



INTRODUCTION TO IPS CERAMICS

Manufacturers of Furnace Equipment,
Ceramics for the EV Battery Industry and
Technical Ceramics for Global Industries

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ABOUT US

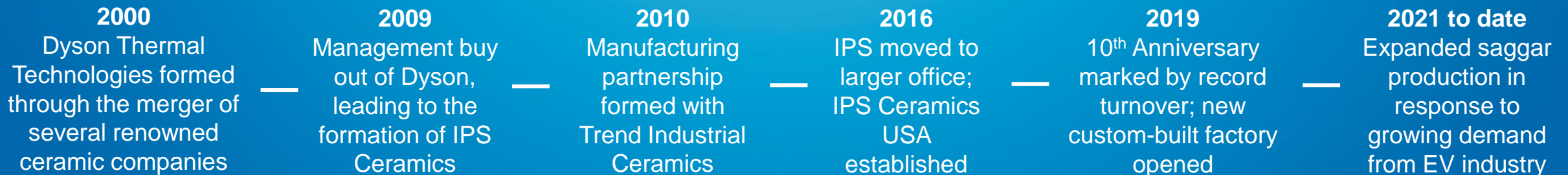
OUR TEAM

- Collective 250+ years experience in design, development, manufacturing and sales
- Supplying furnace equipment and technical ceramic components to a wide range of industries
 - Based worldwide (UK/USA/China)

WHAT WE OFFER

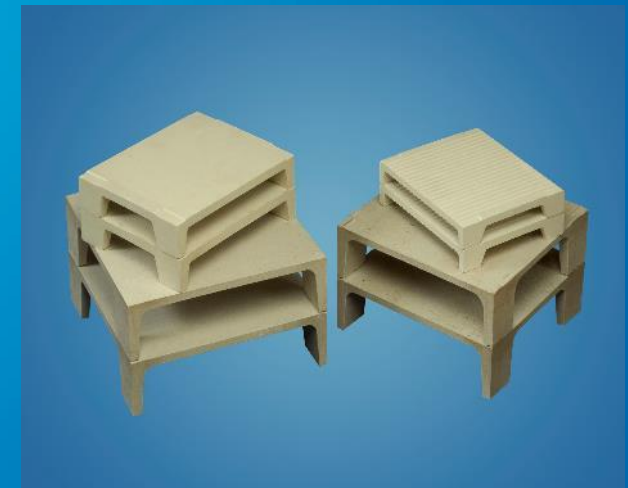
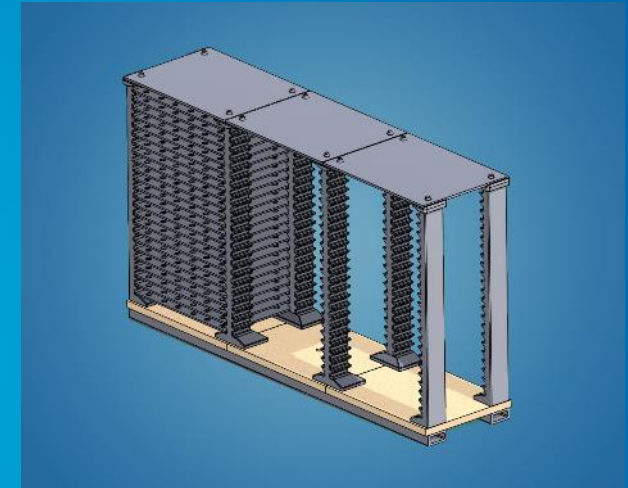
- Dependable ceramic products for many industries
- Wide ranging support provided by our dedicated customer service and technical teams
- Bespoke products created through our expert design teams and robust manufacturing base

