



THE GLOBAL SUPPLIER FOR GLOBAL DEMANDS

Product · Service · Solution



KLINGER UK Total integrity solutions

KLINGER Integrity Services

☆☆

Total

Integrity **Solutions**

We offer a wide range of products and services uniquely tailored to your industry. Our Total Integrity Solutions approach means that we can provide a complete range of self-delivered services to suit your application. From Gasket Design and Manufacturing, through to a full range of On-site Field Engineering Services, we offer a complete product-to service solution. We use the latest cuttingedge service technology and will work with our client's side-by-side, offering a highly collaborative approach to deliver innovative and safer solutions, with a leak-free guarantee and right first-time start-up.

Industry leading supplier of sealing solutions, from gasket design and manufacturing, through to a full range of self-delivered on-site field engineering services.

KLINGER UK forms an integral part of the globally active KLINGER Group; a family business established in 1886 by Austrian engineer Richard Klinger. The KLINGER Group remains at the forefront of the sealing, fluid control, and fluid monitoring industries through investment in continuous research and development. With over 40 companies and more than 80 distribution companies in the world; we are a global leader in innovation.

KLINGER'S extensive range of metallic, semi-metallic gaskets, soft cut gaskets, valves, fluid control, and onsite engineering services are a key component in on-shore and off-shore installations for the petrochemical, chemical, pharmaceutical, food, and aerospace industries.



are generated by KLINGER Group per annum.



2,800 EMPLOYEES work for the KLINGER Group worldwide.



80 COUNTRIES of the world to which the Group has already exported.



60 COUNTRIES worldwide hosting subsidiaries or a representative of the KLINGER Group.

Global Supplier Local Partner

We pride ourselves on being able to deliver the best possible products and services to our customers. With seven customer contact centers spanning across the UK, we can provide our customers with quality products, and a quick turnaround service.



€684MM ANNUAL SALES



MAXIFLEX

- » High integrity seal for use with virtually all media dependent upon style and filler material
- » Spiral wound gaskets provide a safe and high integrity seal in applications where the factors that determines its sealing ability fluctuate. These factors may be the temperature, pressure, flange rotation, bolt stress or creep
- » The sealing element is made up of a preformed metallic winding strip interleaved with a soft filler. When compressed, the filler densifies, fills the surface finish of the flange, whilst the metallic strip provides mechanical resistance
- » Available in a wide range of material combinations to suit applications
- » Exceeds the performance criteria of the latest ASME B16.20
- » KLINGER Maxiflex spiral wound gaskets are fire safe to API 6FB

Filler Material	Maximum Temperature
Graphite	500°C (application dependant)
PTFE	260°C
Mica	1000°C
Mica & Graphite, Zonal	900°C



RING TYPE JOINTS

- » KLINGER Ring Type Joints (RTJ's) are heavy duty, precision manufactured metallic seals used in Offshore and Petrochemical industries
- » Manufactured in accordance to ASME B16.20, API 6A or API 17D
- » Fire Safe
- » Available in a variety of metallurgies, dependent upon the application
- » Available styles R Oval and Octagonal, RX and BX
- » Rated from class 150 through to API 20,000





SCAN TO LEARN MORE ABOUT SPIRAL WOUND GASKETS

MAXIPROFILE KAMMPROFILE GASKET

- » High integrity seal originally suited to problematic flanges
- » Solid metallic core with concentric serrations providing localized high pressure points
- » Soft facing flows into imperfections on flange surface and provides sealing at low seating stresses
- » API 6FB Fire Safe with graphite or Mica facing
- » Configurable to non standard / damaged / mis-matched flanges
- » Available in wide range of metallurgy cores

Maximum Temperature
500°C (application dependant)
260°C
1000°C
250°C

INSULATION SETS & KLINGER SHIELD

General Properties

- » Cathodic Isolation
- » Mitigate against galvanic corrosion
- » High Integrity sealing solution
- » Fire Safe to API 6FB
- » Trusted materials including KLINGERSIL, Top-chem, and Thermica
- » RF and RTJ flange options









KLINGER UK is also the major distributor of GPT products.

