The world-leading provider of highly engineered flow control solutions for critical applications
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We deliver great solutions for customers tackling the world’s most demanding engineering challenges

IMI Critical Engineering is a world-leading provider of critical flow control solutions that enable vital energy and process industries to operate safely, cleanly, reliably and more efficiently.

As part of IMI plc, we operate a global service network, with manufacturing facilities in 12 countries. We employ over 4,000 talented professionals across a range of disciplines. These include over 400 engineers, 150 project managers and over 250 dedicated aftermarket specialists – all committed to providing excellent service to our customers.

We design, manufacture and install customised, highly engineered solutions for new plant builds and also provide complete plant lifecycle service support. This ensures that our customers benefit from efficient maintenance, speedy issue resolution and plant optimisation at all times.

Our products are at the heart of complex energy and production processes. They control the flow of steam, gas and liquids in harsh environments – they are designed to withstand temperature and pressure extremes, as well as intensely abrasive or corrosive cyclical operations.

Our engineering expertise sets us apart. We combine technical knowledge, engineering design capability, application experience and innovative custom-designed products to deliver safe, reliable and durable solutions.

“Global trends are generating rapid growth in a number of sectors. Our business is strategically placed to support our customers’ challenges with proven technology, application optimisation and solutions that are reliable and cost-effective”

Roy Twite
IMI Critical Engineering
Divisional Managing Director

Our market-leading companies
Our market-leading companies

The unique combination of our IMI Critical Engineering companies’ know-how and worldwide experience underpins our reputation as a leading global supplier to the major energy and industrial process sectors.

We help our customers control critical in-plant processes by providing superior, custom engineered valves, actuation and control systems.

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**IMI BOPP & REUTHER**

Established over 135 years ago, based in Mannheim, Germany IMI Bopp & Reuther is a highly regarded control valve business designing a wide range of valves, making plants and processes safer and more efficient.

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**IMI FLUID KINETICS**

One of the world’s leading designers and manufacturers of silencer technologies within custom-designed products, which are engineered for a lifetime of service.

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**IMI CCI**

Presenting an unrivalled portfolio of technologies, including DRAG®, BTG, ABJ® and technology acquired from Sulzer®, to meet extreme pressure and temperature control needs.

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**IMI INTERATIVA**

A key supplier of butterfly isolation valves to the Oil & Gas, Sugar, Ethanol Production and Water Treatment process industries throughout Brazil and South America.

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**IMI NH**

IMI Newman Hattersley has proven technologies spanning over 60 years, including bellows sealed globe, ball and butterfly valves, meeting the high demands of next-generation nuclear reactors.

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Operating in the Nuclear sector for over 50 years, a dedicated supply chain provides control valve, isolation and other services to meet today’s aggressive refuel outages.
Our market drivers

**IMI ORTON**
An international leader in the design and manufacture of triple eccentric metal seated butterfly valves, specialising in refining processes and cryogenic valves for LNG.

**IMI STI**
Providing control solutions for actuation in critical applications, especially where reliability and performance are vital for process efficiency, plant safety and integrity.

**IMI TRUFLO RONA**
A leader in the Oil & Gas, LNG, Petrochemical and shipbuilding industries, producing a range of gate, globe, top & side entry ball valves.

**IMI REMOSA**
A world leader in slide, gate, goggle and through conduit valves, actuation and control units, specialising in Fluid Catalytic Conversion (FCC) applications.

**IMI TH JANSEN**
100 years of experience in the design and manufacture of butterfly and gate valves and blast furnace valves for the Iron & Steel, Power, and Petrochemical industries.

**IMI Z&J**
IMI Zimmerman & Jansen services very high temperature applications with slide, gate and goggle valves as well as heading and unheading devices for delayed coker processes.

**IMI SSF**
A manufacturer of high integrity special fasteners (bolts, set screws, stud bolts, nuts etc.) for critical applications in hostile environments such as offshore, subsea and nuclear.

**IMI TRUFLO MARINE**
High integrity valves for faultless performance in extreme applications, with technology developed in the Naval Marine industry for nuclear submarines.

