

# JGC GROUP Corporate Profile

#### JGC HOLDINGS CORPORATION

2-3-1, Minato Mirai, Nishi-ku, Yokohama, Kanagawa, 220-6001, Japan TEL: 81-45-682-1111 https://www.jgc.com/en/

## JGC's Purpose and Values

The business activities of the JGC Group are guided by and rooted in these principles, as is the conduct of all officers and employees.

# Purpose

Values

We are driven by our shared values and commitments. These elements express our strengths and represent the basis for how we work and deliver solutions to our clients and stakeholders.

#### Professional Shared Values Commitments Enhancing Challenge Create Respect planetary health We remain committed to our traditional mission of creating a more prosperous future. which has been redefined to reflect our purpose of enhancing the intertwined health of humans and the Earth. Integrate Deliver Integrity

#### 02 Enhancing planetary health

## History

Since the company was founded in 1928, our growth has been driven by constant transformation in adaptation to changing times.

# 1928s



Establishment of Japan Gasoline Co., Ltd., the predecessor of JGC Holdings Corp.

Founded to build and operate domestic refineries.

#### 1930s-50s



Engineering Business Growth into Full-Scale Operations Start of Catalyst Manufacturing Business

Start of engineering services, with refinery and petrochemical plant construction supporting postwar recovery and rapid domestic economic growth. Catalyst production also underway by the 1940s.



**Concerted International Expansion** 

Overseas expansion takes off, as JGC executes refinery construction projects in South America and moves into markets including China, Southeast Asia, and North Africa.

#### 1970s



Establishing its Position as a World-class Engineering Enterprise

Awarded a series of orders in resource-producing countries for oil refinery, petrochemical, and gas-processing facilities. JGC's first LNG plant built in Brunei. Start of environmental and energy consulting business.

#### 1980s



Building a Global Network for Project Execution, Diversifying Operations

Globalization of project execution promoted, as sudden yen appreciation reduces cost competitiveness of domestic resources. Ventured into sectors including life sciences, and launched the fine ceramics production business.

#### 1990s-2000s



Overcoming Crisis, Expanded Its Business with the Accelerated Worldwide Resource Development

Withstood a wave of global restructuring and realignment in the engineering industry. Responding to growing gas demand in the late 1990s and energy demand in emerging countries in the 2000s, the JGC Group contributed to resource development projects in Middle Eastern oil-producing countries, and now becomes a world leader in the LNG plant industry.

#### 2010 s



Expansion of Business Areas, Adoption of a Holding Company Structure

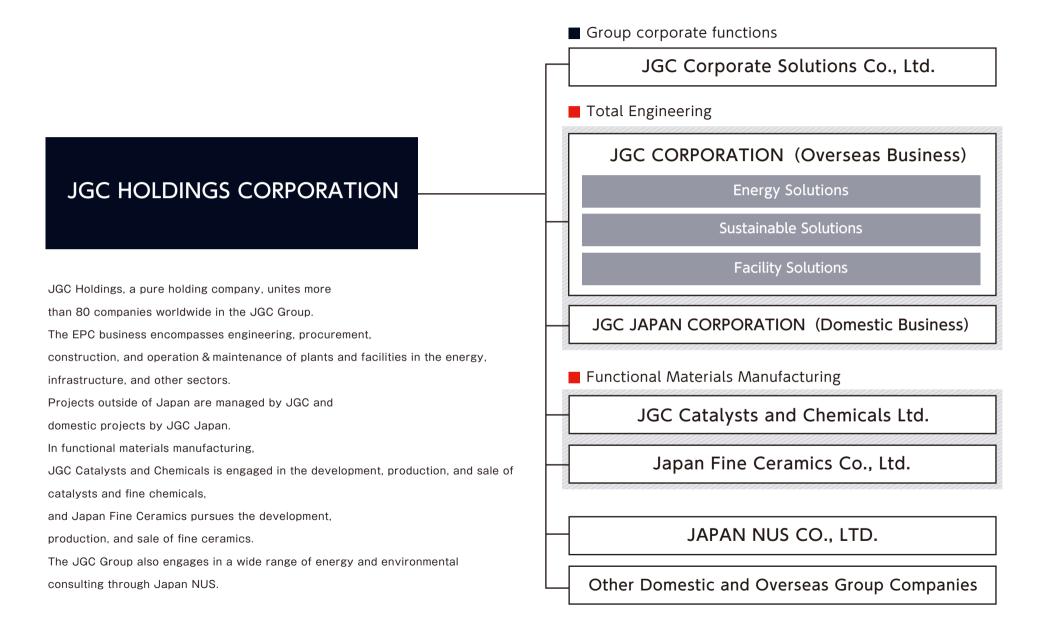
This decade is marked by our North American expansion capitalizing on regional advances in shale oil and gas development together with a clear commitment to offshore and renewable energy. As of October 2019, JGC becomes a corporate group with a holding company structure, pursuing stable, sustained growth from a multi-business portfolio.



