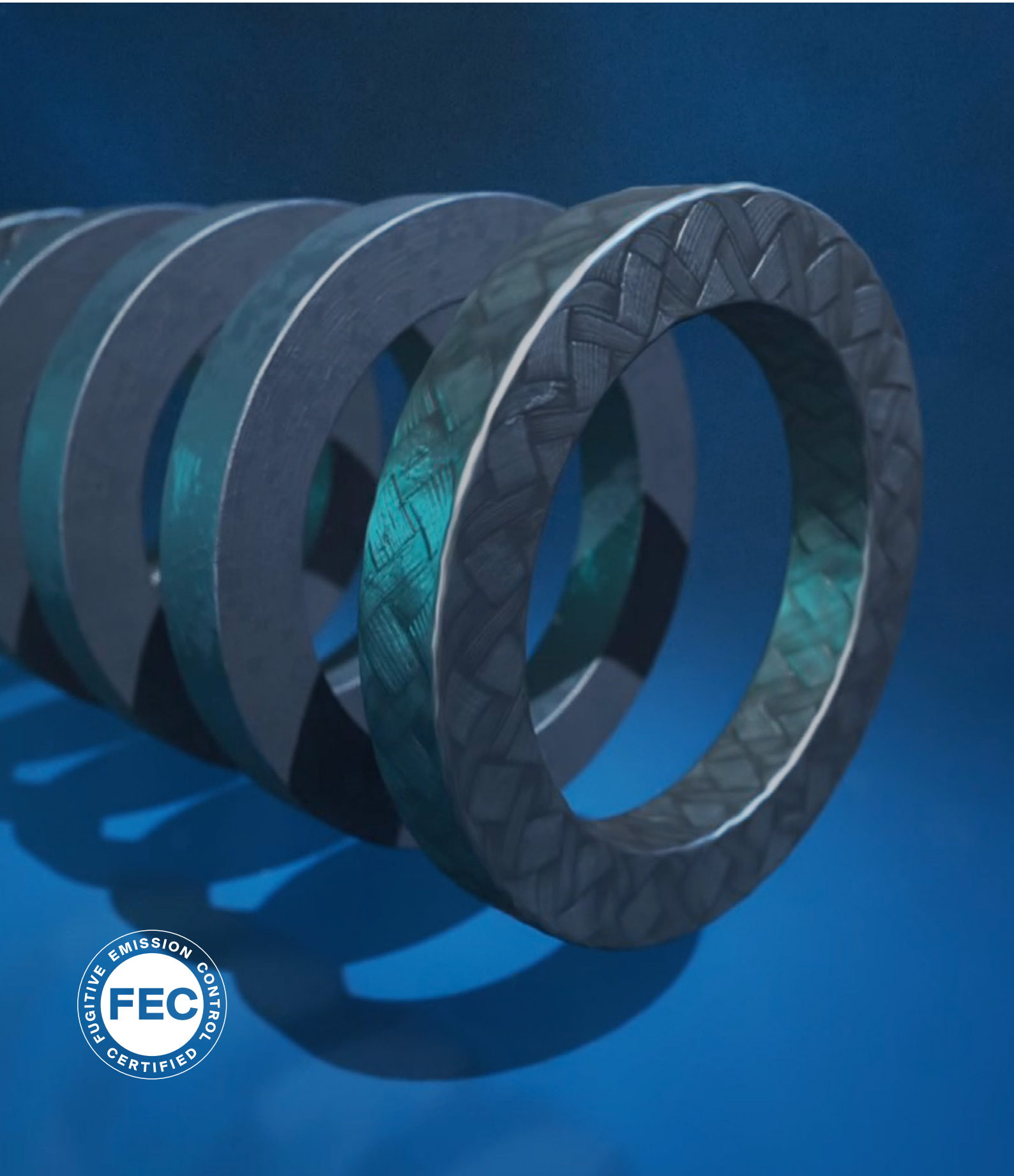
PIONEERING LOW FUGITIVE EMISSION TECHNOLOGIES

Burgmann Packings



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SOLUTIONS FOR ORIGINAL EQUIPMENT MANUFACTURERS

Valves equipped with Burgmann Packings FEC sets at a leading Engineered Valve Manufacturer

CO-ENGINEERING AND DESIGN SUPPORT
We collaborate closely with our clients, offering expert co-engineering and design support to create tailored solutions that meet specific needs and challenges. Our team of experienced engineers works hand-in-hand with your team to ensure optimal performance and reliability.

PERFORMANCE TESTING
Our state-of-the-art laboratories are equipped with international Low-E testing equipment, allowing us to conduct rigorous performance testing. This ensures that our solutions surpass industry performance standards.

COMPLIANCE WITH FUGITIVE EMISSION REGULATIONS
We are committed to ensuring that all our products comply with both local and international fugitive emission regulations. By adhering to these stringent standards, we help our clients maintain regulatory compliance and contribute to a cleaner environment.

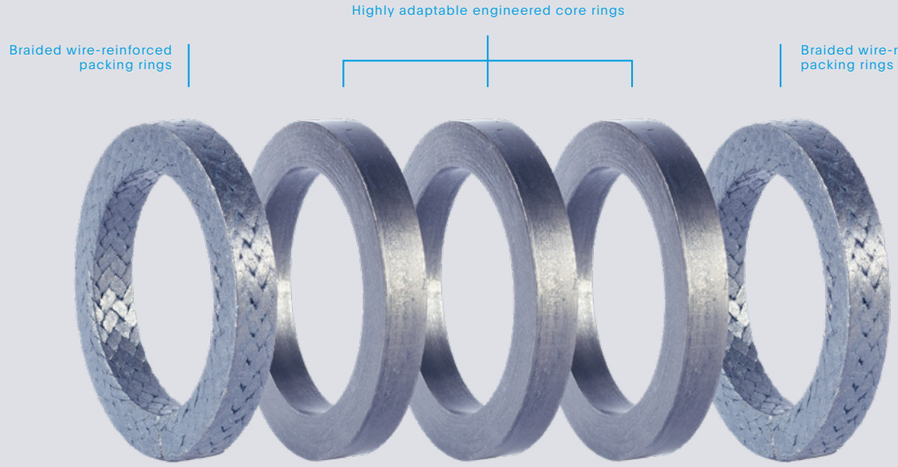
MEETING INTERNATIONAL STANDARDS
In addition to regulatory compliance, our solutions are designed to meet international end-user fugitive emission standards and specifications. This guarantees that our products are reliable and efficient, providing peace of mind to end-users.

COMPETITIVE AND CUSTOMIZED SOLUTIONS
We offer competitive solutions that are available in customer-specific designs and according to all international standards. Whether you need a custom solution or one that adheres to global standards, Burgmann Packings delivers with precision and excellence from our manufacturing plants strategically located in Turkey and China.

Partner with Burgmann Packings and experience the difference of working with a global leader in Fugitive Emission Control (FEC) Sealing Technology. Together, we can achieve outstanding performance and compliance in all your valve applications.

We pride ourselves on being a trusted partner to valve manufacturers worldwide.

OUR FLAGSHIP SOLUTION



BPG 7888
BPG 7888 is the Best-In-Class sealing solution for FEC valve applications. It is the preferred choice from world's leading valve manufacturer and certified according to all relevant global emission standards. This engineered low fugitive emission valve packing set is featuring a combination of braided wire-reinforced expanded graphite rings and a highly adaptable core. The permanently elastic components of the sealing set ensure lowest leakage rates and reduced friction over the entire life cycle of the valve.

