

绍兴自立新型陶瓷材料有限公司
Shaoxing Zili Advanced Ceramic Materials Co., Ltd



陶瓷用氧化铝粉

Superior Alumina for Technical Ceramic



陶瓷行业用氧化铝粉

Superior Alumina for Ceramic Applications

氧化铝是陶瓷领域最重要的氧化物材料之一。氧化铝陶瓷具有良好的机械强度、硬度、抗磨蚀性、热性能和电绝缘性能。

立飒LISAL™氧化铝微粉采用优质原料在隧道窑经过合理温度煅烧后，再采用特定的研磨工艺生产出来的具有良好粒度分布和热活性的低钠氧化铝粉。

低钠超细活性氧化铝粉(LISAL R系列)为高纯度亚微米级别氧化铝粉，专门为需要高密度、低烧成温度、使用少量助熔剂的陶瓷而设计，其良好的可烧结性能可实现较高的机械强度和精细均一的微观结构，适用于电子陶瓷、高级耐磨零部件、半导体等精密陶瓷行业。

低钠氧化铝粉(LISAL C系列)，具有纯度高、杂质含量低、转化率高、粒度分布合理、流动性好、稳定性高等特点，可用于干压、等静压、热压铸、注浆成型和凝胶注膜成型生产陶瓷，适用于电子陶瓷、电子基片、结构陶瓷等。

低钠双峰活性氧化铝粉(LISAL B系列)，具有良好的化学稳定性和较高的填充率和堆积密度，可用于过滤陶瓷、催化剂、结构陶瓷、电子陶瓷等行业。

高纯超细活性氧化铝粉(LISAL RL系列)，为99.9%的亚微米级别氧化铝粉，具有更低的 Na_2O 等杂质含量，专门为要求更高的>99.5氧化铝瓷而设计。

Alumina is one of the most important oxide materials for technical ceramics and is used in a wide range of applications due to high mechanical strength and hardness, excellent resistance to both wear and chemical corrosion of the ceramic parts.

LISAL™ alumina micropowders are low-sodium alumina powders with specified particle size distribution and thermal activity, which were produced using high-quality raw materials. They were calcined at a reasonable temperature in tunnel kiln and then ground with a specific grinding process.

LISAL R series are high-purity sub-micron grade alumina designed for application that requires high density and low firing temperature. The unique sintering feature enables LISAL™ R series to achieve high mechanical strength and homogeneous microstructure, making them ideal for electronics, advanced wear-resistant parts, semiconductors and other precious ceramics.

LISAL C series are high-purity micron grade alumina designed for electronics, electronic substrates, and wear-resistant parts. They feature high conversion rate, strictly controlled particle size distribution, good fluidity, and thermal stability, allowing them to be processed in rolling, casting, dry pressing, isostatic pressing, hot die casting, and grouting.

LISAL B series are low-soda bimodal alumina powders with excellent chemical resistance and dense particle packing. They can be used as filler, catalyst, technical ceramics and electronic ceramics.

LISAL RL series are 99.9% submicron grade alumina powder with much lower content of Na_2O and other impurities. It is specially designed for the >99.5 alumina ceramics.