#### Accelerating toward the Realization of a Decarbonized Society with 2040 Vision

In May 2021, JGC redefined the Group's purpose as "Enhancing planetary health" and formulated our long-term management vision "2040 Vision." Under this banner, JGC contributes to the creation of a healthy future for people and the Earth through our expansion into five business areas.

## Group Management Structure



### Business Model

Clients benefit from EPC services, functional materials manufacturing, and a variety of other business models.

### Total Engineering



#### EPC (Engineering, Procurement and Construction)

Plants and facilities developed through the JGC Group's EPC services support client businesses of all kinds. The Group works with clients from the early stages of project management consulting (PMC) for capital investment plans as well as in feasibility studies (FS) and front-end engineering and design (FEED) before conducting the EPC services. After completion of projects, maintenance services are also available, ensuring that clients maximize their business investment throughout plant and facility life cycles.

#### Project Execution Flow



#### PMC(Project Management Consulting)

Plants and facilities take shape through consulting services that satisfy client needs with contractor resources, applying the extensive accumulated expertise and experience in EPC.

#### Maintenance

Safe and stable operation of plants and facilities is the goal of the Group's maintenance services, which adopt advanced digital technologies.

#### Functional Materials Manufacturing



An enhanced value of catalysts, fine chemicals and fine ceramics operations is brought to clients through the JGC Group's R&D, planning, production and sales.

#### **Business Execution Flow**



#### Consulting, Licensing, Business Participation, Digital Platforms

Energy, environmental, and other consulting services are part of a broader business portfolio that also includes environmental technology licensing, digital platforms, and business participation in areas where synergies can be expected.



### Global Network

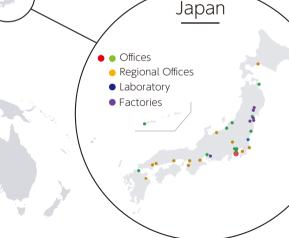
The JGC Group taps a network forged over the course of more than 90 years to provide solutions for clients around the world.

Overseas Main Bases\*1

# 32 locations in 22 countries

Domestic Main Bases\*2

# 33 locations



\*1 Cities where overseas group companies and overseas offices of JGC Corporation are located.

\*2 Cities where headquarters, offices, factories, and research centers of JGC Holdings and the main operating companies are located.

(As of March 2024)

#### **Total Engineering**

### Energy Transition

Adopting Low-Carbon Practices in the Fossil Energy Sector and Expanding Use of Clean Energy, for a Net-Zero Society

### LNG

Fulfilling an Important Role as a Leading LNG Plant Contractor



LNG Plant (Indonesia)

LNG is expected to play a role as a transition energy supporting the move toward a low-carbon and decarbonized society. More than 30% of global LNG production comes from plants designed and built by the JGC Group. Besides expanding production, the Group's outstanding engineering technologies aim to achieve low-carbon and decarbonized society by enhancing efficiency and the integration of technologies to reduce environmental impact, such as introducing electric-driven motors and CCS (Carbon dioxide Capture and Storage) facilities.

While population growth and economic development continue to drive global energy demand, the world is grappling with how to curb climate change. By facilitating the shift to low-carbon fossil energy while promoting widespread use of clean energy, the JGC Group will simultaneously respond to calls for more energy and less carbon.

