Tensograph

ART OF SEALING

Art of sealing

UNICHIMTEK
GROUP
OF COMPANIES

Group of companies UNICHIMTEK — one of the world leaders in the field of industrial graphite technologies

UNICHIMTEK
GROUP
OF COMPANIES

Table of contents

UNICHIMTEK
GROUP
OF COMPANIES

GROUP OF COMPANIES UNICHIMTEK HOLDS A LEADING POSITION IN MARKET OF SEALING EQUIPMENT

ABOUT COMPANY

UNICHIMTEK was founded in 1990 on the basis of the branch scientific-research laboratory at the Moscow State University, where intercalated graphite compounds were studied.

Thanks to the introduction of fundamental scientific developments results into industry, specialists of UNICHIMTEK were the first and only in Russia who implemented a full technological cycle of processing natural graphite from its purification to serial production of wide nomenclature of sealing materials **Tensograph®**.

Today, the trade mark **Tensograph®** is widely known to Russian and worldwide partners and often used in product designation based on intercalated graphite compounds in general.

All types of flange and gland seals, as well as mechanical seals **Tensograph®** guarantee reliable sealing connections of pumps, fittings, pipelines, vessels and devices with a diameter up to 4 meters at high pressures and temperatures, in aggressive environments and high shaft rotation speeds.

In the manufacturing process of **Tensograph®** products careful attention is paid to the finest details at all stages of production. Therefore, solutions proposed by UNICHIMTEK specialists become the embodiment of uniqueness, reliability and quality.

Qualified staff and long-term experience allow to proposing customers individual sealing solutions which become market standards over time.

SEALING PRODUCTS TENSOGRAPH® IS A GUARANTEE OF FAIL-SAFE EQUIPMENT OPERATION OF ANY LEVEL OF COMPLEXITY.

PRODUCTION

Group of companies UNICHIMTEK is the only one producer in Russia having a full cycle of sealing materials and products manufacturing, from natural graphite processing and production of graphite foil to automated production of wide range of end products according to Russian and international standards, as well customer's drawings.

Original technologies for obtaining oxidised and expanded graphite allow producing graphite foil free of corrosive impurities that meets the highest standards of atomic industry requirements.

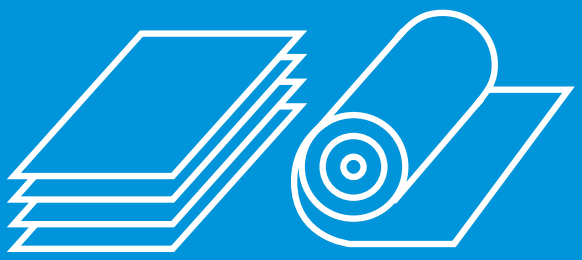
Located in Moscow Region UNICHIMTEK production site is equipped with diverse modern automated machines for production of all types of gland, flange and mechanical seals.

Quality control plays a key role at all stages of development and manufacturing of product line **Tensograph®**.

UNICHIMTEK R&D department is equipped with test rigs that allow controlling all necessary parameters of raw materials, intermediate and end products.

Annual production volume of group of companies UNICHIMTEK is **300 000** of sealing products with total weight over **800 tons**

01 Sealing materials



Product portfolio of sealing materials Tensograph® includes expanded graphite foils and sheets which are available in many grades and designed to offer sealing solutions for various industrial applications.

GRAPHITE FOIL TENSOGRAPH®

Product portfolio of **Tensograph®** graphite foils is aimed to cover all range of requirements starting from basic industrial needs and up to demanding nuclear or high-temperature applications.

Industrial grades offer highly reliable and feasible solution whereas high spec grades are suitable for oxidising, corrosive and high-temperature conditions as well as nuclear norms.

APPLICATIONS

- Production of graphite seals such as SWG, kammprofile and corrugated gaskets, braided packings and rings for stuffing boxes;
- Power generation, chemical, oil and gas industries;
- Oxidising and corrosive medias (Tensograph® C);
- Nuclear industry (Tensograph® D).

OPERATING RANGE

- Temperature range from -195 °C up to 450 °C (in water steam - 650 °C).

MAIN FEATURES AND PROPERTIES

- Compliance to MESC 85/203 and EN 14772 §6.7 (Tensograph® C);
- High purity: > 99,5 % or > 99,85 % of carbon content;
- No corrosion;
- Low sulfur content;
- No aging effect – suitable for long-term applications;
- High tensile strength grade (5,0 MPa) for high-volume production.

