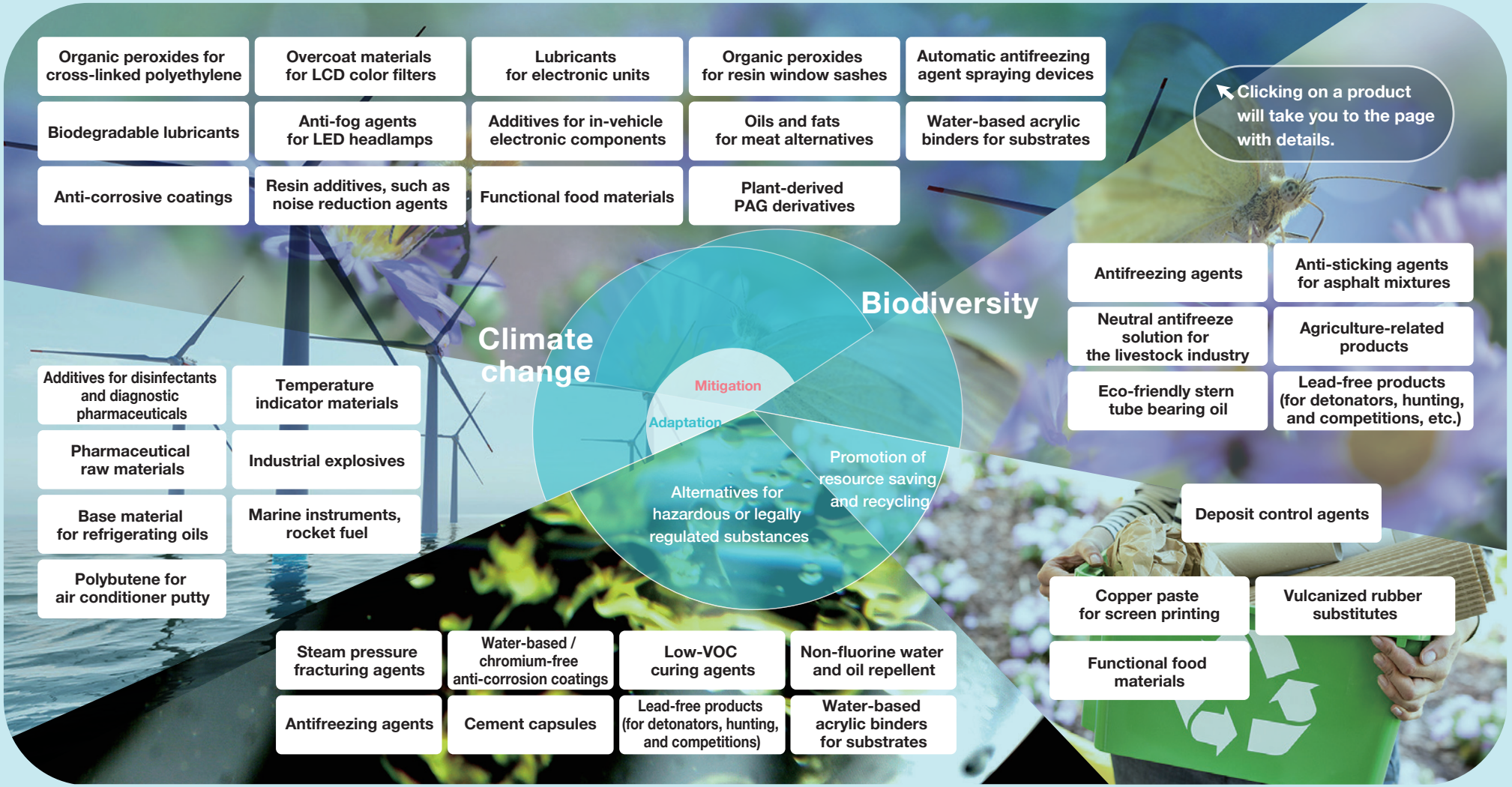
Products that Contribute to the Environment

GRI 201-2/304-2/417-1

In response to global issues such as climate change and biodiversity, the NOF Group is conducting R&D in technologies (clean tech) in our three prioritized business fields and creating a variety of products that contribute to the environment.