### $FLNG \ ({\sf Floating \ LNG \ plant})$

#### Leading FLNG Contractor



FLNG Plant (Mozambique)

Few engineering firms worldwide can undertake the floating LNG (FLNG) facility projects for which the JGC Group is known. Floating production, storage, and offloading (FPSO) units are technically challenging, and the Group's track record of successful LPG-FPSO units attests to project execution at the world's highest level. The technologies and expertise garnered in this work are applied in offshore business development.

## LNG Receiving Terminal

#### Meeting Growing Global Energy Needs



LNG Terminal (Japan) Supplied by JX Nippon LNG Service Company, Limited

More than a third of Japan's receiving terminals have been built with support from the JGC Group. Looking forward, the Group will draw on its extensive experience to support national energy policies in Asia and other emerging areas, where further construction of facilities is planned to satisfy higher electricity demand amid surging population growth and urbanization driven by economic development.

## CCS

#### Reducing Environmental Impact of Fossil Energy Consumption



Gas Processing Plant and CCS Facility (Algeria)

CCS Demonstration Facility (Japan)

Recent years have seen greater attention to CCS (Carbon dioxide Capture and Storage) and CCUS (Carbon dioxide Capture, Utilization and Storage) as a viable ally against climate change: CCS, which injects and stores CO<sub>2</sub> underground, and CCUS, which goes a step further to use CO<sub>2</sub> effectively. The JGC Group has built a reputation as a leading contractor in CCS. Its track record of CCS construction includes Japan, Algeria and Australia. Beyond the design and construction of facilities, the Group is engaged in developing CO<sub>2</sub> separation technologies, devising solutions from the business planning stage, and participating in carbon credit business.

# Hydrogen/Fuel Ammonia

A Viable Path Toward a Decarbonized Society



Ammonia Synthesis Pilot Project Facility (Japan) Supplied by FREA

The JGC Group is capable of employing multipleforms of handling hydrogen, including ammonia, organic hydrides<sup>-1</sup>, and liquid hydrogen as energy carriers. Among these, the group has particular strength in ammonia (NH<sub>3</sub>), which has the highest hydrogen density and extensive supply chains already established. Currently, as part of the New Energy and Industrial Technology Development Organization (NEDO) Green Innovation Fund project, the Group is collaborating with Asahi Kasei Corp. to demonstrate the production of green chemicals such as green ammonia<sup>-2</sup> using renewable energy-derived hydrogen. The goal is to establish efficient and stable manufacturing techniques. The Group also engages in various projects including blue/green hydrogen and ammonia<sup>-3</sup> production and dehydrogenation projects in Japan and overseas from the conceptual planning stage to the implementation stage, contributing to the realization of a hydrogen based society.

\*1 Organic Hydride: A representative example is methylcyclohexane (MCH). MCH is a compound where hydrogen is bonded with toluene, and it remains in liquid form at room temperature and pressure, allowing for efficient hydrogen transport and storage.

\*2 Green Ammonia: Ammonia produced from renewable energy sources

\*3 Blue Hydrogen/Ammonia: Hydrogen or ammonia derived from fossil resources, with captured, utilized, or stored CO2

# Nuclear Energy

#### Looking to the Future of Nuclear Energy



Rendering of the Completed SMR Power Plant Supplied by NuScale Power, LLC

Treatment and disposal of radioactive waste and the reprocessing of spent nuclear fuel has been the focus of numerous facilities designed and built by the JGC Group in Japan and overseas. The Group's accumulated construction expertise is maximally applied in construction projects for nuclear power plants. The Group has also ventured into the EPC business for small modular reactors (SMRs), which are exceptionally safe and, along with hydrogen and renewable energy, potentially contribute to decarbonization.

### Solar Power Generation

#### Bringing Renewable Energy to Japan and the World



As an early participant in solar power generation after Japan introduced a renewable energy feed-in tariff system in 2012, the JGC Group not only boasts very considerable experience in solar construction but has also gained expertise in solar utility operations. Overseas, achievements in this segment include the construction of several large solar power plants in Vietnam and will soon include Mongolia's first solar power plant equipped with an energy storage system. In this way, we provide optimal energy management solutions accounting for storage and transmission.