COMPANY TIMELINE

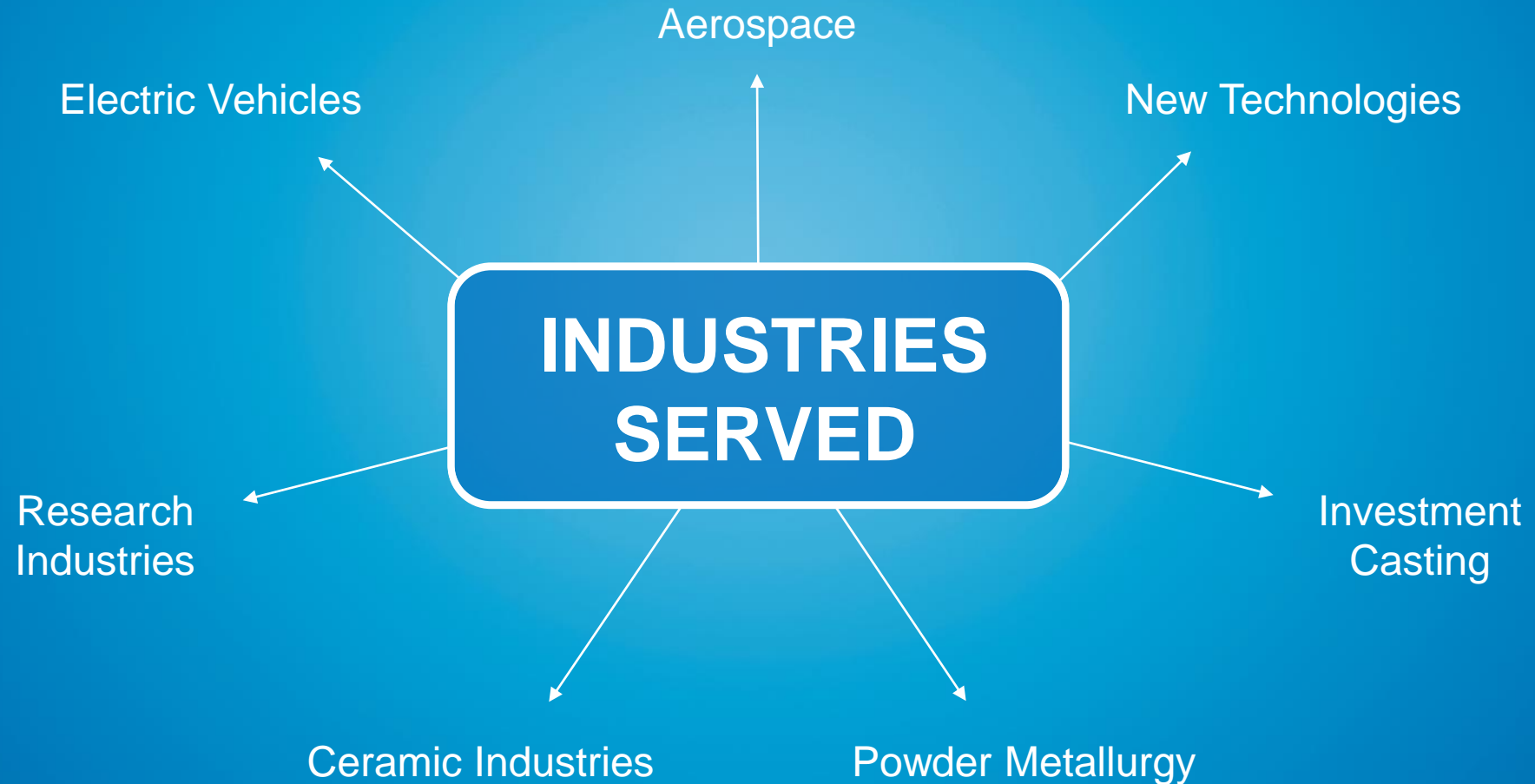


OUR EXPERTISE AND EXPERIENCE

- Worked extensively on projects with R&D institutions, including the creation of sintering support systems for solid state batteries
- Also worked with EV Battery companies to design and develop products for their manufacturing processes
- Our history of working with furnaces and related ceramic materials make us the perfect partner to optimise your kiln/furnace set-ups and get the most out of your materials
- We supply an extensive range of standard and bespoke products to the EV industry



INDUSTRIES SERVED GLOBALLY



ALUMINA MODULE SYSTEM

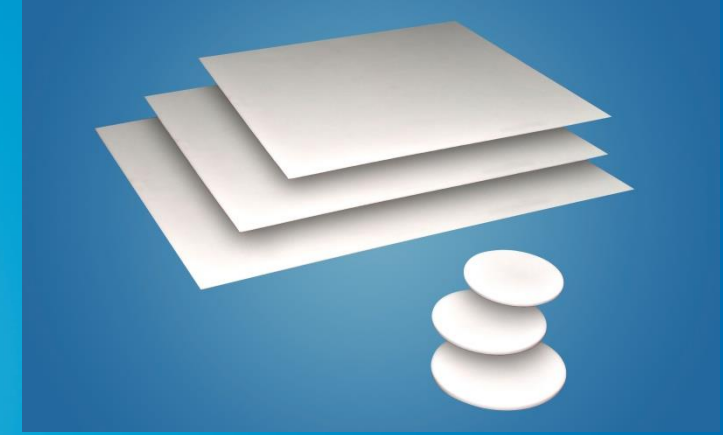


A customisable, compact and modular rack system used for supporting battery components during heat treatment.

Alumina tiles are also available which support materials / components.