AVAILABLE OPTIONS OF GRAPHITE FOIL TENSOGRAPH®

Parameter	Grade B Industrial	Grade G High-purity	Grade D Nuclear	Grade C Anti-oxidation and anti-corrosion
Carbon, %	> 98,0	> 99,5	> 99,85	> 99,5*
Ash, %	< 2,0	< 0,5	< 0,15	< 0,5
Sulfur, ppm	< 200	< 100	< 50	< 100
Chlorine**, ppm	< 100	< 50	< 10	< 50
Fluorine**, ppm	< 10	< 10	< 10	< 10
Total halogens (Cl+F+Br)** , ppm	< 200	< 200	< 100	< 200
Tensile strength, MPa	> 3,5	> 4,0	> 5,0	> 5,0
Compressibility, %	> 35	> 35	> 45	> 45
Recoverability, %	> 7	> 7	> 8	> 8
Oxidation and corrosion inhibitor	-	-	-	yes
Weight loss (670 °C), %/h	-	-	-	< 4
Compliance to special requirements	-	BAM; ASTM F2168 class 2 (B)	PMUC norms; GS RC PVE 011; BAM; ASTM F2168 class 2 (B)	MESC 85/203; EN 14772 §6.7; ASTM F2168 class 2 (A)

* according to ASTM F2168 §13.4

** leachable

FORMS OF SUPPLY TENSOGRAPH® GRAPHITE FOIL

Name	Value
Form	Rolls, tapes, corrugated sticky tapes
Width of rolls, mm	500 / 600 / 1000 / 1500
Thickness, mm	0,2 – 0,8
Length of winding, m	50 / 75 / 100
Available density, g/cm^3	0,7 – 1,3

GRAPHITE SHEETS TENSOGRAPH®

Tensograph® sheets are manufactured using whole range of UNICHIMTEK`s graphite foils followed by further processing with reinforcing insert. Sheets provide great chemical resistance, high elasticity and thermal stability. Depending on the application either tanged, plain or no insert could be recommended.

OPERATING RANGE

- Temperature range from -195 °C up to 450 °C (in water steam - 650 °C).

SELECTION GUIDE

Tensograph® G-P1

- Number of inserts
- Type of insert
- Grade of graphite

APPLICATIONS

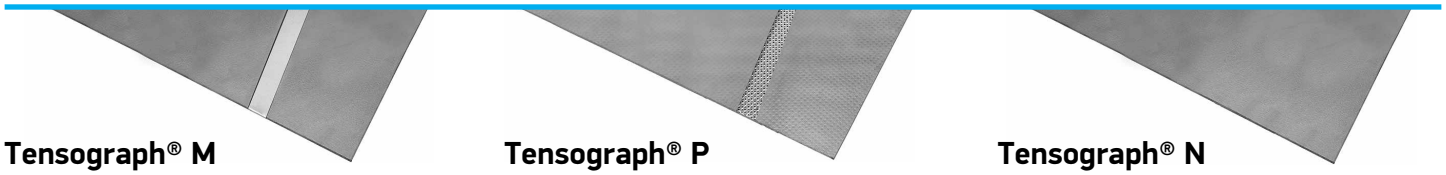
- Power generation, petro-chemical, oil and gas industries;
- High-temperature and chemical equipment.

MAIN FEATURES AND PROPERTIES

- Great chemical and thermal resistance;
- High recovery and compressibility;
- Low sulfur content;
- Suitable for oxidising and corrosive medias (Tensograph®C);
- Blow-out safety;
- Low leakage (conformity to DIN 3535-6);
- Anti-sticking properties in accordance with ASTM F607.
- Fire-safety approved (API Specification 6FB).

FORMS OF SUPPLY TENSOGRAPH® GRAPHITE SHEETS

Parameter		Tensograph® M	Tensograph® P	Tensograph® N
Thickness, mm	1-layer	1-3	1-4	0,5-2
	2-layers	3-5	3-6	-
Dimensions, mm		1000 x 1000/1500 x 1500/2000 x 1500		
Material for inserts, mm		Steel AISI 316L (0,05 / 0,1)	Steel AISI 316L (0,1)	-
Available grades of graphite		Tensograph® B; G; D; C		