Solar Power Plant (Vietnam)

### **Biomass Power Generation**

#### Power Generation Supporting Carbon Neutrality



Among renewables, biomass is emerging as a method of power generation linked to recycling and regional development. Group projects have drawn on our expertise both as an operator and a contractor to proactively develop this business in Japan and beyond.

### Offshore Wind Power Generation

#### Toward Widespread Adoption of Next-Generation Renewables



With many countries planning to expand offshore wind power generation, the JGC Group will contribute to wider adoption by utilizing experience from a vast track record of large-scale projects in oil and gas. Project management capabilities enable optimal coordination of all aspects of EPC plans through a command of wide-ranging engineering technologies as well as procurement and deployment on a global scale, which ensures optimal equipment is brought on-site exactly as needed.

Biomass Power Plant (Japan)

### Oil and Gas Production, Separation, and Integration

Support from the Planning Stage in Upstream Applications



Gas Processing Plant(U.A.E.)

The JGC Group's extensive record of projects for upstream applications in the oil and gas industry includes crude oil and gas gathering facilities, separation plants, and pressure boosting systems in the Middle East, North Africa, and Southeast Asia. The Group is also active from the planning stage of resource development projects of oil majors and national oil companies in oil- and gas-producing countries. For maximum return on investment and rapid progress in development plans, comprehensive proposals are porvided from development planning support to plant construction, operation, and maintenance.

### Petrochemicals, Downstream Chemicals

Building More Competitive, Value-Added Production Bases



Ethylene Plant (U.S.A.)

Using natural gas and shale gas as feedstocks, the JGC Group has a track record of executing large-scale projects in the Middle East, the U.S. and Asia. This includes large-scale ethane crackers and other downstream chemical plants. Group companies at home and abroad provide strong support for the overseas expansion of Japanese chemical manufacturers. The Group has an impressive track record in facilities for specialty chemicals and other highly value-added products.

### Petroleum Refining

Responsive to Developments in the Refining Industry



Refinery (Thailand)

As a corporate group with a wealth of experience in refinery construction, the JGC Group is responsive to changes in industrial business environment. The Group's extensive track record includes reinforcing heavy-oil cracking equipment such as fluid catalytic crackers and hydrocrackers in refinery upgrades as well as new plant construction and modification for sulfur-free gasoline and diesel fuel to meet stricter global environmental regulations. Clients also turn to the JGC Group when implementing capital investment plans for a competitive edge, as when converting domestic facilities to chemical refineries.

### Gas-Fired Power Generation

#### Meeting Global Electricity Demand



IGCC Plant (Japan)

Around the world, the JGC Group has a proven track record in construction projects for thermal power plants fired by oil, natural gas, and other energy sources. New power generation pioneered includes the world's first design and construction of residual oil-fired integrated gasification combined cycle plants, as well as the development of systems powered by boil-off gas from tanks at LNG receiving terminals.

### **Circular Economy**

Contributing to the Realization of a Circular Economy

Efforts toward sustainability are dependent on establishing a circular economy. Broad contributions of the JGC Group to this end include chemical recycling of plastic and fiber waste as well as production of next-generation sustainable aviation fuel (SAF) produced from used cooking oil.

### Sustainable Aviation Fuel (SAF)

Contributing to the large scale production and popularization of SAF



SAF (Sustainable Aviation Fuel) is produced through the treatment of raw materials such as biomass, used cooking oil, and municipal solid waste. The life cycle of the fuel, from production to combustion, is much more efficient than conventional aviation fuels in terms of reduction of green house gas emissions, and it can be used with existing infrastructure without modification. In November 2022, the JGC Group established SAFFAIRE SKY ENERGY<sup>11</sup>, the first large-scale domestic SAF manufacturing company in Japan. The group is constructing SAF plant aiming to start SAF production by 2025.<sup>12</sup> Additionally, the group initiated the "Fry to Fly Project" to promote resource recycling and contribute to achieving a decarbonized society. As of June 2024, 127 organizations are participating in this project. The group will contribute to the realization of a decarbonized society by collaborating with various companies, local governments, and other entities.