**IMI ZIKESCH**
With over 100 years of experience, IMI Zikesch provides total aftermarket service along with a comprehensive valve product range.
Market drivers that guide our growth

Like never before, a number of long-term global trends are driving the demand for cleaner sustainable energy, generated with efficient and reliable production processes. Each of the following market drivers pose significant challenges.

**Environmental emissions**

> Lower greenhouse gases
> Higher energy efficiency

Environmental legislation is striving for a balance between safety and quality. IMI Critical Engineering is at the forefront of innovation to make this happen with:

> Fugitive emission packing for LNG anti-surge valves
> Next generation renewable resources

**Urbanisation**

> Mega cities and transport systems
> 24-hour demand

Energy is an essential building block for the cities of tomorrow. The IMI Critical Engineering businesses design and deploy the technology necessary to support the growth with:

> Attemperators for the most efficient combined cycle plants meeting “time of day” demands
> Turbine bypass systems for super critical plants that serve primary power
> Oil pipeline – transportation infrastructure

**Resource scarcity**

> Coal, gas, nuclear fuel
> Demand for iron and steel

The demand for resources is driving existing and new facilities to be more efficient. IMI Critical Engineering is working with its industry partners to:

> Harness energy from remote locations
> Enhance efficiency for major industries
Engineering great solutions

We deliver great solutions to our customers through a unique combination of engineering know-how and fluid controls technology. At the heart of our ‘Engineering great solutions’ ethos is customer value.

Our relentless drive to solve customers’ fluid control problems has resulted in the creation of two proprietary training programmes: The Valve Doctor® programme and the IMI Critical Engineering University.

The Valve Doctors®
Our dedicated team of Valve Doctors® are the industry’s leading valve specialists and are focused on solving process flow problems for power, nuclear, oil & gas and petrochemical plants around the world.

Our focus extends beyond valve design to include plant operation, system layout and control system integration. The Valve Doctors® are the product of a comprehensive training programme that demands our specialists to work in partnership with our customers to achieve the highest levels of performance, safety and reliability.

IMI Critical Engineering University
The IMI Critical Engineering University further helps to establish us at the forefront of valve technology by working with those customers who want to understand more about how to achieve the highest levels of performance and reliability.

Worldwide engineers
Our staff of over 400 engineers worldwide understand how to convert industry knowledge, market insight and our customers’ toughest challenges into solutions that give our customers a competitive advantage.

Our key customers are the world’s leading players in the energy and process sectors and include Arcelor Mittal, Thyssen, Tata, Petrobras, Sinopec, Alstom, Mitsubishi Heavy Ind, Siemens, Shanghai Electric, Westinghouse, Urenco, Areva, Chevron and Bechtel.

We serve the following sectors:
- Oil & Gas
- Fossil Power
- Nuclear Power
- Petrochemical
- Iron & Steel
- Process Industries
- Aftermarket service

Our elite team – The Valve Doctors® operate on-site wherever they are needed around the world, diagnosing problems, evaluating process requirements, and optimising configurations.
Industry sector

Oil & Gas

As the fastest growing sector, investment in oil and gas is significant. However, producing fields have aged such that the field profiles/mix have changed with smaller, more remote resources being commercialised. This leads to more demanding applications.

Working closely with process licensors and EPCs, our products protect the critical plant component. However, more importantly, our patented IMI STI actuation gives industry leading response times, accuracy and repeatability. This results in LNG trains running optimally, giving operators maximum output. As a result, IMI CCI is the world leader in compressor anti-surge valves.

The LNG process also relies on best-in-class isolation valves: IMI Truflo Rona ball valves and IMI Orton metal seated butterfly valves. Used on the liquefaction plant in a number of applications (cooling system, firefighting, and process valves), we also produce the cryogenic process valves and the loading/unloading valves. Our engineering expertise ensures safe faultless operation at -196°C.

With the need to access remote fields, the growth of Floating Production Storage and Offloading (FPSO) and Floating Liquefied Natural Gas (FLNG) is supported by IMI Critical Engineering. Our valves enable extreme processes to operate safely with the utmost reliability in what will be harsh environments – not only through the process on board, but also the powering and safety of the vessels.

