

**NACHI-FUJIKOSHI CORP.**

# Environmental Policy of NACHI-FUJIKOSHI Toyama, Namerikawa, and Higashi-Toyama Plants

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 breakthrough eco-friendly new products and the top products in the world.
  - (2) Preventing global warming and promoting energy conservation.
  - (3) Promoting Zero Emissions that contribute to profits.
  - (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, 2020  
NACHI-FUJIKOSHI CORP.

Environment Administrator

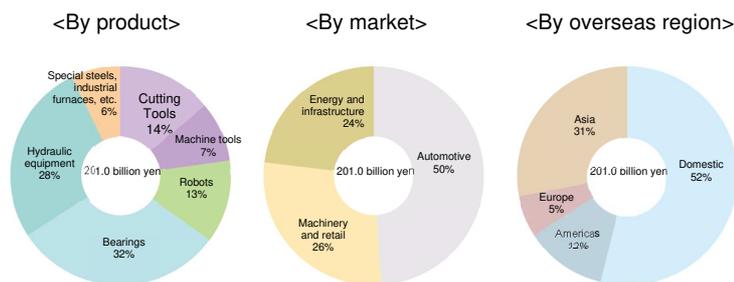
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# Corporate outline

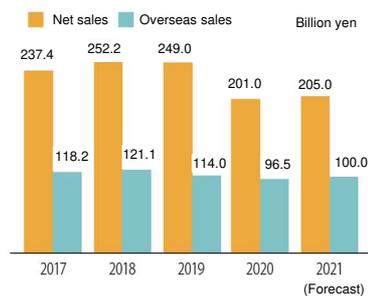
## ■ Outline

Company name	NACHI-FUJIKOSHI CORP. Trademark NACHI	
Established	December 21, 1928	Account settled on November 30
Chairman	Hiroo Honma	
President	Jun Sakamoto	
Head office	105-0021 Shiodome Sumitomo Bldg. 17F 1-9-2 Higashi-Shinbashi, Minato-ku, Tokyo Tel: +81-3-5568-5111	
Major offices	Toyama Plant 930-8511 1-1-1 Fujikoshi-Honmachi, Toyama Tel: +81-76-423-5111	
Capital	16.0 billion yen	
Consolidated net sales	201.0 billion yen (including overseas sales 96.5 billion yen)	
Consolidated subsidiaries	54 companies 22 domestic companies (including 3 engineering companies, 5 sales companies, 12 manufacturing companies, and 2 service companies) 32 overseas companies (including 15 sales companies and 17 manufacturing companies)	
Consolidated number of employees	7,240 with 55 companies (including 3,310 with parent entity)	
Major products	Machining	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

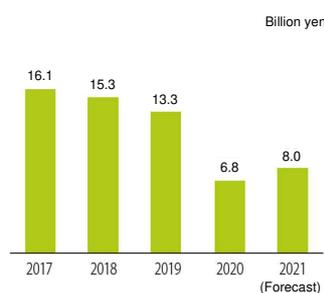
## ■ Breakdown of net sales (consolidated)