市场&应用

Markets & Applications

产品牌号 Product		粒度 Particle size	产品特性 Product Characteristics	产品应用 Applications
氧化铝 原粉 Unground Alumina	R系列 R series	R05	未研磨, 纯度大于99.7%, 易烧结, 具有较高的烧结密度 Unground, >99.7% Al ₂ O ₃ , easy-sintering, has higher fired-density	用于生产高纯度产品(>99%Al ₂ O ₃)包括技术陶瓷、电子陶瓷、耐磨陶瓷等 For higher purity ceramics including technical and electronic ceramics, wear-resistant ceramics
		R08		
	C系列 C series	C152	未研磨, 纯度大于99.7%, 易烧结 Unground, >99.7% Al ₂ O ₃ , easy-sintering	用于生产高性能工程陶瓷和电子陶瓷 for producing high performance engineering ceramics and electronic ceramics
		C20	未研磨, 纯度大于99.7%, 客户可根据要求进行研磨 Unground, >99.7% Al ₂ O ₃ , can be ground as required	高性能工程陶瓷和电子陶瓷如高端火花塞和基板 for producing high performance engineering ceramics and electronic ceramics, such as spark plugs and substrates
		C25		
		C30		
氧化铝 微粉 Batch ground Alumina	R系列 R series	R05SG	<1um	适用于氧化铝含量>99%瓷, 用于电子、机械、化学和热性能要求较高的陶瓷 for higher purity ceramics with higher requirements of electronic, mechanical, chemical and thermal properties
		R05LSG		
	C系列 C series	C152SG	精细研磨, 纯度大于99.7% Al ₂ O ₃ , 粒度分布窄, 易烧结 Fine ground, >99.7% Al ₂ O ₃ , narrow particle size distribution, easy sintering	高性能电子陶瓷和机械工程陶瓷 High performance electronic ceramics and mechanical engineering ceramics
		C20SG	精细研磨, 纯度大于99.7%, 收缩率较低 Fine ground, >99.7% Al ₂ O ₃ , low shrinkage	
		C25SG	精细研磨, 纯度大于99.7%, 生坯密度高, 合适的收缩比 Fine ground, >99.7% Al ₂ O ₃ , high green density, suitable shrinkage ratio	
	B系列 B series	C30SG	精细研磨, 纯度大于99.7%, 生坯密度高 Fine ground, >99.7% Al ₂ O ₃ , high green density	适用于对电性能和机械性能要求高的先进陶瓷如火花塞、基板、电子真空管壳等 Suitable for advanced ceramics with high requirement of electrical and mechanical properties, such as spark plug, substrate, electronic vacuum tube shell, etc
		B20	双峰分布, 良好的化学稳定性、较高的填充率和堆积密度、良好的耐磨性 Bimodal PSD distribution, good chemical stability, high filling rate and packing density, good wear resistance	
双峰氧化铝 微粉 Bi-modal Alumina	B系列 B series	B27	2.6~2.8um	适用于对电性能和机械性能、堆积密度要求高的结构陶瓷、高性能涂料、高端瓷具等 for structural ceramics, high performance coatings and high-end kiln furniture with high requirements on electrical and mechanical properties and bulk density

低钠超细活性氧化铝微粉(LISAL R系列)

Premium Alumina for Ceramic Applications (LISAL R series)

超细微粉产品(LISAL R系列)为高纯亚微米级 α - Al_2O_3 ，极易于低温下烧结达到较高烧结密度，同时实现均匀的微观结构。该系列氧化铝采用特殊的研磨工艺，研磨至原晶粒度尺寸或近原晶粒度尺寸，具有较窄的粒度分布，适用于对高机械强度和良好表面处理有要求的精密陶瓷行业。

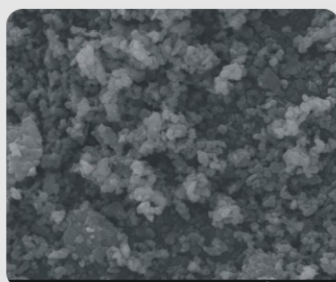
Ultra-fine aluminas (LISAL R series) are high-purity sub-micron α - Al_2O_3 , which is extremely easy to sinter at a low temperature to achieve a high sintered density while achieving a uniform micro-structure. This series of alumina uses a special grinding and grading process, grinding to the original grain size or nearly the primary grain size, with a narrow particle size distribution, suitable for precision ceramic industry with high mechanical strength and good surface treatment requirements.

产品 Product		Ultra-fine aluminas of LISAL R series			
		R05SG	R05SG-MF	R08SG	R08SG-MF
物理属性 Physical properties					
比表面积 Surface area	m^2/g	7.5	7.5	5.5	5.5
粉体粒度D50 Particle size	μm	0.5	0.5	0.8	0.8
原晶粒度D50 Crystal size	μm	0.3~0.5	0.3~0.5	0.3~1.0	0.3~1.0
化学属性 Chemical properties					
Al_2O_3 差减法 by difference	%	99.8	99.8	99.8	99.8
Na_2O	%	0.05	0.05	0.05	0.05
SiO_2	%	0.03	0.03	0.03	0.03
Fe_2O_3	%	0.01	0.01	0.01	0.01
MgO^*	%	0.05		0.05	
陶瓷属性 Ceramic properties					
生坯密度 Green density	g/cm^3	2.18	2.17	2.18	2.18
烧结密度 Fired density	g/cm^3	3.90	3.88	3.89	3.86
线收缩率 Linear shrinkage	%	17.8	17.3	17.0	16.6
烧结温度 Firing temperature	$^{\circ}\text{C}$	1540 $^{\circ}\text{C}$ -2h			