\*1 SAFFAIRE SKY ENERGY: Joint venture company with Cosmo Oil Co., Ltd. and Revo International Inc.

\*2 This project has been adopted as a grant project by the New Energy and Industrial Technology Development Organization (NEDO).

# Chemical Recycling

#### Aiming for the Increase in Plastic Waste and Fiber Waste Recycling Rate



The JGC Group is working to establish recycling systems for a wide range of plastic and polyester fiber waste. EUP (Ebara Ube Process) <sup>\*1</sup> is the only technology in the world with a track record of long-term commercial operation in gasification chemical recycling applications. As a licensor/contractor of EUP, the JGC Group has been engaged in the licensing, design and construction of facilities.

Further, the JGC Group has been working on expanding its role as a licensor of the pyrolysis process by means of which plastic waste is chemically recycled to produce naphtha substitute oil. The process has a long term, large-scale commercial track record<sup>\*2</sup>. Moreover, in chemical recycling for polyester, the JGC Group has been collaborating with companies that have proven achievements in the commercial operation and technology associated with chemical recycling various polyester products including fiber waste, or a broad network in the textile and fiber industries. The JGC Group has been working with them to develop a licensing business<sup>\*3</sup>.

\*1 EUP: The EUP, which was developed by EBARA CORPORATION and UBE Corporation in 2000 and was commercialized for longterm operation by Showa Denko K.K. (currently Resonac Holdings Corporation), is a process that gasifies plastic waste using partial oxidation with oxygen and steam, and produces synthesis gases that can be utilized in the synthesis of ammonia, olefins and other chemicals.

\*2 Pyrolysis plant of the former Sapporo Plastic Recycling Co. Ltd (SPR) was in commercial operation from 2000 for 10 years.

\*3 JGC HOLDINGS CORPORATION, TEIJIN LIMITED and ITOCHU Corporation made a joint venture company for licensing business to apply the technology to chemical recycling polyester fiber.

#### Healthcare/ Life Sciences

Supporting Health Through Advanced Technologies

In healthcare, smart hospitals represent a compelling application of digital technologies, as medical needs in emerging economies and elsewhere continue to grow. In life sciences, drug discovery has become more diverse and sophisticated, from small and middle molecule drugs to biopharmaceuticals to new modalities. To meet these needs and support global health, the JGC Group applies its expertise in pharmaceutical engineering as well as hospital construction and operation honed in Japan since the 1970s.

### Pharmaceutical Plants

#### Applying Japan's Best Technical Expertise in Pharmaceutical Engineering



JGC's engineering and construction expertise is behind this award-winning mid-sized API manufacturing facility of Chugai Pharmaceutical Co., Ltd.Category winner for Innovation in the ISPE Facility of the Year Awards.

Designed by engineers covering a broad range of pharmaceutical specialties and drawing on a track record of more than 650 projects. The pharmaceutical plants made possible by the JGC Group not only conform to GMPs but are noted for pharmaceutical engineering technologies highly valued in Japan. These plants fulfill roles in the production of small and middle molecule active pharmaceutical ingredients, biopharmaceuticals, nucleic acid drugs, vaccines, and sterile solid dosage forms. Outside of Japan, the Group supports the construction of pharmaceutical plants from the initial stage and is fully committed to the success of all projects undertaken.



A facility with an advanced containment technology in the mid-sized API manufacturing facility of Chugai Pharmaceutical Co., Ltd. This technology ensures worker safety from exposure to highly potency compounds.