High Integrity Protection Systems (HIPPS)

As demand continues for hydrocarbon resources, higher utilization of fields is a requirement. For older fields this means enhanced oil recovery through injecting media to improve flow rates. However, many more difficult fields also contain significant levels of H2S (sour gas).

As a result, more field owners/operators want to ensure the safety of the field as well as the equipment investment – and HIPPS is a key application. Leveraging a long history of experience, IMI CCI in Italy designs control and hardware for the system, which we are successfully supplying to onshore fields in the Middle East.
There are 50 valve manufacturers here but only 3 we would trust in this application

Service Engineer Manager Chiyoda
Fossil Power

IMI Critical Engineering has been the leading provider of customised severe service control valves for over 50 years through its IMI CCI and IMI Bopp and Reuther businesses for the power sector. With vast experience gained from over 20,000 valves installed, the know-how and expertise of IMI Critical Engineering remains unrivalled.

Critical for pipeline services

As winters are very long and cold in Alaska, keeping the oil sufficiently heated is critical for pipeline services.

In order to ensure production is optimised and flow rates are maintained when temperatures drop to below -50°F, Alyeska Pipeline Services sought to develop a way of mechanically heating the crude oil by cycling the fluid through a pump. A solution was found in a design that could allow large size particulates to flow through the valve disk stack which could also withstand the seismic activity that occurs in the region. The team designed, built and shipped a custom design which would raise the temperature by nearly 14°F, giving the emergency crews the time necessary to repair any issues before the oil pressure decreased or froze.
We have a large population of DRAG® valves at our stations... your product is the Cadillac of the industry....

Florida Light & Power, USA
Industry sector

Nuclear Power

IMI Critical Engineering has several businesses dedicated to the Nuclear industry. With over 60 years of proven, reliable nuclear power plant service, over half of the world’s nuclear power plants rely on our critical valve technology.

With over 250,000 of our products installed either in nuclear power plants or on vessels or submarines, we have the knowledge and experience to deliver the highest quality, reliability and safety in the industry.

Underpinning all of these offerings is a highly skilled level of technical expertise – over 35% of our workforce are graduate engineers.

Through IMI CCI, we supply severe service control valves featuring DRAG®, ABJ or technology acquired from Sulzer®, plus system medium actuated technology for isolation valves and pilot operated safety valves. With IMI Bopp & Reuther we compliment this with industry leading safety and safety relief valves. Combining a range of actuation options, including our QuickTrak®, we provide the highest performing valves in the industry.

To support nuclear power plant operations, we offer emergency core cooling system strainers and filtered containment venting systems to ensure safe systems.

IMI NH has proven technology for long life bellows sealed globe valves, full flow ball valves and high performance butterfly valves, providing sustainable, cost-effective performance for nuclear power plant operators.

The full valve requirement at plants is complimented by IMI TH Jansen’s butterfly valve technology for cooling/inlet systems.

IMI Truflo Marine is a specialist designer and manufacturer of high integrity valves, actuators and pressure reducing stations for critical seawater, nuclear and naval marine applications. The leader in the field of hull valves, its technology is critical on nuclear submarine fleets in navies around the world.

Nuclear plant life extension

Following the Fukushima disaster and reviews of nuclear reactors around the world, EDF Energy was required to make additional safety improvements to the primary cooling circuits at Hinkley Point B and Hunterston B Advanced Gas-cooled Reactors (AGRs) in the UK. This required the addition of further nitrogen injection points, with associated valves and pipework for diverse reactor holddown. The new circuitry has the secondary function of introducing an additional reactor gas blowdown function.

Due to the critical application of the valves, the specification calls for conformance with ASME III Class 1. As it was necessary to avoid any increase in pressure drop, which would downgrade cooling system performance, EDF Energy sought a solution that used high-integrity full-bore ball valves. The valves were required to operate with utmost reliability and ensure zero leakage, even at high pressure and temperature. The sites were subsequently granted 7-year life extensions.
Emergency core cooling strainers

Cooling water butterfly valves

Filtered containment venting systems

Turbine bypass valves

Bellows sealed control & sampling valves

Master Steam Isolation Valves

Safety relief valves

Cooling water butterfly valves
Petrochemical

IMI Critical Engineering offers niche, highly engineered valves for critical applications in the Petrochemical sector, with world-leading technologies for delayed coking and fluid catalytic cracking.

