

Quadrant Business Profile

Your Global Partner for Solutions Made from Performance Plastics



You inspire ... we materialize®

The Quadrant Group

We are a leading global manufacturer of high-performance thermoplastic materials in the form of semi-finished products and finished parts. Since the invention of plastics, we have applied our expertise and commitment to innovation and development to continuously improve the quality and performance of plastic products. Today, we have more than 2 000 employees in 20 countries and work in close collaboration with industry leaders to identify new application areas and solutions that offer superior performance characteristics to metals and other materials.

We manufacture and promote products that make for a better living and contribute to the realization of KAITEKI — a sustainable condition which is comfortable for people, society and our planet Earth — with our parent companies Mitsubishi

Plastics, Inc. and Mitsubishi Chemical Holdings Corporation. Our extensive technical knowledge and manufacturing expertise ensure we are well placed to support our customers' evolving application requirements and material needs. This creates a solid foundation for our future success and expands our market leadership position.

THE KAITEKI COMPANY

Mitsubishi Chemical Holdings Group



Business Activities

- Stock Shapes
- Machined Parts
- Biocompatible Polymers
- Lining Solutions
- Injection Molded Solutions
- Composite Materials
- Cable Protection Systems
- Co-Development Projects

You inspire ...

Close working relationships are the basis for joint success with our customers. The more we understand about what's important to your company or industry, the better we can apply the right materials and production technologies. Challenge us with your application requirements and we'll engineer an optimized solution that meets your needs.



we materialize®

Organization & Focus

We are global teams of skilled, professional colleagues who share their experience, know-how and resources to continue to grow our markets and satisfy the needs of our customers and partners.

Success with our customers is at the heart of everything we do. We offer solutions which meet our customers' needs using our portfolio of engineering plastics and conversion techniques. Our focus on quality and innovation enables us to support your ambitions, identify new applications and adapt our products to your market requirements. We care about safety in all aspects of our business, from developing safe products for you, to ensuring a safe working environment for our employees.



Quality Commitment

Quadrant continually improves business processes and operational performance to better meet our customer's expectations and the requirements of their markets. Each employee is committed to quality and contributes to it. The ongoing professional development of all Quadrant personnel is based on our commitment to the highest quality.

We are dedicated to customer success. We not only deliver high-quality polymer products for our customers, but also work in collaboration and partnership to co-develop applications and materials to suit complementary needs.

Quadrant locations adhere to strict quality and environmental management systems. We are certified to DIN EN ISO 9001, DIN EN ISO 13485, AS9100C, ISO/TS 16949, DIN EN ISO 14001 and DIN EN ISO/IEC 17025 related to the design, development, manufacturing, sales, marketing, distribution and testing of plastic products.

Our products comply with modern industry relevant product standards like NORSOK M-710 and DIN EN 45545-2.

We consequently work in accordance with regulatory requirements such as RoHS, REACH and Best Manufacturing Practice to assure best quality, guarantee traceability of our products and services and deliver safe, reliable and economic products to all industries worldwide.



Aerospace Helicopter Bearing Cage

Challenge: Improve part quality, reliability and safety

Challenging work environments and high weight sensitivity require the use of plastic parts in helicopters. Injection molded bearing cages were used in the blade adjustment system. Due to variations in the molding process causing voids in the part, a higher quality semi-finished product was needed to provide homogeneous material.

Solution: AS9100C compliant, glass-filled Ketron[®] GF30 PEEK provides constant and reliable quality with high temperature resistance.

New Technology: Our Ketron[®] GF30 PEEK material offers significant cost

and time savings as a result of the machined, void-free parts. Demanding testing processes could be eliminated, safety was considerably increased and field failures could be avoided.



Alternative Energy Yaw Brake Puck

Challenge: Smooth sliding, high loads, no stick-slip

Brake components in wind turbines reduce the head speed in the event of wind turbulence. This results in very high loads on the pucks used in wind turbine brake systems.