FEC PRODUCT SELECTOR

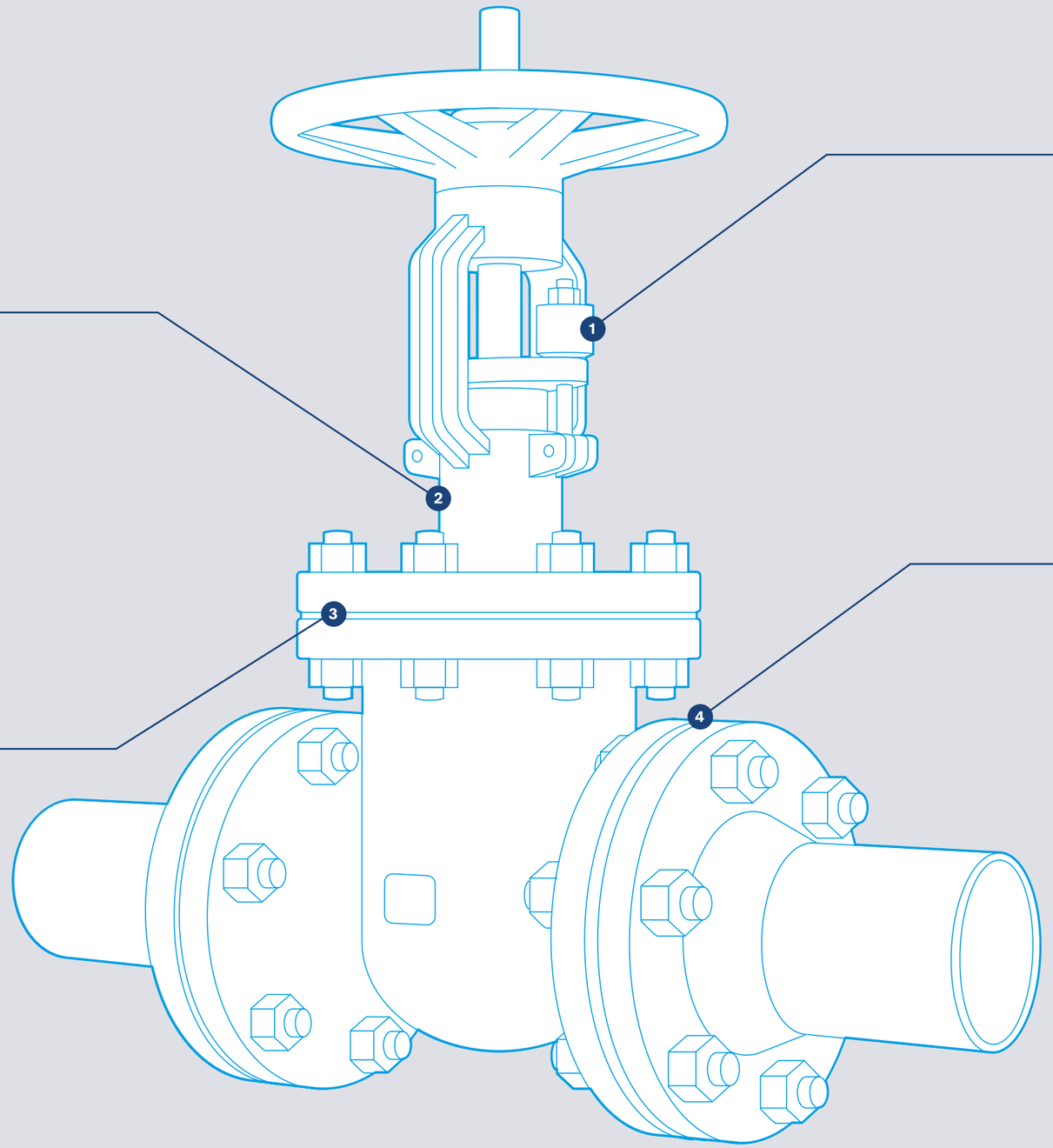
TYPICAL APPLICATIONS

FEC PACKINGS AND SEALING SETS

- BPG 6225
- BPG 6350
- BPG 6500
- BPG 6552
- BPG 6559
- BPG 7200
- BPG 7250
- BPG 7290
- BPG 7888

FEC GASKETS AND RING TYPE JOINTS

- FEC Spiral Wound Gaskets
- FEC Kammprofile Gaskets
- Ring Type Joints
- FEC CNAF Gaskets
- FEC Graphite Gaskets
- FEC Corrugated Gaskets
- FEC PTFE Gaskets



LIVE LOADING SET

- BPG 7900
- BPG 7910
- BPG 7920
- BPG 7930

FEC GASKETS AND RING TYPE JOINTS

- FEC Spiral Wound Gaskets
- FEC Kammprofile Gaskets
- Ring Type Joints
- FEC CNAF Gaskets
- FEC Graphite Gaskets
- FEC Corrugated Gaskets
- FEC PTFE Gaskets

COMPLIANCE REQUIREMENTS

- TA Luft
- Clean Air Act
- ISO 15848
- API 622
- API 624
- API 641
- API 607
- API 6FB
- API 6A
- BAM Oxygen Service
- FDA
- EG 1935/2004
- EU 10/2010
- ASME 16.20
- DIN EN 1514
- DIN EN 12560
- WRAS
- ABS
- Chinese GBT Regulations
- DVGW

SOLUTIONS FOR PROCESS INDUSTRIES

COMPREHENSIVE RANGE OF FEC PRODUCTS
We supply a complete range of Fugitive Emission Control (FEC) products for piping, equipment, and valves. Our solutions are designed to enhance the reliability and efficiency of your operations.

COMPLIANCE WITH EMISSION REGULATIONS
Our products are meticulously designed to meet and exceed both local and international emission standards, ensuring full compliance with regulatory requirements across various regions and industries. By adhering to these stringent standards, we help our clients maintain regulatory compliance, fostering a safer and cleaner environment globally.

PROVEN AND USER-FRIENDLY VALVE RETROFIT SOLUTIONS
Our products are proven and easy to use, especially during valve retrofits performed during shutdowns and turnarounds. This ease of use ensures minimal downtime and maximizes operational efficiency.

INCREASED PLANT EFFICIENCY AND SAFETY
By implementing our solutions, you can significantly increase plant efficiency and safety. Our products are designed to withstand the harshest conditions, ensuring reliable performance.

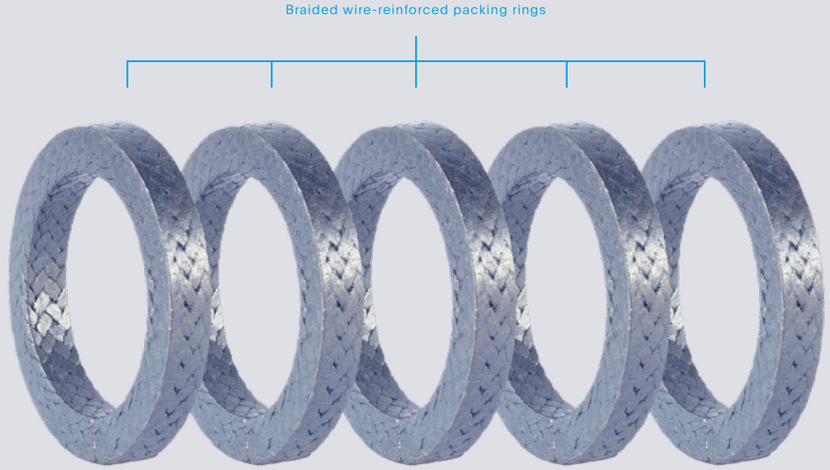
Meeting the Strictest HSE Requirements
We understand the importance of Health, Safety, and Environmental (HSE) requirements. Our products are engineered to meet the strictest HSE standards, ensuring the well-being of your personnel and the environment.

