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大连双骥科技发展有限公司

Dalian Shungji Technology Industry Co., Ltd

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Company Profile

Dalian Shungji Technology Industry Co., Ltd established in 2001, has been dedicated to the exploration and development of carbon products and their applications. Our main products include medium-grained graphite, isostatic graphite, high-purity graphite materials, C/C composite materials, graphite soft felt, and graphite rigid felt. Additionally, we offer processes such as impregnation, purification, coating, as well as comprehensive services including inspection, maintenance, and upgrade of vacuum furnace equipment, providing customers with a comprehensive range of solutions from processing to post-treatment.

大连双骥科技发展有限公司成立于2001年,一直专注于碳素产品及其应用的探索 and 开发。主要产品包括中粗石墨、等静压石墨、高纯石墨材料、碳碳复合材料、石墨软毡及硬毡等。此外,我们还提供浸渍、纯化、涂层等工艺处理,以及真空炉全套设备的检查、维修、升级改造等服务,为客户提供从加工及后处理等一系列解决方案。

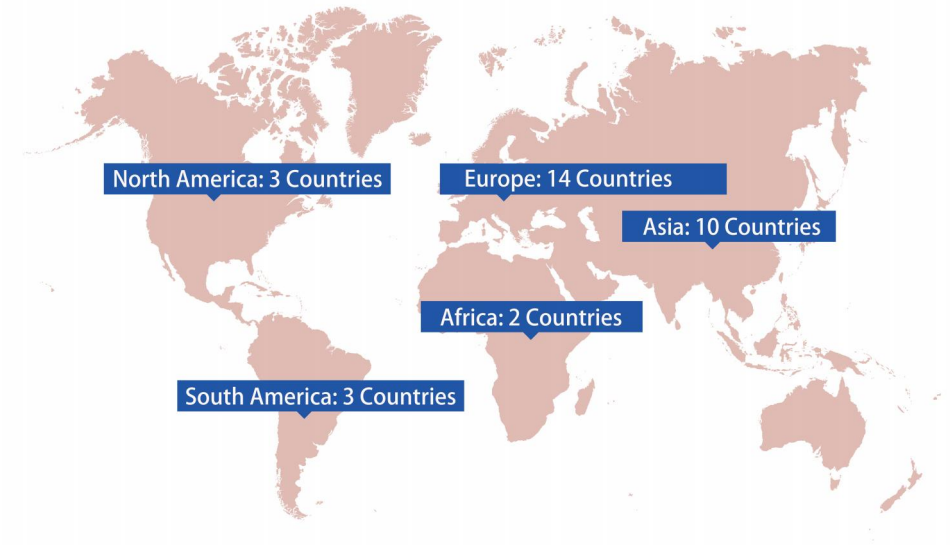
With over two decades of development, our products have been widely used in industries such as metallurgy, machinery, chemical industry, fiber optics, LEDs, and semi-conductors, serving customers throughout both domestic and global markets in over 30 countries!

经过20多年的发展,产品已在冶金、机械、化工、光纤、LED、半导体等行业广泛应用,用户遍及国内及全球三十多个国家。

Dalian Shungji Technology Industry Co., Ltd always adheres to the basic concept of integrity, through high technical force, high service force team to supply quality products, and provide customer satisfaction services!

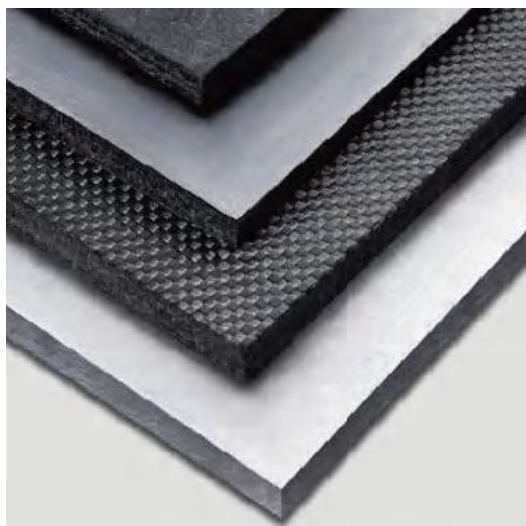
大连双骥科技始终坚持以诚信为基本理念,通过高技术力、高服务力的团队打造优质的产品、客户满意的服务!

