

Business Summary and Strategy—Valve Manufacturing Business

Message from Unit General Manager, Flow Control Business Unit



We will accelerate initiatives targeting growth markets and aim to transform our business portfolio.

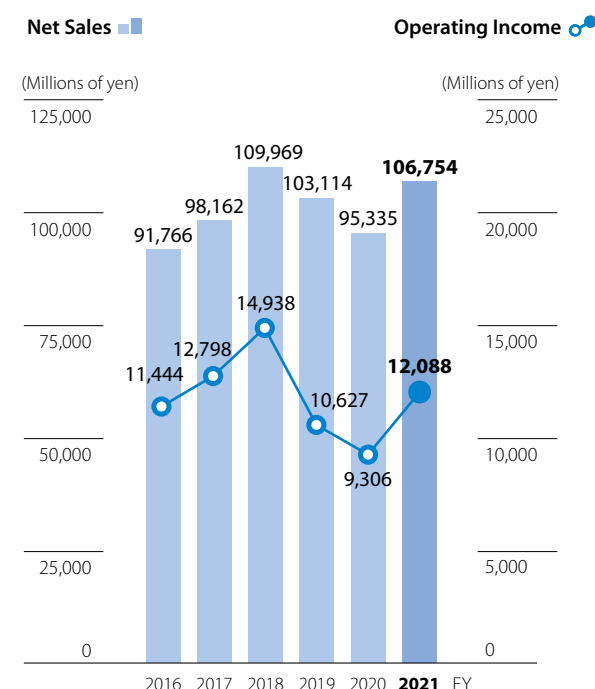
Yukinari Koide

Executive Officer, General Manager, Flow Control Business Unit

Business Results in the Fiscal Year Under Review (FY2021)

At the beginning of FY2021, the impact of COVID-19 on the market was uncertain, but due to expanding demand in the

Net Sales & Operating Income in Valve Manufacturing Business Segment



- For the fiscal year ended December 2020, which is an irregular nine-month period due to the change in the fiscal year end, reference figures (unaudited) calculated as if the previous fiscal year ran from January to December 2020 are shown.
- The operating income of the valve manufacturing business shows the figures before the elimination of corporate expenses, etc.

semiconductor market and the strong performance of products for semiconductor manufacturing equipment, combined with the efforts of price revisions implemented in April and August in response to sharply rising raw material, component and secondary material prices, as well as the temporary demand those revisions caused, sales of general purpose products began to recover, and we managed to exceed our forecast business performance as a result. Sales to domestic industry and Europe have not yet returned to pre-pandemic levels, but the economy has bottomed out globally and is on a recovery track.

Even on the profit/loss front, profit rose in connection with higher revenue for semiconductor manufacturing equipment, and the effects of price revisions and recovery of sales volume also led to increased profit.

As a result of this performance, net sales in the valve manufacturing business segment rose ¥11,419 million year on year to ¥106,754 million. Operating income also increased year on year, up ¥2,781 million to ¥12,088 million and marking a recovery from a disappointing performance a year earlier due to COVID-19.

Toward Achieving the Long-term Management Vision

The Long-term Management Vision states a policy of aiming for expanded sales and profit by pursuing core businesses in greater depth and investing resources in growth markets. The first Medium-term Management Plan, which runs to FY2024, positions the businesses in which the KITZ Group excels, namely building facilities, petrochemicals, water treatment and machinery equipment as core businesses. We will further enhance the infrastructure of these businesses and lay solid

foundations while investing resources in growth markets toward achieving “digitalization” and “decarbonization,” two keywords to solving social issues. Specifically, we have designated semiconductor equipment, semiconductor materials (filters), fine chemicals and hydrogen & clean energy as target markets. In addition, to drive these efforts we have established the Business Promotion Center and rearranged the organizations under the center to reflect business strategy as the Building System Department, Industrial Department and Fine Chemical Department. We have also newly established a Machinery Equipment Sales Department under the National Sales Division. In addition, the New Business Development Department, which has been newly established under the direct control of a executive officer, will aim to provide a fluid solution business through the integrated utilization of fluid control-related technologies. It will also practice open innovation utilizing KITZ technologies and outside technologies, and play the role of promoting the discovery of themes for new businesses.

We will accelerate initiatives aimed at each growth market while specifying and managing resource allocations in an effort to transform our business portfolio.

Initiatives in the Field of Hydrogen

KITZ began selling valves for hydrogen stations that supply hydrogen gas as fuel for fuel cell vehicles and other uses in July 2012, and in April 2020 entered the packaged unit-type hydrogen station business. Additionally, in recognition of the development of technologies to reduce the costs of hydrogen stations as part of the ultrahigh pressure hydrogen infrastructure widespread adoption and technological development project operated by NEDO*, and for the technological development of large valves for liquefied hydrogen as part of a project to develop technologies to build a hydrogen-based society, KITZ was selected by METI* as a “Zero-Emission Challenge Company.”