Type	Technical Alumina (92%)	Technical Alumina (95%)	Technical Alumina (99%)	Technical Alumina (99.7%)
Max. Use Temperature	1400 °C / 2550 °F	1450 °C / 2650 °F	1600 °C / 2900 °F	1700 °C / 3100 °F
Density (g/cm ³)	3.6	3.7	3.9	3.9
Open Porosity (%)	< 0.5	< 0.5	< 0.5	< 0.5
Bending Strength (MPa)	150	175	200	300
Modulus of Elasticity (GPa)	300	300	300	300
Thermal Conductivity (W/mK)	10	25	25	28
Coefficient of Thermal Expansion (x10 ⁻⁶ /K)	7	8	8	8

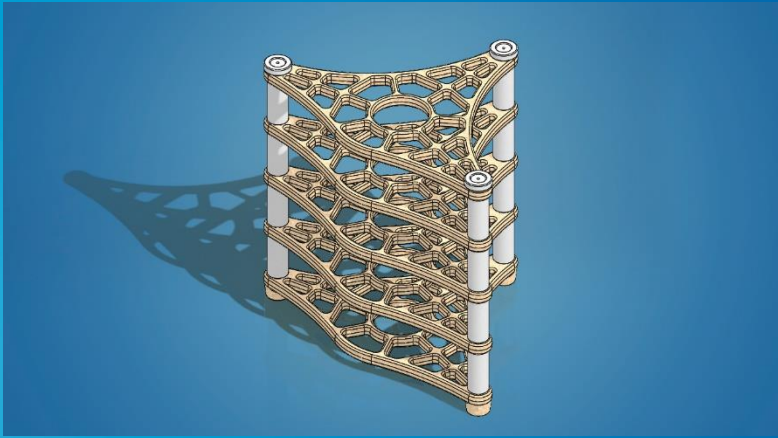
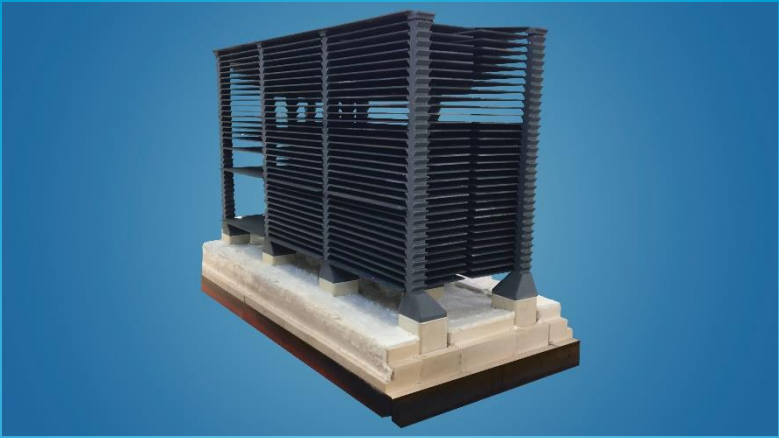
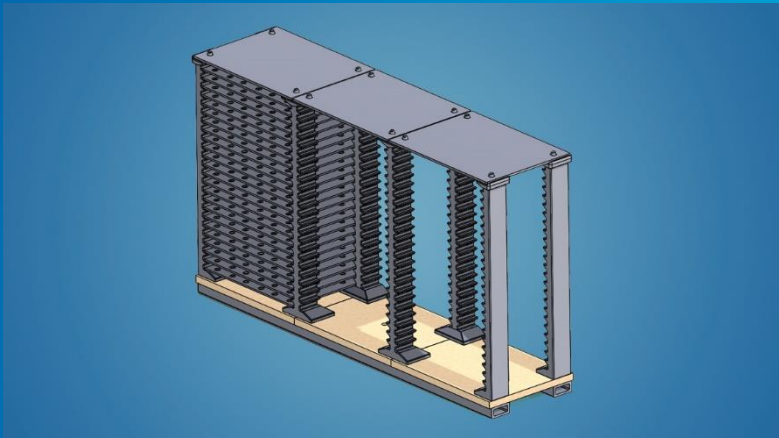
ALUMINA SUBSTRATE TILES



Alumina tiles and discs are used as substrates for new developments in battery and fuel cell technology. These tiles are often around 1mm thick and may be shaped or drilled using laser cutting.

Type	Technical Alumina (92%)	Technical Alumina (95%)	Technical Alumina (99%)	Technical Alumina (99.7%)
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SUPPORT SYSTEMS FOR SINTERING



Bespoke systems used to support products during the sintering process.

Modular designs, built out of individual components, give you high levels of flexibility.