Export Performance / 出口实绩



Graphite Rigid Felt / 保温硬毡

Summary and Applications 概要及应用



We use a special process to combine graphite paper, graphite felt, and carbon cloth into one, solidify and shape them, and then perform secondary high-temperature purification treatment to produce graphite rigid felt. It has high purity, high carbon content, good resistance to ablation and thermal shock, as well as excellent resistance to airflow erosion and thermal insulation. It is mainly suitable for vacuum industrial furnace equipment such as ultra-high temperature and high pressure sintering furnaces, electronics, semiconductor industries, and solar photovoltaic (polycrystalline casting furnaces, single crystal furnaces).

采用特殊工艺将石墨纸、石墨毡、碳布合为一体、固化定型，二次高温纯化处理制得，石墨硬毡纯度高、碳含量高，抗烧蚀性能、抗热震性能好，且气流冲刷和隔热、保温性能都很优越，主要适用于超高温真空高压烧结炉以及电子、半导体行业、太阳能光伏(多晶浇铸炉、单晶炉)等真空工业炉设备。

Surface Treatments 多种表面处理

Surface Treatment 表面处理	Protection Against Dust 防止粉尘	Airtightness 气密性	Surface Protection 表面防护	耐冲击性 Shock Resistance	Advantages 特点优势
No Surface Treatment 无表面处理	—	—	—	—	Good Air Permeability and Low Cost 透气性能好，成本低
Graphite Paper Lamination 石墨纸贴合	◎	◎	○	○	Anti-dust Penetration and Heat Loss 防粉尘渗入、防热损失
Carbon Cloth Lamination 碳布贴合	○	○	◎	○	High Protection Strength, Long Service Life 高防护强度、寿命长
Special Coatings 特殊涂层	◎	◎	◎	◎	Anti-dust Penetration, High Protection Performance, High Purity 防粉尘渗入、高防护性能、纯度高

Protection Classes: — Class I ○ Class II ◎ Class III

— I级防护 ○ II级防护 ◎ III级防护

■ Specifications 理化指标

Material 材料		Graphite Rigid Felt (PAN-based) 硬毡 (PAN基)	Graphite Rigid Felt (PAN-based) 硬毡 (PAN基)	Graphite Rigid Felt (Rayon-based) 硬毡 (粘胶基)
Bulk Density 体积密度	g/cm ³	0.17	0.2	0.15-0.17
Compressive Strength 抗压强度	MPa	0.3	0.35	0.25
Thermal Conductivity (@1000°C) 热导率	W/(m.k)	0.35	0.43	0.20
Ash 灰分	ppm	≤200	≤200	≤200
Maximum Operating Temperature 最高工作温度	°C	3000	3000	2400
Surface Treatment 表面处理		We can provide various processing methods for graphite rigid felt according to the needs of users, including applying hardened coatings, attaching graphite paper, pasting carbon cloth, and attaching C/C plates. 我们可以根据用户需求提供各种加工方式的硬毡, 包括涂覆硬化涂层、贴附石墨纸、粘贴碳布和附加C/C板。		
Maximum Size 最大尺寸	mm	Sheet: 2800*2100*300; Cylinder: φ1800/φ1400*1800 板材: 2800*2100*300; 圆柱体: φ1800/φ1400*1800		

*The above values, sizes are typical, not guaranteed.

*The parameters in this table are standard products. If high purity products are required, purification treatment can be provided, with a purified ash content of ≤ 20PPM maximum.

Special needs and high-end series products can be customized through negotiation and communication with our company.

*以上为代表特性, 参考尺寸, 非保证值。

*本表参数为标准制品, 如需高纯制品可提供纯化处理, 纯化灰分≤20PPM。

特殊需求、高端系列产品可与我司洽谈沟通进行定制。

Graphite Soft Felt / 保温软毡

Summary and Applications 概要及应用



Graphite soft felt has an extremely low thermal conductivity, can withstand high temperatures and erosion, and is commonly used as insulation material for various high-temperature equipment. Meanwhile, due to its unique softness, it can fill relatively complex spaces and is often used as a repair material for furnaces. We can provide customized products with different materials (PAN-based, Rayon-based) and performance requirements for customers, with a maximum usage temperature of up to 3000 °C . Our graphite soft felt has an extremely uniform thickness and density distribution, ensuring consistent high insulation effect, stable, and long-lasting performance.