In addition, Kawasaki Heavy Industries, Ltd. proposed and was selected for its hydrogen-powered aircraft core technology development project as a “next-generation aircraft development project” as part of NEDO’s Green Innovation Fund, and in November 2021 KITZ was selected by Kawasaki Heavy Industries as a project participant and subcontracted again for the development of valve technologies under hydrogen aircraft engine combustor and system technology development and liquefied hydrogen fuel storage tank development. We will pursue efforts in the field of hydrogen, one of our growth markets, including our aim of contributing to the realization of next-generation aircraft through the development of these technologies.

* NEDO: New Energy and Industrial Technology Development Organization

* METI: Ministry of Economy, Trade and Industry

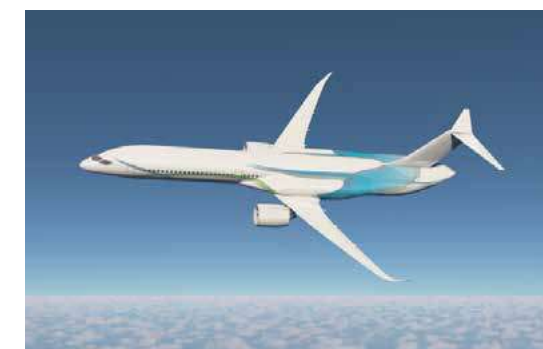


Image courtesy Kawasaki Heavy Industries, Ltd.

Launch of a Monitoring Service

Domestically, there are many plants that were constructed during Japan’s high economic growth periods and which are still operating today. Due to their many years of operation, there is a heightened risk of trouble and accidents from deteriorating facilities, which increases the importance of regular inspections, upkeep and other maintenance tasks for securing safe operations. However, in the field of maintenance work, there are new needs to deal with the aging of experienced engineers and technicians, the decline in the working population and the spread of infectious disease, and as a solution, it is necessary to prevent equipment failures in a way that does not rely on human intervention. Using technologies based on unique sensing algorithms, AI and IoT, KITZ has now launched KISMOS (KITZ SMART MONITORING SYSTEM), a monitoring service that detects signs of abnormalities in valves for batch processing production processes in plants and factories. This will provide a system for providing total support to customers from the selection of valves to planned maintenance. Going forward, KITZ will fully take on the challenge of solutions-oriented businesses.



Valves equipped with sensors and other devices

KITZ Group + Water

To meet the world's water infrastructure demands

Supporting the Stable Supply of Water

Water is the source of life and essential for sustaining all lives on the earth, flora and fauna alike. The KITZ Group helps to make people's daily lives more comfortable by supporting the stable supply of clean and safe water through its safety-conscious products and services.

