

Low fugitive emission valve solutions



The installation of high quality products to control volatile emissions and the associated monitoring systems along with comprehensive training create the ideal conditions for optimizing your production equipment.

Plant operators now have to work extremely hard to meet the growing environmental protection regulations around the world. The compliance with these regulations can not only have a direct impact on the production process but also on overall plant profitability.

The challenges facing processing industry go far beyond the usual production and business issues. There are increasing demands worldwide to the effect that industry should not only limit but actually reduce the environmental impact of its activities over the long term.

These demands have now been translated into a whole series of environmental protection laws which have a significant effect on industry. In Europe, implementation of the IPPC directive and the introduction of the ISO 15848 standard for valve leakage levels make it imperative that all processing systems comply with extremely stringent emission limits. Similar standards such as API 622 and the TA-Luft directive in Germany have also created the need for low leakage sealing systems for valves and equipment connections.

Plant operators will have to comply with these new regulations and provide evidence on a regular basis that their systems are compliant at all times. Process plants must use the best possible practices and significant penalties can be imposed for non-compliance.

As one of the world's leading sealing companies, EagleBurgmann has a range of products which can meet these new laws without putting pressure on the maintenance budget.

Better performance

State-of-the-art seal technology can limit the potential release of product to the atmosphere. More reliable seal systems might appear to be more expensive, but when the quality is right and proper maintenance is performed, the replacement intervals become significantly lower. EagleBurgmann offers its BuraTAL sealing products for valves and flanges which meet the most stringent volatile emission regulations.



Greater efficiency

Reliable BuraTAL sealing sets reduce stoppages and downtime. They are designed to minimize spindle and shaft friction. This increases service life and reduces power losses in valve actuators.

Lower emissions

All BuraTAL packing sets have been proven to comply with current emission regulations (e.g. TA-Luft, ISO 15848, API 622) and ensure conformance of the process equipment.



Low fugitive emission valve solutions



BuraTAL HT 9650/HT

BuraTAL HT is a completely new design of packing set developed for upgrading valves to fugitive emission standards. It achieves this sealing adaptability through the following components:

- Braided end rings of expanded pure graphite with reinforced corners of carbon fiber yarn.
- Sealing rings of expanded pure graphite, with very high density to maintain cross-sectional tightness under load.
- Especially impregnated adapter rings of very dense expanded pure graphite
- Inner sealing ring of lower density, of expanded pure graphite, treated with a friction reducing coating.

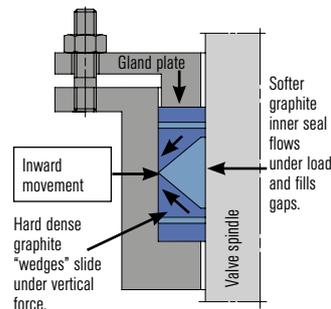
BuraTAL HT is the universal sealing set for valves. Thanks to its extremely ingenious design and shape this set fulfills the IPPC Directive and TA-Luft standard even at high temperatures. Because of the special material selection combined with the unique geometric design this set achieves very low spindle torques at high temperatures even with temperature cycling.

BuraTAL HT can achieve the TA-Luft leakage requirements without live-loading across a wide range of applications. It is an ideal set for upgrading existing valves to fugitive emission standards because of its ability to seal worn and over-size stuffing boxes and spindles.

Range of applications

Valve sealing kit – for high pressures and temperatures, particularly in TA-Luft applications, for standardization without live-loading. Universal kit for use in all valve applications, such as the processing, chemical, petrochemical and mineral oil (refineries) industries.

Gland compressed



BuraTAL-Flex 6070

The BuraTAL-Flex 6070 is a graphite-based high-efficiency packing whose innovative multi-layer structure guarantees the requirements regarding tightness and flexibility in the most difficult of applications. The multi-layer structure combines the advantages of the greatest possible gap bridging due to the interior Inconel® wire reinforcement and the protection of the high-quality spindle surfaces in the valves at the same time.