LIFE-CYCLE-COST ADVANTAGES
Our solutions provide substantial life-cycle-cost advantages that translate directly into increased profitability for your business. By designing products and systems that extend maintenance intervals, reduce downtime, and enhance overall operational efficiency, we enable you to achieve significant cost savings throughout the entire life cycle of your assets.

Our comprehensive services and innovative solutions ensure that we meet and exceed the industry's demanding standards.

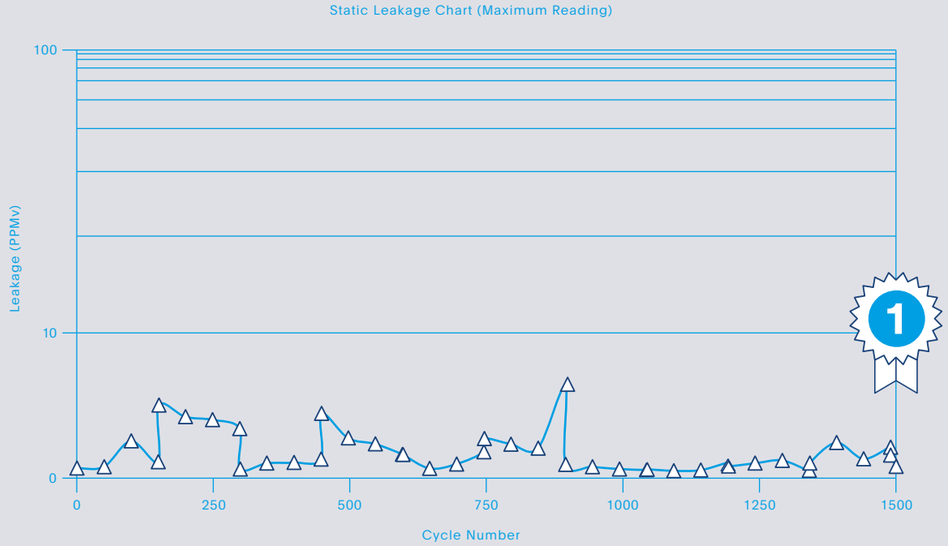
Burgmann Packings provides FEC solutions for a large variety of applications in the process industry.

OUR FLAGSHIP SOLUTION



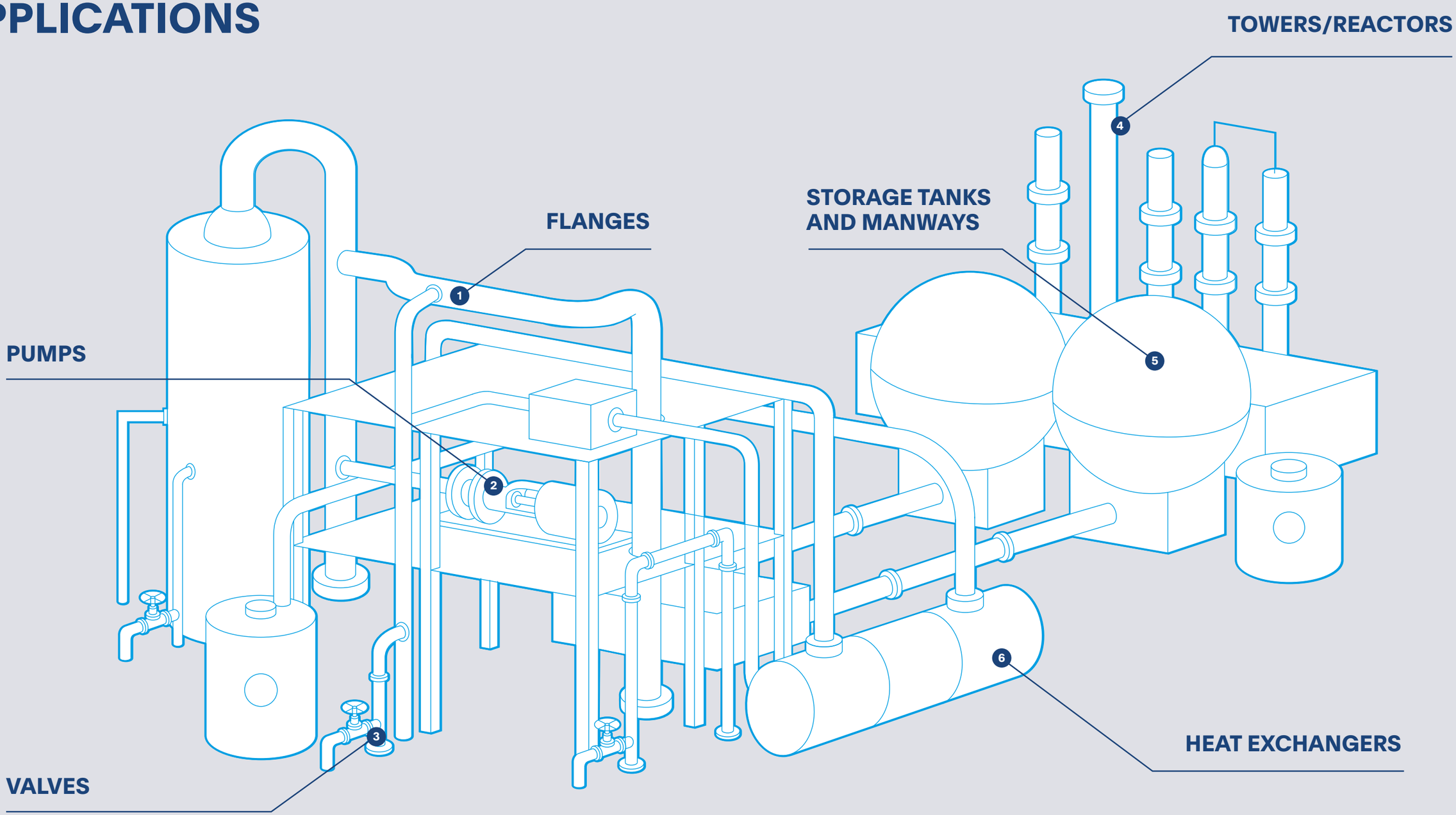
BPG 6559
BPG 6559 is the ideal low emission packing solution, designed to withstand high pressure and temperature environments, offering exceptional resistance and durability. It provides certified performance for fugitive emission applications, meeting international standards such as ISO 15848 or API 622, ensuring minimal leakage and safe valve operations. This packing is particularly suitable for quick repair services across all valve dimensions, making it highly efficient for both planned shutdowns and urgent turnarounds. Notably, no retightening is required after installation, simplifying maintenance.

UNMATCHED PERFORMANCE OFF-THE SPOOL



CLASS LEADER
BPG 6559 delivers unmatched performance, **achieving the lowest leakage rate ever recorded** by Yarmouth Research and Technology in the US under API 622 2nd edition testing for fugitive emissions. Robust and ready to use off-the-spool, it allows for easy customization, fitting, and full compliance with industry standards. Cut, fit, and comply with ease, making BPG 6559 the optimal solution for demanding valve applications in the field.

TYPICAL APPLICATIONS



APPLICATION

Properties/applications shown throughout this brochure are typical. Your specific application should not be undertaken without independent study and evaluation for suitability. For specific application recommendations consult our team.

To select the inproper sealing products could result in property damage and/or serious personal injury. Performance data published in this brochure has been developed from been used in compiling this brochure, we field testing, customer field reports and/or assume no responsibility for errors. inhouse testing. While the utmost care has

FUGITIVE EMISSION MANAGEMENT

SUSTAINABLE SOLUTIONS
Pioneering innovations, uncompromising quality, and tailored solutions are our strengths. Our high-quality products and reliable performance have earned us long-term business relationships with international corporations. We collaborate with industry specialists to gather data, continuously enhancing our product performance. We highly value ongoing dialogue with our customers, and our hands-on approach enables us to create cost-effective, sustainable solutions to meet our clients' most challenging inquiries. We believe in sharing our knowledge to make sealing technologies more efficient, support our clients' efforts to reduce environmental impacts, and increase the operational efficiency of plants worldwide.

