



shaping your dreams

Environmental Report 2018



Further growth in a new era by adapting to the changing times

OSG recognizes that addressing environmental problems is a common issue worldwide and essential to our corporate activities. Responding to the changing times and customers' needs, we will take the initiative in developing environmentally friendly products using future technology.



OSG Corporation
President and CEO

In fiscal 2017, OSG achieved record-high net sales. We have announced the four-year management plan entitled "The Next Stage 17" for the period from fiscal year 2017 to 2020, which targets sustainable growth and corporate value enhancement for the long term.

In March 2018, OSG has marked its 80th anniversary since its foundation and created an anniversary logo forming "80" with three intertwined rings which represent the core values of our company – quality, globalization, and innovation. By enhancing the core values and deepening communication with customers, we will take on the challenge of achieving further growth toward the 100th anniversary.

In an effort to further promote our ongoing activities for environmental conservation, we will actively develop products that contribute to environmental protection and help our customers to reduce their environmental impact through the use of our products. In our eco-friendly production, we will aim, with making full use of information technology, to maximize productivity and promote energy saving by installing a smart production line which enables both full automation for large lot production and the improvement of flexibility for small lot production.

We will commit ourselves to transforming each and every one of our customers' dreams into reality and continue to contribute to the development of the manufacturing industry and the realization of a sustainable future. We look forward to your continued support.

Concept of OSG's Anniversary Logo "OSG's 80 Ring"



Anniversary

OSG's 80th anniversary logo represents our core values in the three intertwined rings – quality, globalization, and innovation. "Quality" has been an unchangeable core value of OSG since its founding in 1938. With expanding the three core values, we will continue to take on the challenge of achieving sustainable growth toward our 100th anniversary.



Fundamental Business Policy

- Always aware that our corporation is an institution that serves society, we provide products that are appreciated by our customers.
- We assign our employees appropriate jobs and strive to improve their daily lives.
- We strive to provide stable dividends to our stockholders.
- We implement sound business practices that earn enhanced social trust and develop the corporation into a worldwide business.

Basic Environmental Ideas

- All will work to maintain the global environment in harmony with OSG's basic business policies.
- OSG publicizes information on its three declarations made in October 1996 (i.e., Global Expansion, Health-consciousness, and Eco-friendliness).
- OSG conducts activities with consideration of the environment while offering products and services that contribute to society.
- Following societal norms, OSG promotes communication with the local community.

Environmental Policy

OSG strives to protect the global environment and act in harmony with nature under OSG's slogans of "an Eco-friendly Company" and "a Culture That Cares for the Environment."

Seventh Mid-Term Environmental Plan (From FY2018 through FY2020)

Slogan: Achieve further environmental improvement as a leading eco company

[We aim to reduce costs by actively promoting eco-factory activities and developing eco-products]

• Priority activities

Eco-factory — Reduction in consumption of energy and indirect materials such as cutting oils and grinding wheels

Eco-product — Development of cutting tools with long life and that help customers to reduce their environmental impact

Energy conservation — Productivity enhancement by reducing setup time and improving cycle time

FY2017 Targets and Results, FY2018 Targets

| Environmental Objectives | | FY2017 Target | FY2017 Result | FY2018 Target |
|--------------------------|---|---|---|---|
| Energy Conservation | Total Energy Use Reduction (Energy sources: Electric power, Fuel oil and LPG) Total use of energy BM: 95,676 GJ/month | 1.0% reduction 850 GJ/month reduction | 1.0% reduction 897 GJ/month reduction | 1.0% reduction 957 GJ/month reduction |
| | Basic unit of production BM: 20 GJ/million yen | 1.0% reduction 0.20 GJ/million yen reduction | 2.2% reduction 0.44 GJ/million yen reduction | 1.0% reduction 0.20 GJ/million yen reduction |
| Eco-Products | Eco-Friendly Product Development | 13 cases | 13 cases | 29 points*1 |
| Eco-Factory | Eco-Friendly Production | 22 cases | 21 cases | 31 points*1 |

*1 Improvement of environmental activities Evaluation by scoring (60 points maximum)