## ■ Net sales (consolidated)



## ■ Operating income (consolidated)



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Values created by NACHI

# Leading innovations in manufacturing using the 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.

## Machining

Cutting Tools



Machine tools



## Materials

Special steels



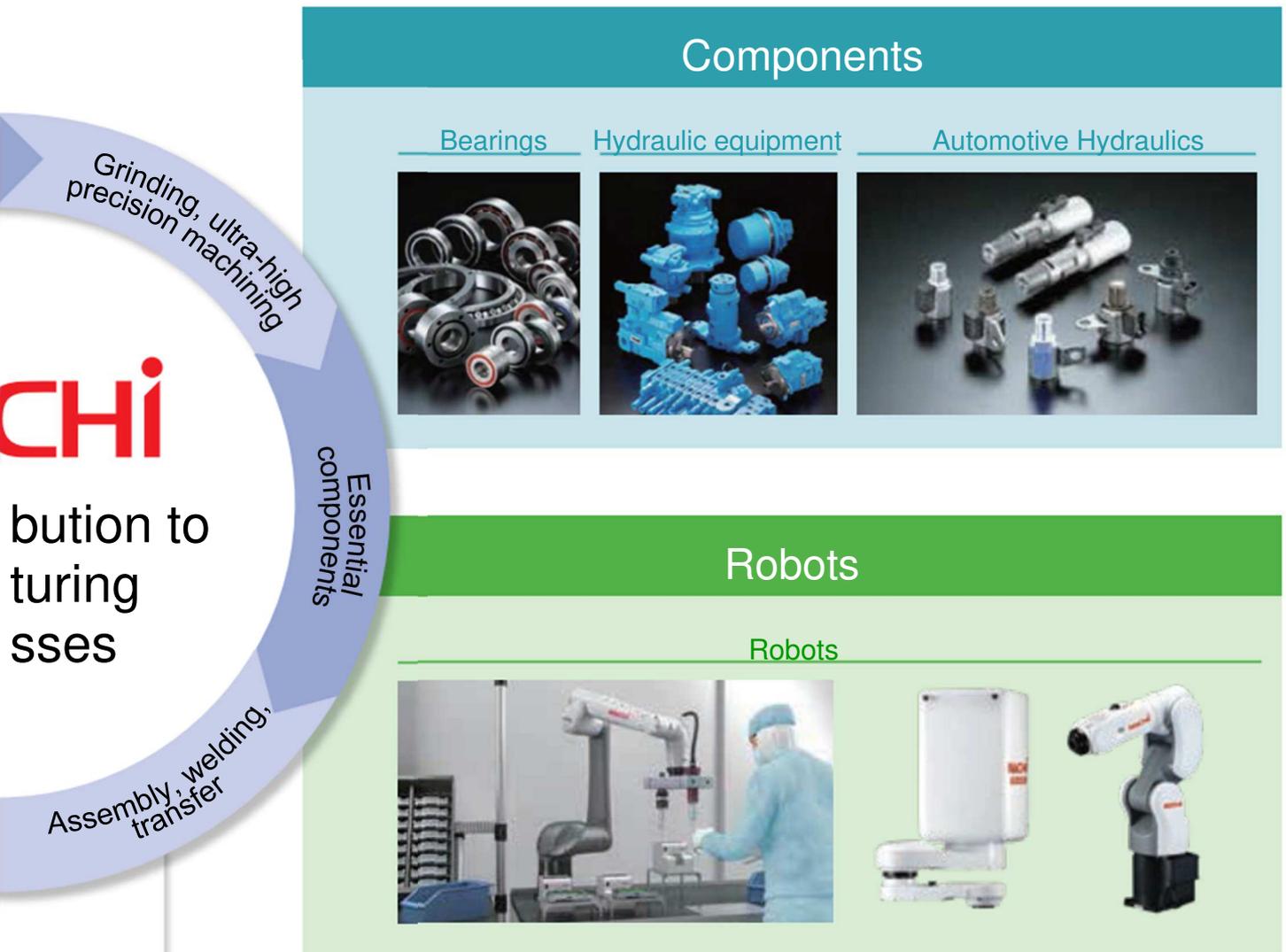
Industrial furnaces, coating



Corporate mission

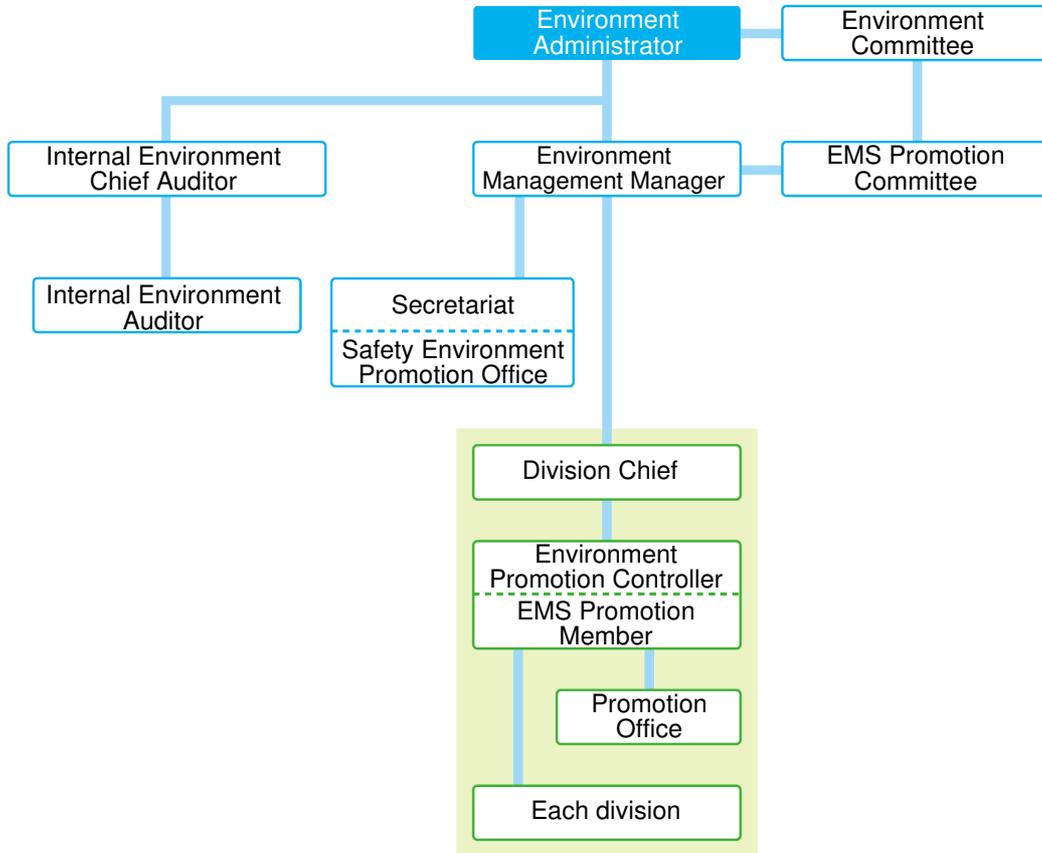
**Contributing to the progress of the world of manufacturing.**

technologies with robotics at its core.



**Contributing to the development of a sustainable society through manufacturing.**

## 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 environmental 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). After receiving audit of the conversion to the revised standard of April 2017, we received a periodical audit in April 2020.

- **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 (January 2021)

Qualification name	Qualified persons	Required number
Pollution Control Manager (Air)	18	4
Pollution Control Manager (Water Quality)	29	4
Pollution Control Manager (Noise)	23	4
Pollution Control Manager (Vibration)	19	4
Pollution Control Manager (Dioxin)	8	1

(Number of persons)

Qualification name	Qualified persons	Required number
Licensed Electrical Engineer (Class 2 and 3)	16	3
Qualified Energy Manager	14	6
Certified Environmental Measurer (Concentration, Noise, and Vibration)	3	1
Certified Measurer	1	1
Working Environment Measurement Expert (Class 1 and 2)	2	2

# 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 Toyama, Namerikawa and Higashi-Toyama plants received the first periodic audit and renewed their ISO 14001 certification. Our 10 domestic subsidiaries obtained ISO 14001 certification.
2005	Our 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	Our two overseas 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 <sub>2</sub> 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 water sprinkling over factory roof) 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 2019 Monozukuri Award of the Best 10 New Products Award. We received the FY2019 Environmental Activity Award (energy conservation by switching to LED lighting in plants).
2020	Our carbide drill AquaREVO Drills Oil-Hole received the 2020 Encouragement Award of the "CHO" MONODZUKURI Innovative Parts and Components Award.

## ISO 14001 Certification

Registered businesses

Development, design and manufacture of cutting tools, machine tools, bearings, hydraulic equipment, robots, automotive solenoid valves, industrial furnaces, coating, and special steel.

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. Hokuriku Branch Office



# FY2020 performance and FY2021 targets

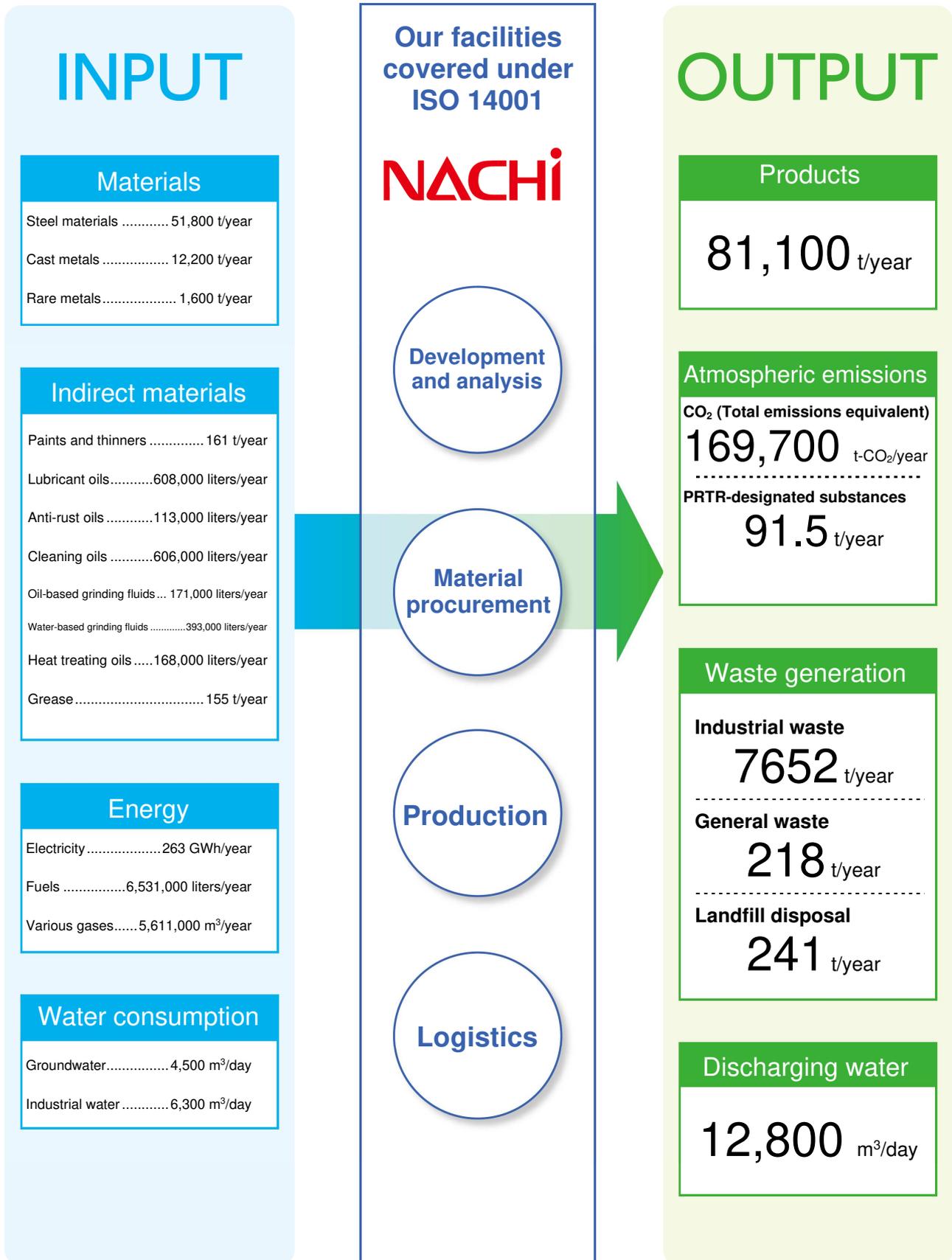
BM: benchmark 😊 Achieved; 😐 Partially achieved; 😞 Not achieved.