Type	Cordierite	Silicon Infiltrated / Reaction Bonded SiC	Nitride Bonded SiC	Recrystallised SiC
Properties	Good heat resistance Non-reactive	High strength Low creep	High strength and low creep Lightweight	High working temp. and low creep Thermal shock resistant
Max. Use Temperature	1350 °C / 2462 °F	1380 °C / 2500 °F	1450 °C / 2650 °F	1650 °C / 3000 °F
Density (g/cm³)	2 g/cm³	3	2.8	2.7
Open Porosity (%)	26 %	< 0.5	13	15
Bending Strength (MPa)	15 Mpa	250	160	90
Modulus of Elasticity (GPa)	--	325	200	250
Thermal Conductivity (W/mK)	--	45	25	25

ROLLERS FOR KILNS & FURNACES



Used to support and transport products through the kiln or furnace during heat treatment.

Lengths, diameters and wall-thicknesses can be tailored to your application.

Type	Mullite	Silicon Infiltrated / Reaction Bonded SiC	Nitride Bonded SiC	Recrystallised SiC
Properties	High melting point Excellent stability Non-reactive	High strength Low creep	High strength Low creep Lightweight	High working temp. Thermal shock resistant Low creep
Max. Use Temperature	1300 °C / 2372 °F	1380 °C / 2500 °F	1450 °C / 2650 °F	1650 °C / 3000 °F
Density (g/cm³)	2.16 g/cm³	3	2.8	2.7
Open Porosity (%)	29.6 %	< 0.5	13	15
Bending Strength (MPa)	--	250	160	90
Modulus of Elasticity (GPa)	--	325	200	250
Thermal Conductivity (W/mK)	--	45	25	25
Coefficient of Thermal Expansion (x10 ⁻⁶ /K)	--	4.5	4.7	4.8

HEATING ELEMENTS



Used in kilns and furnaces for battery production.

High-density elements have a ceramic coating, allowing them to be used without a protection tube while providing a longer service life.

They resist oxidation or corrosion, exhibit minimal deformation, and are easy to install/maintain.

Type	Standard Heating Element	High Density Heating Element
Properties	Requires Protection Tube	Protection Tube not needed
Max. Use Temperature	1600 °C / 2912 °F	1600 °C / 2912 °F
Density (g/cm³)	2.5	2.65
Open Porosity (%)	23	18
Bending Strength (MPa)	50	60
Specific Heat (kJ/kg·°C)	1.0	1.0
Thermal Conductivity (W/mK)	14~19	14~19
Coefficient of Thermal Expansion (x10 ⁻⁶ /K)	4.5	4.5

BURNER NOZZLES AND RADIANT TUBES



Silicon Carbide Radiant Tubes and Burner Nozzles provide effective heat transfer in the furnace. Radiant Tubes also block contaminants and keep products pure. They are very strong and give a long service life.

Type	Silicon Infiltrated / Reaction Bonded	Nitride Bonded SiC	Recrystallised SiC
Properties	High strength Low creep	High strength Low creep Lightweight	High working temp. Thermal shock resistant Low creep
Max. Use Temperature	1380 °C / 2500 °F	1450 °C / 2650 °F	1650 °C / 3000 °F
Density (g/cm³)	3	2.8	2.7
Open Porosity (%)	< 0.5	13	15
Bending Strength (MPa)	250	160	90
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Thermal Conductivity (W/mK)	45	25	25
Coefficient of Thermal Expansion (x10 ⁻⁶ /K)	4.5	4.7	4.8

HIGH PERFORMANCE SAGGARS



Pressed and slip-cast saggars are used for the production of lithium-based cathode materials. They're non-reactive and hard wearing.

Type	Mullite	Cordierite	Silicon Infiltrated / Reaction Bonded SiC	Nitride Bonded SiC	Recrystallised SiC
Properties	High melting point Excellent stability Non-reactive	Good heat resistance Non-reactive	High strength Low creep	High strength Low creep Lightweight	High working temp. Thermal shock resistant Low creep
Max. Use Temperature	1300 °C / 2372 °F	1350 °C / 2462 °F	1380 °C / 2500 °F	1450 °C / 2650 °F	1650 °C / 3000 °F
Density	2.16 g/cm ³	2 g/cm ³	3 g/cm ³	2.8 g/cm ³	2.7 g/cm ³
Open Porosity	29.6 %	26 %	< 0.5 %	13 %	15 %
Bending Strength	--	15 Mpa	250 MPa	160 MPa	90 MPa
Modulus of Elasticity	--	--	325 GPa	200 GPa	250 GPa
Thermal Conductivity	--	--	45 W/mK	25 W/mK	25 W/mK
Coefficient of Thermal Expansion	--	2.8 x10-6/K	4.5 x10-6/K	4.7 x10-6/K	4.8 x10-6/K



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