保温软毡具有极低的导热系数，可耐高温、耐烧蚀，常用做各类高温设备的保温隔热材料使用。同时，因其特有的柔软性，可使之填充相对复杂的空间，因此也常被作为炉内修补材料。我们可为客户提供不同材质(PAN基、黏胶基)、不同性能要求的定制化产品，使用温度最高可达3000℃。我们的保温软毡具有极其均匀的厚度和密度分布，能确保始终如一的高保温效果，性能稳定、持久。

Features 特点

High purity: Due to its high purity, it can reduce or minimize secondary pollution to the product.

High flexibility and lightweight: It has good workability and strong applicability to complex spaces.

Uniform thickness: It has good processability and strong quality stability.

高纯度:由于具有较高的纯度,可降低或减少对制品的二次污染。

高柔软性、轻量化:具有良好的可作业性能、对复杂的空间适用性强。

厚度均一:具有良好的可处理性能,品质稳定性强。

Specifications 理化指标

Grade 型号		TRF1-01	TRF3-01
Material 材料		Graphite Soft Felt (PAN-based) 软毡 (PAN基)	Graphite Soft Felt (Rayon-based) 软毡 (粘胶基)
Bulk Density 体积密度	g/cm ³	0.13	0.1
Thermal Conductivity (@1000°C) 热导率	W/(m.k)	0.24	0.15
Ash 灰分	ppm	≤500	≤200
The Maximum Operating Temperature 最高工作温度	°C	3000	3000
Maximum Size 最大尺寸	mm	Width:1600; Thickness: 5,10 宽度:1600; 厚度:5、10	

*The parameters in this table are standard products. If high purity products are required, purification treatment can be provided, with a purified ash content of ≤ 20PPM maximum.

*The above values are typical, not guaranteed.

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特殊需求、高端系列产品可与我司洽谈沟通进行定制。

■ C/C Composite Materials / 碳碳复合材料

■ Features 产品特征

C/C composite material is a carbon carbon composite material, reinforced by high-strength carbon fibers, its characteristics include light weight, high mechanical strength and high elasticity.

High mechanical strength, high elasticity, and high toughness

Compared with isostatic pressing graphite, C/C composite materials have high strength, high elasticity, and resistance to cracking and peeling.

High heat resistance

Compared to metal materials, it has high strength at high temperatures. In inert gases, they can even be used at high temperatures above 2000 °C.

Light weight and easy to handle

Compared to metal materials, it has a lower density and can therefore achieve lightweight design.

Can achieve high thermal conductivity

By using carbon fiber structure control technology, higher thermal conductivity than copper has been achieved.

C/C复合材料是一种碳-碳复合增强材料,由高强度的碳纤维增强,它的特性有重量轻、机械强度高和弹性高。

高机械强度、高弹性、高韧性

与等静压石墨相比,C/C复合材料具有高强度、高弹性、且抗开裂和剥落性能。

高耐热性

与金属材料相比,在高温时具有高强度。在惰性气体中,它们甚至可以在2000°C以上高温中使用。

轻量,易于处理

与金属材料相比,密度低,因此可以实现轻量设计。

可实现高导热性

通过使用碳纤维结构控制技术已经实现比铜更高的导热系数。

■ Products and Applications 产品及应用

CFC Plate

Features: Formed by high-pressure carbon cloth, with a long fiber content of 80%, it has high strength, antioxidant, uniform material, and stable structure.

Application areas: Photovoltaics, semiconductors, vacuum heat treatment furnaces, high-temperature brazing furnace, high temperature sintering furnace, etc.

名称:平板

特点:由碳布高压成型,长纤维含量80%,强度高,抗氧化,材质均匀,结构稳定。

应用领域:光伏、半导体、真空热处理炉、高温钎焊炉、高温烧结炉等。



CFC Fastener

Features: Stable structure, strong tensile performance, and high modulus.