Theme		FY2020 target	FY2020 performance	Rating	FY2021 target
1	<b>Development of breakthrough eco-friendly new products and the top products in the world</b>	<b>Development of eco-friendly products</b> 154 or more certified eco-friendly products in cumulative total	<b>Development of eco-friendly products</b> 154 certified eco-friendly products in cumulative total	😊	<b>Development of eco-friendly products</b> 167 or more certified eco-friendly products in cumulative total
2	<b>Preventing global warming</b> <small>Note 1</small>  BM FY2012 Per unit weight emissions: 1.324 t-CO <sub>2</sub> /t (Emissions: 110,182 t-CO <sub>2</sub> /year) Per unit gross value added emissions: 2.801 t-CO <sub>2</sub> /million yen	<b>Reduction of CO<sub>2</sub> emissions</b>  Per unit gross value added emissions: 17.6% or more reduction compared with BM  (2,307 t-CO <sub>2</sub> /million yen or less) (Emissions: 129,520 t-CO <sub>2</sub> /year or less)	<b>Reduction of CO<sub>2</sub> emissions</b>  Per unit gross value added emissions: 11.6% reduction compared with BM  2,476 t-CO <sub>2</sub> /million yen (CO <sub>2</sub> emissions: 108,972 t-CO <sub>2</sub> /year)	😞	<b>Per unit gross value added emissions: 12.0% reduction compared with BM</b> (2,464 t-CO <sub>2</sub> /million yen or less) (Emissions: 120,169 t-CO <sub>2</sub> /year or less)
	<b>Reducing groundwater consumption</b>  BM FY2012 Groundwater used (excluding snow melting use): 2,173,300 t/year	<b>Groundwater consumption: 7.0% reduction compared with BM</b> (2,021,300 t/year or less)	<b>Groundwater consumption: 25.1% reduction compared with BM</b> (1,627,500 t/year)	😊	<b>Groundwater consumption: 15.7% reduction compared with BM</b> (1,833,000 t/year or less)
3	<b>Maintaining Zero Emissions that contribute to profits</b>  BM (FY1999: 12,106 t/year)	<b>Landfill disposal rate: 1.2% or less</b> (Final disposal: 241.3 t/year or less) (Landfill rate excluding materials: 0.6% or less)	<b>Landfill disposal rate: 1.1%</b> (Final disposal: 192.0 t/year) (Landfill rate excluding materials: 0.5%)	😊	<b>Landfill disposal rate: 1.1% or less</b> (Final disposal: 194.2 t/year or less) (Landfill rate excluding materials: 0.5% or less)
4	<b>Managing and reducing environmentally hazardous materials</b>  BM FY2010 Per unit consumption of PRTR-designated substances related to painting: 4.04 kg-substance/t	<b>Per unit consumption of PRTR-designated substances related to painting: 32.4% or more reduction compared with BM</b> (2.73 kg-substance/t or less)	<b>Per unit consumption of PRTR-designated substances related to painting: 30.2% reduction compared with BM</b> (2.82 kg-substance/t)	😞	<b>Per unit consumption of PRTR-designated substances related to painting: 33.7% reduction compared with BM</b> (2.68 kg-substance/t or less)
5	<b>Developing eco-conscious communities/human resources</b>	<ul style="list-style-type: none"> <li>Liaison meeting with neighborhood associations: twice a year;</li> <li>Cleaning of factory surroundings: three times a year</li> <li>Enhanced environmental education and verification of effectiveness;</li> <li>Environmental education: four times a year;</li> <li>Environmental news: five times a year;</li> <li>Utilization of e-learning, etc.</li> <li>Disclosure of environmental information;</li> <li>Publication of environmental report (including compliance information)</li> <li>Promotion of participation in external environmental activities: at least once a year</li> <li>Due execution of emergency drill and review</li> </ul>	<ul style="list-style-type: none"> <li>Liaison meeting with neighborhood associations: once a year;</li> <li>Cleaning of factory surroundings: three times a year</li> <li>Enhanced environmental education and verification of effectiveness;</li> <li>Environmental education: implemented four times;</li> <li>Environmental news (including quiz): implemented five times</li> <li>Disclosure of environmental information (English/Japanese versions);</li> <li>Publication of environmental report: published in June (posted on HP)</li> <li>Tree planting and preservation activities have not been conducted</li> <li>Execution of emergency drill, review, and corrective action verification</li> </ul>	😐	<ul style="list-style-type: none"> <li>Liaison meeting with neighborhood associations: at least once a year;</li> <li>Cleaning of factory surroundings: three times a year</li> <li>Enhanced environmental education and verification of effectiveness;</li> <li>Environmental education: four times a year;</li> <li>Environmental news: six times a year;</li> <li>Implementation of e-learning, verification tests, etc.</li> <li>Disclosure of environmental information (Japanese/English versions)</li> <li>Promotion of participation in external environmental activities: at least once a year</li> <li>Due execution of emergency drill and review</li> </ul>

Note 1: CO<sub>2</sub> equivalent is consistently based on the following rate: 0.360 t-CO<sub>2</sub>/1,000 kWh.

# Material balance

We monitor the use of resources and energy as well as waste generation to promote activities to reduce the environmental burden.



Mission **1**

# Launching eco-friendly new or improved 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.

## MZ12H Multi-Purpose Smart & Compact Robot

Features

Reduction of weight and improved rigidity of the arm enables industry-leading, high-speed and high-precision motion.



### Can be used in various uses

➔ Equipped as standard with IP67-equivalent dust-proof and moisture-resistant and rust-prevention properties.

### Smart cable routing (hollow wrist structure)

➔ Prevents interference with hand-wiring routing through its hollow wrist.

### Full standard application wiring/piping

➔ Equipped as standard with wiring/piping requested by various applications.

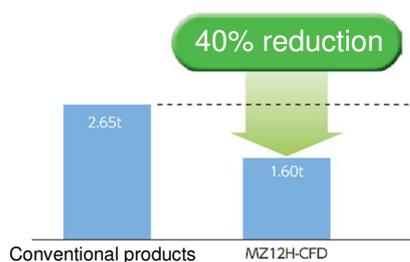
Wiring/piping outside the arm is not required.

### CO<sub>2</sub> reduction

➔ CO<sub>2</sub> emissions are reduced by 40%.

CO<sub>2</sub> emissions were reduced by 1.05 t to 1.60 t, based on an assumed operation of 16 h x 250 days/year, compared with conventional products.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	MZ12H-CFD	Results
Power consumption (kWh/year)	4812	2908	<b>-1904</b>
CO <sub>2</sub> emissions (t/year)	2.65	1.60	<b>-1.05</b>

Annual operation time (16 h/day x 250 days/year)

# Machining CONCEPT

## Cutting Tools

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 Nachi also provides high-speed and high-feed tools that can improve processing efficiency.

## AquaREVO Drills Oil-Hole 8D

### Features

The REVO Power Cooler achieves substantially longer tool life and high-efficiency drilling. The new oil-hole shape improves cooling, lubricating, and chip evacuation capabilities.



### Suppresses wear generation to extend tool life

- ➔ Design/development of the oil-hole shape that supplies cutting fluid more efficiently
- Reduces the heat generated by the cutting-edge and suppresses the abrasion of work materials by lubricating capabilities.