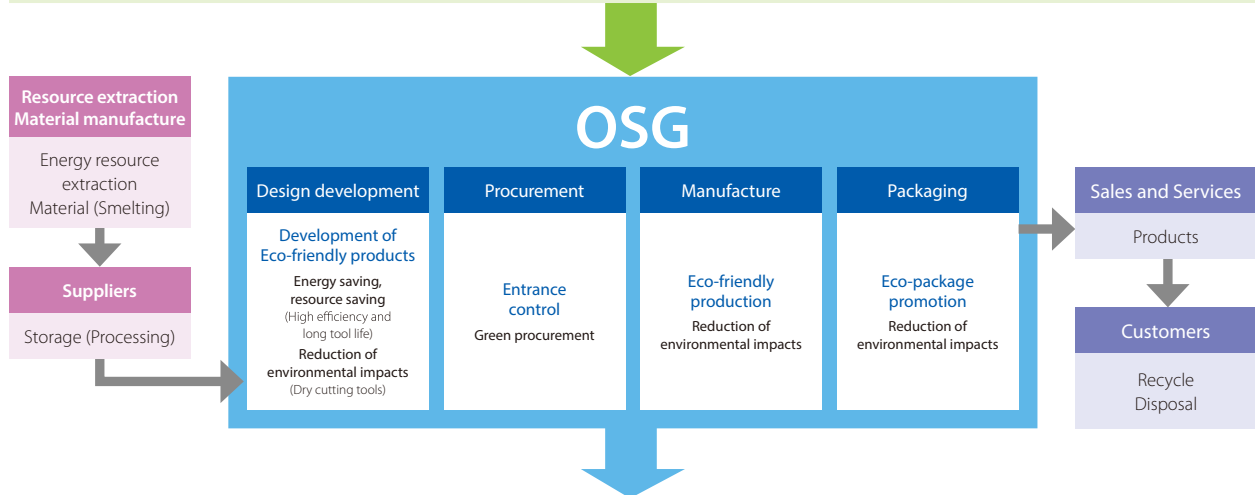
Environmental Activities

An important task for OSG is to address environmental issues, which will impact future generations. We aim to reduce environmental impacts and build a recycling-oriented society, while making efficient use of resources, promoting eco-friendly production and providing eco-friendly products and services to our customers.

Material Balance

In order to contribute to the realization of a low-carbon society and the creation of a resource recycling society, OSG understands and manages the various environmental impacts of our business activities. We remain committed to initiatives such as reducing energy use and using waste from our manufacturing processes as recycled materials.

| INPUT (Natural resources, Energy) | Energy | | Resources | |
|--------------------------------------|-----------------------------|------------------------|--------------------------------------|---------------|
| | Purchased electric power | 89,700,000 kWh | Raw Materials (Metal) | 1,890 tons |
| | Crude oil power generation | 1,174 kl | (Substances subject to PRTR | 261 tons) |
| | Air conditioning | 830 kl | Oils (Cutting fluid, Grinding fluid) | 511 kl |
| | Gas (LPG) | 433 tons | Others | Sub-materials |
| | Water supply | 115,603 m ³ | | |
| | Water for industrial use | 31,452 m ³ | | |
| | Well water | 4,710 m ³ | | |
| | Paper: Copy paper (A4 size) | 4,090,000 sheets | | |



| OUTPUT (Waste materials, Emissions to water and atmosphere) | Manufactured Products | | Water Emissions | |
|--|--------------------------|--------------------|---|-----------------------------|
| | Production | 53,258 million yen | Drainage water | 151,765 m ³ |
| | Packaging supplies | 185 million yen | <small>* Most drainage water is domestic drainage water. * We have balanced our water use so that the amount of drainage water equals our water usage. 50~60% of actual drainage water is estimated to be from the use of water-soluble coolants and the evaporation from air conditioning, etc.</small> | |
| | Emissions Waste Material | | Atmospheric Emissions | |
| | Amount for re-use | 1,251.5 tons | CO ₂ emissions | |
| | Recycled amount | 1,054.9 tons | Production | 51,484 tons-CO ₂ |
| | Reclaimed amount | 3.0 tons | | |
| | Total output | 2,309.4 tons | | |



Promotion of Resources Recycling

OSG has promoted zero emission activities to reduce waste. We developed a system to recycle reusable and recyclable resources, and established a structure to ensure the proper disposal of waste from our operations. Therefore, our recycling rate has been over 99% since 2005.