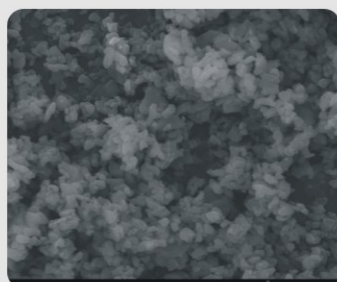
* MgO 作为添加剂引入，不计算在杂质含量内。

典型值 Typical data

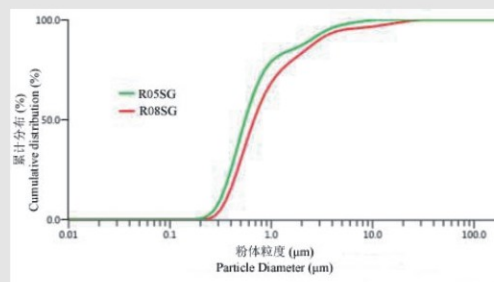
* MgO is an additive and not considered as an impurity in Al_2O_3 .



R05SG



R08SG



R系列氧化铝粉粒度分布

低钠氧化铝微粉(LISAL C系列)

Low Soda alumina powders (LISAL C series)

低钠活性氧化铝粉(LISAL C系列)采用优质原料, 在合理的煅烧温度下利用隧道窑煅烧而成的晶型稳定的氧化铝产品, 在研磨过程中, 采用激光粒度仪, 严格控制粒径, 无团聚和大颗粒。具有良好的化学稳定性、电性能、热性能以及均匀的收缩性, 适用于电子陶瓷制品, 为流延成型和其它复杂电子陶瓷及电子基片的首选。

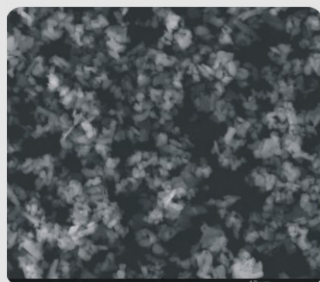
The low-sodium alumina powders (LISAL C series) are produced in a tunnel kiln at a reasonable temperature using high-quality raw materials. During grinding, a laser particle size analyzer is used to strictly control the grain size. With good chemical stability, electrical properties, thermal properties and uniform shrinkage, it is suitable for electronic ceramic products and is the first choice for tape casting and other complex electronic ceramics and electronic substrates.

产品 Product		Aluminas of LISAL C series						
		C152SG	C152SG-MF	C20SG	C25SG	C30SG	C40FG	C50FG
物理属性 Physical properties								
比表面积 Surface area	m ² /g	3.7	3.7	2.1	1.3	0.9	0.8	0.7
粉体粒度D50 Particle size	μm	1.2	1.2	2.0	2.5	3.5	4	5
原晶粒度D50 Crystal size	μm	1.0	1.0	1.8	2.2	2.7		
化学属性 Chemical properties								
Al ₂ O ₃ 差减法 by difference	%	99.8	99.8	99.8	99.8	99.8	99.8	99.8
Na ₂ O	%	0.05	0.05	0.05	0.05	0.05	0.05	0.05
SiO ₂	%	0.04	0.04	0.02	0.02	0.03	0.04	0.03
Fe ₂ O ₃	%	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MgO*	%	0.05						
陶瓷属性 Ceramic properties								
生坯密度 Green density	g/cm ³	2.35	2.35	2.34	2.39	2.37		
烧结密度 Fired density	g/cm ³	3.85	3.75	3.55	3.42	3.05		
线收缩率 Linear shrinkage	%	15.3	14.5	13.3	11.5	8.5		
烧结温度 Firing temperature	°C	1620°C-1h			1670°C-1h			