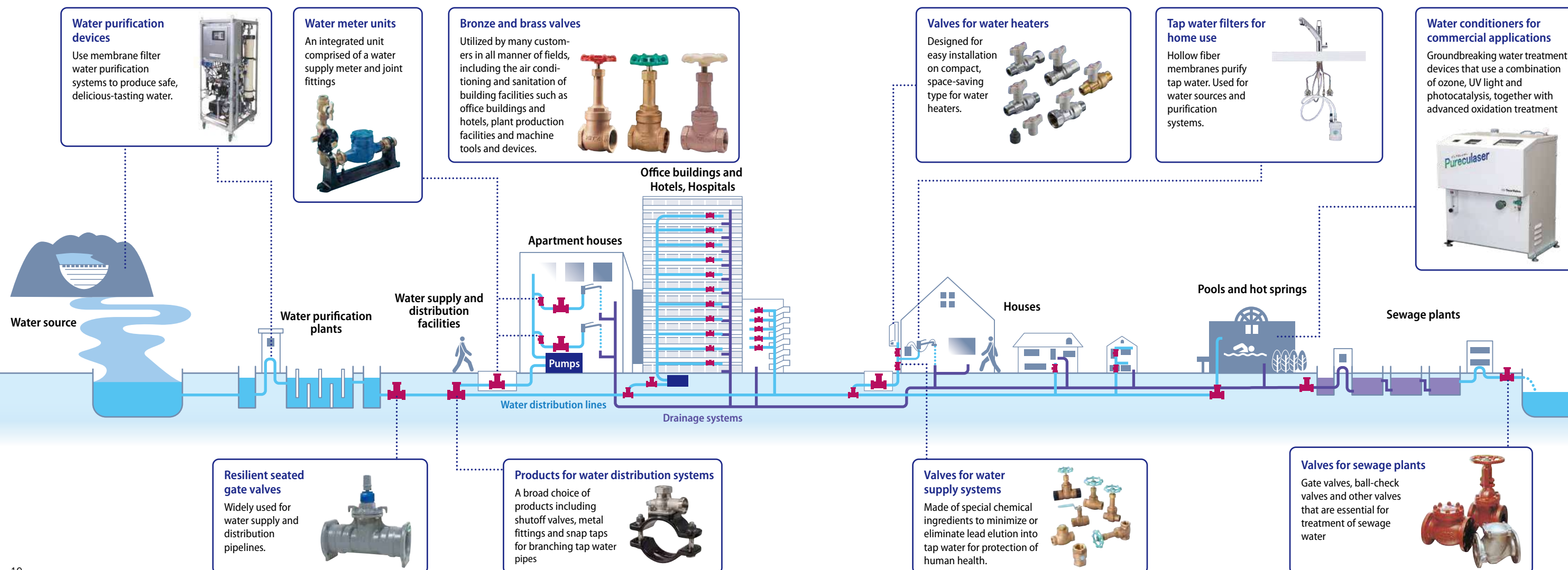
Evolution of Water Treatment Technology

The KITZ Group is steadily evolving technologies that meet the world's water infrastructure demands, including water purification technologies that use membranes to clean water, desalination technologies to purify and desalinate water that is not suitable for consumption such as seawater and technologies catering to the need for pure water and ultrapure water against the backdrop of an expanding semiconductor market.

Working toward Solving Water-Related Issues

We work actively on the development of environmentally friendly technologies, such as surface treatment technology to prevent elution of nickel and lead from valves, and lead-free copper alloy materials, and meet the international standards for water quality. Moreover, our lineup includes equipment that breaks down organic substances dissolved into water by way of ozone, UV light or photocatalysis, purification devices designed to handle every kind of water source and household water purifiers.

The world faces serious issues related to water resources and shortages. The KITZ Group is marshalling its combined strengths to ensure that all people have access to clean and safe water and is seeking new solutions for various water-related problems by harnessing the Group's combined capabilities, utilizing every group member's experience, know-how, technologies, products and services.



Providing Valuable Energy Resources That Keep Industry Running in an Endless Stream

Ensuring the Stable Supply of Energy

The KITZ Group provides a wide scope of products that play a key role in providing essential energy resources that keep industry running to oil refineries, petrochemical plants, chemical plants and innumerable other industrial processes through oil and gas pipelines, loading/off-loading terminals and other modes of transportation.

Controlling the Flow of Fluids in Extreme Harsh Environments

At energy plants, valves must be able to withstand severe conditions like extremely high temperatures and pressure with no possibility of failure. Before introducing any new product, the KITZ Group repeats stringent laboratory tests, analyses and evaluations based on actual on-site service environments. Only those products that have passed such verification procedures are added to our product lineup.

For a Clean Energy Society

With the decarbonization of energy picking up speed in the race to carbon neutrality, there is increased interest in liquefied natural gas (LNG), which produces fewer CO₂ emissions during combustion than coal or oil and it can help curb global warming, as well as on hydrogen, regarded as the mainstay of next-generation energy. Particularly with regard to hydrogen, we have begun to develop large-sized valves for the high volume transportation of liquid hydrogen, and aim to have the KITZ Group's valves supplied throughout the supply chain for hydrogen.

We are focused on developing eco-friendly products to deliver clean, renewable energy to people all over the world with the aim of contributing to the realization of a decarbonized society.



Metal seated ball valves

Offer high durability and are also capable of handling high temperature and corrosive fluids.



Stainless steel valves

Suited for use under high temperature, high pressure conditions in various types of plants.



Automated valves

Automated operation valves equipped with actuators



Fully-welded type pipeline ball valves

Safety design ball valves guarantee leak-free control of fluid flow in pipelines.



High-pressure ball valves for hydrogen stations

Ultrahigh-pressure ball valves with excellent seal performance and durability, developed for use in hydrogen refueling stations



Valves for high-purity gas service

Clean stainless steel diaphragm valves or bellows seal valves for semiconductor manufacturing



Crude oil and natural gas excavation locations

Crude oil

Liquefied natural gas

Oil refineries and petrochemical plants

LNG terminal and transportation facilities

Thermal power plants

Hydrogen stations

Semiconductor manufacturing facilities

Three-piece trunnion mounted ball valves

From oil and gas to the oil refining and petrochemical industries, industrial floating and trunnion mounted ball valves are used in a wide range of chemistry and energy-related fields.



Carbon steel valves

Widely used in chemical plants and petrochemical industry due to their superior corrosion resistance.



Actuated compact ball valves

Cater to automation needs for small-diameter piping on industrial production process lines.