SENTRY REVERSE INTEGRITY GASKETS

Maximise plant up time / Reduce emissions / Increase efficiency

- » Save up to \$1m on shut down / pit stop costs
- » Allows leak testing on individual flanged joints without the need to pressurise the full system
- » Speeds up the leakage testing reducing plant downtime
- » Significantly reduces the volume of testing media required
- » Validates individual joint integrity at installation reducing the need to re-visit the joint
- » Suitable for all ASME B16.5, B16.47, API and PN flanges, Class 150-2500, API 5K-20K



SENTRY RTJ

» Reverse Integrity Gaskets for ring joint flanges



SENTRY DS

» Reverse Integrity Gaskets for raised face flanges



SENTRY DS PRO

» The world's thinnest reverse integrity gasket, a safe high integrity seal



SENTRY IK

» Reverse Integrity Gaskets for cathodic protection



SENTRY SR

» Reverse Integrity Gaskets for clamped connections





INTRODUCTION

- » From development and testing, design concept through to application opportunities
- » Understanding the limitations of the traditional method of testing bolted joint integrity

TESTING

- » SENTRY connections
- » Test pump operation
- » Queries, possible failure points and rectification methods



INSTALLATION

» How to install and why a competent installation is necessary when assembling a bolted joint



SCAN TO LEARN MORE ABOUT SENTRY GASKETS





ECO-SEAL LOW EMISSIONS GASKET

Reduce your plant's fugitive emissions with our emissions reduction programme

Eco-Seal is an ultra-low emissions spiral wound gasket. Manufactured in accordance with ASME B16.20-2017 it has been designed to provide a tighter seal compared to standard spiral wound gaskets. The concept behind Eco-Seal is not just a tighter gasket, its being able to quantify a reduction in plant emissions. We can provide you with data that you can understand and can relate to. We highly recommend this gasket for Hydrogen Services.

For even the most demanding applications:

- » Hydrogen » Chemical
- » Hydrocarbon » Petrochemical » Power
- » Steam

Construction:

- » 316L
- » High purity graphite filler

Standards:

- » ASME B16.20-2017
- » Fire Safe to API 6FB
- » NACE MR0175

Gasket factors:

» МЗ

» Y 10,000 PSI

Features:

- » High density construction resulting in increased mechanical stability
- » Modified winding strip form
- » High quality graphite filler
- » Controlled filler protrusion
- » Improved leakage performance at lower stresses

When in combination with KLINGER INTEGRITY SERVICES, we can offer you the complete emissions reduction program from gasket, installation, testing, and recording.

SCAN TO LEARN MORE ABOUT ECO-SEAL GASKETS





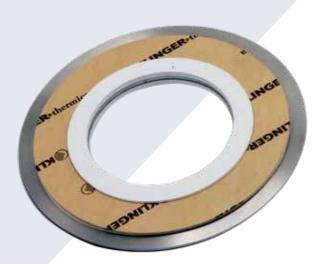


SAFEGUARD CORROSION CONTROL GASKET

The Safeguard has been developed by KLINGER as a solution to sealing corroded flanges which are particularly evident in the offshore environment. Simple to install, the Safeguard limits further corrosion and provides a safe and efficient sealing solution and enables users to plan for necessary flange face repair.

Features and benefits:

- » Fire safe to API 6FB
- » Continuous service up to 260°C
- » Suitable for RTJ, RF, mismatched RTJ to RF and dissimilar metallurgy flange connections
- $\,$ » Suitable for sizes 1/2"-24" and pressure classes 150-2500
- » Fire Safe primary seal combined with biaxially orientated, structurally modified PTFE that conforms to pitting*



*Range of metallurgies available, contact KLINGER for acceptance criteria.

FLANGE MACHINING

KLINGER understands machining of a flange face is always the first-choice remedial action, where it is permissible to machine the flange face. KLINGER integrity services' dedicated machining team can solve all on-site problems. With extensive experience, a proven industry record and the most advanced equipment, we provide a fast, comprehensive, and safe service.

Capabilities include:

- » Weld repair
- » RTJ machining
- » Hub re-machining
- » Full exchanger machining service



SCAN TO LEARN MORE ABOUT OUR PRODUCTS AND SOLUTIONS

KLINGER MAXIFLEX PRO-X

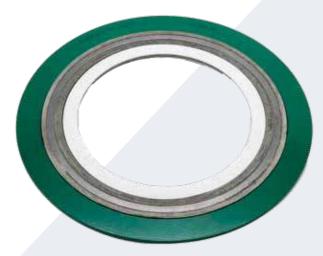
The Maxiflex Pro-X has been designed to offer a standard spiral wound-style gasket that has been specifically engineered to prevent the ingress of potentially corrosive media into the flange sealing area.

By combining Mica and Graphite in the sealing element we provide a safe, tight, and long-term solution to Hydrocarbon based industries and those exposed to saltwater.