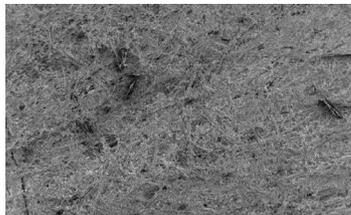
The BuraTAL-Flex 6070 is manufactured of highly purified expanded graphite yarns. The purity is >99 %. In combination with a newly developed high-temperature impregnation, the packing complies with the strict leakage threshold values in accordance with ISO 15848 and TA-Luft (Technical Instructions on Air Quality Control). For long-term stable use in the high temperature range, the packing is additionally processed with a corrosion inhibitor. The BuraTAL-Flex 6070 is a high-efficiency packing which can be installed without special end rings.

Apart from compliance with the European emission directives, the BuraTAL-Flex 6070 was not only certified in accordance with the API 622 directive but also in accordance with the stricter requirements of Chevron Texaco (5,000 spindle strokes with 10 temperature cycles). Usage in areas in accordance with Fire-Safe API 589 was demonstrated by a test at the Yarmouth Institute. These properties make the BuraTAL-Flex 6070 the ideal solution for end users and valve service companies.

Parameter	Equipment	BuraTAL HT 9650/HT	BuraTAL-Flex 6070
Pressure p (bar)	Pumps		
	Valves	300 (80 – TA-Luft)	450
	Plunger pumps		
Sliding velocity v _s (m/s)	Mixers, agitators, kneaders, filters		
	Pumps		
	Valves	2	2
Temperature (°C)	Plunger pumps		
	Mixers, agitators, kneaders, filters		
		-200 °C ... +400 °C Steam: +550 °C	-200 °C ... +450 °C, Steam: 650 °C
pH range		0 ... 14	1 ... 14
Application		Valves	Valves
Variants		9650/HTB (with live-loading set)	
Media resistance		Resistant to most chemicals (solvents, hydrocarbons, acids, alkalis), steam, alcohols, oils, water, etc.	Hot water, steam, gases, oils, acids and alkalis. Exceptions: Strongly oxidizing acids as sulphuric acid and nitric acid in higher concentration.
Approvals & Certification		TA-Luft certified by MPA Stuttgart including testing at 400 °C, 40 bar, and 1,000 cycles – No live-loading. API 622, API 589 (Fire safe).	ISO 15848, Fire safe acc. to API 589, Leakage test acc. to API 622, Leakage test acc. to Chevron Texaco Testcert, TA-Luft.
Supply	Form	Customised sealing set with or without live-loading system.	Supplied by the meter
	Stock sizes, mm (other sizes available on request)	Made to order	

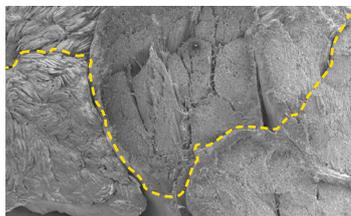
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BuraTAL T.. is an unique range of packing sets made from patented non-woven technology to provide a flexible, low friction, hard wearing sealing set for process and control valve applications. This technology combines dimensional stability, cross-sectional impermeability and low friction in a unique way.



Non-woven fiber matrix

- No leakage paths
- Interlocking, multi-directional fibers prevent cold flow of PTFE impregnation



Conventional braided PTFE packings

- Visible leakage paths between the fibers
- PTFE is prone to cold flow and this leads to gap extrusion and insufficient elasticity



BuraTAL T3 9650/T3

Made from 2 end rings of non-woven carbon fiber impregnated with graphite/PTFE. The middle rings are made from aramid non-woven material with PTFE impregnation. This set shows very good performance under temperature cycling over a wide temperature range. Low gap extrusion and reduced cold flow complete its excellent properties.

Range of applications

For universal use in all valves in the chemical and processing industries. Especially suitable where high gas sealing performance with low friction is required, particularly in control valves.



BuraTAL T4 9650/T4

Made from 2 rings on the atmospheric side of non-woven carbon fiber impregnated with graphite/PTFE. The product-side rings are made from aramid non-woven material with PTFE impregnation.

Range of applications

For universal use in all valves in the chemical and processing industries that demand total elimination of impurities from the media. Especially suitable where high gas sealing performance with low friction is required, particularly in control valves.



BuraTAL T5 9650/T5

Made of 4 (or 5) rings of aramid non-woven material with pure PTFE impregnation with high cross-sectional stability. Ideal for control valves requiring extremely low friction and maximum sealing performance.