Operating reliably and safely for the life of a refinery in extreme temperatures of 1,650°C and in erosive environments demands highly engineered solutions – the specialism of IMI Z&J (Zimmerman & Jansen) and IMI Remosa.

With 25-year lifecycles and extremely corrosive media, our products meet the exacting specifications of process licensors such as UOP, CB&I and Exxon, ensuring your plant performance is optimised.

IMI Remosa produces bespoke slide, butterfly, gate and through conduit valves that are designed for a specific plant. These are controlled by IMI Remosa’s actuators and hydraulic control units to match the increasing demand for high availability and reliability, with diagnostic systems to reduce unscheduled downtime. Used in FCC, these are critical products for the conversion of heavy gas oil to gasoline the world over.

IMI Z&J are world-renowned specialists in delayed coker and dehydrogenation processes for ethylene and propylene.

Thermal cracking to produce hydrocarbon coke requires control of the drums and process, as well as, critically, the slide gate valves for top and bottom unheading.

Catofin projects

The shale gas revolution in the USA has led to low-cost availability of propane. Propane can be used, via a dehydrogenation process, as the feedstock for the production of ethylene and propylene.

This has resulted in major investment and upgrades to facilities for dehydrogenation units, using the Catofin® process. As a result, customers turned to IMI Z&J, which has 15 references globally for this technology – having worked on every major plant for the last 55 years.

IMI Z&J successfully delivered 42” wedge-in-wedge gate valves and 48” air inlet and outlet valves.

A key part of the process, our bottom unheading devices ensure reliable and (most importantly) remote safe unheading to optimise operational efficiency.

For dehydrogenation processes (conversion of propane to propylene for plastics) IMI Z&J produces a range of inlet and outlet valves for air and hydrocarbon, as well as for purging.

Our wide range of products includes IMI Truflo Rona’s top entry ball valves. These highly engineered valves are used in purified teraphathathalic acid (PTA) for plastic production, where the reaction between secondary petroleum and acetic acid is a highly corrosive medium.

IMI Bopp & Reuther offer a full range of safety and safety relief valves for processes which support safe and reliable plant.
Double disk through conduit

Top unheading and bottom unheading devices

Goggle valves

Turbo expander valves

Propane desuperheating

Top entry ball valves

Sliding gate valves
As a truly global industry, smelting plant owners and operators want to ensure the huge investment is utilised to its maximum in a very competitive sector. To do this, they need the most reliable plants, with highest yield and lowest cost to run. For this, they turn to IMI Critical Engineering – specifically our IMI Z&J (Zimmermann & Jansen) and IMI TH Jansen businesses.

Innovative technologies

Our No-Bell Top Charger has been designed to optimise burden distribution in the blast furnace. With a flexible chute design, it is possible to charge the burden and the coke to any position in the blast furnace.

The constantly tilting angle is perfectly guided (acoustic gas measurement) to give exact level control. This generates better gas exploitation, leading to increased output from the furnace, but also greatly reduces the consumption of the reducing agents – a significant saving for plant owners/operators.

TRTs are specially designed low revolution turbines that use the hot gases from the blast furnace to generate power. The design has been optimised to reduce all drag and friction to produce a high efficiency turbine – 30 years’ experience results in the lowest losses. They can simultaneously support two blast furnaces.
Hot blast valves

Top-gas Recovery Turbines

Through conduit double disk valves

Air separation valves

No-Bell Top Charger

Hot blast valves
We provide world class products across process industries where safety valves are required to protect pressure systems for steam, gases and liquids.

Safety valves have the function of preventing inadmissible overpressure in all pressurized systems like pipe systems, pressure vessels, power boilers and reactors, in order to avoid danger to people, plant and the environment. These are set typically to the Maximum Allowable Working Pressure (MAWP) - a higher pressure than the operating pressure of the system to be protected. For functional and operating requirements, third party certifications and approvals of safety valves are required by laws, code and standards. IMI Bopp & Reuther safety valves fulfil this for all areas of the world (CE-marking, ASME section I, III and VIIIa designator, Chinese and Russian type test approvals.