The proactive element of the Pro-X is engineered through the inclusion of a KammProfile based inner ring, faced with biaxially orientated, multi-directional PTFE.

Features and benefits:

- » Fire safe to API 6FB
- » Designed to ASME B16.20 2017
- » Standard Construction: 316SS winding strip / MGM filler / 316L KAMM INNER / PTFE Facing



*Range of metallurgies available, contact KLINGER for acceptance criteria.







PRECISION ENGINEERING

SCAN TO LEARN MORE ABOUT PRECISION ENGINEERING



KLINGER UK's precision production facility specialises in highly complex machined parts. Housing a range of specialised machinery, including CNC Milling and Turning, Surface and Cylindrical Grinding, as well as the latest WEDM equipment.

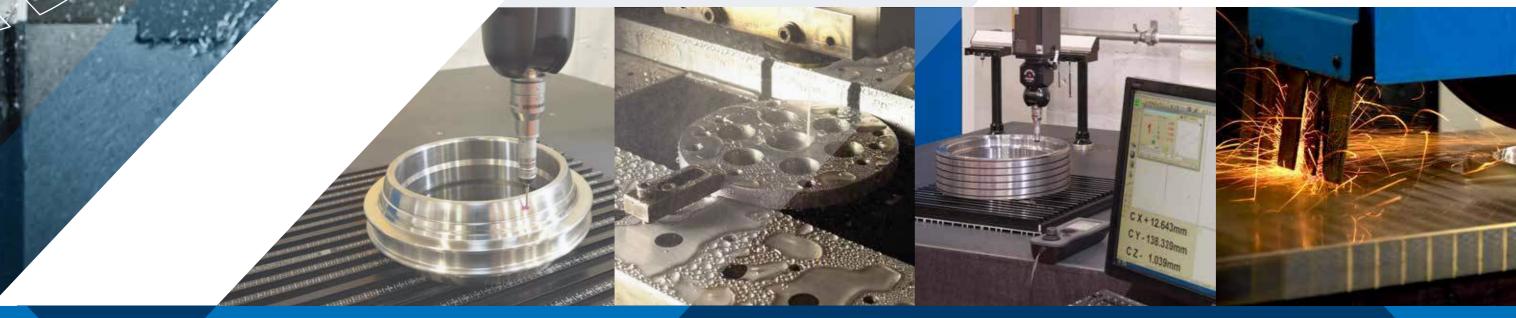
KLINGER Precision is supporting KLINGER UK's pre-existing and ever increasing demand for exotic alloy RTJ's for the offshore Oil and Gas Industries.

PRODUCTS

- » BOP wellhead rings
- » Machined components from one-off bespoke products to multi-batch work
- » Tubesheets
- » Press tool design & manufacture
- » Baffle plates

CAPABILITIES

- » Wire erosion
- » Milling
- » Grinding
- » Turning





» High precision measurement using latest CMM equipment

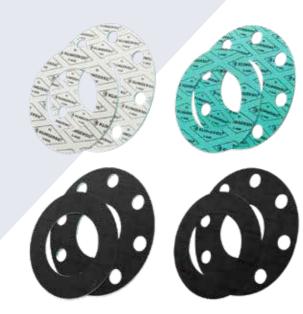


KLINGERSIL

The original Non Asbestos sheeting material, KLINGERSIL is trusted globally and the 1st choice calendared sheeting in a range of industries.

KLINGERSIL materials are manufactured with KLINGER's unparalleled levels of quality control to meet our high specifications. KLINGERSIL sheet materials are easy to cut, handle and fit, and are produced with our 3xA finish.

KLINGERSIL C-4430, C-4400, C-4324, C-4509. Available in sheet and cut gaskets.



EXFOLIATED GRAPHITE LAMINATES

Exfoliated Graphite Laminates can be supplied either with or without reinforcement materials in varying forms; tanged, foil insert and with eyelets. They don't contain a rubber binder and are not subject to hardening of the material.

General properties:

- » Excellent resistance to steam
- » Resistant to virtually all media
- » Outstanding resistance to high and low temperature
- » High compressibility
- » Good leakage properties
- » Unlimited storage life
- » Anti-stick finish on both sides

PSM-AS

Pure exfoliated graphite with a tanged stainless steel sheet reinforcement for improved blow-out resistance and ease of handling. Due to the excellent chemical and thermal capabilities of graphite it is used extensively throughout the petrochemical and chemical industries for process duties and steam applications.