### Hospitals

#### EPC and Operations, Supporting Health



Hospital Redevelopment Project (Japan)

As society ages faster and the need for healthcare reform looms on the horizon, new medical construction must anticipate future needs. Across Japan, the JGC Group is engaged in a number of hospital and medical facility construction projects that integrate and optimize management, operation planning, planning/design/construction, equipment installation, information infrastructure construction, environmental/disaster prevention planning, relocation planning and maintenance management under a consistent philosophy. In addition, the JGC Group is also engaged in hospital management and operations overseas, applying hospital management expertise gained through public-private partnerships in Japan. Furthermore, with an eye on establishing businesses that contribute to preventive medicine for extending healthy life expectancy, the JGC Group is also developing digital healthcare operations with digital technologies adopted at hospitals and clinics to collect medical data and improve the quality of treatment.

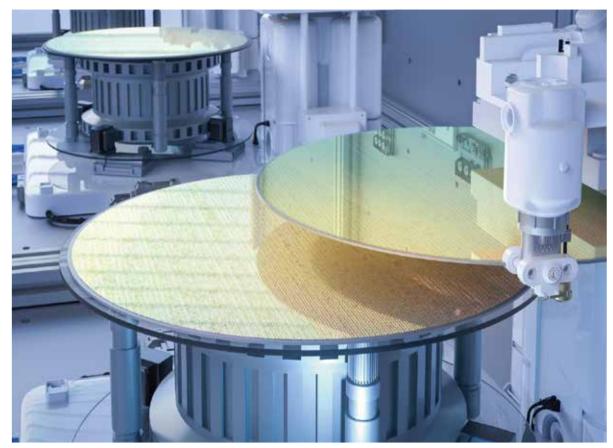
### Industrial / Urban Infrastructure

Responding to various demands around the world

Further development of the information society is driving demand for infrastructure facilities supporting digital industries -semiconductor and storage battery factories and data centers, for example- and demand in related industries is also surging. Furthermore, in emerging economies with growing populations like southeast Asia, demand for infrastructure to provide electricity, water and sewage systems, and rail transport is increasing. Applying competencies of engineering technologies and project management capabilities developed over years in projects, the JGC Group provides facility solutions by accompanying clients from the conceptual stage to the realization of their capital investment plans and the construction of plants and facilities.

## High-tech Industries

Realizing the Best Integration of Buildings and Facilities, with Deeper Understanding of the Clients' Manufacturing Processes



The JGC Group participates from the basic conception and planning stages of projects for production facilities for parts and materials used in semiconductors and storage batteries and executes the projects. In addition, for advanced data centers, for which demands are rapidly increasing, the JGC Group provides complex solutions and project execution as an engineering contractor that handles everything from project conception to EPC execution. The JGC Group makes full use of our engineering technologies and project management capabilities developed over many years of serving the pharmaceutical manufacturing sectors, etc., to provide optimal solutions for the engineering of plants that integrate buildings and facilities, as well as for our clients' processes and project characteristics, to ensure highly reliable factories.

## Smart Factories

#### Enhancing Competitiveness in Manufacturing



For applications such as food and cosmetics production, machining and assembly, or distribution, next-generation smart factories proposed by the JGC Group offer higher productivity through IoT/digital technologies, robots, and other automation, besides meeting low-carbon/decarbonization needs through energy-efficient and environmentally conscious technologies. The JGC Group leverages our unmatched strengths as an engineering contractor excelling in design technology including architectural, mechanical, and electrical design, to propose solutions from the conceptual stage that meet client needs and enable overall factory optimization.

### Non-Ferrous Metal Refining

Contributing to Expansion of Production of Rare Metals with Cutting-Edge Technologies



Nickel Smelting Plant (Philippines)

Factors such as the spread of EVs have made rare metals and nonferrous metals such as copper and nickel more vital than ever. "Wet smelting" plants designed and built by the JGC Group with world-class technical expertise and extensive experience are notable for addressing issues of exploiting low-grade ore deposits, managing sulfur and other ore impurities, and reducing the overall environmental footprint. By providing a one-stop service for the construction of nonferrous metal smelting plants, from feasibility studies to design, construction, and commissioning support, the Group contributes to an expanded supply of nonferrous metals.

## Complex Urban Infrastructure

#### Functional Integration of Urban Infrastructure



In developing complex infrastructure, the JGC Group applies its accumulated expertise in the design, construction, operation, and maintenance of various types of urban infrastructure used for renewable energy, life sciences, healthcare, transportation, water and wastewater treatment, manufacturing, and recycling. JGC project management services also integrate renewable energy, circular economy, and other solutions, enabling environmentally-conscious industrial parks and urban development.