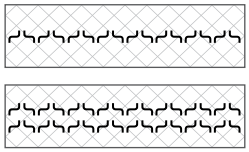
Tensograph® M

M1

M2

Plain steel insert

Tensograph® P



P1

P2

Tanged steel insert

Tensograph® N

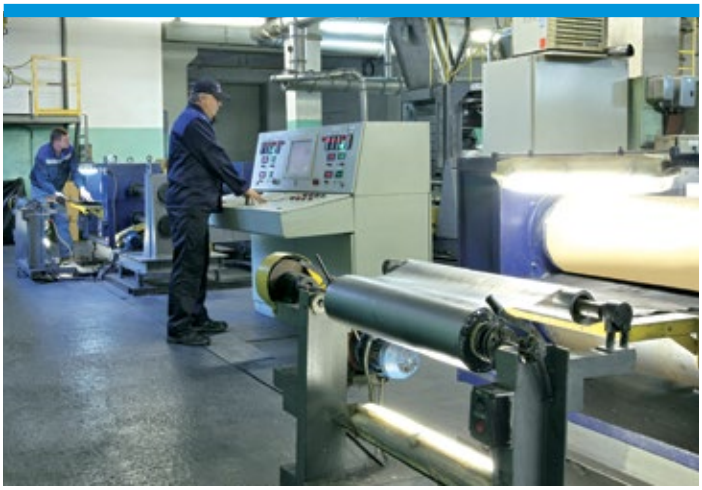
Non-reinforced

AVAILABLE OPTIONS OF GRAPHITE FOIL TENSOGRAPH®

Parameter	Grade B Industrial	Grade G High-purity	Grade D Nuclear	Grade C Anti-oxidation and anti-corrosion
Carbon, %	> 98,0	> 99,5	> 99,85	> 99,5*
Ash, %	< 2,0	< 0,5	< 0,15	< 0,5
Sulfur, ppm	< 200	< 100	< 50	< 100
Chlorine**, ppm	< 100	< 50	< 10	< 50
Fluorine**, ppm	< 10	< 10	< 10	< 10
Total halogens (Cl+F+Br)** , ppm	< 200	< 200	< 100	< 200
Tensile strength, MPa	> 3,5	> 4,0	> 5,0	> 5,0
Compressibility, %	> 35	> 35	> 45	> 45
Recoverability, %	> 7	> 7	> 8	> 8
Oxidation and corrosion inhibitor	-	-	-	yes
Weight loss (670 °C), %/h	-	-	-	< 4
Compliance to special requirements	-	BAM; ASTM F2168 class 2 (B)	PMUC norms; GS RC PVE 011; BAM; ASTM F2168 class 2 (B)	MESC 85/203; EN 14772 §6.7; ASTM F2168 class 2 (A)

* according to ASTM F2168 §13.4
** leachable

GRAPHITE FOIL TENSOGRAPH® S



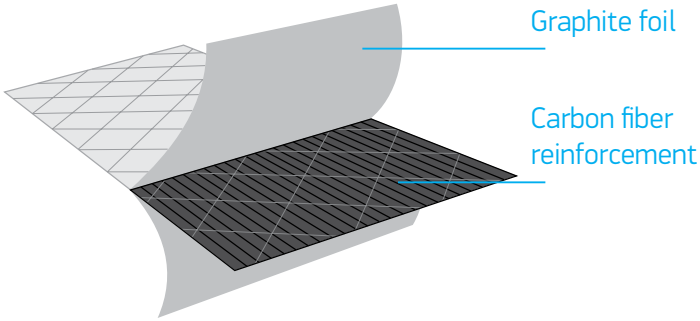
Product by patented technology of UNICHIMTEK ultra-strong graphite foil with reinforcement of continuous carbon fibers. **Tensograph® S** has exceptional tensile strength which is more than 20 times higher than standard grade graphite foils.

FIELD OF APPLICATIONS

- Best solution for high temperatures and maximal pressures;
- Good alternative for graphite and carbon fiber packings;
- Oil and gas industry;
- Valves.

MAIN FEATURES AND PROPERTIES

- High tensile strength;
- No sulfur;
- Extended pressure/temperature range;
- Efficient heat dissipation ;
- No break of the ring at compression;
- Rings could be used in worn-out stuffing boxes.



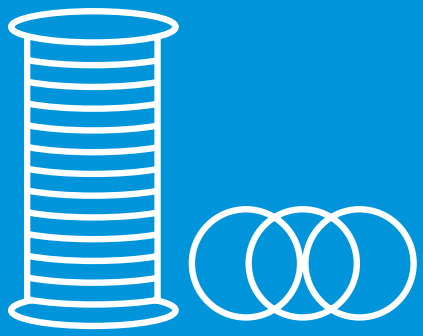
TYPICAL PROPERTIES OF TENSOGRAPH® S

Parameter	Value
Tensile strength, MPa	> 80
Compressibility, %	> 35
Recovery, %	> 7
Density, g/cm^3	0,8 – 1,4
Thickness, mm	0,2 – 1,0
Carbon content, %	98
Sulfur content, ppm	< 200
Width, mm	600

Tensograph® S allows to produce highly efficient and compression-resistant die molded rings. These rings are to be used in extreme conditions such as high temperatures and pressures thanks to unique elastic response which allows to uniform distribution of tension.

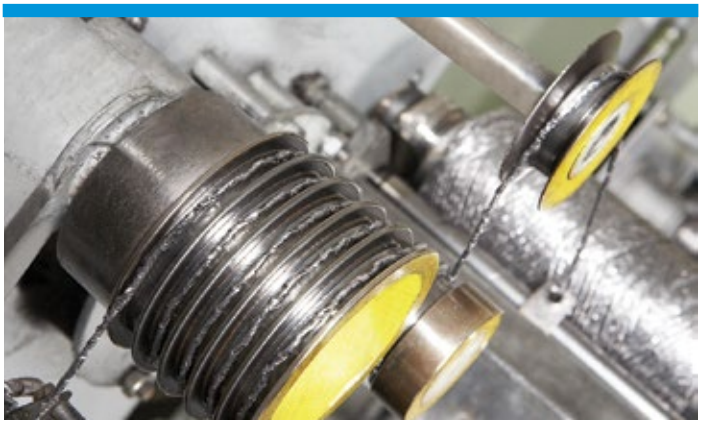
Reliable performance of braided packings H 1600 made of **Tensograph® S** makes possible its exploitation in extreme conditions which is a result of combination of excellent heat dissipation and anti-friction properties of expanded graphite and ultimate strength of carbon fibers.