Applications:

- » Low bolt loads
- » Sealing of damaged flange surfaces
- » Hot oil equipment
- » Gas-to-liquid plants
- » Heat exchangers
- » Nuclear power plants
- » Cylinder head and manifold
- gaskets for engines and compressors



PTFE

PTFE has excellent chemical resistance and is only attacked by molten alkali metals and hydrogen fluoride compounds at elevated temperatures making it suitable for a wide range of severe chemical applications.

Properties include:

- » Suitable for use with food and
- pharmaceutical applications » Excellent chemical resistance

Gore Sealant Technologies range

As an Active Partner with Gore we can supply a range of their materials including Gore DF tape, Gore series 500 and 1000 tape, Gore UPG gaskets and Gore GR sheeting.

GORE

KLINGER TOP-CHEM PTFE RANGE

Products from the KLINGER® TOP-CHEM range are tailored to provide the characteristics required by their target industries. Amongst others, this includes tightness even at low surface pressures, high resistance against strong acids or strong alkaline solutions as well as good properties at medium and low temperatures.

General properties:

- » Easy handling
- » No embrittlement
- » No aging reaction
- » Weldable
- » No sticking on flange



Leading mechanical stability with Top-Chem-2000:

- » Long service life because of high stress retention
- » High residual stress
- » TOP-CHEM 2000 has the lowest creep on the market



Sealex PTFE Joint Sealant

Reliable versatile gasketing on a roll. Sealex is a soft highly compressible sealing material which has a pressure sensitive adhesive backing to assist with installation.

Thread Seal Tape

Available as a one wrap seal for gas applications and also as a general Thread Seal for liquids.



SCAN TO LEARN MORE ABOUT JOINTING MATERIALS

Broad application coverage:

- » Temperature ranges from -200°C up to +260°C
- » Excellent chemical resistance in strongly acidic and alkaline applications
- » Used in the pharma industry, food industry, chemical industry, energy sector, in oxygen pipelines etc.



Top-Chem-2003:

- » Glass Micro-sphere filler
- » Highly compressible
- » Outstanding chemical resistance



KLINGER is your partner for the development, manufacture, and sale of high-quality industrial valves, used every day in a wide range of fields - from district heating to LNG, through to the chemical and the oil & gas industry. Our industrial valve products are 'trusted worldwide' because of their high reliability, long life cycle, and extremely low total cost of ownership.

Our valve specialists recommend, source, and deliver all types including pneumatic, electric, or hydraulic actuated packages and control valves, providing a complete valve package service.



BALLOSTAR® KHI BALL VALVES



BALLOSTAR® KHE BALL VALVES



MONOBALL® KHM BALL VALVES



MONOLITH KHO **BALL VALVES**



KVN PISTON VALVES



BALLOSTAR® KHA BALL VALVES



Metal expansion joints are engineered components designed to absorb pipeline movements. KLINGER manufactures a range of expansion joints and hoses, some of the products in the range include:

WELD END **EXPANSION JOINTS**



Weld end expansion joints are equipped with carbon steel or stainless-steel pipe connections.

FLOATING FLANGED EXPANSION JOINTS

Floating flanged expansion joints are equipped with carbon steel or stainlesssteel flanges (EN, ASME or as requested). It absorbs mainly axial movements with possibility of some lateral movements.

FIXED FLANGED EXPANSION JOINTS

Fixed flanged expansion joints are equipped with welded carbon steel or stainless-steel flanges (EN, ASME or as requested). It absorbs mainly axial movements with possibility of some lateral movements.

CENTRAL HEATING SYSTEM TYPE **EXPANSION JOINTS**

Significant displacements due to thermal movements on central heating pipes create thermal stresses resulting in bending of pipes and irritating noise. To prevent these problems, Central Heating System Type Expansion Joints may be preferred to absorb these movements.

















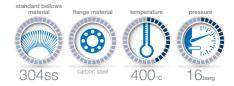














KLINGER offers a high-quality portfolio of expansion joints and various types of metal hoses, compression packings, spray shields, and insulating gasket sets. Our comprehensive range of packings for centrifugal or reciprocating pumps and valves meet, and in most cases exceed the stringent fugitive emission targets set by various environmental bodies such as the EPA. Understanding the diverse requirements of operators around the world, our range includes standard designs as well as products specifically tailored to meet customer and industry-specific needs.

SCAN TO LEARN MORE ABOUT ASSOCIATED PRODUCTS



LEVEL GAUGES

As the inventors of the Level Gauge KLINGER have a proud history of manufacturing the complete range of level gauges and associated products.