### Compatible with a wide range of materials and conditions

- ➔ Improves chip evacuation capabilities through overwhelming flow rate and flow velocity to be compatible with a hole depth that is eight times the diameter. Applicable to work materials ranging from low carbon steel, hardened steel, stainless steel, titanium alloy, to heat-resistant alloy.

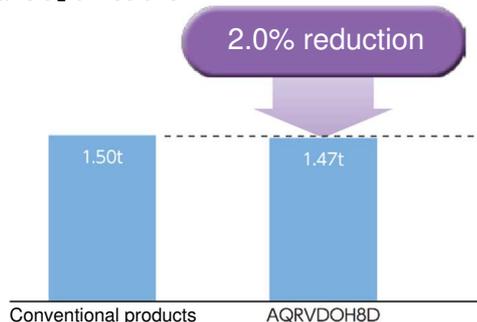
### CO<sub>2</sub> reduction

- ➔ CO<sub>2</sub> emissions are reduced by 2.0%.

CO<sub>2</sub> emissions were reduced by 2.0% to 1.47 t, based on an assumed operation of 10 h x 240 days/year, compared with conventional products.

- ◆ "Encouragement Award of 2020 'CHO' MONODZUKURI Innovative Parts and Components Award" sponsored by MONODZUKURI Nihon Conference and Nikkan Kogyo Shimben
- ◆ "Technological Award of FY2020 Japan Cutting & Wear-resistant Tool Association Award" sponsored by Japan Cutting & Wear-resistant Tool Association (JTA)

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	AQRVDOH8D	Results
Power consumption (kWh/year)	2725.06	2670.28	-54.78
CO <sub>2</sub> emissions (t/year)	1.50	1.47	-0.03

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

# Machining

## Cutting Tools

### 2- and 4-Flute AquaREVO Mills 2.5D

**Features** High-performance carbide end mill that is compatible with a wide range of cutting conditions and work materials. This end mill achieves the set-up workload and processing cost reductions.



#### Stable high-performance processing surface

➔ Adopts a variable pitch and variable lead design with the standard helix angle of 30 degrees to reduce cutting resistance  
Achieves stable high-efficiency processing of low-rigidity workpieces even with small machines by controlling chattering vibration. This vibration affects the surface finish of the workpiece and leads to tool damage.

#### Tool life extension

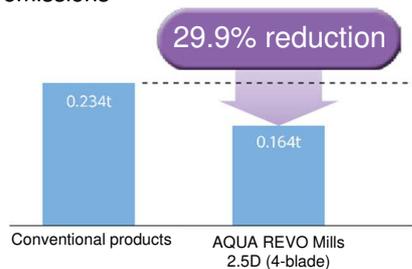
➔ Adopts AlCrXN film for new REVO-M coating  
Extends life of tools by improving thermal shock resistance  
Furthermore, prevents chip jamming by suppressing adhesion of work materials to the cutting edges through an ultra-smoothing coating process.

#### CO<sub>2</sub> reduction

➔ CO<sub>2</sub> emissions are reduced by 29.9%.

CO<sub>2</sub> emissions were reduced by 29.9% to 0.164 t, based on an assumed operation of 10 h x 240 days/year, compared with conventional products.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	AQUA REVO Mills 2.5D (4-blade)	Results
Power consumption (kWh/year)	416.44	291.98	-124.46
CO <sub>2</sub> emissions (t/year)	0.234	0.164	-0.070

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

## DLC Drills Micro Decreasing Helix Type

### Features

Achieve high-precision and longer tool life by adopting a variable spiral flute with a gradually reduced helix angle to enable ultra-high-speed drilling in turning processes and machining centers where chip clogging is likely to occur.



### Reduces cutting resistance

→ Enables high-speed drilling by adopting a cutting edge shape that significantly reduces thrust force in the axial direction during drilling.

### Excellent chip evacuation

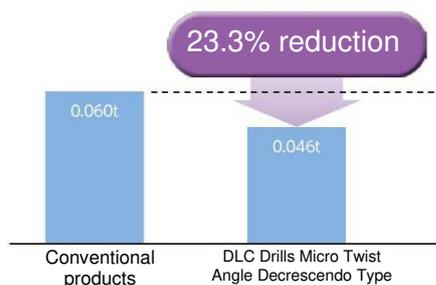
→ Finely cuts chips  
Achieves stable and high efficiency drilling even in aluminum alloy whose chip is likely to extend. By adopting a decreasing helix flute shape chip evacuation is improved.

### CO<sub>2</sub> reduction

→ CO<sub>2</sub> emissions are reduced by 23.8%.

CO<sub>2</sub> emissions were reduced by 23.3% to 0.046 t, based on an assumed operation of 10 h x 240 days/year, compared with conventional products.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	DLC Drills Micro Twist Angle Decrescendo Type	Results
Power consumption (kWh/year)	108.90	82.99	-25.91
CO <sub>2</sub> emissions (t/year)	0.060	0.046	-0.014

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

# Machining

## Cutting Tools

### Carbide Skiving Cutter for Quiet Gear Cutting

**Features**

Achieve high-speed processing by adopting a special cutting edge shape. Ensure stable processing accuracy and enable longer tool life by coating and surface modification.



**Achieves high-speed processing**

➔ Enables high-speed processing by adopting an optimal design and a special cutting edge shape.

**High-precision and long-life processing**

➔ Achieves longer tool life with improved wear resistance by coating and surface modification.

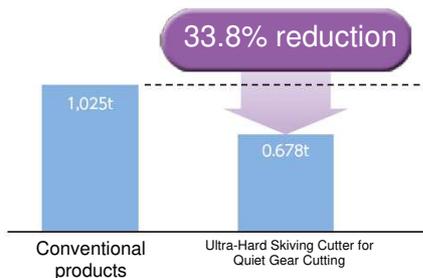
Achieves processing accuracy equivalent to that of ground gear in gear finishing process after heat treatment.

**CO<sub>2</sub> reduction**

➔ CO<sub>2</sub> emissions are reduced by 33.8%.

CO<sub>2</sub> emissions were reduced by 33.8% to 0.678 t, based on an assumed operation of 10 h x 240 days/year, compared with conventional products.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	Ultra-Hard Skiving Cutter for Quiet Gear Cutting	Results
Power consumption (kWh/year)	1863.06	1232.41	-630.65
CO <sub>2</sub> emissions (t/year)	1.025	0.678	-0.347

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

# Machining CONCEPT

## Machine Tools

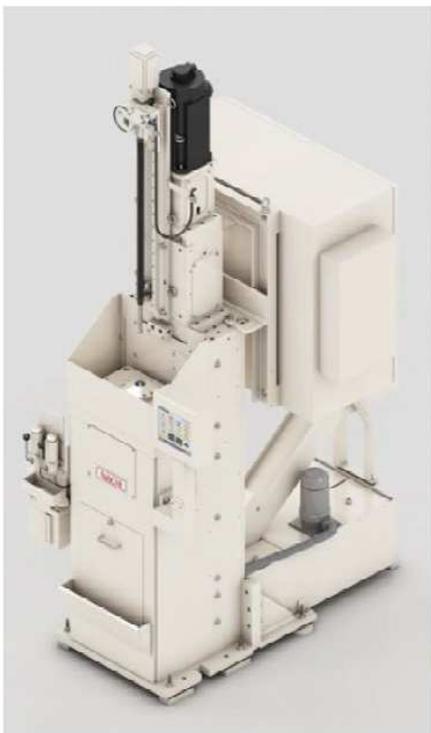
We have pursued human- and eco-friendly, high-speed advanced machine tools, and developed Japan's first broaching machines and various machine tools that are essential for ever-evolving production systems.