02 Gland sealings



Braided packings, graphite rings and stuffing box kits Tensograph® are suitable for use in valves and pumps in many industries including chemical plant and chemical processing, gas plant, petrochemical plant, power stations, refineries.

GRAPHITE YARNS TENSOGRAPH®



Graphite yarns **Tensograph®** are manufactured from graphite foil with usage of various reinforcing materials such as natural cotton, glass fibers, stainless steel, inconel and carbon fibers and characterized by high purity, low sulfur and chlorine content.

The finished product retains all the inherent benefits of flexible graphite: heat resistance, chemical inertness, low friction and self lubrication.

Parameter	Tensograph CT graphite + natural cotton reinforcement	Tensograph GL graphite + glass reinforcement	Tensograph M graphite + steel reinforcement	Tensograph MI graphite + inconel reinforcement	Tensograph CF graphite + carbon fibers reinforcement
Density, kTex	3.2, 3.8, 5.5, 11 intermediate values available				
Weight tolerance, %	±10				
Strength, MPa	9	20	20	20	80
Ignition loss[1], %	< 11	< 5	< 5	< 5	< 8
Temperature range,°C	-200 up to +160 (+300 [2])	-200 up to +450 (+600 [2])	-200 up to +450 [3] (+650 [2])	-200 up to +450 [3] (+650 [2])	-200 up to +450 [3] (+650 [2])
PH	4-11	0-14	1-14	1-14	1-14
Carbon, %	> 89 (99,5 [4])	> 87 (99,5 [4])	> 85 (99,5 [4])	> 85 (99,5 [4])	> 90 (99,5 [4])
Ash, %	0,2-0,5	6-8	9-11	9-11	0,5
Sulfur, ppm	< 100				< 200
Chlorine, ppm	< 50				

1. For non inhibited graphite (300 °C)
2. In steam
3. Maximum temperature of inhibited yarn Tensograph® M, MI and CF is +525 °C
4. Initial purity of graphite foil Tensograph® grade G, other grades are available on request

UNICHIMTEK GROUP OF COMPANIES

GRAPHITE BASED BRAIDED PACKINGS TENSOGRAPH®

UNICHIMTEK produces variety of graphite-based braided packings made of graphite yarns **Tensograph®** which are characterized by high carbon content, low sulfur and chlorine content.

Graphite yarns are manufactured with usage of different reinforcing materials such as natural cotton, glass fibers, stainless steel, high temperature synthetic fibers and carbon fibers. Due to its thermal and chemical resistance (most of mineral acids and solvents), self-lubrication, low coefficient of friction, anisotropy and remarkable thermal conductivity graphite packings **Tensograph®** offer perfect solution for high temperature and pressure applications securing long life of a shaft.

ANTI-CORROSION TREATMENT CAN BE APPLIED ON DEMAND.

Name	General material	Recommend-ed media	Application	pH range	max. pressure, MPa	max. temp, °C	max. velocity of sliding, m/s	Features
H 1100	Graphite yarn with cotton reinforcement	water steam low concentrate acids petrochemical solvents salt solutions	Valves Centrifugal pumps Piston pumps	4-11	8 (35*) 2 8 (35*)	up to +160 (up to +300 °C - steam)	2 20 2	Very gentle to shaft
H 1200	Graphite yarn with glass fiber reinforcement		Valves Centrifugal pumps Piston pumps	0-14	8 (50*) 2 8 (50*)	up to +450 (up to +600 °C - steam)	2 15 2	Great chemical and thermal resistance
H 1300	Graphite yarn with steel or inconel reinforcement		Valves only	1-14	50	up to +450 (up to +600 °C - steam)	2	High pressure application
H 1400	Graphite yarn with high temperature synthetic fiber reinforcement		Valves Centrifugal pumps Piston pumps	0-14	20 3 20	up to +380	2 20 2	Gentle to shaft, thermally and chemically stable
H 1600	Graphite yarn with carbon fibers reinforcement		Valves Centrifugal pumps Piston pumps	1-14	40 3 40	up to +450	2 15 2	Extreme applica-tions, resistant to cycling and high temperatures, gentle to shaft

* - only for pre-pressed rings

GRAPHITE RINGS TENSOGRAPH®

More than
1000
sizes of graphite rings

Graphite rings are manufactured of **Tensograph®** graphite foil and resistant to almost all organic and inorganic acids, alkalis, oils and solvents and will be a perfect solution for sealing of valves and pumps serving best as intermediate sealing rings in set.

GR-F

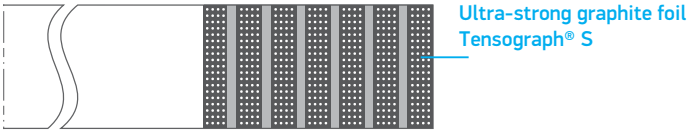
Our rings have uniform density distribution, high purity and elasticity, no sulfur and ash particles which leads to very gentle treatment of shaft and lack of corrosion. According to a request, rings can be manufactured with any standard and custom size and of both standard and nuclear grades of graphite.