We highly value ongoing dialogue with our customers, and our hands-on approach enables us to create cost-effective, sustainable solutions to meet our clients' most challenging inquiries.

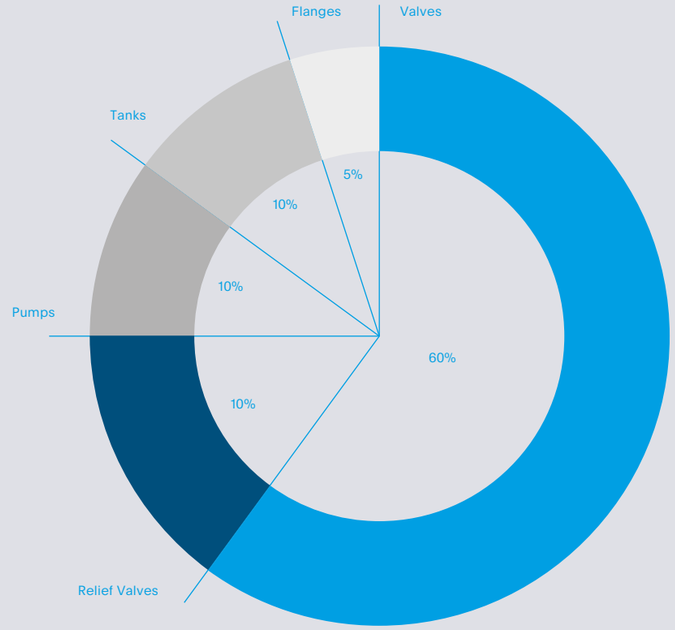
OUR EXPERTISE
Burgmann Packings offers a complete range of low fugitive emission sealing products for both new valves and retrofits. Burgmann Packings' Fugitive Emission Control Packings comply with the world's strictest standards, including TA LUFT, ISO 15848, API 622, API 624, API 641, API 607, and API 589.

Valves, especially control valves, account for approximately 60% of leakage loss in a plant. For processes containing hazardous fluids, conventional packings can be replaced with low emission sealing sets. Burgmann Packings' fugitive emission control (FEC) sealing products are ideal for increasing plant safety and efficiency and improving environmental protection. This is why our "Best Available Technology" (BAT) products are approved by leading end-users and OEM manufacturers.

Valves, especially control valves, account for approximately 60% of leakage loss in a plant.

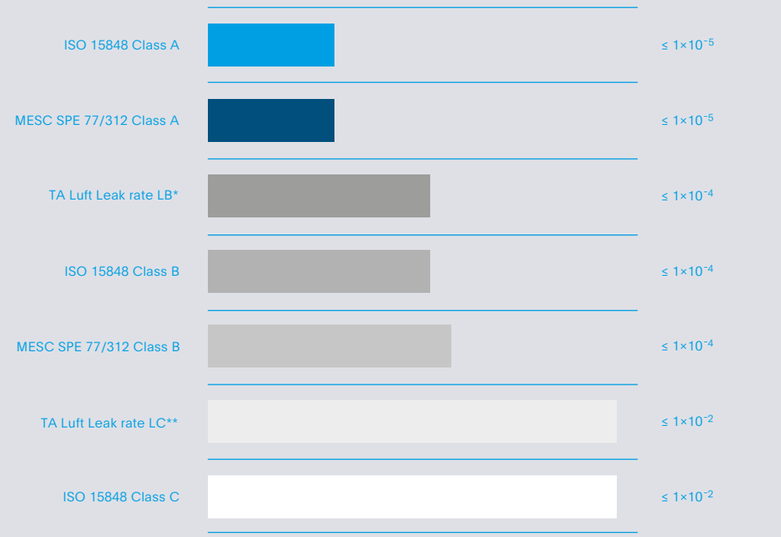
Leak Detection and Repair programs have shown to be a key lever to reduce the overall site emissions.

SOURCES OF EMISSIONS



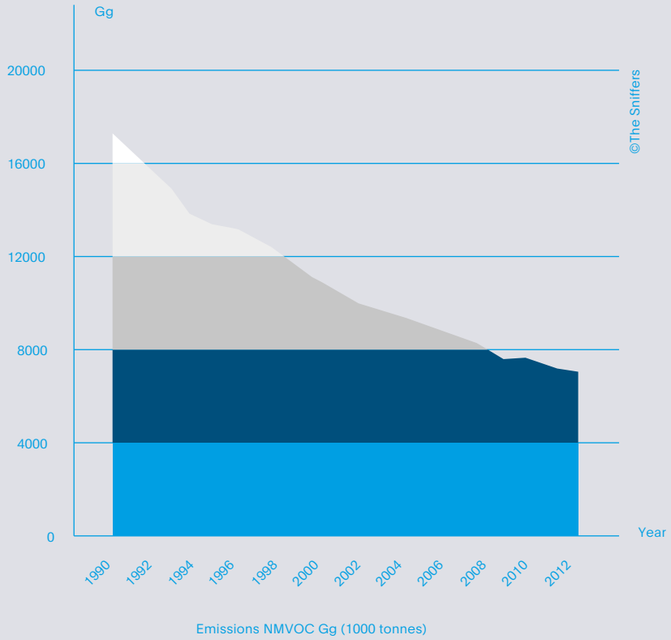
Source: European Sealing Association

EMISSION STANDARDS



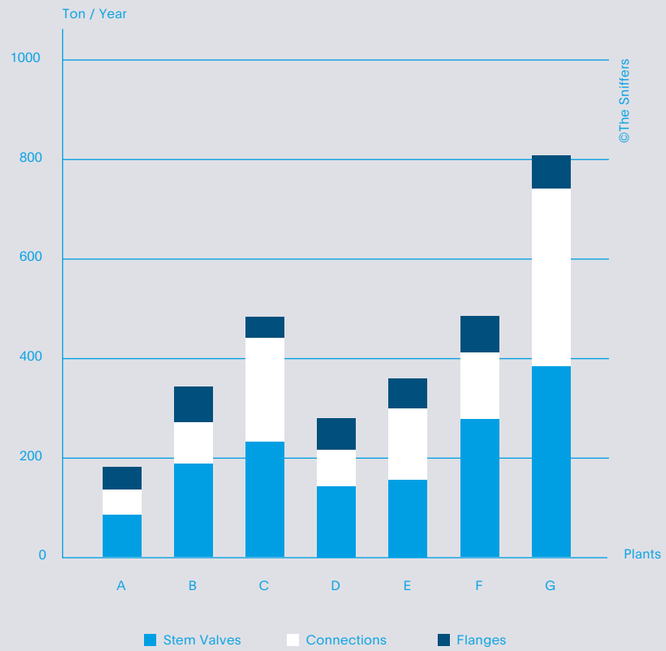
Leakage rates in mg/(s×m) *(≤ 40 bar and ≤ 200°C) **(≤ 40 bar and > 200°C; > 40 bar and ≤ 200°C; > 40 bar and > 200°C)

REDUCTION OF EMISSIONS



Emissions NMVOC Gg (1000 tonnes)

SOURCES OF FUGITIVE EMISSIONS



Life-cycle cost analysis show that leakage reduction of expensive process media will also improve the bottom line.

Evidence worldwide has shown that another key factor in reducing overall site emissions is the implementation of Leak Detection and Repair (LDAR) programs.