- » Magnetic Level Gauges
- » Reflex Level Gauges
- » Transparent Level Gauges
- » Class 150–1500 flange rated
- » Temperature range -196°C 400°C
- » Sight Glasses
- Gaskets

SLIP / SPECTACLE PLATES AND BLANK FLANGES

- » Manufactured by KLINGER UK to standard or specific customer specification
- » API590 and B16.48
- » Range of metallurgy
- » Size range 1/2" to 80"
- » Raised face or Ring Type Joint



HYDRAULIC SEALS / O-RINGS

- » O-Rings, Geopak Seals, Wiper Rings, Piston Seals, Wear Rings
- » Materials including Viton, Nitrile, HNBR, Neoprene, EPDM and Silicon
- » Lubricants
- » O-Ring fitting tools
- » Food and Pharmaceutical grades
- » Multiple Industry applications

KLINGER TOPLINE GLAND PACKINGS

KLINGER Gland Packing and die-formed rings have been manufactured for over 100 years and are trusted worldwide.

- » A complete range of PTFE, Graphite, Synthetic and Hybrid packings
- » Available for Fire Safe, WRAS, FDA and BAM Approved applications
- » Outstanding resistance to Chemicals
- » Wide Temperature tolerance
- » Low Coefficient of friction



STUD BOLTS

KLINGER supply the petrochemical industry with many different types of bolting. From standard to bespoke stud bolts. Ranging from ¼" to 3" diameter. KLINGER can also supply forged bolts to suit your requirements in all material grades. Different coatings can be specified including PTFE, Zinc or Galvanised. Other coatings are available on request.









XLINGER INTEGRITY SERVICES

SCAN TO LEARN MORE ABOUT KLINGER INTEGRITY SERVICES



Collaborate. Innovate. Optimise.



TECHNICAL SERVICES

- » Pre-Engineering of client Critical Flanges
- » Client Joint Integrity procedure creation & review
- » ECITB, EN & ASME Joint Integrity Training
- » New product development
- » Application-based product testing

INTEGRITYXPERT Industry leading flange management system

We completely understand the environmental and economic factors that drive the requirement for leak-free systems. In recent years, the successful management of bolted flange connections has been highlighted as a major factor in reducing leaks and fugitive emissions.

IntegrityXpert - Our industry-leading management system - has a comprehensive flange management module as well as sections on creating engineering work packs for integrity disciplines during Engineering, Construction, Commissioning, Plant start-up, Operations, and Maintenance scopes.

It allows KLINGER to incorporate all equipment, flange, and small-bore tubing breaks for ease of reference during the integrity verification process. It can also be used to plan work scope and produce work packs prior to the field execution stage.

IntegrityXpert is a bespoke system, developed to include all aspects of the joint assurance process. The flexibility allows client-specific developments, to their individual requirements and as the software has been developed across desktop, web, and handheld technologies it can be implemented in any environment.

SCAN TO LEARN MORE ABOUT KLINGER INTEGRITY SERVICES



IntegrityXpert single interface, enables clients to engineer, execute & control multiple construction, commissioning and maintenance activities



At the core of IntegrityXpert is a comprehensive calculation tool that is compliant with ASME PCC-1 & EN-1591 standards. The software uses a component-based calculation to ensure that bolt, flange and gasket stresses are assessed under all applicable assembly, operating and test conditions.

The inclusion of proprietary gasket data allows KLINGER to provide a unique level of calculation with true gasket data at its core. IntegrityXpert can implement calculations for all standard piping systems as well as compact flanges, hubs, heat exchangers and non-standard applications.

IntegrityXpert has an inbuilt comprehensive PDF mark-up tool as part of the work pack creation. This allows P&IDs & isometric drawings to dynamically display progress of joint integrity work scope, through colour coding of the flanges in line with the client's tagging procedure.

The overlay facility shows multiple services lines on a single drawing for full system overview, demonstrating system and subsystem progress and also acting as a control measure during testing activities.

For field applications KLINGER Integrity Services uses industry leading IntegrityXpert ATEX rated zone 1 handheld technology, ensuring our integrity engineers and QA/QC teams have live access to data, drawings and calculations.

IntegrityXpert is the key technology that completes our total integrity solution of Product. Service and software.









KLINGER has a vastly experienced technical team servicing clients globally from the UK. Technical services including, conceptual design services, CAD and FEA, gasket integrity and torque calculations, bespoke sealing solutions, on site support, inventory rationalisation and

competency training.