In recent years, we have put together our comprehensive technologies to meet diversified processing needs, including commercializing process streamline-type small scale gear cutting machines that best match internally manufactured cutting tools.

## NBV-5-8MA Broaching Machine

### Features

Mechanical type broaching machine that achieves both stable high-speed processing and high-environmental performance.



### Clean, energy-saving, and space saving

- ➔ Compared to conventional hydraulic products
  - cleaner hydraulic-free machine
  - achieves 40% less space

### Stable high-speed processing with servo motor installed

- ➔ Cutting speed: 2.5 times faster (from 6 m/min to 15 m/min)
- Ram turnaround time: from 14 sec. to 6 sec.
- Cutting vibration reduction by adopting ball screws

### Easy changeover

- ➔ Equipped with a servo motor for driving broach lifters and rams to enable easy setting of the length (adjustable range of 300 mm) and stroke of the broach.

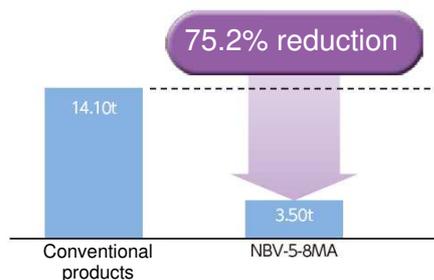
### CO<sub>2</sub> reduction

- ➔ CO<sub>2</sub> emissions are reduced by 75.2%.

CO<sub>2</sub> emissions were reduced by 75.2%, based on an assumed operation of 16 h x 250 days/year, compared with conventional products.

\*CO<sub>2</sub> emissions were calculated from the amounts of power consumption and oil consumption compared with the conventional machines.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	NBV-5-8MA	Results
Power consumption (kWh/year)	0.024	0.005	-0.019
CO <sub>2</sub> emissions (t/year)	14.10	3.50	-10.60

Annual operation time (16 h/day x 250 days/year)

# Components

CONCEPT

## 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.

## Angular Bearings

**Features** Achieve low torque with the equivalent mass by changing from roller bearings to ball bearings.



### Low torque

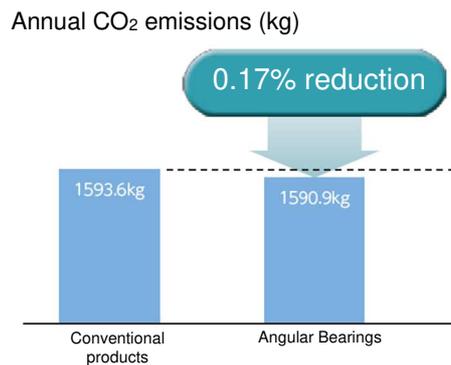
➔ Achieves low torque with the structural change from roller bearing to ball bearing.

### High-rigidity

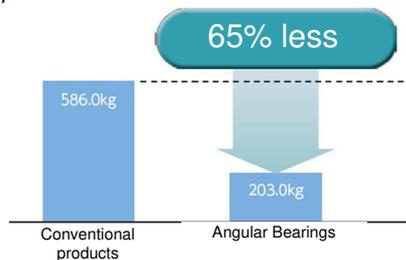
➔ Achieves the load resistant power equivalent to that of tapered roller bearings by using fixed double row parallel angular ball bearings.

### CO<sub>2</sub> reduction

➔ CO<sub>2</sub> emissions are reduced by 0.17%.  
Number of rotations: 2,000 rpm



### Torque ratio



### CO<sub>2</sub> emissions reduction results

	Conventional products	Angular Bearings	Results
Fuel consumption (L/year)	686.90	685.70	-1.20
CO <sub>2</sub> emissions (kg/year)	1593.60	1590.90	-2.70

# Materials

## CONCEPT

Special steels

Our Material Division commercializes DURO series for precision metal molds and highly functional materials EXEO series, etc. which make use of high-speed tool steels used as raw materials for cutting tools, cemented carbide materials, and special melting. In recent years, we have been developing materials to respond to next-generation vehicle technologies (EV, reduced weight, and high performance parts).

## DHF20 Carbide End Mill Material

**Features** Carbide base material that has both good wear resistance and toughness with our original alloy design.



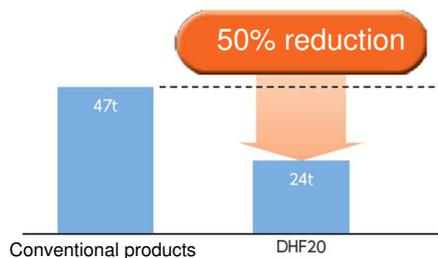
### Achieves both wear resistance and impressive toughness

→ The life of end mill manufactured using DHF20 is improved 2 times compared with conventional materials.

### CO<sub>2</sub> reduction

→ CO<sub>2</sub> emissions for manufacturing the target demand volume (7.6 t/year) were reduced by 23.8 t (50%), compared with conventional products.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	CLA28-260	Results
Power consumption (kWh/year)	60.3	30.2	-30.2
Annual CO <sub>2</sub> emissions (t/year)	47.5	23.7	-23.7

# Components

CONCEPT

## Automotive Hydraulics

With the aim of contributing to the development of more eco-friendly automobiles, we have been making efforts to realize downsizing and high-efficiency of automobile solenoid valves. With our highly precise manufacturing utilizing our processing technologies and efficient design capability utilizing CAE, we consistently pursue eco-friendly products.

### CPV12-256 Automotive Vane Pump

**Features** CO<sub>2</sub> reduction with improved pump efficiency and reduced weight using vane pumps.



#### Improved pump efficiency

➔ **Efficiency improvement by the use of vane pumps**

Improved efficiency by changing from conventional gear type to vane type.

- Volumetric efficiency  
Conventional benchmark products: 89% → CPV12-256: 94%
- Mechanical efficiency  
Conventional benchmark products: 62% → CPV12-256: 82%

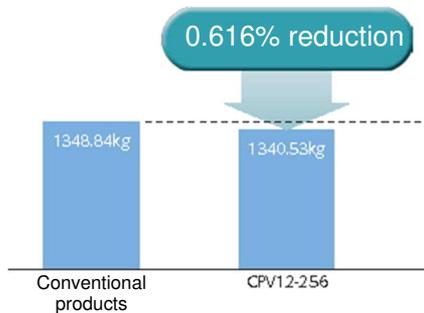
#### CO<sub>2</sub> reduction

➔ **CO<sub>2</sub> emissions are reduced by 0.616%.**

Gasoline consumption was reduced by 3.58 liters/year and annual CO<sub>2</sub> emissions were reduced by 8.31 kg (0.616%), compared with conventional products. (\*1)

\*1 Gasoline consumption and CO<sub>2</sub> emissions were calculated from the pump efficiency and weight compared with the conventional benchmark products (manufactured by other companies).

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	CPV12-256	Results
Gasoline consumption (L/year)	581.40	577.81	<b>-3.58</b>
CO <sub>2</sub> emissions (kg/year)	1348.84	1340.53	<b>-8.31</b>

Annual energization time (8 h/day x 200 days x 1/3)

### CLA28-260 Automotive Actuator

**Features** Holding actuator in which the holding load is generated when a current is applied. CO<sub>2</sub> reduction with reduced weight by optimizing the magnetic circuit.



#### Reduced weight

➔ **Reduced weight by optimizing the magnetic circuit.**

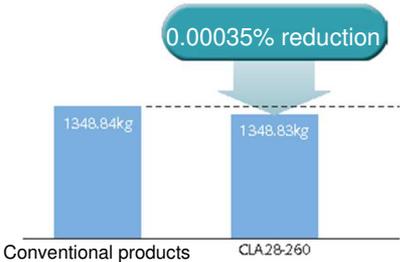
Achieves reduced weight by simplifying the structure and optimizing the magnetic circuit after achieving both high holding load and OFF response.