Cryogenic and low temperature service control valves

Valves for LNG designed for control of flow rate of industrial low temperature fluids, under technical collaboration with Valtek Inc. USA (currently Flowserve Corp.)



Cryogenic and low temperature service shut-off valves

Designed for handling ethylene and industrial low-temperature gas fluids in LNG production, intake, satellite terminals and various other applications.



Microfiltration Filters

Micro-pore, low-leaching hollow-fiber membrane filters make significant contributions in the semiconductor and medical fields.



Research and Development System Creating High Added Value

In order to meet the diverse needs of the times, we take immense pride in producing fluid control devices delivering safety, durability and reliability.

R&D Concept

The KITZ Group's engineering section is actively and boldly engaged in research and development to realize KITZ' Statement of Corporate Mission: "We strive to build a robust global environment and sustainable future by supporting societal infrastructure through our advancements in fluid control technologies and materials."

■ Core technologies

We integrate process technologies in the field of sealing, material and process engineering that serves as the core of our R&D operations.

■ Providing solutions

We focus on resolving customer problems and provide products and services that please our customers.

■ Speed and global network

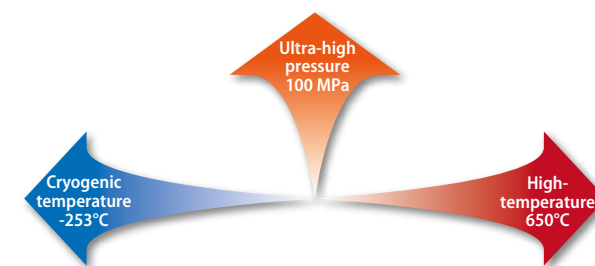
We develop new products rapidly by utilizing the worldwide group network to respond to the diverse needs of customers.

Sealing Technology and Materials Development Supporting Lifelines in a Wide Range of Fields

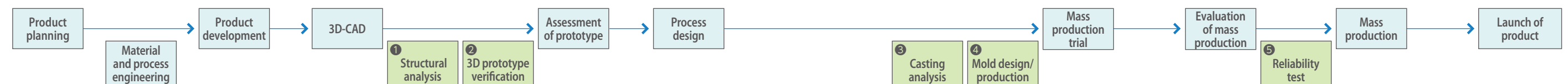
KITZ Corporation started operations from manufacturing general-purpose valves. Over the years, KITZ has continually gone a step ahead of the needs of emerging markets and developed high value-added products, advancing from manually operated shut-off valves to automated control valves, and from single valves to complex modular products.

What makes it possible is sealing technology and materials development. Sealing technology has been developed in a wide range of fields from low pressure to ultra-high pressure, from extremely low temperature to high temperature, with up to more than 90,000 products created. The Company has also, based on its know-how cultivated over the long period of its history, developed optimum metal materials and introduced new products through high-level casting technology. These technologies are still evolving.

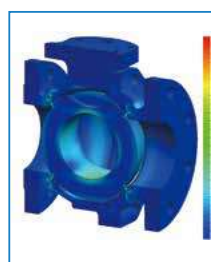
Sealing Technology



Valve Research and Development Process



Fluid analysis



Structural analysis

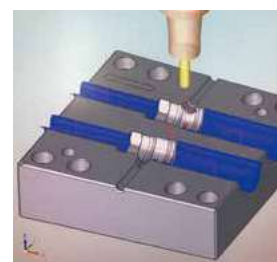
① Structural analysis
The optimal structure of the product is designed by using simulated fluid analysis, stress or other structural analysis.



② 3D prototype verification
Prototypes can be verified at an early stage using 3D printer modeling. Customers can check those prototypes by touch.



③ Casting analysis
Design for an optimal mold for casting is planned using solidification analysis.



CAM

④ Mold design/production
The CAM* data used to design the molds is transferred to processing equipment, and molds are produced internally.

* Computer Aided Manufacturing

⑤ Reliability test

Testing and analysis is carried out under every condition of use.



Cryogenic test
Liquefied natural gas (LNG) is a low-temperature fluid. We conduct tests to reproduce the low temperature conditions.



Fire test
We verify as to whether valve functions can be maintained, even if a fire occurs and the valve seal materials are burned out completely.



Blow-off test
Significant force is applied for high temperature and high pressure fluid flow control when valves are opened and closed. We verify the durability to ensure that valves can operate properly even under the conditions of application limits.



Low emission test
The company exclusively retains the only methane gas testing facility based on the API standard in Japan and performs leak tests with actual fluid.

Earning the Trust of Users Globally with World-Class Valve Technologies

The Product Development Department at KITZ is engaged in research and development to provide value to customers in a wide range of fields, including building utilities, petrochemicals, clean energy, water treatment and semiconductors.