#### Promoting Overseas Development of Railway Infrastructure



Mechanical and electrical packages –assemblies of particularly complex subsystems– are a facet of JGC design and construction in railway infrastructure, as are train depots. Our approach to totally optimize railway EPC by system integration can achieve a high level of reduction of construction period and cost, as well as achieve labor saving in maintenance.

# Water Treatment that is Both Environmentally Compatible and Economical



Responding to a variety of needs of clients and communities, the JGC Group offers water infrastructure for plants, factories, and complex infrastructure, such as industrial parks and regional development, from the standpoint of an integrated approach to business planning, engineering, procurement, construction, and maintenance. In response to the requirement for carbon neutrality, the Group realizes water infrastructure combining economic efficiency and environmental acceptability by taking low carbon/decarbonization measures such as optimal integration between renewable energy and water infrastructure.

### Functional Materials Manufacturing High-Performance Functional Materials

Responding to Worldwide Needs Through Advanced Manufacturing

## Catalysts

#### Contributing to a Carbon Neutral Society



Catalysts for Petroleum Refining (FCC Catalysts)



Denitrification catalysts remove nitrogen oxides (NOx) from the flue gases of thermal power plants and waste treatment facilities, preventing environmental pollution.

Development and production are centered on fluid catalytic cracking (FCC) catalysts, petroleum refining catalysts such as those used in hydrogenation processes, chemical catalysts for petrochemical applications, and environmental catalysts (denitrification catalysts etc.) for removing nitrogen oxides from flue gases of thermal power plants etc. Further, in recent years, we are aiming to contribute to the realization of carbon neutral society by developing catalysts for synthetic fuels to achieve carbon recycling, utilizing the technologies cultivated over the years.

The JGC Group responds to changing industrial needs, helps improve people's quality of life, and works toward a sustainable society through development, production and sales of catalysts for refineries, petrochemical plants, waste treatment plants, fine chemicals applying nanotechnologies, as well as fine ceramics distinguished by properties such as heat resistance, corrosion resistance, and high rigidity.

# Fine Chemicals

#### Improving Quality of Life with Nanotechnologies



Sols of Silica and Metallic Colloids Silica sols are used in anti-reflective coatings for flat panel displays and similar surfaces.

Fine chemicals supplied by the JGC Group, applying the nano-technologies developed through catalyst production, fulfill numerous needs in IT/electronic, optical, cosmetic, and colloidal applications. The products they enable are indispensable to a comfortable life and range from memory devices to TV and computer LCDs and FPDs, eyeglass lenses, and cosmetics.

### Fine Ceramics

#### New Materials, Endless Possibilities



Engineering Ceramics

Octacalcium Phosphate (OCP) as a Bone Regeneration Material

The JGC Group meets the diverse needs of various advanced industries, including the semiconductor manufacturing equipment field, with its proprietary technologies in the fields of electronic ceramics, engineering ceramics, and metal-ceramic composite materials (MMC) etc.

We are also expanding production of high thermal conductivity silicon nitride substrates for power modules used in electric vehicles (EVs) and other applications, using our unique technology that is superior to conventional manufacturing methods, thereby contributing to the realization of the decarbonized society.

Furthermore, through joint research with Tohoku University, the Group have achieved the world's first mass production of Octacalcium Phosphate (OCP), a material with excellent bone regeneration capabilities and high biodegradability. Anticipating increased demand due to an aging society, the Group plans to collaborate with various pharmaceutical and medical device manufacturing companies to develop bone substitute products using OCP as a raw material.

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# Company Profile



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	Chairman and Chief Executive Officer (CEO)
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Established	October 25, 1928
Capital	¥23,798.81million (As of March 31, 2024)
Employees (Consolidated)	8,865 (As of March 31, 2024)
Stock Exchange Listing	Prime Market, Tokyo Stock Exchange (TSE Code:1963)

# Main Group Companies

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