#### CO<sub>2</sub> reduction

➔ **CO<sub>2</sub> emissions are reduced by 0.00035%.**

Gasoline consumption is reduced by 2.4 mL/year and annual CO<sub>2</sub> emissions are reduced by 0.0047 kg (0.00035%), compared with conventional products.

Annual CO<sub>2</sub> emissions



CO<sub>2</sub> emissions reduction results

	Conventional products	CLA28-260	Results
Gasoline consumption (L/year)	581.40	581.39	-0.0020
CO <sub>2</sub> emissions (kg/year)	1348.84	1348.83	-0.0047

# Mission 2

## Preventing global warming and reducing energy consumption

All our plants work to reduce total CO<sub>2</sub> emissions by optimizing equipment operation and adopting energy-saving equipment.

In FY2020, we were able to achieve our target CO<sub>2</sub> emissions because of significant reduction in production but unable to achieve the target per unit gross value added emissions.

In FY2021, 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 total CO<sub>2</sub> emissions (per year)



Trends in per unit gross value added CO<sub>2</sub> emissions (per year)

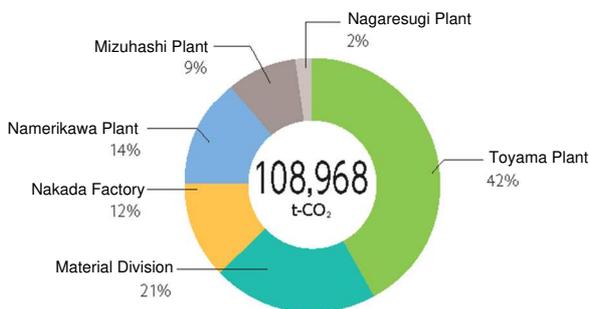


### FY2020 performance

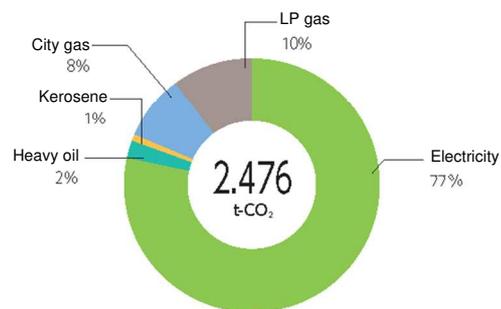
CO <sub>2</sub> emissions	Per unit CO <sub>2</sub> emissions
<b>108,968</b> t-CO <sub>2</sub> /year (-15.9% compared with the plan)	<b>2.476</b> t-CO <sub>2</sub> /million yen (+7.33% compared with the plan)

We did not achieve our target for per unit CO<sub>2</sub> emissions. We did, however, achieve our target for CO<sub>2</sub> emissions.

Ratio of CO<sub>2</sub> emissions by plant (FY2020)



Ratio of CO<sub>2</sub> emissions by energy (FY2020)



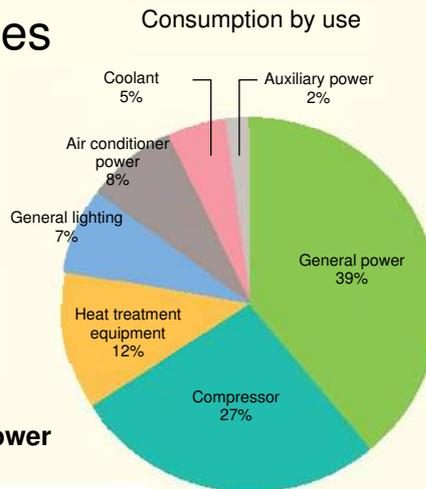
### Energy conservation efforts

- Shift to LED lighting equipment  
Fluorescent lighting equipment in the office building (one floor) were switched to LED lighting. (Reduction of 0.3 t-CO<sub>2</sub>/month)  
Mercury lamps in factories were switched to LED lighting. (Reduction of 3.6 t-CO<sub>2</sub>/month)
- Reduction in installed capacity associated with renewal of aged high-pressure compressors  
Compressor capacity was reduced compared with existing compressors by lowering the discharge pressure and increasing the air volume.  
Compressor capacity: Reduced 115 kW (reduction of 17 t-CO<sub>2</sub>/month)

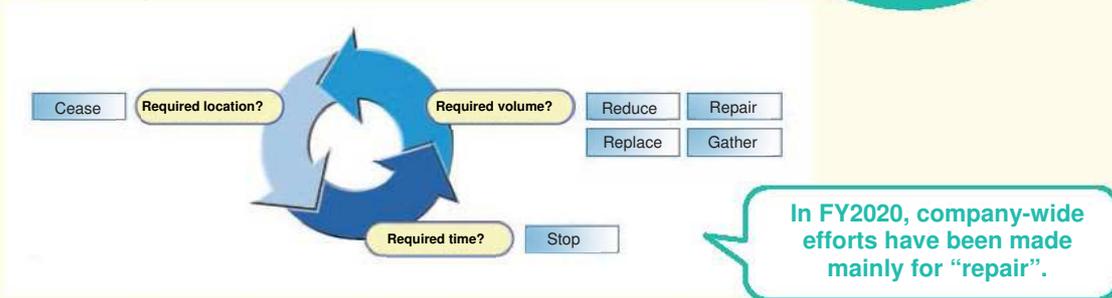
# TOPICS Energy saving activities

## Reduction in compressor power consumption

**Outline** Examining the percentage of “electricity” we use by use revealed that compressors accounted for 27%. In some divisions, the volume used exceeds the production power consumption, and reducing compressor power consumption has been a priority item in energy saving activities.



### ● Six keywords for the reduction in compressor power consumption



### ● Company-wide total improvement in air leakage

	June	July	Aug.	Sep.	Oct.	Nov.	Cumulative total
Number of cases found	80	87	112	78	69	73	499
Number of cases of repairs completed	43	69	90	85	73	74	434
Number of repeated cases	37	55	77	70	66	65	65

For the six-month period from June to November 2020, 434 repair cases have been carried out.

### ● <Improvement case>

Before repair



After repair



The cocks used before repairing the air leakage from the inner ring raceway grinding machine lubricator cock were made of resin and easy to break.

We found that cocks made of metal available from other manufacturers fit well when we used them on a trial basis, and therefore we have adopted them and promoted their use across the company.

Before repair



After repair



In order to prevent workpieces from clogging, the air had been kept flowing.

It was changed to intermittent injection by installing a pulse blow valve.

# Mission 3

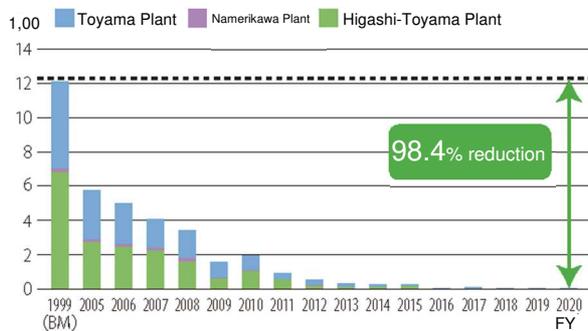
## Promoting Zero Emissions that contribute to profits

### Continued and enhanced efforts for recycling

Waste within factories is gathered in the green station in each workplace (primary segregated waste storage within a factory), stored in the green yard (final segregated waste storage within a factory), and consigned to the contracted waste disposers.