On customers demand, UNICHIMTEK's qualified engineers will determine right combination of over 20 items of packings and graphite rings to provide secure sealing of valve, circulating and piston pumps.

GR-A

GR-A is manufactured of **Tensograph® S** – unique UNICHIMTEK's ultra strong graphite foil reinforced with continuous carbon fibers. This technology allows to produce high-strength graphite rings which are aimed for exploitation in extreme conditions and at the same time being gentle to shaft. Unique elastic response and recovery properties of these rings gives a remarkable spring-like effect.

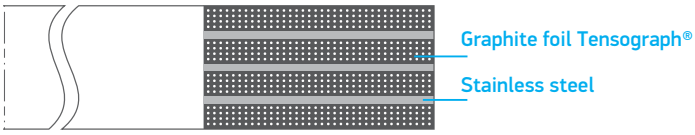
GR-A rings are a perfect solution not only for extreme conditions but can also be used in worn-out stuffing boxes filling all imperfections of stuffing box.



GR-S

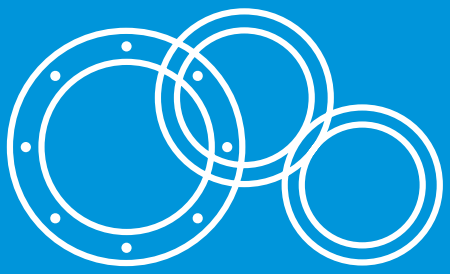
GR-S is manufactured of **Tensograph®** – ultra-pure graphite foil with horizontal inserts of stainless steel which are inside graphite and have no contact with metallic construction of shaft.

These rings are aimed for high-speed applications due to significant heat release in horizontal direction.



Special anti-adhesive and anti-friction treatments might be applied to achieve desired characteristics of a customer.

03 Flange sealings



Graphite flange gaskets are used to seal flanges and connecting parts of pipelines and valves in chemical, petrochemical, oil processing, gas industries and thermal and nuclear energy.

SPIRAL WOUND GASKETS TENSOGRAPH®

Spiral wound gaskets (SWG) are reliable and easy to use gaskets with the highest-quality flexibility and recovery for applications at high and fluctuating temperatures and pressures.

SWG's have been widely applied as static seals in standard flanged joints as well as in pumps, valves and other special equipment. SWG's allow lower clamping forces compared to solid gaskets. Unichimtek produces SWG's with/without inner/outer guide-ring arrangements.

STANDARD COMPLIANCE:

- ANSI, EN, DIN,GOST,OST, and custom design.

FILLER MATERIAL:

- Graphite, MESC SPEC graphite, PTFE (mica, ceramic and others options upon request).

SIZES AVAILABLE:

- From 12 mm up to 4000 mm (Oval SWG and SWG with internal bars upon request).

MATERIAL FOR OUTER RINGS:

- Carbon steel (painted);
  Stainless steel (304, 316L, 316 Ti, 321), Monel 400 (Inconel, Hastelloy, Nickel, Titan upon request).

MATERIAL FOR WINDING STRIP AND INNER RINGS:

- Stainless steel (304, 316L, 316 Ti, 321), Monel 400, (Inconel, Hastelloy, Nickel, Titan upon request).

APPLICATIONS:

- Oil and gas industry;
- Energy production;
- Chemical, atomic and marine industry.

MAIN FEATURES:

- High reliability;
- Easy to use;
- Resistant to cycling;
- Lower clamping forces needed.

UNICHIMTEK GROUP OF COMPANIES

KAMMPROFILE GASKETS TENSOGRAPH®

Extremely tight gaskets for high pressure and temperature applications. Pressure limit up to 80 MPa and temperature limit of 450-1100 °C is available upon material choice.

Kammprofile gaskets are made of concentrically grooved metal core covered by soft filler such as graphite, PTFE or mica. Rigid core of kammprofile gasket provides great reliability even in huge diameters, efficiently resists uneven bolt tensioning and overcompression. Soft layer allows to fit seating surface's imperfections. Main application of gaskets are flange seals in extreme conditions of exploitation as well as sealing of heat exchangers.

PROFILE:

- Plain and Convex style;

STANDARD COMPLIANCE:

- ANSI, EN, DIN, GOST, OST, and custom design;

SOFT MATERIAL:

- Graphite, PTFE or mica;

RIGID CORE MATERIAL:

- Stainless steel (304, 316L, 316 Ti, 321, Monel, Inconel).

SIZES AVAILABLE:

- From 23 mm up to 4000 mm;

APPLICATIONS:

- Oil and gas industry;
- Energy production;
- Petrochemical plants;
- Chemical, process, atomic and marine industry.

MAIN FEATURES:

- High pressure and temperature limit;
- Extremely tight;
- Resistant to uneven bolt tensioning and over-compression;
- Reliable at huge diameters.