STANDARDS AND REGULATIONS

Fugitive emissions, typically defined as gases or vapors that unintentionally leak from industrial installations, significantly impact health, safety, and the environment. Surveys have shown that the majority of these emissions come from valves and flanges, with valves being the most problematic. Fortunately, an integrated approach can significantly reduce these emissions.

In Europe, for example, Non-Methane Volatile Organic Compounds (NMVOC) emissions were reduced by 57% between 1990 and 2011. This progress has been driven and accelerated by legislative frameworks, such as the European Directive Industrial Emission Directive IED2010/75/EU and the European Integrated Pollution Prevention and Control (IPPC). The concept of Best Available Techniques (BAT) and the BREFs reference documents have supported end-user efforts to comply with stricter emission standards, which have been incorporated into national standards like TA Luft in Germany.

Burgmann Packings actively contributes to this process by developing and manufacturing Fugitive Emission Control (FEC) products that meet and exceed the strictest emission regulations. In addition to internal testing, these products have been certified by independent testing institutes.

EVIDENCE AND IMPACT

Evidence worldwide has shown that another key factor in reducing overall site emissions is the implementation of Leak Detection and Repair (LDAR) programs. These programs provide transparency, identifying where the largest leaks occur and focusing maintenance activities to produce short-term, high-impact results.

The Sniffers, a market leader in LDAR Fugitive Emission Management Programs, has completed more than 6,000 LDAR projects globally over the past 25 years. Data from an emission reduction program in a European refinery shows that annual emissions can be reduced by 75% with an aligned and effective program.

Compliance is only one benefit for plant operators. The improvement of various Health, Safety, and Environment (HSE) factors produces measurable results. Additionally, life-cycle cost analysis shows that reducing leakage of expensive process media also improves the bottom line.

To learn more about these opportunities, browse our website or contact Burgmann Packings engineers. For more information about LDAR services, visit The Sniffers.

FUGITIVE EMISSION CONTROL PACKINGS

In 1884, we invented the mechanically braided, self-lubricating packing. Since then, we have built a legacy of pioneering innovations, uncompromising quality, and tailored solutions for our global customers. Today, our braided packings are the preferred choice for end-users and OEM customers around the world.

At the beginning of the 21st century, we were among the first manufacturers to present the first generation of Fugitive Emission Control (FEC) sealing solutions. Today, we offer a complete range of low fugitive emission sealing products for both new valves and retrofits. Available off-the-spool or tailored to your individual needs, our products are combat-tested, certified, and safe.

Burgmann Packings' Fugitive Emission Control Packings comply with the world's strictest standards, including TA LUFT, ISO 15848, API 622, API 624, API 641, API 607, and API 589.

BPG 7888

PROPERTIES
This engineered low fugitive emission valve packing set features a combination of braided wire-reinforced expanded graphite rings and a highly adaptable core. The permanently elastic components of the sealing set ensure the lowest leakage rates and reduced friction over the entire life cycle of the valve.

APPLICATIONS
Our BPG 7888 sealing set is specifically designed for use in low fugitive emission valve applications.

OPERATION PARAMETERS

Speed	2 m/s
Temperature	–200°C … +450°C (most media) –200°C … +550°C (steam)
PH Value	0…14
Pressure	45 MPa

PRODUCT SPECIFICATIONS

Media	Steam, gases, alkalis, oils, acids*, oil, hydrocarbons
Certificates / Approvals	TA Luft, ISO 15848, API 622

*Exceptions: Strong oxidizing acids like sulphuric acid and nitric acid in high concentrations.

BENEFITS

- → High temperature and chemical resistance
- → Full compliance to latest fugitive emission regulations
- → Excellent sealing effect and constant elasticity
- → Good extrusion resistance at high pressures
- → Low compression force required due to optimized ring configuration

BPG 6559

PROPERTIES
This packing is braided from high-purity expanded graphite material (C-content >98%) and over-knitted with Inconel wire. It contains a special high-temperature impregnation and a corrosion inhibitor.

APPLICATIONS
This product is designed for use in valve applications.

OPERATION PARAMETERS

Speed	2 m/s
Temperature	–200°C … +450°C (most media) –200°C … +650°C (steam)
PH Value	0…14
Pressure	45 MPa

OPERATION PARAMETERS

Media	Steam, gases, alkalis, oils, acids*, oil, hydrocarbons
Certificates / Approvals	TA Luft, ISO 15848, API 622, API 589 (fire safe), Chevron and Texaco Test

*Exceptions: strongly oxidising acids like sulphuric acid and nitric acid in high concentrations

BENEFITS

→ **High pressure resistance**
→ **Quick repair for all valve dimensions**
→ **Excellent performance for fugitive emission and TA Luft valves**

BPG 7290

PROPERTIES
This packing is composed of braided end rings made of expanded pure graphite, reinforced with carbon yarn corners. It features high-density expanded graphite disks with a permeation barrier, uniquely impregnated high-density expanded graphite adapter rings, and a low-density expanded graphite sealing ring with a special friction-reducing coating.

APPLICATIONS
The product is designed for use in valve applications.

OPERATION PARAMETERS

Speed	2 m/s
Temperature	–200°C … +400°C (most media) –200°C … +550°C (steam)
PH Value	0…14
Pressure	30 MPa

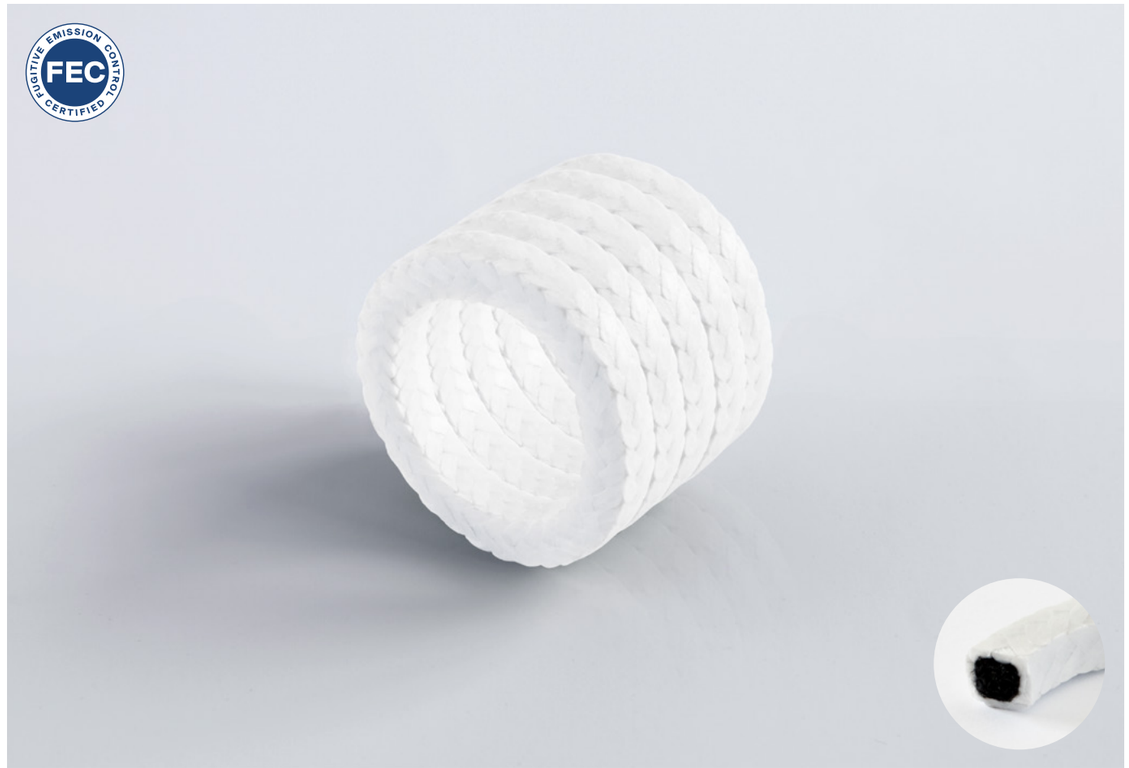
PRODUCT SPECIFICATIONS

Media	Steam, gases, alkalis, oils, acids*, oil, hydrocarbons
Certificates / Approvals	TA Luft, ISO 15848, API 622, API 589 (fire safe)

*Exceptions: strongly oxidising acids like sulphuric acid and nitric acid in high concentrations

BENEFITS

→ **Up to 80 % lower friction compared to standard sealing systems made of expanded graphite**
→ **Very low spindle torques at high temperature**
→ **Low compression required due to optimized force deflection**



BPG 6350

PROPERTIES
This packing features a carbon yarn core, concentrically over-braided with a dense PTFE yarn sleeve. It also contains a special impregnation to enhance its cross-sectional density.