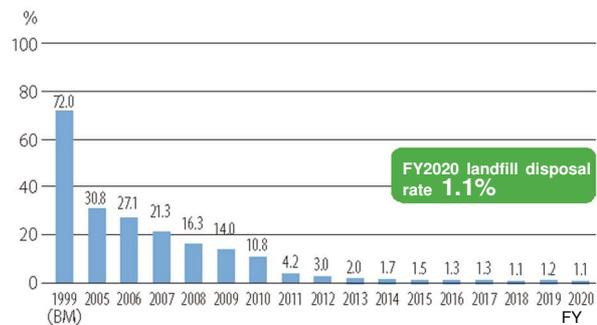
We have been almost fully recycling grinding sludge since last year by pressing it with in-house equipment to the extent possible and strictly segregating it.

#### Trends in waste landfill disposal (per year)



To effectively use resources and save landfill space, we try to minimize the landfill disposal volume. In FY2020, we successfully reduced the volume of landfill disposal by 98.4% compared with BM.

#### Trends in waste landfill disposal rate\* (per year)



The landfill disposal rate\* is substantially reduced from 72.0% (BM) to 1.1% by recycling slag, expanding the use of waste liquid and sludge as fuels to generate power, increasing the capacity of grinding sludge, and promoting its pressing to the extent possible.

\* 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 96.4% of our grinding sludge by solidifying it within our company and consigning the balance to external contractors. We have continued recycling 100% (no landfill disposal) of all metal grinding powder. In preparation for any unexpected stoppage of press machines, we regularly supply spare parts and carry out maintenance. In FY2020, we also promoted the development of standard operation manual for schedule maintenance to recycle metal grinding powder and contribute to profits.



### FY2020 major new efforts and contribution to profits

#### Efforts to increase the landfill disposal rate by changing intermediate treatment contractors of waste oil

We have promoted the reduction of residues in intermediate treatment (incineration). [Hydraulics/Thermo-Tech] The landfill disposal rate was improved from 3% to 0.3%, and our two divisions recycled a total of approx. 3.2 t/year into construction raw materials.

#### Contribution to profits

Contribution to profits\* 87,759,000 yen (FY2020 result)

\* Profit contribution = Disposal costs payable for industrial wastes - Valuable purchasing costs  
We will contribute to profit by continuing efforts for recycling that takes into account the aspect of costs.



## Mission 4

# Managing and reducing environmentally hazardous materials

## Reduction of chemical substances

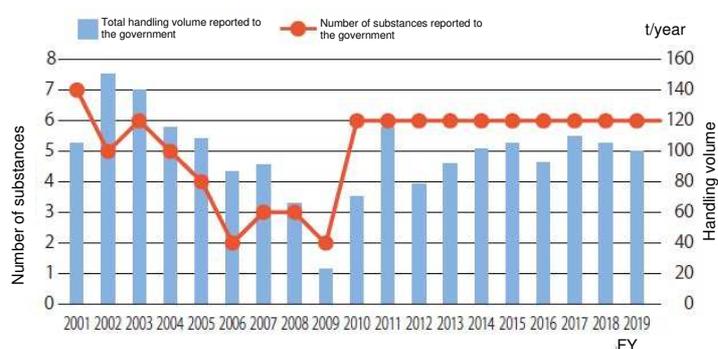
We have worked to reduce the use of PRTR-designated substances.

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.

In November 2008, the PRTR Law was revised and the number of substances that we need to manage increased starting from March 2009. Accordingly, three items (methylnaphthalene, 1,2,4-trimethylbenzene, and N,N-dicyclohexylamine, contained in Heavy Oil A, some grinding fluids, and anticorrosive agents) were added. Together with three other conventional items (toluene, xylene, and ethyl benzene contained in coating materials and cleaning oil or kerosene), we needed to report six substances in FY2019, the same as the previous year. In contrast, the overall handling volume has temporarily decreased due to switching of some paints since FY2012, but it was on an increasing trend due to increased production, except for FY2016 when the handling volume reduced due to conversion of fuels (Material Plant) and switching of cleaning agents from paint thinners in some processes (Namerikawa Plant). Under such circumstances, in FY2019, it decreased by 5% from the previous year partly due to the effect of switching to paints that do not contain PRTR-designated substances in the painting process of the Robots Division.

### Trends in PRTR-designated substances



\* Substances associated with metallic melting at Material Plant are excluded.

### FY2019 PRTR report summary

(Unit: kg)

Subject facility	PRTR No.	Chemical substance	CAS No.	Handling volume [kg/year]	Main usage	Discharge to air	Discharge to water	Amount of waste
Toyama Plant	80	Xylene	1330-20-7	4,244	Painting and cleaning	4,120	0	2
	188	N,N-Dicyclohexylamine	101-83-7	3,018	Grinding fluids	0	0	3,018
	296	1,2,4-Trimethylbenzen	95-63-6	5,473	Cleaning and rust, proofing	5,353	0	0
	300	Toluene	108-88-3	7,504	Paint	7,482	0	0
	438	Methylnaphthalene	1321-94-4	1,719	Fuels	9	0	0
Namerikawa Plant	53	Ethylbenzene	100-41-4	1,449	Paint	1,444	0	0
	80	Xylene	1330-20-7	8,546	Paint	5,868	0	18
	296	1,2,4-Trimethylbenzen	95-63-6	3,270	Fuels	449	0	0
	300	Toluene	108-88-3	14,245	Paint	14,203	0	0
Higashi-Toyama Plant (Nakada Factory)	53	Ethylbenzene	100-41-4	3,833	Paint	3,821	0	0
	80	Xylene	1330-20-7	7,796	Paint	6,282	0	20
	296	1,2,4-Trimethylbenzen	95-63-6	2,288	Fuels	834	0	0
Higashi-Toyama Plant (Material Plant)	300	Toluene	108-88-3	16,084	Paint	16,036	0	0
	80	Xylene	1330-20-7	5,712	Fuels	29	0	0
	296	1,2,4-Trimethylbenzen	95-63-6	6,591	Fuels	33	0	0
[Metallic melting processes]	438	Methylnaphthalene	1321-94-4	7,802	Fuels	39	0	0
	87	Chromium and chromium(III) compounds	-	-	-	0	0	7,640
	132	Cobalt and its compounds	-	-	-	0	0	992
	412	Manganese and its compounds	-	-	-	0	0	7,639
	453	Molybdenum and its compounds	-	-	-	0	0	4,865

**Calculation period** April 1, 2019 to March 31, 2020  
**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 (Issued in July 1999, enforced in April 2000, and revised in November 2008)  
 PRTR (Pollutant Release and Transfer Register)  
 Report to the government: PRTR Law Class 1 designated chemical substances 462 items (contents: 1% or more; volume: 1 t/year or more)

## 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, etc. 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 m<sup>3</sup>/hour, and the Higashi-Toyama Plant (Material Plant) is a specified factory with discharging gases of more than 40,000 m<sup>3</sup>/hour. Both plants do not have a specified facility for hazardous substances.

#### Restriction on volatile organic compounds (VOCs)

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

We do not have a facility subject to regulatory restriction (100,000 m<sup>3</sup>/hour or more). We voluntarily measure VOC discharged from our facilities at least once a year.

Although it was not the facility subject to regulatory restriction, we exceeded the limit (700 ppm-C) once in our voluntary measurement in FY2016. We therefore changed a part of our cleaning equipment in the beginning of FY2017 to use water-based cleaning fluids instead of VOCs. As we think we can further improve the process, we continue our studies to achieve our voluntary standard.

We newly introduced automatic painting lines with water-based cleaning facilities in FY2019. In FY2020, they are in operation only for some parts and therefore our voluntary standard has not been achieved yet, but a reduction from the previous measured values has been confirmed.

#### 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 <sup>3</sup>	0.08g / Nm <sup>3</sup>	0.10g / Nm <sup>3</sup>	0.10g / Nm <sup>3</sup>	0.20g / Nm <sup>3</sup>

In FY2020, we had no exceedance of emission standard.