Among the NOF Group's products, those that (directly or indirectly) contribute to solving issues related to the natural or social environment, such as climate change and biodiversity ▸ P.130-134



Products that Contribute to the Environment

GRI 201-2/304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the shift to EVs

Functional Materials business | Metal Coatings business

- Additives for in-vehicle electronic components
- Lubricants for electronic units
- Anti-corrosive coatings
- Overcoat materials for LCD color filters
- Resin additives, such as noise reduction agents
- Anti-fog agents for LED headlamps

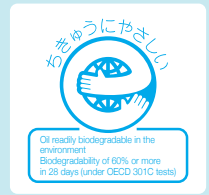
It is expected that electric vehicles (EVs) will contribute to climate change mitigation as they generate less greenhouse gas emissions than gasoline-powered vehicles when running. In addition, compared to gasoline-powered vehicles, it is predicted that EVs will require more electronic components (passive components), electronic units, LCD panels, silent components, and power-saving components. Thus, the NOF Group's products used in these applications will contribute in this area. Climate change mitigation also contributes to biodiversity because it reduces the ecological imbalance caused by global warming.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to renewable energy

Functional Materials business | Metal Coatings business

- Organic peroxides for cross-linked polyethylene
- Biodegradable lubricants
- Anti-corrosive coatings



Eco Mark Certification Number: 08110006
Name of utilizing contractor: NOF CORPORATION
Products:MILLUBE® series

Renewable energy such as wind power and solar power is becoming increasingly important as it does not produce greenhouse gases. Our anti-corrosive coatings and biodegradable lubricants used in bolts for wind power generation blades, as well as solar power mounting parts and gears contribute in this area. In addition, ultra-high voltage and high-voltage electric wires are indispensable in transmitting electricity from wind and solar power generation sites. Thus, our organic peroxides for cross-linked polyethylene used as a coating material contribute to the spread of renewable energy.

Products that Contribute to the Environment

GRI 201-2/304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the spread of energy conservation

Functional Materials business

- **Organic peroxides for resin window sashes**

Resin window sashes made using vinyl chloride contribute to the spread of energy-efficient housing due to their excellent heat insulation properties. Organic peroxides are used as polymerization initiators for the vinyl chloride resin, and thus contribute to the spread of energy conservation.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to reducing greenhouse gas emissions and securing protein sources

Functional Foods business

- **Oils and fats for meat alternatives**

Due to the greenhouse gases (methane) produced by the livestock industry and the protein shortage caused by the rapid growth of the global population, movements to find new sources of protein are starting up. NOF's oils and fats for meat alternatives are working toward the spread of soy protein and other such meat alternatives as they enhance the flavor and texture of these products through our proprietary oil and fat processing technologies.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the reduction of food loss

Functional Foods business

- **Functional food materials**

Disposing of food that has gone past its expiry date leads to food loss, and this has made securing food resources an issue. NOF provides functional materials for food that can maintain the softness and improve the texture and volume of breads and sweets, thereby contributing to reduction of food loss by preventing waste due to expiration.

Products that Contribute to the Environment

GRI 201-2/304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to preventing the depletion of the ozone layer

Functional Materials business

- Base material for refrigerating oils

Alternative CFCs that do not deplete the ozone layer are being increasingly used in refrigerants used in air conditioners and refrigerators. Base materials for refrigerating oils enhance miscibility with alternative CFCs and improve their thermal stability, electrical insulation performance, and other factors. Moreover, the low viscosity of refrigerating machine oils contributes to energy saving. In recent years, refrigerants with a lower global warming potential than before are required. NOF is now supplying refrigerating machine oil for refrigerants with a lower global warming potential.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to biodiversity, climate change mitigation, and environmental conservation

Explosives & Propulsion business | Nippon Koki Co., Ltd.

- Antifreezing agents
- Automatic antifreezing agent spraying devices

KAMAGU® and AUTOKAMAGU JET® have a significant impact on preventing icy roads.

Calcium chloride and other antifreezing agents conventionally used on road surfaces in cold areas have caused the issue of “salt damage.” KAMAGU® is an acetic acid-derived antifreezing agent containing no chloride, thus it can be used without fear of such salt damage. KAMAGU® is also eco-friendly with minimal impact on plants. AUTOKAMAGU JET®, an automatic antifreezing agent spraying device, is a sensor-based system that automatically sprays KAMAGU® onto snowy or icy roads. A type that runs on 100% natural energy (solar energy) is available, which also contributes to mitigating climate change. The device is also capable of advanced road management via remote monitoring and control, and therefore contributes to both environmental conservation and road safety along with the antifreezing agent.

