leakage-related accidents/incidents that occurred in the past year.



Report on implementation of training



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