CORRUGATED GASKETS TENSOGRAPH®

Reliable and easy to use gasket for standard flange sealing or heat exchanger applications. Corrugated gaskets have an optimal thermo-cycling resistance and blow-out safety alongside with pressure and temperature performance.

Rigid base is a corrugated solid metal core ring with soft graphite layer bonded to both sides. Low seating stress and high tightness level make it an excellent choice for sealing of flanges with limited bolt tension capability and non-critical operation conditions. Corrugated gaskets are easy to install and replace and are less sensitive to assembly faults. Construction of gasket and usage of **Tensograph®** ultra-pure graphite foil makes possible exploitation of gaskets in permanent temperatures up to 350-400 °C and transient of up to 450 °C and 600 °C with use of oxidation inhibitors.

SOFT MATERIAL:

- Graphite, MESC SPEC graphite;

STANDARD COMPLIANCE:

- ANSI, EN, DIN, GOST, OST, and custom design;

SIZES AVAILABLE:

- From 18 mm up to 4000 mm;

RIGID CORE MATERIAL:

- Stainless steel (304, 316L, 316 Ti, 321);

APPLICATIONS:

- Oil and gas;
- Energy production;
- Process and chemical industry;
- Power and petrochemical plants.

MAIN FEATURES:

- High reliability and gas tightness;
- Possibility to provide tight sealing with low stress;
- Easy handling;
- High resistance to chemicals;
- Smart choice for non-critical applications.

REINFORCED GRAPHITE GASKETS TENSOGRAPH®

Graphite flange gaskets are manufactured of **Tensograph®** plain and reinforced graphite sheets with implementing of a wide range of additional options such as inner/outer or both eyelets and any type of guide rings.

Precise cutting allows to produce reinforced graphite gaskets with any shape and dimensions up to 1500 mm. Special technology of Unichimtek makes possible to produce an eyeleted flat gaskets with design of any complexity which is a problem solver for sealing of non-standard flanges. Gaskets application is possible in temperature range up to 450 °C in case of contact with air, up to 600 °C in case of water and steam. Flat, tanged (perforated) and multilayer reinforcements are available. Inner ring to avoid over-compression could be applied.

STANDARD COMPLIANCE:

- ANSI, EN, DIN,GOST,OST, and custom design;

SIZES AVAILABLE:

- Outer diameter up to 1500 mm;

MATERIAL:

- Graphite with reinforcement of perforated and plain s/s layer;

REINFORCEMENT MATERIAL:

- Stainless steel (316L, 321, 430), aluminium and other on request.

APPLICATIONS:

- Oil and gas industry;
- Energy production and power plants;
- Process and chemical industry;
- Petrochemical plants.

MAIN FEATURES:

- High temperature and pressure limit;
- High resistance to chemicals;
- Easy installation;
- Can be manufactured with custom design.

METAL-JACKETED GASKETS TENSOGRAPH®

Metal-jacketed gaskets are most flexible in terms of shape metal-graphite gaskets which are typically used for sealing of heat exchangers' flanges. Metal-jacket provides blow–out resistance and compressive strength whereas filler material forces metal-jacket to deform due to flange defects.

A wide range of outer metal-jackets and filler material options are available to suit most of operating conditions. Different options of design for inner bars can be applied: welded and integrated bars. Designs of gasket and usage of different sealing materials such as Tensograph® ultra-pure graphite foil, PTFE, mica, ceramics with wide combination of resistant metal-jacketed cores makes possible exploitation of gaskets in permanent temperatures up to 350-450 °C and transient of up to 800 °C.

STANDARD COMPLIANCE:

- ANSI, EN, DIN, GOST, OST, and custom design;

SOFT MATERIAL:

- Graphite, PTFE (mica, ceramics and others upon request);

RIGID CORE MATERIAL:

- Stainless steel (304, 316L, 316 Ti, 321) Monel, Inconel, copper, aluminum and other on request;

APPLICATIONS:

- Oil and gas industry;
- Energy production;
- Process and chemical industry;
- Power and petrochemical plants;
- Heat exchangers;

MAIN FEATURES:

- Many types of design and materials;
- High temperature limit and resistance to chemicals;
- Easy installation;
- Can be manufactured with custom design.

GRAPHITE WOUND GASKETS TENSOGRAPH®

Graphite wound gaskets are manufactured of **Tensograph®** graphite foil by a special technology of Unichimtek similar to graphite rings production technology. This type of gaskets is highly efficient for sealing of 'tongue-groove' flanges and shaft connection to ball and gate in valve.

Inner structure of gasket allows filling of closed volume and provides secure sealing. Wide range of additional options such as inner/outer or both eyelets and any type of guide rings to avoid contact with aggressive media are available on request. Graphite wound gaskets are manufactured with a cold pressing technology and have a density in range between 1,2 – 1,9 g/cm^3 depending on conditions of usage. Anti-adhesive and gas anti-leakage treatment for gaskets might also be applied on request.
Application of graphite wound gaskets is possible in temperature range up to 450 °C in case of contact with air, up to 600 °C in case of water.