### ● Prevention of water pollution

The Toyama Plant and the Higashi-Toyama Plant (Material Plant) are both the specified factory with discharging water of less than 10,000 m<sup>3</sup>/day. Both plants have a specified facility for hazardous substances.

The main environmentally hazardous substance contained in discharging water is oil. In addition to limiting 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 <sup>3</sup> /day	Higashi-Toyama Plant (Material Plant) Approx. 3,000 m <sup>3</sup> /day
Hydrogen-ion concentration (pH)	6.0~8.0	6.8~7.8 / 6.5~7.8	7.1~7.4	7.1~7.6
Biological oxygen demand (BOD)	20	16 / 10	3.0~16	0.7~2.2
Suspended solids (SS)	50	25	2~5	1~6
Normal hexane extracts content (Mineral oils)	3	3 / 2.4	0.2~0.8	0.1~1.2
Soluble iron content	3	0.9 / 1.5	< 0.1*~0.2	< 0.1*~0.5
Chromium content	0.5	0.15	< 0.04*	< 0.04*
Cyanogen compound (as cyanogen) hazardous substance	0.1	0.05	< 0.01*	—

\* Less than detectable limits

In FY2020, we had no exceedance of effluent standard (Water Pollution Prevention Act or Toyama Prefecture Ordinances), but had 1 case of exceeding our voluntary standard for abnormal times (Mineral oils 3.2 (due to rainfall)). We will work to prevent recurrence.

### ● 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 premise since FY2018.

\* Agreed limit 1: Toyama Plant north side, Higashi-Toyama Plant (Material Plant) east, west and south sides;

Agreed limit 2: Toyama Plant east, west and south sides, Higashi-Toyama Plant (Material Plant) north side;

In FY2020, we had no exceedance of noise and vibration standards.

#### Regulatory limit at the boundary line of the site

(Unit: dB)

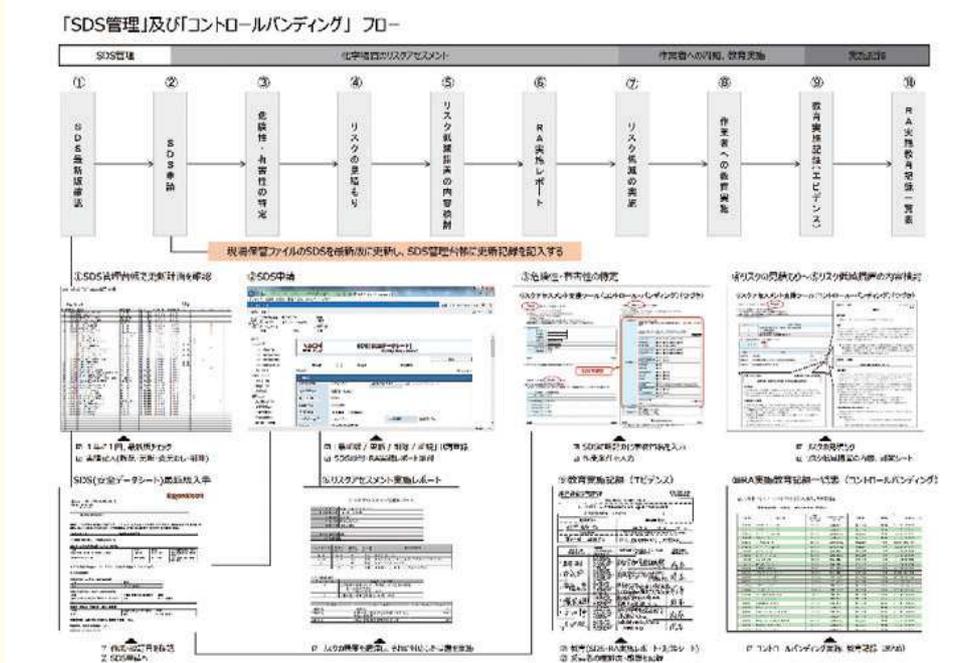
Hour	Regulatory value 1	Regulatory value 2
Daytime 8:00 - 19:00	70	65
Morning and evening 6:00 - 8:00 19:00 - 22:00	65	60
Night-time 22:00 - 6:00 next day	60*	55

# TOPICS Efforts to improve the management of chemical substances

## ① SDS management

The chemical substance SDS (Safety Data Sheet) has been available at the sites using chemical substances, but its updates tended to fall behind when implementing internal data registration and risk assessment or revising it.

Therefore, efforts have been made to improve the situation by establishing the procedure (flowchart) and developing the SDS management ledger at the sites using chemical substances.



## ② Management of hazardous material storage volumes

In some storage locations of hazardous materials, there are many types and large volumes of hazardous material products and it could not be determined at first sight whether they were managed not to exceed the specified quantities/volumes. Therefore, efforts have been made to improve the situation by promoting the improvement of notices and borders.



# Developing eco-conscious communities/human resources

## Received "Monozukuri Award of 2020 Best 10 New Products Award"

The Best 10 New Products Award is a system to recognize products that help develop manufacturing and strengthen the international competitiveness of Japan, selected by Nikkan Kogyo Shimbun from among products that are developed or put into practical use in the year concerned by the applicant companies. "MZ25" is a medium-sized robot that has the same characteristics of high speed, amazing precision, and outstanding versatility as a small-sized robot MZ series and it is compatible with a wide range of areas, including automotive parts and general industrial machinery. This year its outstanding versatility to be used in a wide range of areas, including assembly and transportation, contribution to productivity improvement with its high-speed and high-precision motion, and convenience of being compatible with various applications were recognized and awarded.



## Received "Encouragement Award of 2020 'CHO' MONODZUKURI Innovative Parts and Components Award"

The "CHO" MONODZUKURI Innovative Parts and Components Award is a system to recognize parts/materials used "behind the scenes" that contribute to industrial and social development, selected by MONODZUKURI Nihon Conference and Nikkan Kogyo Shimbun from among parts/materials that are developed or put into practical use by the applicant companies, to support strengthening the competitiveness of manufacturing in Japan. Our carbide drill "AQUA REVO Drills Oil-Hole" was recognized for its achievement of approx. twice the tool life compared to general oil-hold drills of other companies as well as its outstanding versatility and technological innovation of being compatible with a wide range of work materials with a single "AQUA REVO Drills Oil-Hole".



## Cutting Tool Division received "Environmental Activity Award"

Our Cutting Tool Division worked on "energy saving by improving compressor operation" and made significant achievements. The effort was recognized and received the "FY2020 Environmental Activity Award from the Japan Cutting & Wear-resistant Tool Association".

The surplus compressor capacity is estimated by adding up "motor outputs" displayed on multiple compressors in operation



Achieved the reduction of 6 MWh/month

## Company tour

In January 2020, the suite of the ambassador of the Republic of Benin visited our company. The suite of the ambassador of the Republic of Benin, which is the home country of the father of active NBA player Rui Hachimura who is from Toyama Prefecture, made a goodwill visit to Toyama Prefecture. As part of the visit, they visited our company. (At present, company tours are not available to the general public to prevent coronavirus infection)



## Contribution to global environment

With the aim of contributing to regional environment and raising awareness on environmental management, cleaning activities around plants have been periodically conducted by our employees.



## Execution of emergency drill and review

For facilities such as high-pressure gas tanks that must be dealt the case of natural disasters, we periodically conduct and review emergency drills. In addition, we also implement recurrence prevention measures and training for accidents/incidents that occurred within the past year, such as leakage.



Example of report on implementation of training

**NACHI**  
**NACHI-FUJIKOSHI CORP.**

**Safety & Environment Promotion Dept.**  
**TQC/TPM Promotion Headquarters**

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