Products that Contribute to the Environment

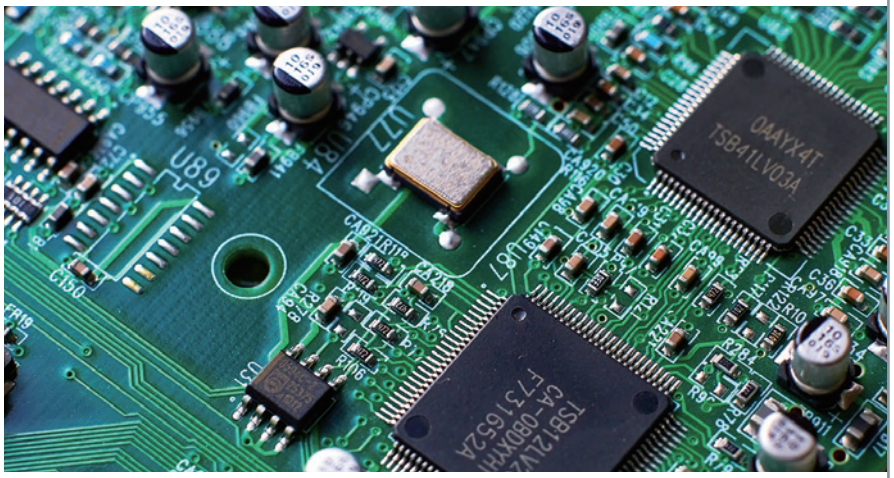
GRI 201-2/304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to environmental conservation and energy saving

Functional Materials business

- Water-based acrylic binders for substrates



Demand for ceramic substrates and green sheets is increasing due to the enhanced performance and miniaturization of vehicles, electronic devices, telecommunications equipment, and similar. Solvent-based binders, which are high in volatile organic components (VOCs), have typically been used as binding agents to form these items. NOF's water-based acrylic binder, MARPROOF® AE-002, not only reduces environmental impact and improves worker safety due to its low VOC levels, but also offers excellent thermal decomposition at low temperatures, thereby achieving energy saving.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to climate change adaptation (air conditioners / refrigerators)

Functional Materials business

- Base material for refrigerating oils
- Anti-corrosive coatings
- Polybutene for air conditioner putty

As temperatures rise, there is an increasing need for air conditioners and refrigerators across the world, including in developing countries. Base materials for refrigerating oils, which are used in refrigeration lubricants, as well as anti-corrosive coatings for fastening parts in external air conditioner units and polybutene for air conditioner putty, which is used to plug gaps formed by holes in external walls, therefore contribute in this area.

Products that Contribute to the Environment

GRI 201-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to climate change mitigation

Functional Materials business

- Plant-derived PAG derivatives

Polyalkylene glycol (PAG) derivatives are used in cosmetics and industrial products due to their moisturizing, lubricating, and other properties. In the cosmetics industry in particular, the adoption of naturally-derived raw materials is gaining momentum thanks to European manufacturers, whose consumers have high expectations in terms of eco-friendly products. The issue is, however, that efforts to move away from petrochemical-derived products have not actually made much progress. Under these circumstances, the plant-derived PAG derivative developed by NOF has the potential to become a leading material in the industry. We will also widely promote eco-friendly products in non-cosmetic fields, such as sealants, coatings, and other industrial products.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to climate change adaptation (diagnostic pharmaceuticals / pharmaceutical raw materials)

Functional Materials business | Life Science business

- Additives for disinfectants and diagnostic pharmaceuticals
- Pharmaceutical raw materials

Should tropical infectious diseases and other diseases and disorders spread due to the effects of climate change, then our disinfectants for infectious diseases and additives for diagnostic pharmaceuticals, as well as our pharmaceutical raw materials for combatting diseases and disorders, will contribute in this area.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to climate change adaptation (environmental information / disaster prevention and mitigation products)

Explosives & Propulsion business | Nippon Koki Co., Ltd. | NiGK Corporation

- Marine instruments, rocket fuel
- Temperature indicator materials
- Industrial explosives

As climate change progresses, there may be an increased need for surveying the entire planet, including seawater temperatures. In addition, there may be an increase in embankment construction to safeguard against the risk of storm surges and other such conditions. Marine instruments and rocket fuel necessary for these environmental surveys, as well as industrial explosives used to procure rocks and sediment from the mountains, will therefore contribute in this area.