Solution: Ketron[®] HPV PEEK combines very high load capacity with improved wear and friction properties. The material has high dimensional stability, which is important in environments with changing temperatures.

New Technology: Quadrant's Ketron® HPV PEEK considerably extends the lifetime of yaw brake pucks. Wind turbine operators benefit from longer periods between repairs and reduced spare part costs. In addition, high frequency sounds are eliminated.

Cable Protection Custom-Made Tubes / Elbows

Challenge: Elbows and bends with specific radiuses and dimensions Specific and non-standard elbows such as special elbows, offset bends and elbows with specific radiuses and dimensions are increasingly in demand in the tunnel construction industry, power plants and other sectors.

Solution: Symalit has the know-how and key manufacturing capabilities to make these types of elbows, tubes and bends on request.

New Technology: Our production facility for PE cable protection tubes features state-of-the-art manufacturing technology. Special

elbows, off set bends and elbows with specific radiuses and dimensions for various applications, such as tunnels, power plants, railways and high-voltage power lines, are made to order by our specialists.



Quadrant Applications in Major Industries

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Heavy Equipment Cable Sheave

Challenge: Reduce wear and corrosion, allow high loads

Hoisting machines, like huge container and offshore cranes or small grabs, use high-quality cables in their lifting units. The expensive cables are exposed to high wear due to heavy loads and corrosion conditions.

Solution: Nylatron[®] GSM – a cast nylon material from Quadrant – has proven to be the right solution for these problems. Machine operators profit from the considerably extended lifetime of the steel cables.

New Technology: Nylatron® GSM is extremely wear-resistant, has a high load capacity and withstands any weather conditions. The material is suitable for ropes and cables, which significantly increases intervals between repairs. Crane lifting capacity is also increased.



Medical & Life Science Trial Implant

Challenge: Improve pre-operation process, shorten operation time

In order to keep patient stress to a minimum, orthopedic surgeons work with provisional trial implants made from biocompatible polymers.

Solution: Quadrant[®] LSG PPSU premium polymer (biocompatible as per ISO 10993-5) has an excellent cost-performance ratio and high resistance to common sterilization, outperforming materials like POM or PEI due to longer autoclave life and resistance to high-energy radiation.

New Technology: Quadrant's provisional implants offer high mechanical strength and very good dimensional stability. Surgeons and patients therefore profit from easy and fast fitting of the permanent implant. Color coding

and laser marking increase safety by easy choice of the correct implant size.

Semiconductor Vacuum Chamber Application

Challenge: Improve productivity and minimize downtime

Due to increasingly aggressive conditions in plasma chambers, semiconductor equipment engineers are continually pushing for more robust material solutions.

Solution: Semitron[®] MPR1000 – a new engineering material developed for vacuum chamber applications where purity and longevity are key requirements.

New Technology: Quadrant developed this unique material designed to increase life in plasma chambers compared with traditional plastics thus maintaining high purity and low

outgassing. Typical applications include clamp rings, trench rings, centering pins, focus rings, insulators, vacuum pads and wafer guides.



Added Values

Broad Range of Manufacturing Technologies

Annealing Assembly Bending of Tubes & Elbows Bonding Clean Room Technology **CNC-Machining Compression Molding** Extrusion Injection Molding (2K/3K) Lamination Near Net Shape Production Plastic-Metal Molded Solutions **Research & Development** Sintering Standard & Special Custom Casting Welding

Application Expertise in Major Industries

Aerospace & Defense Alternative Energy Architectural Automotive Building & Construction Chemical Processing – Oil & Gas Food & Beverage Heavy Equipment Industrial Equipment Medical & Life Science Semiconductor & Electronics Sports & Leisure Telecom & Power Plants Transportation

Market Driven Development Strategy

Application Know-How & Development Capabilities Co-Development with Customers Legislative & Environmental Market Driven Product Development Material Certification Product Traceability Regulatory Compliance Solutions & Systems Provider Technology Standards Understanding of Market Trends and Environment

The World's Largest Portfolio of Polymer Based Materials



Automotive Airbag Housing

Challenge: Increased performance for airbag housings

Plastic airbag housings replace conventional steel parts to help lower cost and weight and increase performance. Since plastics are isolators, a solution had to be found to conduct the electrical signal for the horn function. Traditionally, lead frames were assembled after molding, but this required extra operation and cost.