Training and Awareness:

KLINGER has established a proud engineering knowledge based on sound engineering practises, industry knowledge and client confidence.

Our material, product and application understanding has enabled KLINGER to establish our Technical Training Centre in Bradford.

KLINGER can offer training packages ranging from bespoke sessions to fully accredited competency training certified by ECITB.

With the latest testing and training equipment including our KLINGER Assembly Demonstration Unit we aim to:

- » Increase best practice techniques and competency
- » Offer interactive, practical and tailored learning
- » Demonstrate real-time information on gasket compression, bolt stress and pre-load
- » Increase material awareness.
- » Offer sealing solutions through gasket appreciation and development

Trusted expertise for worldwide projects

KLINGER Projects team brings together multi-disciplines to ensure a focused one-team approach to your project. With the experience of supplying both Greenfield and Brownfield sites across the world, KLINGER Projects can support all stages of your project from Feasibility and FEED studies to commissioning, start-up, and handover. As a manufacturer and service provider KLINGER has worked with asset owners and EPC contractors ensuring a quality solution for all project requirements from small to megaprojects.

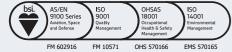
Our technical team is unrivaled, with gasket, valve, and instrumentation product specialists on hand to offer advice and recommend the most advanced solutions to meet EPC and project requirements.

Our team provides the following across all our products and services:

- » Engineering support and calculations
- » Flange Management solutions
- » Commercial support, scheduling, and pricing
- » Documentation Control
- » Onsite services and training
- » Logistics Support



Accreditations:











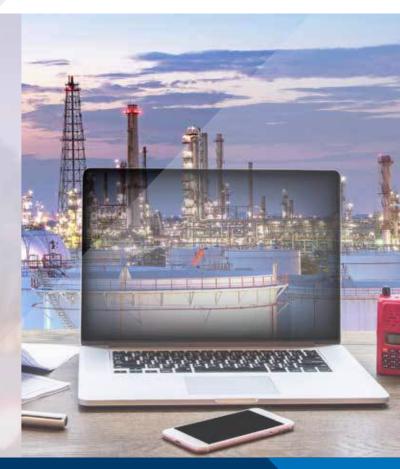


trusted. worldwide

DEDICATED PROJECT MANAGEMENT TEAM

» Quality Assurance & Certification

KLINGER's global network of companies and partners means that we can supply ongoing support to the facility through local stock and service technicians.





Power-to-X, also known as Power-2-X (P2X), is the process of turning electricity (power) into sustainable green products (the "X"). The input of this process is renewable power from solar panels, wind turbines, hydropower, etc., and the output is a variety of clean fuels (e-fuels) or chemicals.

The "X", the energy carriers, are hydrogen, fuel gases and liquid fuels such as gasoline, ammonia, kerosene and diesel, for example. Sector coupling, i.e. the interconnection of the individual energy industries and their joint use and production of energy sources, is in the foreground here.

RENEWABLE ENERGY PRODUCTION

- » Insulation Sets
- » Valves
- » Bolt Torquing and Tensioning
- » IntegrityXpert Flange Management Software

HYDROGEN PRODUCTION

- » Spiral Wound Gaskets
- » KLINGERSIL Soft Cut Sheeting
- » Valves
- » IntegrityXpert Flange Management Software

WASTE HEAT UTILISATION

- » Spiral Wound Gaskets
- » KLINGERSIL Soft Cut Sheeting
- » Valves
- » Level Gauges

SYNTHESIS PROCESS **REUSE OF HYDROGEN**

- » Spiral Wound Gaskets
- » KLINGERSIL Soft Cut Sheeting
- » Valves
- » Level Gauges

» IntegrityXpert Flange Management Software » Machining

» Spiral Wound Gaskets » KLINGERSIL Soft Cut Sheeting » Valves » Level Gauges

» Bolt Torquing and Tensioning



HYDROGEN COMPRESSION & STORAGE

» Spiral Wound Gaskets » KLINGERSIL Soft Cut Sheeting » Valves » Level Gauges » Bolt Torquing and Tensioning » Machining

ELECTROLYZER

» Spiral Wound Gaskets » KLINGERSIL Soft Cut Sheeting » Valves » Level Gauges » Bolt Torquing and Tensioning » IntegrityXpert Flange Management Software

CARBON SOURCE

» Spiral Wound Gaskets » KLINGERSIL Soft Cut Sheeting » Valves » Level Gauges » Bolt Torquing and Tensioning » IntegrityXpert Flange Management Software » Machining





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