Products that Contribute to the Environment

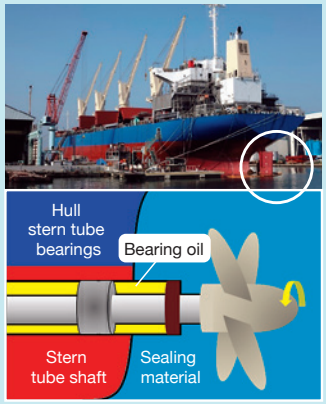
GRI 304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the conservation of marine environments

Functional Materials business

Eco-friendly stern tube bearing oil



MILLUBE® ST-100U	Mineral oil	Eco-friendly lubricants supplied by competitors	
		Company A	Company B
After 30 days	After 30 days	After 7 days	After 5 days
No rust or corrosion	No rust or corrosion	Visible rust and corrosion	Visible rust and corrosion

Results of comparison of anti-corrosive coatings (shafts were soaked in a 60°C mixture of lubricant (95%) and natural seawater (5%) for a certain period of time to compare the state of corrosion)

After a major oil spill in the Gulf of Mexico in 2010, the United States' 2013 Vessel General Permit (VGP) regulation came into effect for all vessels in 2013. This regulation led to growing global demand for biodegradable and eco-friendly lubricants. We developed MILLUBE® ST-100U, a stern tube bearing oil that meets the needs of the market by greatly improving the lubrication and anti-corrosion of conventional biodegradable lubricants offered by competitor companies. At the same time, the product satisfies the 2013 VGP regulation in terms of high biodegradability, low toxicity, and low bioaccumulation, thereby contributing to the conservation of marine environments as a superior lubricant.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the protection of animals (disinfectants)

Explosives & Propulsion business | Nippon Koki Co., Ltd.

Neutral antifreeze solution for the livestock industry

Barns, vehicles, and other places are disinfected in order to hygienically manage livestock, however disinfectants must be mixed with antifreeze to prevent them from freezing in the winter months. We contribute to the protection of animals with Viva Frostir®, a neutral antifreeze solution for the livestock industry that is gentle for both humans and animals.

Products that Contribute to the Environment

GRI 304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to environmental conservation

Functional Materials business

Anti-sticking agents for asphalt mixtures

Eco Mark Certification Number:12110001
Name of utilizing contractor: NOF CORPORATION
Target product:
ASPHARAB® Series

In road construction, asphalt mixtures often stick to cargo beds of trucks and hoppers used within plant facilities, etc. Petroleum-derived solvents have therefore been used to prevent this from happening. However, conventional adhesion preventers have negative impacts on the environment, such as soil and water contamination. ASPHARAB®, made from natural oil, contributes to environmental conservation as a highly biodegradable product.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the protection of animals (weak calves, dirt removal)

Functional Materials business
YUKA SANGYO CO., LTD.

Agriculture-related products
(NEODRINK®, Za Yoroi-Otoshi)

NEODRINK® is a nutritional supplement that maintains the physical strength of weak calves, while Za Yoroi-Otoshi helps reduce stress in cows by quickly removing stubborn dirt stuck to the cows' bodies.

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the use of recycled paper

Functional Materials business
YUKA SANGYO CO., LTD.

Deposit control agents

Recycled paper resources contain numerous impurities, including sticky substances such as adhesives. These impurities lower the efficiency of the paper recycling process and impact the quality of the product. Pitch control agents MILLSPRAY®, SPANOL®, and DETAC® and removing agent BIOREX® have solved these problems to promote the use of recycled paper.

These products demonstrate a superior performance in reducing impurities that are generated in the paper-making process.

Products that Contribute to the Environment

GRI 304-2/417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to environmental conservation and health maintenance

Explosives & Propulsion business

Lead-free products (for detonators, hunting, and competitions, etc.)

Progress is being made in removing lead from small arms that have conventionally contained large amounts of lead, such as detonators and shot. Lead can poison birds of prey, as well as causing soil and water pollution. Lead in detonators can also vaporize during firing and cause damage to human health. Therefore, making such products lead-free contributes to environmental conservation and health maintenance.

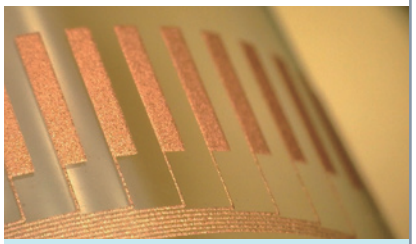
Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the efficient use of resources

Functional Materials business

Copper paste for screen printing

Etching is the standard method for forming copper wiring on electronic circuit boards. However, in this method, most of the copper foil is dissolved, which generates copper waste fluid. This requires waste fluid processing. The copper paste developed by NOF makes it possible to directly draw copper wire on the necessary areas using screen printing. Therefore, copper wiring can be formed without producing waste or generating waste fluid, which makes it possible to use resources efficiently and contribute to environmental conservation.