To maximize the synergy of the Group, engineers from Japan, Europe, the Americas, ASEAN and China collaborate to promote product development and design, utilizing networks such as groupware, and have established a technology structure for design at the optimum sites worldwide. We also develop products with materials and specifications that are compatible with the markets and regulations in each country, and strive to improve efficiency through the active introduction of DX, such as promoting product development according to market needs through centrally managing product drawings, design drawings and component tables through the use of PLM*.

In response to the diverse needs of today's world, each and every engineer, by raising the level of his or her skills and continuing to take up the daily challenge of value creation, is creating fluid control devices that are outstandingly safe, durable and reliable.

* PLM: Product Lifecycle Management

To Provide Next-generation Solutions

As part of KITZ' 70th anniversary project, the KITZ Group Innovation Center was constructed on the grounds of the Chino Plant.

On the second floor, which has an office area for development and design sections, there is ample meeting space. Thanks to the adoption of hot desking and activity-based working (ABW)*, the space encourages the free and flexible exchange of ideas and knowledge. This has created an environment for the speedy development of products and technologies that will satisfy customers.

In addition, on the third floor we have set up an "innovation studio" for putting design ideas that create new value with original ideas into practice. This will be the starting point for the providing of solutions aimed at the next generation.

* ABW: A working style where people choose their work location based on the nature of the work at the time.



Production Systems That Assure High-Quality Products

The KITZ Group's manufacturing is based on the concept of delivering products when necessary and in the quantities required with better quality.

Integrated Production System That Provides Quality Control Starting from Castings

Based on integrated production, the KITZ Group positions castings (forge and foundry materials) that are valve materials as the core technology and produces them internally from castings. We have established an integrated production system in which our Group has its own casting facilities for the main valve materials such as bronze, casting iron, ductile, stainless steel and casting steel, thus putting in place a quality assurance system starting from materials. We also provide a wide variety of products in small quantities.

What supports manufacturing operations based on the market-oriented concept is the production method according to the KITZ Innovative and Challenging System (KICS). KICS provides a mechanism of sending only good products to the subsequent process by producing each product one by one in a sequence of processes at the exact timing with which it can be sold. It also achieves the elimination of stagnation and waste in a series of processes from order receipt to production and delivery. Moreover, we strive to further reduce delivery times and reinforce production lines continuously by thoroughly implementing standard work and improving processes.

In June 2021, a machining center for casting mold production was set up at the Nagasaka Plant. The production of molds, which determine the quality of casted items, requires

expertise in molding plan design and the precision machining technologies to give shape to those plans. By accumulating these mold production technologies in-house, we will be able to improve casting quality and shorten mold production lead times.

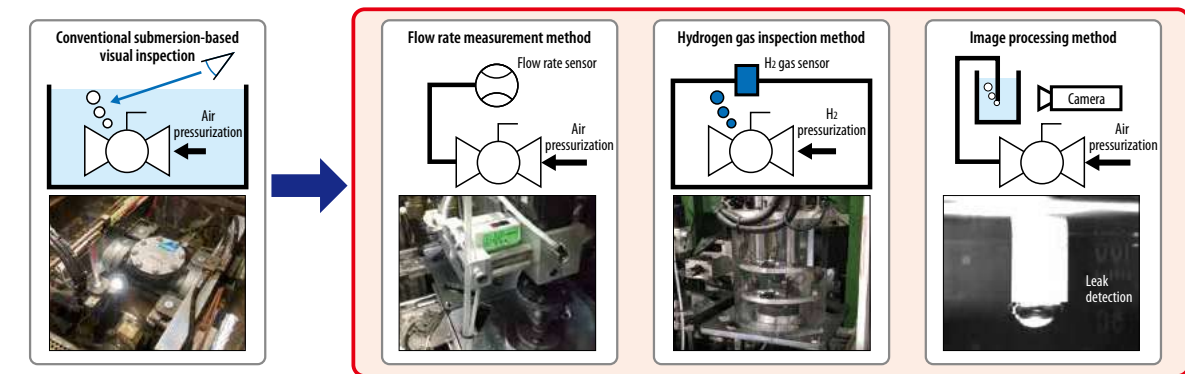


Production of cast molds using the machining center

Toward an Eco-friendly Manufacturing Workplace for Creating Added Value

KITZ is investing proactively in R&D for new production technologies and environmental improvements with the aim of achieving quality, prices, delivery times, services and sustainable, eco-friendly production processes that will guarantee the satisfaction of our customers. In addition to introducing robots to the manufacturing workplace, we are also outfitting our production lines with ICT-based equipment management and inspections that apply image processing and sensor technologies. New initiatives include the reuse of sand used in the casting process, the recycling and use of water resources used in valve inspections and the substitution of raw materials in plastic components. Through these initiatives, we are driving the evolution of

Improving the Leak Inspection Process through DX



eco-friendly production processes in the manufacturing workplace toward creating greater added value.