Solution: Instead of an additional assembly step, the lead frames are insert molded in the part during the injection molding process.

New Technology: Fully automated cell to prepare and insert the lead frames as well as control the quality of the produced housings.



Automotive Engine Protection

Challenge: Engine skid plate protection for bad road and extreme climate conditions Development of a lighter and more robust skid plate with reversible material behavior as compared to current steel solutions.

Solution: The GMT / GMTex[®] material design with functional integration of single components offers maximum weight-saving potential and design freedom.

New Technology: GMT / GMTex[®] is a plastic hybrid solution made out of random glass fiber and weave-reinforced thermoplastic composite material. The lightweight design offers weight reduction of about 70% compared to steel alongside reduced cycle costs. With reversible

deformation under load, the skid plate remains free of damage and guarantees full protection together with improved acoustical properties.



Building and Construction Scaffolding

Challenge: To develop an alternative to plywood that is resistant to water and humidity For exterior applications such as scaffolding, the lifetime of a wooden product is limited due to absorption of humidity and swelling of the material. The challenge was to develop a thermoplastic composite sandwich product which is lighter and resistant to water, and which provides an anti-slip surface.

Solution: MultiQ[®] Impact – A sandwich panel which is resistant to the absorption of humidity and swelling, with better mechanical properties and a hexagonal anti-slip surface.

New Technology: Sandwich

design of SymaLITE® (PP / glass core material) with GMTex® (glass weavereinforced material) as a lightweight solution compared to plywood.

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Quadrant Applications in Major Industries

Chemical Processing Seals

Challenge: *Improve efficiency, minimize damage and extend operating time* In rotational equipment, increases in efficiency can deliver a major competitive advantage. During equipment failures, internal metal parts can cause serious component damage that requires costly repairs and downtime.

Solution: Replacing metal or poor performing polymer seals with Quadrant's Fluorosint®, Ketron® or Duratron® products can meet these challenges.

New Technology: Duratron[®] PAI provided the answer at temperatures of -196°C and Ketron[®] HT PEEK handles higher temperatures and loads in seal applications.

Fluorosint[®] 135 is improving efficiency and extending lifetime in piston rings and bearing applications for this demanding industry.



Food & Beverage Beer System

Challenge: *Disposable and fully recyclable beer keg made of plastic materials*

Quadrant's task was to design and produce a valve system that ensures full recyclability of the complete keg.

Solution: The keg was designed in plastic to enable full and easy recycling of the complete product. The concept of the plastic valve guarantees both mechanical strength and optimal moldability, which is required for large-scale production. It remains fully compatible with the established industry standard connector types.

New Technology: Environmental impact and costs are lower

compared to multi-use metal kegs due to lower weight and no transportation of empty kegs. No additional cleaning is required at the breweries as all components fulfill the HACCP environmental production requirements.

Food & Packaging Guiding Segment

Challenge: Anti-adhesive surface, high resilience properties, food-approved material Coated cookies tend to stick to the conveyor components during transportation through the packaging line. This regularly causes production jams or damage of the bakery products.

Solution: With Quadrant's Ertalyte® TX (PET) guiding segments installed, the cookies run smoothly without any sticking. Ertalyte TX has outstanding anti-adhesive properties against sticky materials such as chocolate or dough.

New Technology: Ertalyte® TX is a food contact-approved polymer with anti-adhesive properties. Food production line operators profit from smooth transport, high-quality bakery products and reduced maintenance work. Ertalyte® TX can be machined with very tight tolerances and offers optimized resilience.



Quadrant's Global Presence



Quadrant Group

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QUADRANT

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