Range of applications

Particularly suitable for use in control valves where white packings with the lowest friction and absolute minimal leakage rates are required, such as TA-Luft applications. For universal use in all valves in the chemical and processing industries. Especially suitable where high gas sealing performance with low friction is required.

Parameter	Equipment	BuraTAL T3 9650/T3	BuraTAL T4 9650/T4	BuraTAL T5 9650/T5
Pressure p (bar)	Pumps	250 max. 30 – TA-Luft, no live-loading 63 – TA-Luft with live-loading	250 max. 30 – TA-Luft, no live-loading 63 – TA-Luft with live-loading	250 max. 30 – TA-Luft with live-loading
	Valves			
	Plunger pumps			
	Fans			
Sliding velocity v_s (m/s)	Mixers, agitators, kneaders, filters	2	2	2
	Pumps			
	Valves			
	Plunger pumps			
Temperature (°C)	Fans	-50 °C ... +250 °C	-50 °C ... +250 °C	-200 °C ... +250 °C
	Mixers, agitators, kneaders, filters			
pH range		1 ... 13	1 ... 14	1 ... 14
Application		Valves	Valves	Valves
Variants		9650/T3B (with live-loading)	9650/T4B (with live-loading)	9650/T5B (with live-loading)
Media resistance		Resistant to all media except strongly oxidising media like hot sulphuric or nitric acid.	Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.	Universal chemical resistance, except strongly oxidising media like oleum, fuming nitric acid, gaseous fluorine, and molten alkali metals.
Approvals & Certification		TA-Luft cert. by MPA Stuttgart: <250 °C, 30 bar/1,000 cycles <250 °C, 40 bar/2,000 cycles (with live-loading) with live-loading in-house certified: <250 °C, 63 bar/1,000 cycles <250 °C, 40 bar/100,000 cycles	TA-Luft cert. by MPA Stuttgart: <250 °C, 30 bar/1,000 cycles In-house: <250 °C, 40 bar/1,000 cycles	In-house: <250 °C, 40 bar/1,000 cycles
Supply	Form	Customised sealing sets made from endless or split, pre-compressed rings with and without live-loading.	Customised sealing sets made from endless or split, pre-compressed rings with and without live-loading.	Customised sealing sets made from endless or split, pre-compressed rings with and without live-loading.
	Stock sizes, mm (other sizes available on request)	Made to order	Made to order	Made to order

FUGITIVE EMISSION STANDARDS

ISO 15848

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

TA-LUFT (VDI 2440)

The German Fugitive Emission Control Legislation refers in TA-Luft regulation to VDI 2440 for defining leakage rates, test and measuring methods.

FLANGE CONNECTIONS

According to TA-Luft and VDI 2440 flange connections must comply with maximum leakage rate of $10 \cdot \text{mbar} \times l$ ($s \times m$) 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, 2nd Edition is an international performance test for packing materials considering several factors such as temperature, pressure, thermal and mechanical cycling. 2nd 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

First edition of API 624 is a type testing of rising stem valves equipped with graphite packing for Fugitive Emissions. The standard covers rising and rising-rotating stem valves up to 24" diameter and has to be performed at original valves. The test procedure requires 310 mechanical cycles and three thermal cycles to 260°C (500 °F). Allowable leakage is 100 ppm maximum. It requires that the tested valve packing be previously tested according to API 622 and be suitable for use at service temperatures –29°C to +538°C (–20 °F to 1000 °F).

ISO 15848 TIGHTNESS CLASSES

Grade	Measured leakage rate	Remarks
A (Helium only)	$\leq 10 \cdot \text{mg} / (s \times m)$	Typically achieved with bellow seals or equivalent spindle / shaft gasket system for swivel valves
B	$\leq 10 \cdot \text{mg} / (s \times m)$	Typically achieved with packing system based on PTFE or elastomer materials
C	$\leq 10 \cdot \text{mg} / (s \times m)$	Typically achieved with packing on flexible graphite basis

MAXIMUM LEAK RATES ACCORDING TO VDI 2440*

Temperature rate	Measured leakage rate
< 250°C	$\leq 10 \cdot \text{mbar} \times l / (s \times m)$
$\geq 250^\circ\text{C}$	$\leq 10 \cdot \text{mbar} \times l / (s \times m)$

*for harmful VOC's (Volatile Organic Compounds) for valves