KITZ Brand is Backed by Quality Management Systems

KITZ Corporation recognized the importance of conformance to the international standard on quality management systems earlier than anyone in the industry. In November 1989, KITZ became the first Japanese company to earn ISO 9001 certification. At present, all domestic and international production bases in the KITZ Group have been certified to this standard. In February 2019, our Group company, KITZ Engineering Service Co., Ltd., became the first in the Group to obtain certification for the scope of "valve maintenance" under the standard. Additionally, in July 2001, KITZ Corporation was certified, for the first time in the valve industry in Japan, in accordance with the Pressure Equipment Directive (PED) for CE marking required for European markets. KITZ plants in Taiwan, Thailand, China, Spain and Germany have subsequently obtained PED

certification as well.

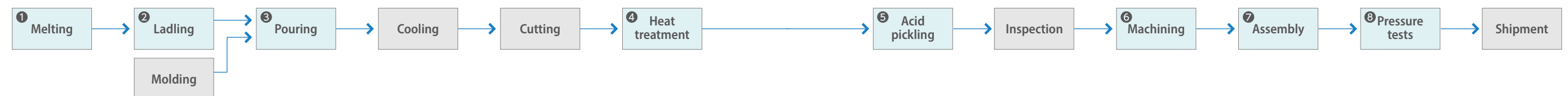
In addition to these international quality standards, in Japan, KITZ Corporation is approved by the Minister of Economy, Trade and Industry as an authorized gas tester under the High Pressure Gas Safety Act. It supplies Japan Industrial Standards (JIS) certified products and complies with standards of the Japan Water Works Association (JWWA). KITZ plants in Japan and China are also certified to display the API Monogram of the American Petroleum Institute.

Global Production Network: Manufacturing Facilities Located in Optimum Locations

The KITZ Group is building a structure for undertaking production in the most suitable locations for its operations around the world.

Under this structure, we produce high value-added products in Japan, while Japan also plays a crucial role as the command center for our global manufacturing activities. The KITZ Group now has international factories in Thailand, Taiwan, China, Korea, India, Spain, Germany and Brazil.

Stainless Steel Valve Manufacturing Process



1 Melting
Raw materials are melted in high-frequency electric furnaces.



2 Ladling
Melted metal is ladled for pouring.



3 Pouring
Melted metal is poured into a casting mold. The melted metal flows into the cavity between the upper mold, the lower mold and the core.



4 Heat treatment (solution heat treatment)
Raw materials are quenched after having been heated up to 1,100°C. This process forms a uniform metallic structure and makes mechanical properties such as tensile strength and elongation higher and ensures corrosion resistance.



5 Acid pickling
Pickling castings in acid solution removes impurities such as oxidized scales on the casting surface caused by heat treatment and shot blasting. At the same time, a protective film is formed on the casting surface, enhancing corrosion resistance.



6 Machining
Castings are cut, drilled and processed with machines.



7 Assembly
Various parts and components are assembled to complete valves.



8 Pressure tests
Valves are pressurized with air and/or water and operated to verify that they satisfy the quality requirement.

Extensive and Strong Sales Network

Since our foundation, the KITZ Group has established a strong sales network covering all of Japan. Today, we are working on the development of a global sales network in order to meet customers' requests with regard to quality, price, delivery and service.

Full Distribution System

We have developed a sales structure to respond to customer requests immediately through a strong distributors' network covering all of Japan. These distributors and KITZ are connected via dedicated lines and the Internet. As a result, information on market demand is fed back directly to the production site, and this also achieves marked improvements in business efficiency and the acceleration of business. We have also adopted a pull production system, a system for setting a standard volume of distributor inventory for each product and replenishing the quantity shipped on a daily basis to maintain the inventory at a certain level. With this, distributors do not need to monitor the inventory volume of products for which standard inventory is set and can meet needs for rapid delivery.



KITZ's Strength in Domestic Sales

KITZ provides a variety of products, from goods familiar in our daily lives to the production processes encompassing industrial fields, through its powerful and wide-ranging sales network.

Customers in each market decide which valve manufacturer they will use. To respond to customer needs with a diverse range of solutions, KITZ listens carefully to usage conditions and the issues customers face to select the most suitable valves and quickly respond with prices and delivery times.