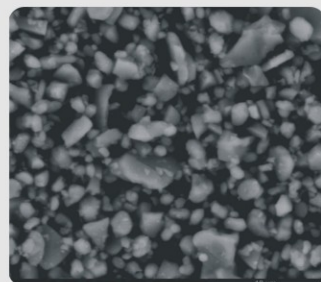
*MgO作为添加剂引入, 不计算在杂质含量内。

典型值 Typical data

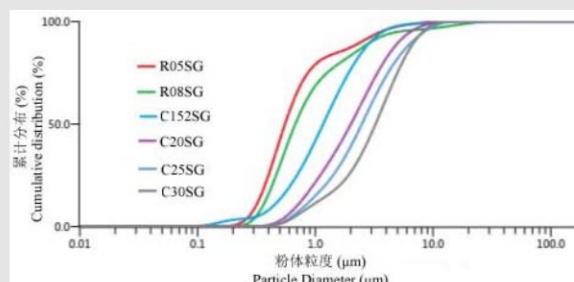
*MgO is an additive and not considered as an impurity in Al₂O₃.



C152SG



C20SG



C系列氧化铝粉粒度分布

低钠氧化铝原粉(LISAL R和C 系列)

Unground low Soda alumina powders (LISAL R and C series)

LISAL R系列和C系列均提供未研磨的氧化铝原粉，采用优质原料，在合理的煅烧温度下利用隧道窑煅烧而成的晶型稳定的氧化铝产品，原晶粒度范围在0.5~3μm之间。

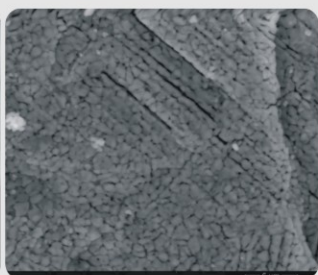
Unground alumina powders (LISAL R and C series) are produced in a tunnel kiln at a reasonable temperature using high-quality raw materials, with primary crystal sizes ranging from 0.5 to 3μm.

产品 Product		LISAL R series		LISAL C series			
		R05	R08	C152	C20	C25	C30
物理属性 Physical properties							
比表面积 Surface area	m ² /g	4.5	3.0	1.2	0.95	0.6	0.5
粉体粒度D50 Particle size	μm	65	65	70	78	80	80
原晶粒度D50 Crystal size	μm	0.3~0.5	0.3~1.0	1.1	1.8	2.2	2.7
化学属性 Chemical properties							
Al ₂ O ₃ 差减法 by difference	%	99.8	99.8	99.8	99.8	99.8	99.8
Na ₂ O	%	0.05	0.05	0.05	0.05	0.05	0.05
SiO ₂	%	0.03	0.03	0.04	0.02	0.02	0.02
Fe ₂ O ₃	%	0.01	0.01	0.01	0.01	0.01	0.01
陶瓷属性 Ceramic properties							
生坯密度 Green density	g/cm ³	2.17	2.18	2.35	2.34	2.39	2.37
烧结密度 Fired density	g/cm ³	3.88	3.85	3.75	3.55	3.42	3.05
线收缩率 Linear shrinkage	%	17.3	16.6	14.5	13.3	11.5	8.5
烧结温度 Firing temperature	°C	1540°C-2h		1620°C-1h	1670°C-1h		

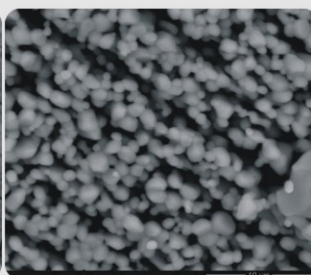
典型值 Typical data



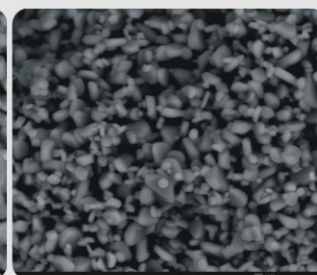
R05



R08



C25



C30

低钠双峰活性氧化铝微粉(LISAL B系列)