Waste Recycling

| | |
|---|---------------------|
| Metal scrap | 889.5 tons |
| Cardboard boxes (sold for re-use) | 74.1 tons |
| Waste oil (sold for re-use, recycled) | 528.0 tons |
| Oil sludge (sold for re-use, recycled) | 140.1 tons |
| Diatomaceous soil (sold for re-use, recycled) | 443.8 tons |
| Waste grinding wheels (recycled) | 40.8 tons |
| Waste plastic (recycled) | 46.3 tons |
| Wood chips (recycled) | 90.9 tons |
| Others (recycled) | 53.0 tons |
| Total | 2,306.4 tons |

Reductions in Environmental Impacts

OSG has strived to reduce energy consumption, CO₂ emissions and waste output. Focusing on efficient energy use and switching to energy-saving equipment, we have worked to promote continuous improvement in environmental impact throughout the entire company.

Reductions in Energy Consumption

In FY2017, although OSG continuously encouraged the switch to LED lighting across the entire company, our energy consumption increased as due to increase in production. As a result, our energy consumption per unit of production remained the same level as that of the previous fiscal year.

CO₂ Emissions

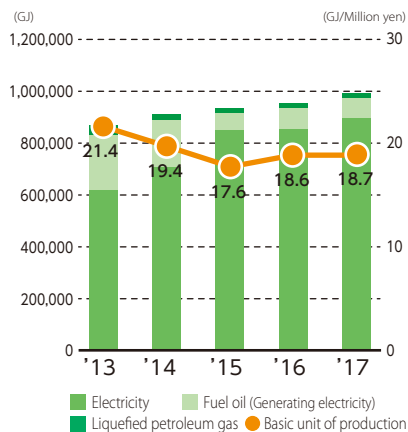
OSG's CO₂ emissions per unit of production remained flat from FY2016 because increased production resulted in increased CO₂ emissions.

Waste emissions and valuable materials ratio

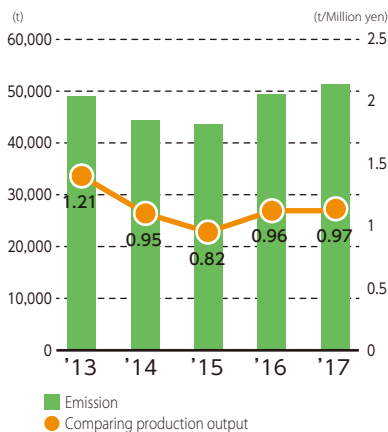
OSG has been continuing to promote the recovery of valuable materials from waste.

Although our waste emissions increased 6% with the increase in production, the sale amount of valuable materials increased 11% from the previous fiscal year.

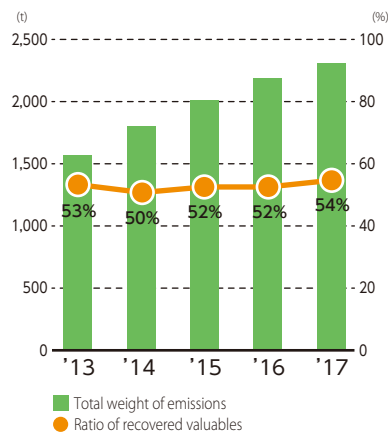
Energy Use



Carbon-Dioxide Emissions



Waste Output and Ratio of Recovered Valuables





Eco-Friendly Products and Services

OSG is striving to produce eco-friendly products and provide them to our customers. We are actively working to reduce environmental impacts by enhancing regrinding services and developing energy-saving products and high-efficiency products that enable high speed and long-life.

Carbide Material Recycling

Raw materials of carbide tools include rare metals such as tungsten and cobalt.

OSG group promotes recycling of carbide tools. For customers' CSR activities and zero-emission promotion, we utilize these resources by collecting end-of-life tools from our customers and recycling rare metals.

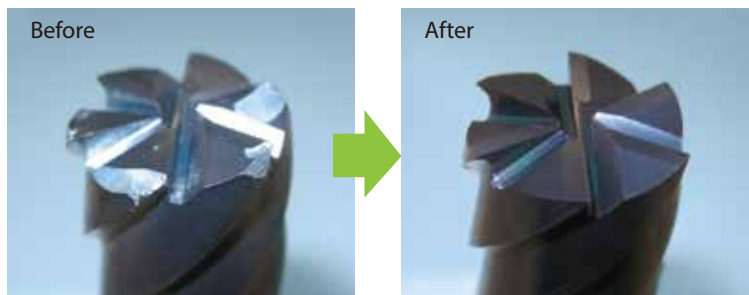
05



Regrinding Services

Cutting tools such as taps, end mills and drills become worn and dull after repeated use.