After delivery, we maintain close contact with customers through meticulous support services including technical

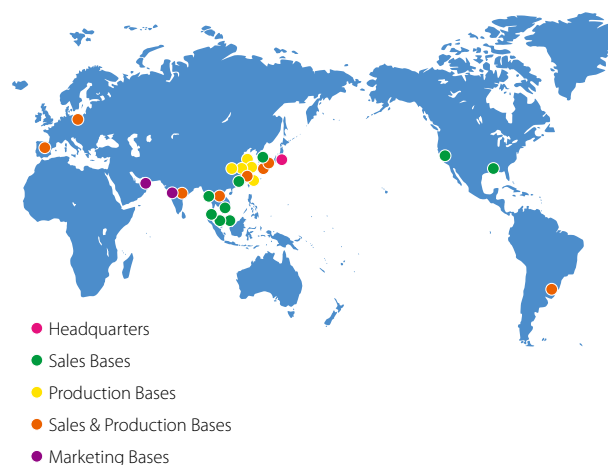
assistance, parts supply and on-site inspection and repair. We build win-win relationships with customers by securing repeat orders from customers and by accepting maintenance requests for existing valve installations.

KITZ Engineering Service Co., Ltd. (KESCO) handles after-sales service. Through coordination between four domestic service centers and affiliate companies, we provide smooth and varied maintenance services across Japan.

Sales Structure Responsive to the Market Environment

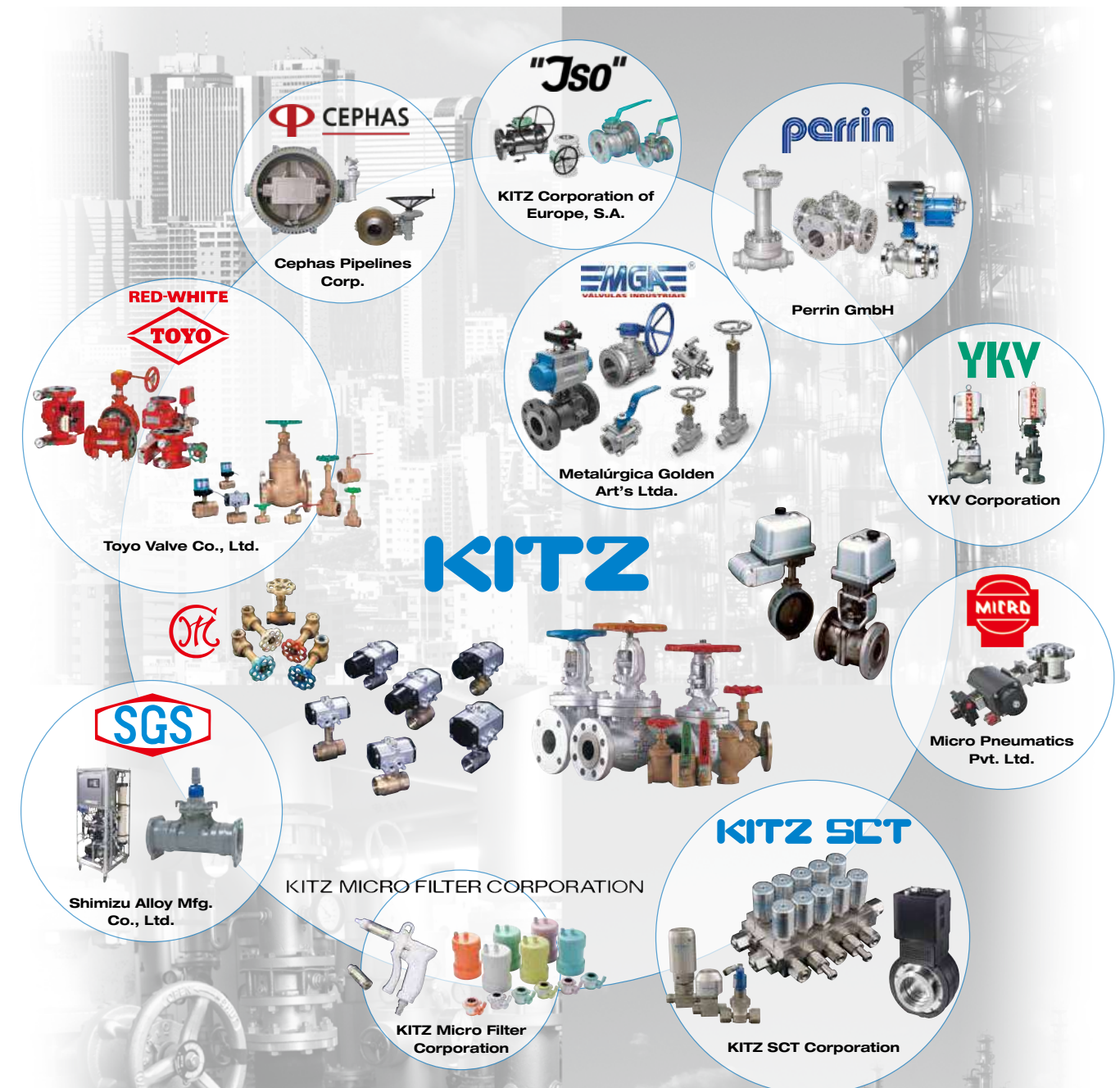
For global markets, we have been strengthening our sales and service systems based on the environment in each market. We have established regional headquarters that provide the functions of sales, marketing, engineering, stock, maintenance and service for each area, and conduct business close to the region and provide products and services to satisfy local customers' needs.