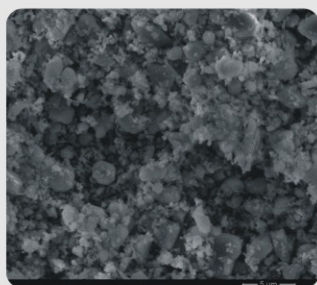
Low Soda bimodal alumina powder(LISAL B series)

低钠双峰活性(LISAL B系列)氧化铝粉, 具有良好的化学稳定性和较高的填充率和堆积密度, 可用于过滤陶瓷、催化剂、结构陶瓷、电子陶瓷等行业。

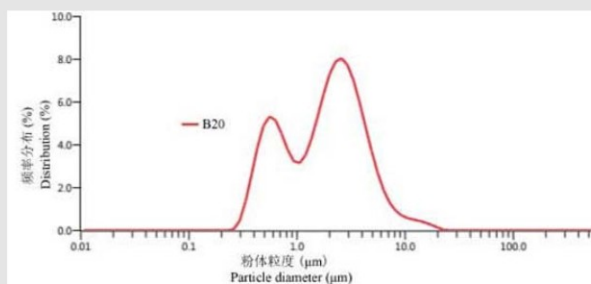
LISAL B series are low-soda bimodal alumina powders with excellent chemical resistance and dense particle packing. They can be used as filler, catalyst, technical ceramics and electronic ceramics.

产品 Product		Aluminas of LISAL B series	
		B20	B27
物理属性 Physical properties			
比表面积 Surface area	m ² /g	4.0	2.6
粉体粒度D50 Particle size	μm	2.0	2.7
原晶粒度D50 Crystal size	μm	0.5~2	0.5~4
化学属性 Chemical properties			
Al ₂ O ₃ 差减法 by difference	%	99.8	99.8
Na ₂ O	%	0.05	0.05
SiO ₂	%	0.04	0.03
Fe ₂ O ₃	%	0.01	0.01
MgO*	%	0.05	0.05
陶瓷属性 Ceramic properties			
生坯密度 Green density	g/cm ³	2.52	2.54
烧结密度 Fired density	g/cm ³	3.83	3.55
线收缩率 Linear shrinkage	%	13.0	11.0
烧结温度 Firing temperature	°C	1670°C-1h	1670°C-1h

典型值 Typical data



B20



B20双峰氧化铝粉粒度分布

高纯超细活性氧化铝微粉(LISAL RL系列)

High-purity Ultrafine alumina powders (LISAL RL series)

高纯超细活性氧化铝粉(LISAL RL系列)为99.9%亚微米级别氧化铝粉, 专门为>99.5%陶瓷等要求更高的陶瓷领域而设计。

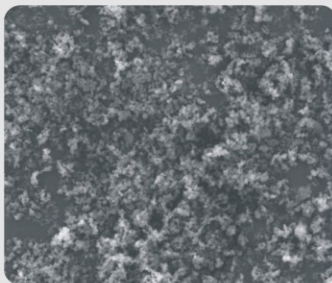
LISAL RL series are 99.9% submicron grade alumina powder with much lower content of Na_2O and other impurities. It is specially designed for the >99.5 alumina ceramics.

产品 Product		High-purity Ultrafine Alumina of LISAL RL series			
		R05LSG	R05LSG-MF	R08LSG	R08LSG-MF
物理属性 Physical properties					
比表面积 Surface area	m^2/g	7.5	7.5	5.5	5.5
粉体粒度D50 Particle size	μm	0.5	0.5	0.8	0.8
原晶粒度D50 Crystal size	μm	0.3~0.5	0.3~0.5	0.3~1.0	0.3~1.0
化学属性 Chemical properties					
Al_2O_3 差减法 by difference	%	99.9	99.9	99.9	99.9
Na_2O	%	0.01	0.01	0.01	0.01
SiO_2	%	0.03	0.03	0.03	0.03
Fe_2O_3	%	0.01	0.01	0.01	0.01
MgO^*	%	0.05		0.05	
陶瓷属性 Ceramic properties					
生坯密度 Green density	g/cm^3	2.18	2.17	2.18	2.18
烧结密度 Fired density	g/cm^3	3.91	3.88	3.90	3.86
线收缩率 Linear shrinkage	%	17.9	17.3	17.1	16.6
烧结温度 Firing temperature	$^{\circ}\text{C}$	1540 $^{\circ}\text{C}$ -2h			

* MgO 作为添加剂引入, 不计算在杂质含量内。

* MgO is an additive and not considered as an impurity in Al_2O_3 .