APPLICATIONS
This product is designed for use in fugitive emission on/off and control valves. It is very flexible and retains sufficient gland pressure even after several temperature cycles without retightening, making it ideal for ISO 15848 qualification

OPERATION PARAMETERS

Speed	2 m/s
Temperature	−100°C … +280°C
PH Value	0 … 14
Pressure	30 MPa

PRODUCT SPECIFICATIONS

Media	Chemical resistance to all media, except molten alkali metals and elemental fluorine
Certificates / Approvals	TA Luft, ISO 15848, EU 10/2011

BENEFITS

- → **Very low leakage rates**
- → **Stays flexible even after temperature cycles**
- → **Good pressure and extrusion resistance**
- → **Low friction**
- → **Excellent gland pressure retention**

BPG 6225

PROPERTIES
This packing is a zebra braid made from aramid and PTFE yarns. It contains a special impregnation to enhance its cross-sectional density.

APPLICATIONS
This product is designed for use in fugitive emission valves. It can be used for quick repair service as an alternative to specialized TA Luft packing sets. Due to its low friction, it is also suitable for control valves. For ISO 15848 and frequent temperature cycling, live-loading of the gland bolts is recommended.

OPERATION PARAMETERS

Speed	2 m/s
Temperature	−100°C … +280°C
PH Value	0 … 14
Pressure	30 MPa

PRODUCT SPECIFICATIONS

Media	Chemical resistance to all media, except molten alkali metals and elemental fluorine
Certificates / Approvals	TA Luft, ISO 15848, EU 10/2011

BENEFITS

- → **Low leakage rates**
- → **Emission certification**
- → **Excellent extrusion resistance**
- → **Low leakage rates**
- → **Low friction**

LIVE LOADING

Live loading provides a constant load over the life of the FEC packing set, helping to maintain the lowest leakage levels. This greatly reduces or, in many applications, eliminates the need for packing box adjustments and reduces maintenance.

While many Burgmann Packings FEC products can be used without live loading systems without compromising performance, we recommend considering live loading for extreme service applications.

To get your customized live loading system, please reach out to the Burgmann Packings engineering team.

BPG 7900

PROPERTIES
The live loading system features a special arrangement of disc springs combined with a stainless steel protection sleeve.

APPLICATIONS
This product is used in agitators, mixers, valves (especially control valves), as well as in thermal cycling applications, critical nuclear services, and low emission services.

PRODUCT SPECIFICATIONS

Housing material	All common stainless steel materials incl. high temperature alloys
Spring material	51CrV4 (1.8159), other materials upon request

VARIATIONS

BPG 7910	consisting of sleeve, springs and bottom disc
BPG 7920	consisting of sleeve with inner thread and springs
BPG 7930	consisting of sleeve with inner thread, springs and bottom discs

INFLUENCE FACTORS

- → Pressure
- → Temperature
- → Medium
- → Sealing Set (compression rate)
- → Type of application (valve or mixer)
- → Dimensions (stuffing box, surrounding)
- → Compression Force (bolts, spring set)

BENEFITS

- → Defined compression by customised spring stack
- → Sleeve acts as protection for springs
- → Springs are guided by the sleeve and not by the bolts
- → Ideal compression easy to initiate by gap between sleeve and housing
- → Gap indicates constitution of packing set
- → Extended service life for FEC packing set

TECHNICAL INFORMATION

FUGITIVE EMISSIONMANAGEMENT
Burgmann Packings offers the complete range of low fugitive emission sealing products – for both new valves and retrofits. Especially when combined with an application specific live-loading system they achieve leakage rates which are consistently lower than those required by legislation. This is why our "Best Available Technology" (BAT) products are approved at leading end users and OEM manufacturers.

ENVIRONMENTAL PROTECTION
Valves, especially control valves, account for approximately 60 % of the leakage loss in a plant. For processes containing hazardous fluids conventional packings can be replaced with low emission sealing sets.

FUGITIVE EMISSION CONTROL SEALING TECHNOLOGY HELPS TO:
- Increase plant safety
- Protect our environment
- Increase plant efficiency and throughput
- Improve your bottom line
- Meet strictest emission standards worldwide

ISO 15848
ISO 15848 regulation describes measurement, test and qualification procedures for fugitive emissions at industrial valves.
The regulation is separated into 2 parts:
- ISO 15848-1: Classification system and qualification procedures for type testing of valves
- ISO 15848-2: Specifies production acceptance test of valves for valve manufacturer

TA LUFT
The German Fugitive Emission Control Legislation refers in TA LUFT regulation to DIN EN ISO 15848-1 for defining leakage rates, test and measuring methods.

FLANGE CONNECTIONS ACCORDING TO VDI 2200, VDI 2440 AND TA LUFT
According to TA LUFT and VDI 2440 flange connections must comply with maximum leakage rate of 10^{-4} mbar × l (s × m) at test pressure of 1 bar. VDI 2200 defines the selection, calculation, design and assembly of bolted flange connections as well as test procedures and refers to VDI 2440 regarding permissible leak rates. VDI 2200 also defines criteria for "Blow-out" safety test for gaskets. Aim of this Blow-out test is to avoid a sudden leakage through seal burst.

CLEAN AIR ACT
The Clean Air Act defines maximum leakage levels for flange connections, valves, pumps and agitators in the USA. Leakage test has to be done according to EPA Method 21 (sniffing method) with methane.

API 622
API 622, 3rd Edition is an international performance test for packing materials considering several factors such as temperature, pressure, thermal and mechanical cycling. 3rd Edition of API 622 defines 1510 mechanical cycles and 5 thermal cycles. High temperature test shall be performed from ambient temperature to 260°C (500 °F) and pressures from 0 to 600 psig (0 – 41 barg). Permissible leakage level is 100 ppm with test medium methane.

API 624
The second edition of API 624 provides type testing of rising stem valves equipped with graphite packing for fugitive emissions. The standard covers rising and rising-rotating stem valves up to 42" in diameter and must be performed on original valves. The test procedure requires 310 mechanical cycles and three thermal cycles to 260°C (500°F). The allowable leakage is a maximum of 100 ppm. It requires that the valve packing be previously tested according to API 622 and be suitable for use at service temperatures ranging from -29°C to +538°C (-20°F to 1000°F). Cryogenic testing is optional only.