In addition to the representative offices in India and UAE, we have established sales bases in China, Hong Kong, Korea, Singapore, Thailand, Malaysia, Vietnam, the United States, Germany, Spain and Brazil and have developed global sales networks. In order to quickly respond to individual requests from customers, we have developed the KITZ Official Modification Shop network for the modification and repair of valves.



KITZ—A Reliable Brand

The KITZ Group provides a full lineup of products, and our quality is highly regarded by customers in Japan and overseas. Our 12 brands have a presence in virtually all markets and fields centered on the KITZ brand.



Focus

A "CHRYSANTHEMUM-HANDLE®" is a symbol of **KITZ**, the brand of valve reliability.

Created in cooperation with Mr. Sori Yanagi (1915-2011), a prominent Japanese industrial designer. Pursues the ease of holding from the perspective of ergonomics. Because the shape of the finger-holds embodies plumpness that is reminiscent of large chrysanthemum petals, it is nicknamed the "chrysanthemum handle." It was employed for the design of the handle for bronze valves in September 1980 and has gradually been applied to other products.



Brass Bar Manufacturing Business

Manufacture and Sales of Brass Bars

The KITZ Group operates a brass bar manufacturing business, manufacturing and selling brass bars and other fabricated brass products (cut and forged brass products). Brass bars are widely utilized for machines, construction materials and other applications.

What is Brass?

Brass is an alloy of copper (Cu) and zinc (Zn). Modifying the percentages of copper and zinc contained in the alloy and adding various other metallic elements makes it possible to produce numerous superb characteristics, such as electrical and thermal conductivity, corrosion resistance, plastic workability and machinability.



Brass Bar Manufacturing Business

KITZ Metal Works Corporation, which handles the KITZ Group's copper products business, develops and supplies the materials for brass valves, and also manufactures and sells high-quality brass bars and fabricated items, which are used widely as materials for faucet metal fittings, and components in gas supply equipment, home appliances and auto parts.

Hokuto Giken Kogyo Corporation manufactures and sells cut parts and brazed workpieces.

Development of Environmentally Friendly New Materials

In recent years, stricter regulations concerning substances that impact the environment have been introduced around the world. In Europe, in particular, lead regulations have become increasingly strict, and the demand for lead-free brass bars is expected to expand in the future.

In addition to the KEEPALLOY series of bismuth-based lead-free brass bars it has already been selling, KITZ Metal Works Corporation has also released KEEPALLOY II, a series

with high recyclability. In 2019, the company entered into a licensing agreement with Mitsubishi Shindoh Co., Ltd. (currently Mitsubishi Materials Corporation) for the ECO BRASS® series of silicon-based lead-free brass bars. ECO BRASS® is a global material registered under JIS, EN and ASTM, and demonstrates high corrosion resistance and strength properties.



ECO BRASS®

Initiatives as a Company Promoting the SDGs

KITZ Metal Works Corporation is registered as a company promoting the SDGs in Nagano Prefecture and pursues a number of initiatives to achieve the SDGs. As one of these efforts, since April 2022 we have adopted CO₂-free electric power utilizing environmental value derived from hydro-electric and solar power generation (non-feed-in-tariff/non-fossil-fuel certified), and expect to reduce CO₂ emissions by roughly 85% compared with before introduction.

In addition, a feature of the brass products manufactured by KITZ Metal Works Corporation is the ease of recycling. By promoting even greater recycling, the company will strive to reduce its environmental impact.



Brass Bar Manufacturing Process



Hotel Beniya is also a KITZ Group company.

Suwa, Nagano Prefecture, is the birthplace of KITZ founder Toshio Kitawaza. In addition to KITZ Corporation's Chino and Ina plants, many of the plants and offices of the KITZ Group are located in the surrounding area, including KITZ Metal Works Corporation and KITZ Micro Filter Corporation.

Hotel Beniya is one of the largest resort hotels in the Kamisawa Onsen hot spring area and boasts a diverse range of spa facilities, including a hot spring bath with outstanding panoramic views and a fully-equipped *ganbanyoku* (hot stone spa). The hotel is used not only by tourists, but also by local residents as a place for relaxation.

Hotel Beniya also operates the Suwako Service Area on the Chuo Expressway (outbound) and the Tobu-yunomaru Service Area on the Joshin-etsu Expressway (inbound) serving food incorporating local specialty produce and selling local goods and souvenirs.