Application areas: Photovoltaics, semiconductors, vacuum heat treatment furnaces, high-temperature brazing furnaces, high-temperature sintering furnaces, etc.

名称:紧固件

特点:结构稳定,抗拉性能强,模量高。

应用领域:光伏、半导体、真空热处理炉、高温钎焊炉、高温烧结炉等。



CFC Load bearing structural components (including shaft type transmissions)

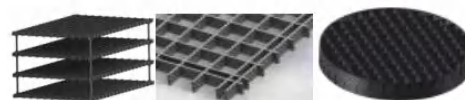
Features: It has excellent dimensional stability, thermal conductivity, and durability, strong tensile performance, and high modulus.

Application areas: Photovoltaics, semiconductors, vacuum heat treatment furnaces, high-temperature brazing furnaces, high-temperature sintering furnaces, etc.

名称:承载结构件(含轴类传动)

特点:具有优异的尺寸稳定性、导热性和耐久性,抗拉性能强,模量高。

应用领域:光伏、半导体、真空热处理炉、高温钎焊炉、高温烧结炉等。



CFC Sagger, Shaped Material

Features: Low density, high strength, high carbon fiber content, long service life, and high purity.

Application areas: Photovoltaics, semiconductors, vacuum heat treatment furnaces, high-temperature brazing furnaces, high-temperature sintering furnaces, etc.

名称:匣钵、异形材

特点:密度低,强度高,碳纤维含量高,寿命长,纯度高。

应用领域:光伏、半导体、真空热处理炉、高温钎焊炉、高温烧结炉等。



CFC Cylinder

Features: Low density, high strength, small thermal deformation, uniform thermal field, convenient installation, and long service life.

Application areas: Photovoltaics, semiconductors, vacuum heat treatment furnaces, high-temperature brazing furnaces, high-temperature sintering furnaces, etc.

名称:圆筒类

特点:密度低,强度高,热变形量小,热场均匀,安装方便,寿命长。

应用领域:光伏、半导体、真空热处理炉、高温钎焊炉、高温烧结炉等。



■ Specifications 理化指标

Material 材料		C/C	C/C	C/C	C/C
Bulk Density 体积密度	g/cm ³	1.3	1.4	1.45	1.6
Compressive Strength 抗压强度	MPa	≥100	≥150	≥150	≥150
Flexural Strength 抗折强度	MPa	≥120	≥120	≥150	≥150
Tensile Strength 抗拉强度	MPa	≥60	≥80	≥80	≥100
CTE 热膨胀系数	10 ⁻⁶ /°C	≤4	≤4	≤4	≤4
Thermal Conductivity (@1000°C) 热导率	W/(m.k)	20-30	20-30	20-30	20-30
Ash 灰分	ppm	<200	<200	<200	<200
Maximum Size 最大尺寸	mm	φ1800*φ1400*1800			

*The parameters in this table are standard products. If high purity products are required, purification treatment can be provided, with a purified ash content of ≤20PPM maximum.

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Isostatic Graphite / 等静压石墨

Summary 产品概要



Isostatic graphite is a kind of fine-grained isotropic graphite produced by cold isostatic molding technology, with good electrical and thermal conductivity, high-temperature strength, small coefficient of thermal expansion, self-lubricating, high-temperature, corrosion-resistant, easy to process, and is widely used in the fields of monocrystalline silicon, polysilicon, EDM, continuous casting of metals, vacuum furnaces, sintering, smelting of precious metals, glass, medical treatment, chemical industry, and so on.

等静压石墨是一种采用冷等静压成型技术生产的细颗粒各向同性石墨, 导电导热性能好, 高温强度高, 热膨胀系数小, 自润滑, 耐高温, 耐腐蚀, 易加工, 广泛应用于单晶硅、多晶硅、电火花加工、金属连铸、真空炉、烧结、贵金属熔炼, 玻璃, 医疗, 化工等领域。

Applications 典型应用

- Metallurgy, casting and heat treatment:

Vacuum furnaces, inert atmosphere furnaces, heating elements, conductive electrodes and connectors, loading trays, muffle boxes, thermal field liners and structural components, crucibles, fixtures, molds, etc; copper, aluminum and other non-ferrous metal continuous casting crystallizers; hot pressing mold, and so on.