These tools can be returned to their original as-new condition by regrinding. OSG group provides regrinding services and meets customer's various needs.



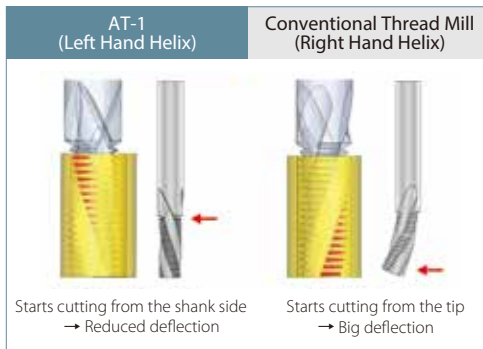


Revolutionary 1-Pass Thread Mill AT-1

Features

Right-Hand Cut and Left-Hand Helix Geometry

The AT-1's right-hand cut and left-hand helix geometry begins the cutting process from the shank side, thereby reducing deflection. With the elimination of zero-cutting, which is used for the correction of deflection, longer tool life can be achieved.



Comparison of differences in internal thread pitch diameter at initial cutting stage

Unit: mm

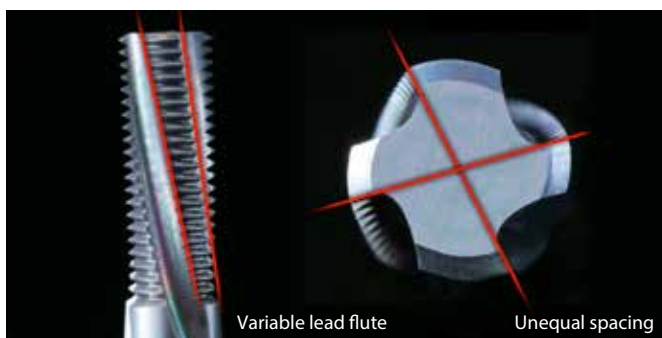
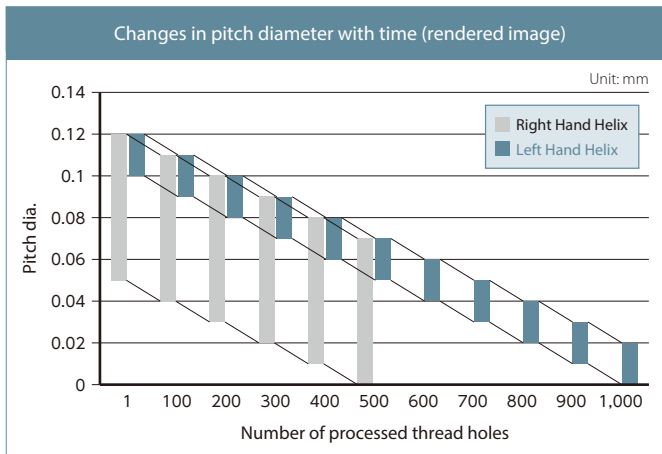
| | Hole Entry | Inner Hole Area | Dia. Difference |
|------------------|---------------|-----------------|-----------------|
| Right Hand Helix | +0.120~+0.140 | +0.040~+0.060 | 0.060~0.100 |
| Left Hand Helix | +0.120~+0.140 | +0.120~+0.140 | 0~0.020 |

Pitch diameter measurement method: Step gauge

Handles pitch diameter differences of 20µm or less.

Unequal Spacing and Variable Lead Flute

By applying the unequal spacing and variable lead flute geometry for reducing vibration, thread milling in one pass can be achieved, which enables superior and consistent surface finish.



Cutting in 1-Pass

The AT-1's unique tool geometry enables to generate threads in one pass, thus reducing machining time, which contributes to the reduction of power consumption.



OSG Corporation

1-15 Honnogahara, Toyokawa, Aichi, 442-8544 Japan

Tel.+81-533-84-8929 Fax.+81-533-84-8952

E-mail : infoeco@osg.co.jp