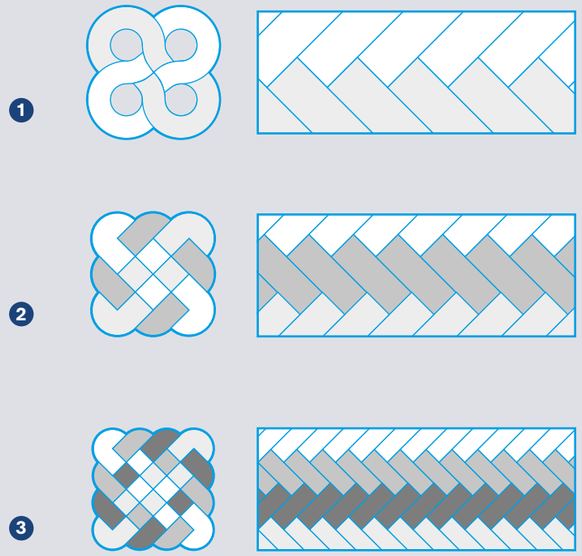
ISO 15848 CATEGORISES THREE TIGHTNESS CLASSES:

Class	Measured leakage rate	Remarks
A	≤ 10^{-5} mg / (s × m)	Typically achieved with bellow seals or equivalent spindle / shaft gasket system for swivel valves
B	≤ 10^{-4} mg / (s × m)	Typically achieved with packing system based on PTFE or elastomer materials
C	≤ 10^{-2} mg / (s × m)	Typically achieved with packing on flexible graphite basis

TA LUFT DEFINES FOLLOWING MAXIMUM LEAK RATES FOR HARMFUL VOC'S FOR VALVES:

Temperature Class	Temperature rate	Pressure	Measured leakage rate
LB	≤ 200°C	≤ 40 bar	≤ 10^{-4} mbar × l / (s × m)
LC	> 200°C	≤ 40 bar	≤ 10^{-2} mbar × l / (s × m)
LC	≤ 200°C	> 40 bar	≤ 10^{-2} mbar× l / (s × m)
LC	> 200°C	> 40 bar	≤ 10^{-2} mbar× l / (s × m)

BRAIDING TYPE



1 2-TRACK SQUARE BRAID (Double diagonal braid)
Coarse surface
Good elasticity
Used for smaller square packing up to a nominal size of 6 mm

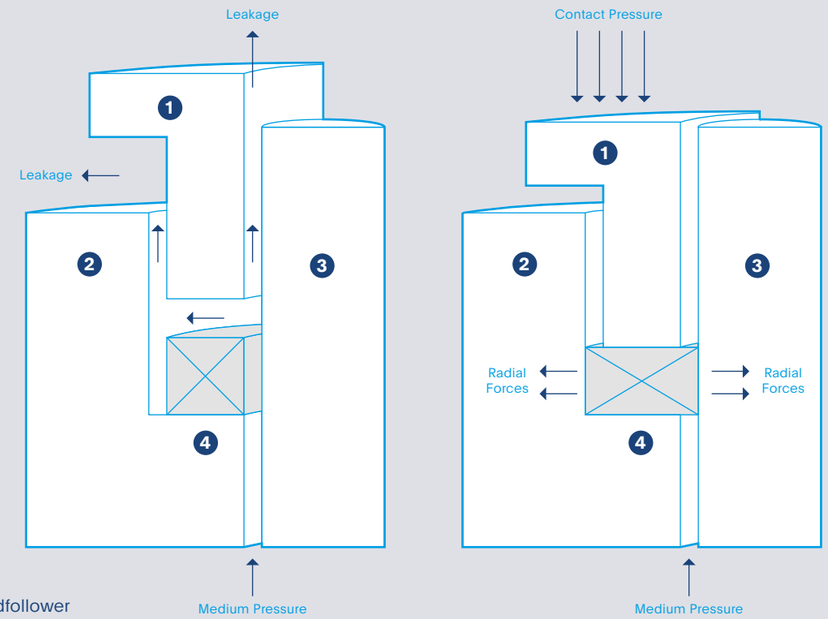
2 3-TRACK DIAGONAL BRAID (Interbraid / Cross-braid)
Good cross-sectional stability
Dense but flexible braiding structure
Nominal packing dimension between 5 and 12 mm

3 4-TRACK DIAGONAL BRAID (Interbraid / Cross-braid)
Smooth surface
Highly resistant to wear
high cross-sectional stability
Highly dense braid structure
Nominal packing dimension between 10 and 80 mm

4 CONCENTRIC BRAID (Braid-over-braid)
Fine, dense surface structure
Low mechanical resistance to wear
Rectangular or round shapes available

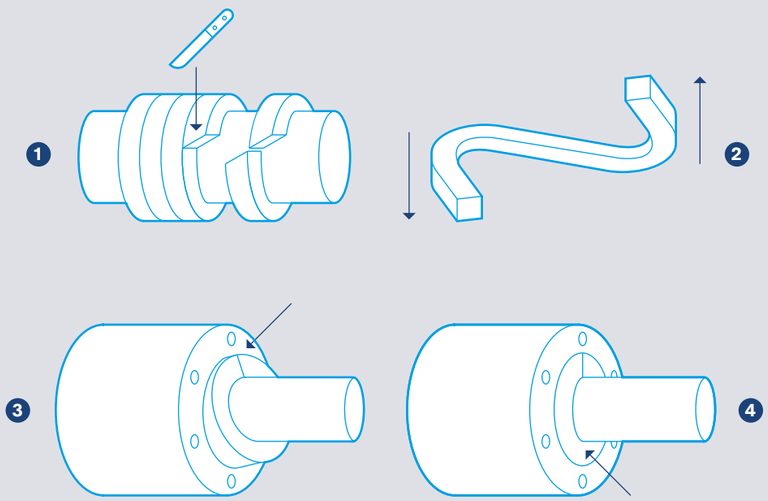
5 GRAPHITE RINGS (Rings or ring segments made of compressed graphite foil or expanded graphite material)
High cross-sectional density
Outstanding resistance to pressure, temperature and chemicals

COMPRESSION



1 Gland/Glandfollower
2 Housing
3 Spindle/Shaft
4 Packing

CUTTING AND INSTALLATION



1 Cutting packing at a 45° angle
2 First open axially, then radially
3 Introduce the joint end first
4 Insert the packing

API 641

The second edition of API 641 is one of three prevalent valve standards tests that evaluate fugitive emissions performance over an accelerated life cycle. Of the three, the API 641 Standard is the most stringent type test for quarter-turn valves, covering different designs, temperature ratings, and sealing components. To pass this critical test, valves must meet the demanding criteria of a maximum leakage of 100 ppmv while undergoing 610 cycles under extreme temperatures.

FUNDAMENTALS

Control of fluid loss is essential for the successful operation of mechanical equipment used in fluid handling. Various methods are utilized to control leakage at shafts, rods, valve stems, and other functional parts of equipment requiring containment of liquids or gases. One of the oldest, yet still most common and proven sealing solutions, is compression packing. Compression packings seal all types of fluids in valves, pumps, and other equipment in the process and service industries. Advancements in fiber and lubricant technology have enabled high performance of packings in a wide range of modern applications.

Made from relatively soft, pliant materials, compression or mechanical packings consist of a number of rings inserted into the stuffing box between the rotating shaft or reciprocating stem and the body of the pump or valve. Stuffing box packings are manufactured from yarns using braiding machines with various braiding types depending on dimension and packing type. The type and area of application define whether the packings are additionally manufactured with lubricants, fillers, and binding agents. Because compression packings are specifically engineered to solve each application in the broad range of fluid sealing, they are provided in a wide array of configurations, materials, and dimensions.

FUNCTION

By tightening a follower or packing gland against the top or outboard ring, pressure is transmitted to each individual packing ring, which expands the rings radially against the side of the stuffing box and the reciprocating stem or rotating shaft, effecting a seal. Additionally, the applied compressive force closes the internal structure of the packing ring material.

CONSTRUCTION

The square braid is formed when yarns, rovings, ribbons, and other various materials, either alone or in combination, are processed on equipment where strands pass over and under strands running in the same direction. Resulting packings are usually supplied in a square cross-section, but rectangular sizes can also be braided by this method. Depending on the braiding method, compression packings can have different mechanical properties such as density or flexibility.