STANDARD COMPLIANCE:

- ANSI, EN, DIN, GOST, OST, and custom design;

SIZES AVAILABLE:

- Outer diameter from 9 mm up to 1310 mm;

MATERIAL:

- Graphite;

APPLICATIONS:

- Oil and gas industry;
- Nuclear power stations;
- Process and chemical industry;
- Petrochemical plants.

MAIN FEATURES:

- Efficient for sealing of tongue-groove flanges and shaft connection of valves;
- High resistance to chemicals;
- Exclusive technology;
- Can be manufactured with custom design;
- Extra-purity of graphite;
- Easy installation.

RECOMMENDED MEDIAS FOR PRODUCTS OF TENSOGRAPH® GRAPHITE FOIL

Gases and vapors		
• Steam	• Chlorine wet (room temp.)	• Ethylene, propylene
• Air, nitrogen	• Chlorine dioxide	• Formaldehyde
• Oxygen	• Propane, natural gas	• Hydrogen chloride
• Freons	• Acetylene	• Hydrogen sulfide
• Fluorine	• Ammonia	• Sulfur anhydride (dry)
• Chlorine (dry)	• Carbon dioxide	
Petroleum products		
• Oil (raw)	• Creosote, naphtha, oil tar	• Petrol, kerosene, diesel gasoil, petroleum ether
• Asphalt, bitumen, tar	• Paraffin	• Mineral oils
Petroleum products		
• Oil (raw)	• Creosote, naphtha, oil tar	• Petrol, kerosene, diesel gasoil, petroleum ether
• Asphalt, bitumen, tar	• Paraffin	• Mineral oils
Solvents, organic substances		
• Spirits , glycols	• Amines, amino acids	• Hydrocarbons
• Esters, aldehydes, ketones	• Acids	• Aromatic hydrocarbons
		• Chlorinated hydrocarbons
Aqueous solutions of salts		
• Sulfates, alum	• Sulfites, sulphates	• Nitrates
• Chlorides	• Alkalis, aqueous ammonia	• Phosphates
• Fluorides	• Chromates	• Carbonates
Inorganic acids		
• Hydrochloric	• Nickel plating solutions	• Nitrates
• Hydrofluoric	• Phosphorous	• Phosphates
• Hydrobromic	• Fluorosilicate	• Carbonates
• Anodizing solution	• Sulfuric	
• Chroming solutions	• Nitric	
	• Chromic	
Oxidants		
• Bromine, bromide water (room temp)	• Bleaching solutions	• Chlorates, hypochlorites
• Lodine (room temp)	• Hydrogen peroxide	

Notice: it is not recommended to use products made of **TENSOGRAPH®** graphite foil in medias of strong oxidants – highly concentrated nitric acid, oleum, chrome and perchloric acids, melt-oxidizing salt and molten alkali metals.

- Special forms and grades available on request;
- Material is free of any particles of asbestos;
- All data is provided in informational purposes and is not subject of obligations.

Other activities

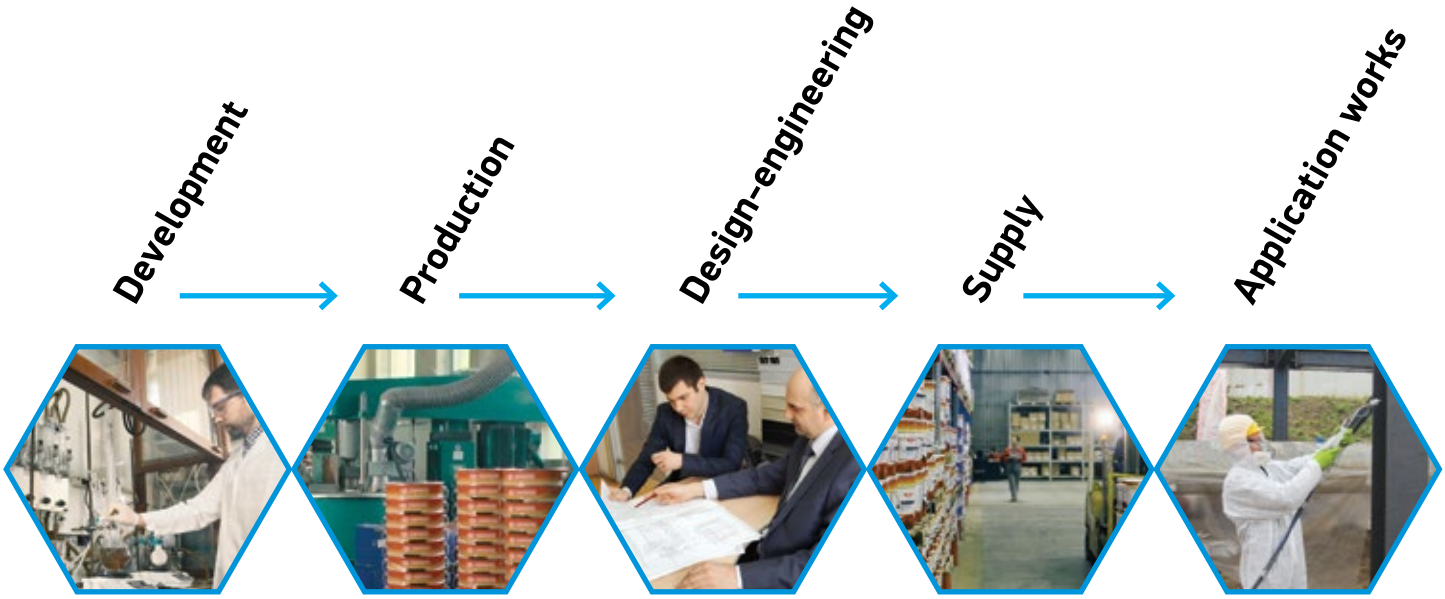
Powerful intellectual resources, years of experience, as well as its own testing and production facilities allow UNICHIMTEK to produce variety of top-quality products that meet the highest standards.