The IMI Bopp & Reuther Si series are most commonly used in process plants. The closed spring bonnet traps the process fluid in the valve and prevents a release to the environment. The straightforward design and reliable guidance of the stainless steel inside parts ensure free and repeated discharge cycles.

Conventional safety valves are usually selected where a short outlet pipe leads to the atmosphere, where fluid is safely discharged into low pressure systems and where the fluid is non-critical.

Our safety valves with bellows between the body and bonnet are designed for where there is excessive build-up of back pressure, where the fluid is highly viscous or contains solid fractions that could have a corrosive effect on inner parts, where there is media with a very high temperature, or where use of safety valves with lifting devices the environment should be 100% protected against pollution.

IMI CCI has process steam turbine bypass, steam conditioning and desuperheating products to ensure plant uptime and the most cost effective output. With class leading products, including BTG technology - IMI CCI are leaders in applications for sugar, ethanol, paper and pulp processing industries worldwide.

Our range of products serve high temperatures and ensure high repeatable quality, such as our range from IMI Z&J for production of float glass. IMI Th Jansen provides air separation valves used across the world and approved by process licensors for the production of oxygen, hydrogen and other gasses.
Our products are designed for the most extreme of environments – extremes of temperature, pressure, erosive media and severity of operation. Our engineers in IMI CCI, IMI Remosa or IMI Z&J in particular act as consultants partnering with customers through the design stage. It is crucial that we therefore support commissioning with our field service technicians – whenever and wherever your project is in the world.

We have our own in-house field service technician team, backed up with planners, coordinators and health & safety to ensure true 24 hour service capability - 7 days a week across the world.

With 15 manufacturing plants supported by service centres across the world, we can provide OEM parts to meet your outage or turnaround requirements. With portable workshops, we can set up on site to ensure outage or refinery turnarounds are managed to time and cost safely.

Our field service technicians can also support service and repair on any installed valves and regularly asked to replace, upgrade or repair competitor’s valves due to performance or reliability issues. We have a team able to engineer upgrades and replacement to meet your existing installation and configuration. This is critical for major refinery projects, where existing infrastructure to support the valves must be used.

IMI Critical has over 250 field service technicians across the world. These are also supported by our world renowned Valve Doctors® for any plant operation issues you have. In addition with IMI Bopp & Reuther and IMI Zikesch we have built even further on our capability.

We can provide aftermarket services for every valve, across all phases of a valve’s lifecycle, all over the world. This has added over 100 service technicians to the IMI CCI team with, 4 additional manufacturing facilities and an efficient back office, providing fast and effective support – assisting you from the erection and commissioning of the plant, through regular maintenance and any retrofits as may be required.

Since 1955, IMI Remosa has been operating in the field of industrial maintenance and specifically within refineries and petrochemical plants. With its proven experience in these areas, we are an excellent source of problem-solving as a consultant for engineering, retrofitting and repair work for any type of valve installed in FCC Units and Expander Power Recovery Units. This capability allows the replacement of the internals, along with the modification of the valve inside geometry, without removing the valve from the line.

IMI Z&J has a field service team which will oversee installation and commission of what are the largest valves in the world. We are experts in refinery turnarounds with technicians based out of our manufacturing locations in Duren, Germany and Houston, USA. Our expertise will ensure your plant is optimised whether it is delayed coking in petrochemical, blast furnaces in iron & steel mills or the glass industry.
Valve Doctors solve your plant problems

More than 250 service engineers

24 hour response to all global locations

Health and Safety of paramount importance

Turnarounds on refineries planned and managed
For more than 50 years, our business has been synonymous with innovation and performance in the severe service valve and controls industry. We have manufacturing operations in 19 countries and support our customers on the ground via local manufacturing facilities and our global service network, which includes 200 dedicated aftermarket specialists.
We operate a global manufacturing and service network.