AVAILABILITY

Packings can be supplied on KG-creels, as pre-cut meter lengths, or as pre-pressed/pre-formed rings (single or in ready-to-install sealing sets). Packings are available in standard sizes from 3 to 25 mm. Other shapes or sizes are available on request.

PACKING INSTALLATION

The ideal way to pack a stuffing box is with die-formed rings. Pre-cut lengths or self-cut lengths can also be used. When cutting lengths from a creel, a packing cutter can be used. By wrapping the cut packing around the shaft or spindle, the length can be checked for accuracy. Alternatively, the packing can be directly wound around the shaft from the creel and cut accordingly.

A diagonal cut produces a better sealing effect than a straight cut. When cutting packings that tend to fray, adhesive tape should be placed on the appropriate side of the area to be cut prior to cutting to prevent fraying. Install each ring into the stuffing box, ensuring the ends are placed together and inserted first, followed by the rest of the ring. The joints of the individual packing rings should be staggered by 90°. The packing set should initially be tightly compressed so that it will mold and seat itself into the stuffing box. The gland nut should then be loosened and retightened to an appropriate setting.

INSTALLING DIE-FORMED RINGS

Die-formed rings with exact dimensions should be handled with care to retain their advantages. If the rings need to be opened to fit onto the shaft, the ring ends should only be opened axially enough to fit over the shaft. Bending the ring radially deforms the ring and makes installation more difficult.

PRE-COMPRESSION OF PACKINGS

The correct compression of a packing set depends on the type of packing and application. If a torque wrench or a similar tool is available, the necessary gland pressure can be adjusted precisely.

PRE-COMPRESSION FOR PUMPS

Pump packings should be compressed with a gland pressure of 1.05 to 2 times the media pressure. A minimum compression of 0.5 to 1.5 MPa is necessary.

PRE-COMPRESSION FOR VALVES

Valve packings should be compressed with a gland pressure of 2 to 5 times the media pressure. A minimum compression of 5 MPa is necessary.

"RUNNING-IN" OF NEW PACKINGS

Pump packings are particularly susceptible to damage from high temperatures during the run-in period. If the packing runs dry, it will get too hot, and the pump must be stopped. After a short cooling period, a regular leakage drip should appear, and the pump can be restarted. This procedure may need to be repeated several times until regular leakage appears.

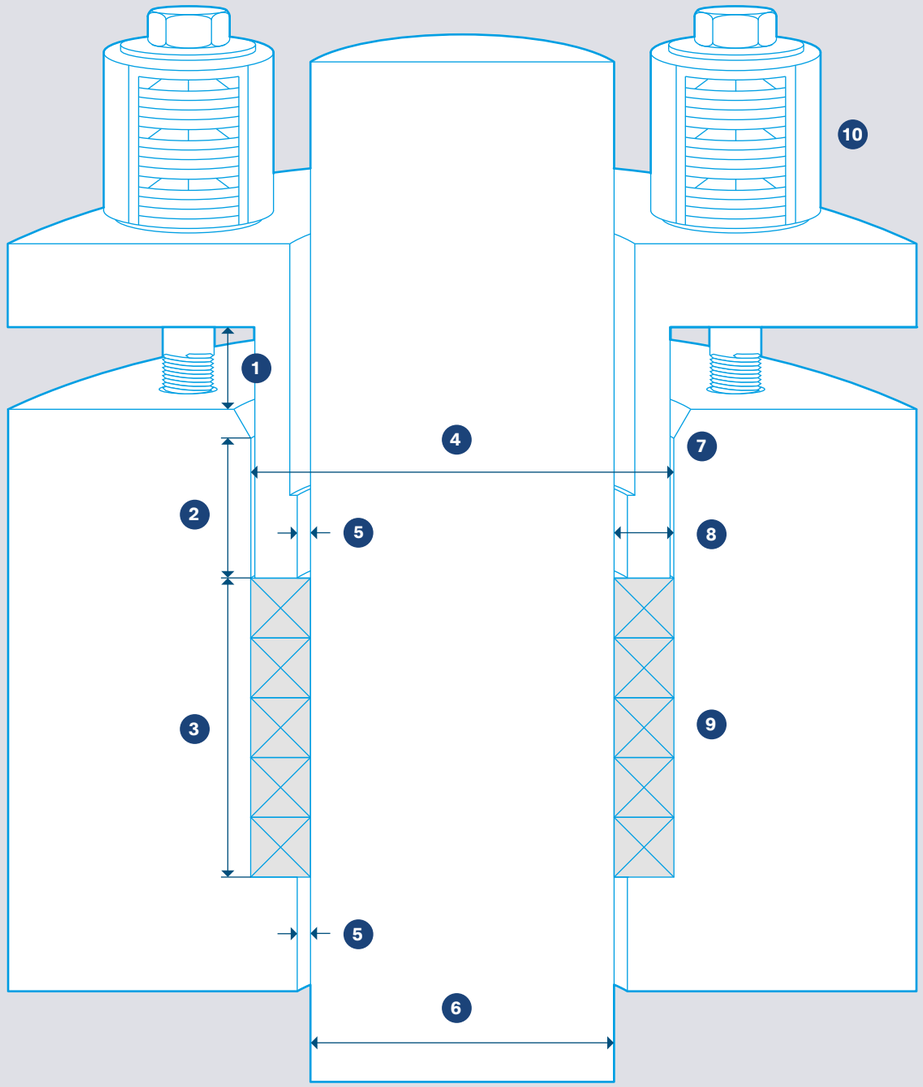
RECOMMENDED SURFACE

We recommend a surface roughness of Rz < 1.6 µm. For increased sealing effect and longer service life, it can be reduced to Rz < 0.6 µm. The permissible eccentricity on centrifugal pumps should be less than 0.001 of the shaft diameter. To reduce leakage, the eccentricity must not exceed 0.01 of the packing width. The permissible extrusion gaps between the shaft and gland or housing are 0.02 of the packing section. If the gaps are larger or the packing tends to extrude, suitable anti-extrusion rings should be fitted.

PACKING SIZE AND WEIGHT

Packing size	Weight
≤ 6.4 mm	1 kg / creel
7 – 10 mm	2 kg / creel
11 – 12.7 mm	3 kg / creel
14 – 24 mm	5 kg / creel
≥ 25 mm	10 kg / creel

STUFFING BOX DETAILS



1 Adjustment travel for gland 20 % to 30 % of packing set height
2 Min. insert depth for gland 0.5 × packing width
3 Packing set height
4 Housing diameter
5 Clearance max. 0.02 × packing width
6 Stem / Shaft diameter
7 Chamfer 2 × 30°
8 Packing width
9 Stuffing box packing
10 Live Loading sytem

CERTIFICATES AND APPROVALS

With all our products, we aim to provide the best sealing solutions. We strive to meet customer requirements in safety, reliability, performance, and optimized life-cycle costs.

Our engineers work in close partnership with key stakeholders in end-user plants and the OEM segment to find reliable solutions for increased uptime requirements and extended service intervals.

Top performance and product safety have always been our most important benchmarks. We accept no compromises. The quality and reliability that have always characterised our company made our outstanding market position possible. Visit our website for more information.

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KEY BENEFITS OF FUGITIVE EMISSION CONTROL PACKINGS

1 INCREASE PLANT SAFETY

2 PROTECT OUR ENVIRONMENT

3 COMPLIANCE WITH STRICTEST EMISSION STANDARDS WORLD-WIDE

4 INCREASE PLANT EFFICIENCY

5 IMPROVE YOUR BOTTOM LINE

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