- 冶金、铸造、热处理领域:

真空炉、惰性气氛炉发热体、导电电极及连接件、载料盘、马弗箱、热场内衬及结构组件、坩埚、工装、模具等; 铜、铝等有色金属连铸结晶器; 热压模具; 等等。

- Sintering:

Sintering molds for cemented carbide cutting tools, diamond tools, and electronic component packaging; sintering molds for glass products; metal sealing welding fixture, and so on.

- 烧结领域:

硬质合金刀具、金刚石工具、电子元件封装的烧结模具; 玻璃制品烧制模具; 金属封焊夹具; 等等。

- Electrical and electrochemical:

Electrodes for EDM; fuel cell bipolar plate; electrolytic anode and cathode, etc.

- 电气及电化学领域:

电火花加工用电极;燃料电池双极板;电解阳极、阴极等。

- PV and semiconductor:

Polycrystalline silicon reduction furnace disc, holder, preheater; thermal field components of polycrystalline silicon ingot furnace; PECVD graphite boat pieces and components; CZ monocrystalline silicon furnace heating element, insulation tube, guide tube, crucible component; PVT method SiC long crystal furnace graphite crucible, heating element, upper cover, etc.

- PV、半导体领域:

多晶硅还原炉卡瓣、卡座、预热器;多晶硅铸锭炉热场组件;PECVD石墨舟片及组件;CZ直拉单晶硅炉发热体、保温筒、导流筒、坩埚组件;PVT法SiC长晶炉石墨坩埚、发热体、上盖等。

- Fiber optic:

Furnace core tube, heating element, central tube, muffle tube and base, etc.

- 光纤:

炉芯管、发热体、中心管、马弗管及底座等。

■ Specifications 理化指标

Grade 型号	Bulk Density 体积密度	Specific Resistance 电阻率	Flexural Strength 抗折强度	Compressive Strength 抗压强度	Ash (Normal Grade) 灰分	Ash (Purified) 灰分	Grain Size 粒度	Regular Size 常规尺寸
	g/cm ³	μΩ.m	MPa	MPa	ppm	ppm	μm	mm
FM-12	1.76	9~10	40	65	500	50	13-15	550*410*250 610*510*250 910*310*310
FM-13	1.86	9~10	45	85	500	50	13-15	
FM-22	1.81	9~13	38	75	1000	N/A	25	260*250*170
IS-14	1.86	11~12	65	135	500	50	5	1200*640*270 1600*670*300
IS-41	1.78	15	65	130	200	N/A	10	620*520*260 900*570*260
IS-42	1.78	14	55	110	200	N/A	13-15	510*310*250 620*520*250 740*740*230

*The above values are typical, not guaranteed, other specification and sizes are also available.

*以上为代表特性,非保证值,另有其他特性及规格尺寸可供选择。

I Spectral Graphite Rod / 光谱石墨棒

■ Summary and Applications 概要及应用



Spectral graphite rods are utilized in the fields of emission spectroscopy, atomic absorption spectroscopy, gas analysis, etc. They are characterized by uniform and consistent electrical conductivity, strong resistance to thermal shock, high purity, and good machinability.

High-purity graphite rods are specifically employed in the field of spectral analysis. Presently, the ash content generally stands below 5PPM, and efforts have been made to reduce it to below 2PPM. We are also striving to achieve even higher levels of purity.

Typical sizes include $\Phi 6 \times 300$, $\Phi 8 \times 300$, $\Phi 10 \times 300$, $\Phi 13 \times 300$, $\Phi 15 \times 300$, etc. Other sizes are also available as per customer's needs.

The above values are typical, not guaranteed. If there are tolerance requirements, we'd like to discuss and execute according to customer requirements. For example, a 6mm diameter can be executed with a tolerance of $0 \sim +0.1$.