PASSIVE FIRE-PROTECTION

UNICHIMTEK is a market leader in Russia for development and production of fire-protection materials. One of pioneers of Russian fire-protection materials manufacturing.

UNICHIMTEK offers the market not only the widest range of OGRAX® fire-protection materials, but also a turn-key approach to meet the customer's requests. The process includes development of new materials, testing of these materials with subsequent certification, training, supervision, as well as design-engineering of fire protection systems and execution of application works.

TURN-KEY APPROACH TO FIRE-PROTECTION



OGRAX® fire-protection materials have been confidently providing a reliable passive fire protection for many years already, protecting lives of people and property of the companies.

TYPES OF FIRE-PROTECTION MATERIALS

REACTIVE COATINGS FOR STEEL STRUCTURES

OGRAX® pfp-coatings create a thermal insulation layer on surface of steel structure, reduce heating influence and help to maintain their structural properties for a specified period of time.

REACTIVE COATINGS FOR CABLES

Protect cables and cables lines from fire spread across their surface. Depending on type of cable, condition of cable lines and its installation particularities, various types of fire-protection coatings and wraps are used.

FIRE COLLARS

OGRAX® fire-protective collars prevent fire spreading through the building along sewerage and water supply systems.

CABLE PENETRATION SEALS

This material is designed to prevent flame propagation and combustion products along cable lines. Ensures reliable fire-safety of cable penetration through walls, partitions and ceilings.

INCMaT

INSTITUTE
OF NEW CARBON
MATERIALS
AND TECHNOLOGIES

New developments, research and technologies

Key competitive advantage of UNICHIMTEK is a powerful R&D Department — Institute of New Carbon Materials and Technologies (INCMaT), which was established in 2003 in cooperation with Moscow State University.

The institute employs over 60 highly skilled researches; over 30 % of them are PhD in chemistry and physics.

INCMaT ACTIVITIES

INCMaT performs research and development in the following areas:

- development of new graphite materials (sealing, heat distribution, etc.);
- development of new fire-protection compositions;
- development and optimization of carbon-carbon composites production technology;
- development of high temperature polymer matrices (epoxy, bmi, cyanate ether), including materials for high temperature vacuum infusion and rtm;
- development of technologies of textile processing of carbon fiber;
- development of the carbon fiber composites manufacturing technologies, prototyping.

EQUIPMENT

Up-to-date research and testing equipment allows reaching wide range of technological goals for Unichimtek and our customers and partners.

Special rig for flange seal tests enables to carry out stress resistance testing, leakage testing, compressive creep testing and/or creep/relaxation testing conforming to EN 13555, DIN 3535-6, TA-LUFT.

The test rig for gland seals allows to determine deformation and sealing properties of stuffing box packings conforming to ISO 15848-1:2015 and API 622.

CS-analyzer allows determination of sulfur and carbon in both organic and inorganic samples.

Electronic tensile tester measures tension, compression, flexure, tear of a wide range of materials including yarns, foils, etc, and conforms to ASTM E 83, ASTM E4, EN 10002-2 and so on.

Universal Mechanical Tester tests the mechanical and tribological properties of materials.

CONTACTS

MANUFACTURING AND SALES

2, ZAVODSKAYA STREET,
PODOLSK, MKR. KLIMOVSK,
MOSCOW REGION,
142181, RUSSIA

TEL: +7 (495) 580-38-94
INFO@UNICHIMTEK.COM
WWW.UNICHIMTEK.COM

R&D DEPARTMENT

MOSCOW STATE UNIVERSITY,
CHEMISTRY DEPARTMENT,
LENINSKIE GORY, 1, BLD.11
119234, MOSCOW, RUSSIA

TEL: +7 (495) 939-35-92
INFO@INUMIT.RU
WWW.INUMIT.RU

Tensograph
ART OF SEALING

UNICHIMTEK
GROUP OF COMPANIES

«UNICHIMTEK», JSC
2, Zavodskaya street, Podolsk
mkr. Klimovsk, Moscow region
142181, Russia

tel: +7 (495) 580-38-94
info@unichimtek.com
www.unichimtek.com