典型值 Typical data



R05LSG

氧化铝粉性能检测方法

Analytical Methods of Calcined Aluminas

化学组成Chemical Analyses

Al_2O_3 含量为差减法所得，杂质 Na_2O 、 CaO 、 Fe_2O_3 和 SiO_2 采用XRF、AAS和ICP检测。

Al_2O_3 content was obtained by difference and impurities for alumina such as Na_2O , CaO , Fe_2O_3 and SiO_2 were determined by XRF, AAS and ICP.

粒度分布Particle Size Distribution (PSD)

氧化铝粉体的粒度分布采用马尔文3000激光粒度测试仪进行检测。

The PSD of fine alumina powders was measured by Mastersizer 3000 Laser Particle Size Analyzer.

原晶粒度D50 Primary Crystal Size

将氧化铝粉研磨至原晶状态之后采用马尔文3000激光粒度测试仪进行检测。

The alumina powder is milled down to primary crystals, and D50 is measured by Mastersizer 3000 Laser Particle Size Analyzer.

比表面积Specific Surface Area (BET)

氧化铝粉的比表面积采用比表面积及孔隙度分析仪 Micromertics Gemini VII 2390 Surface Area Analyzer进行检测。

The BET of alumina powders were determined by Micromertics Gemini VII 2390 Surface Area Analyzer.

陶瓷属性Ceramic Properties

经过完全研磨后的氧化铝粉不添加任何添加剂在35MPa或90MPa下压制成

$\Phi 20\text{mm}$ 小样测试生坯密度。压制的小样在各自合适的温度如1540°C、1620°C或1670°C下保温1h或2h测定其烧结密度和线收缩率。线收缩率为径向收缩率。

Fully ground aluminas without any additives were pressed at 35MPa or 90MPa to form a compact for testing green density. The compacts were then held at firing temperature appropriate for the material, 1540°C, 1620°C and 1670°C for 1 or 2h to determine the fired density and linear shrinkage (radial direction).

我们致力于氧化铝粉体研发及其在陶瓷行业中的适应性研究。

自立控股不断加大资金投入，配置先进、专业的粉体性能分析和表征设备，同时聘请领域专家进行技术指导和提升，努力提高研发实力。

自立控股与中科院上海硅酸盐研究所等研究院所建立合作，对氧化铝粉的应用进行评价，为客户提供最优化的氧化铝粉体和全面的技术支持。

For Zili, we commit to the R&D of alumina powders and its applications in ceramics.

Zili enhanced its R&D capabilities through its laboratory: configure advanced and professional equipment to analyze and evaluate raw materials and products, recruit technical experts to provide technical guidance and improvement.

Zili established cooperation with the Institute of Ceramics, such as Shanghai Institute of Ceramics, Chinese Academy of Sciences, to evaluate the application of alumina powder, to provide customers with optimized alumina powder and comprehensive technical support.



扫描电子显微镜
Scanning electron microscope



射线衍射仪
X-Ray Diffraction



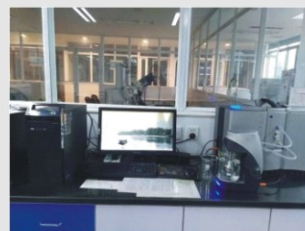
荧光光谱仪
X-Ray Fluorescence Analyzer



电感耦合等离子体发射光谱仪
ICP-OES-Inductively Coupled Plasma Optical
Emission Spectrometer , Thermo Fisher



比表面积及孔隙度分析仪
Micromeritics Gemini VII 2390
Surface Area Analyzer



马尔文3000激光粒度分析仪
Mastersizer 3000 Laser Particle
Size Analyzer



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