光谱石墨棒用于发射光谱、原子吸收光谱、气体分析等领域，具有导电性均匀一致、抗热震性强、高纯度、可机械加工好等特点。

高纯度的石墨棒专用于光谱分析领域。目前，灰分普遍低于5PPM，并已实现低于2PPM，正在努力向更高纯度方向研发。

常规尺寸包括 $\Phi 6 \times 300$ 、 $\Phi 8 \times 300$ 、 $\Phi 10 \times 300$ 、 $\Phi 13 \times 300$ 、 $\Phi 15 \times 300$ 等，也可根据客户要求提供其他尺寸。

以上为常规尺寸。若有公差要求，可协商按客户要求执行，例如6mm直径可按 $0 \sim +0.1$ 公差执行。

■ Specifications 理化指标

Grade 型号	Bulk Density 体积密度	Specific Resistance 电阻率	Flexural Strength 抗折强度	Ash 灰分	Grain Size 粒度	Regular Size 常规尺寸
	g/cm ³	μΩ.m	MPa	ppm	mm	mm
FE-P-1	≥1.68	8	30	5	0.045	Φ6*300、Φ8*300
FE-P-2	≥1.68	8	30	10	0.045	Φ10*300、Φ13*300 Φ15*300

The above values are typical, not guaranteed.

以上指标为代表值，非保证值。

Medium-Grained Graphite / 中粗石墨



Features 特点

- High thermal and chemical resistance
- Good thermal conductivity
- Low coefficient of thermal expansion
- Minimal wettability to molten metals
- 耐热、耐化学腐蚀
- 导热性好
- 热膨胀系数低
- 对熔融金属润湿性小

Applications 典型应用

Heat treatment: Vacuum furnace, inert atmosphere furnace heating element, conductive electrode and connecting parts, loading tray/plate, muffle box, thermal field lining and structural components, crucible/material box, tooling, mold, etc.

Metallurgy and casting: Degassing stirring rods, rotors, blowing pipes, carbon sleeve rollers for silicon steel annealing furnaces, melting crucibles, casting molds, etc.

Chemical and electrolysis industries: Graphite heat exchanger components, magnesium manganese lead sodium electrolysis anodes (cathodes), etc.

Photovoltaics: Polycrystalline silicon hydrogen reduction furnace electrodes, heating elements, etc.

Lithium ion batteries: Anode carbonization crucibles, saggers, etc.

负极热处理: 真空炉、惰性气氛炉发热体、导电电极及连接件、载料盘/板、马弗箱、热场内衬及结构组件、坩埚/料箱、工装、模具等。

冶金、铸造: 除气搅拌棒、转子、吹气管、硅钢退火炉碳套辊、熔炼坩埚、铸造模具等。

化工、电解: 石墨换热器组件、镁锰铅钠等电解阳极(阴极)等。

光伏: 多晶硅氢还原炉电极、发热体等。

锂离子电池: 负极碳化坩埚、匣钵等。

Specifications 理化指标

Grade 型号		MV-12	MV-13	MV-20	ME-11
Type of Forming 成型方式	Unit 单位	Vibro-molded 振动成型	Vibro-molded 振动成型	Vibro-molded 振动成型	Extruded 挤压成型
Bulk Density 体积密度	g/cm ³	1.72	1.73	1.65	1.73
Specific Resistance 电阻率	μΩ.m	9	8.5	11	8
Compressive Strength 抗压强度	MPa	30	35	28	37
Flexural Strength 抗折强度	MPa	13	15	9	18
C.T.E(RT-600°C) 热膨胀系数	10 ⁻⁶ /°C	3.2	3.3	N/A	2.4
Thermal Conductivity 热导率	W/(m.k)	100	130	N/A	N/A
Ash 灰分	%	0.2	0.12	0.25	0.2
Maximum Grain Size 最大粒度	mm	0.8	0.8	2	0.8

Regular Sizes 常规尺寸 (mm)

- Blocks 块 : 500 * 500 * (1800/1850), 650 * (500/600) * (1800/1850/2200), 800 * 500 * 1850, 950 * 500 * 1850, 1100 * 400 * 2200, 1250 * 450 * 2200.
- Rods 棒 : Dia 400mm, Dia 440mm, Dia 500mm and Dia 600mm, length 1800~2100mm.
- Rounds 圆 : Dia 700mm, Dia 800mm, Dia 900mm, Dia 1000mm, Dia 1100mm Dia 2100mm, length 350mm.

The above are typical values, other specifications are also available.

以上为该系列的代表值,也可根据用户需要提供其他指标的产品。