Example of printing copper paste by screen printing

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to the reduction of food loss

Functional Foods business

Functional food materials

Lutein compound modifier LP-VTM is a product for baked goods that contains lettuce powder. The process of growing lettuce in plants generates leaves that are primarily disposed of while shaping lettuces prior to shipping. Seeing these discarded leaves as an unutilized resource, we have blended them into LP-VTM. This eco-friendly product improves the physical properties and texture of dough due to the effect of lutein, which is contained in lettuce leaves. In addition, we have also developed Hokkaido White Grape Peel Powder, a material for health food made by effectively utilizing the pomace from pressed white grapes (Hokkaido Niagara grapes) produced during wine production. The powder improves moisture in skin and maintains skin elasticity through its anti-inflammatory, antioxidant, and other properties. Since it is an upcycled material that utilizes resources that would have originally been discarded, it can minimize environmental impact.

Products that Contribute to the Environment

GRI 417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to recycling

Functional Materials business

Vulcanized rubber substitutes

While large quantities of vulcanized rubber are used in auto parts and sealing materials, which need to be highly resistant to heat and oil, vulcanized rubber cannot be melted down once it has been molded, and cannot therefore be recycled. In contrast, the NOFALLOY® TZ series, which can be heated and remelted as many times as wanted for recycling, is extensively utilized as a substitute for vulcanized rubber.

Products made recyclable by the use of the NOFALLOY® TZ series

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to reducing environmental impact

Functional Materials business

Low-VOC* curing agents

Bathtubs are manufactured by thermally curing unsaturated polyester resin. PERHEXYL® A is a curing agent that can shorten the molding cycle, and further, can significantly reduce VOCs, compounds remaining in molded products that impact the environment.

*VOC is an acronym of Volatile Organic Compounds

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to environmental conservation and health maintenance

Functional Materials business

Non-fluorine water and oil repellent

Organic fluorine compounds (PFAs), which have been used to make products water repellent, are known for their poor biodegradability, bioaccumulation, and toxicity. For this reason, the European Chemicals Agency (ECHA) has unveiled proposed restrictions on their use. In response, NOF has developed BLEMMER® HU-SP, a PFA-free product partially made with plant-derived materials, as a water-resistant raw material. In addition, in 2024, we announced the MODIPER® WR Series, which is both water and oil repellent. It has been a longstanding challenge to make non-fluorine materials oil repellent, but with this product, it is possible to use such materials in, for example, clothing required to be resistant against stains from human sebum. In meeting the growing need for PFA substitutes in applications such as paper, textiles, and leather products, we will contribute to environmental conservation and health maintenance.

Products that Contribute to the Environment

GRI 417-1

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that contribute to environmental conservation and health maintenance

Metal Coatings business

NOF METAL COATINGS ASIA PACIFIC CO., LTD.

Water-based / chromium-free anti-corrosion coatings

GEOMET® is a water-based, chromium-free anti-corrosion coating that contains no chrome compounds. Satisfying the requirements of Europe's ELV*1 and RoHS*2 directives, GEOMET® treated parts are used by automakers all across the world.

*1 Scrapped automobiles
*2 Restriction on the use of certain hazardous substances in electrical and electronic equipment

Parts treated with GEOMET® anti-corrosion coating

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

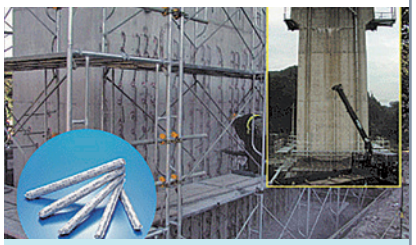
Products that contribute to reducing environmental impact

Explosives & Propulsion business

NiGK Corporation

Cement capsules

A cement capsule is an (inorganic) adhesive-based capsule anchor for post-installation mainly intended for use in anti-earthquake reinforcement work. This product is more resistant to fire than resin products, and it also excels in safety due to containing no harmful chemicals that could lead to sick building syndrome.



Example of installation (Shinkansen bridge piers anti-earthquake reinforcement work)

Climate change | Biodiversity | Promotion of resource saving and recycling | Alternatives for hazardous or legally regulated substances

Products that are kind to the surrounding environment

Explosives & Propulsion business

Nippon Koki Co., Ltd.

Steam pressure cracking agent, GANSIZER®

GANSIZER® uses the high vapor pressure generated during the thermolysis of the agent to crush bedrock, stone, and concrete structures with little vibration or noise. The agent has been highly evaluated as an explosive-free crushing agent that is kind to the surrounding environment. It has a strong track record in situations such as crushing concrete and excavation works near rivers, and was also used for underwater crushing of breakwaters that were destroyed during the Great East Japan Earthquake.