

Porous Metal Foam Nickel Iron Alloy Research Electrode Material

Item Number: FZ55



Introduction

High porosity metal foam engineered for research electrode applications and advanced filtration delivers exceptional electrical conductivity, customizable PPI configurations, superior corrosion resistance, and high structural durability under extreme operational conditions.

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Application	Description	Key Benefit
Secondary Battery Electrodes	Utilized as a conductive 3D current collector for nickel-metal hydride, nickel-cadmium, nickel-zinc, and advanced metal-air battery systems.	Significantly reduces cell internal resistance, boosts active material mass loading, and prevents electrode pulverization during rapid charge-discharge cycling.
Supercapacitors & Pseudocapacitors	Serves as a porous conductive substrate for electrodepositing transition metal oxides, conductive polymers, and carbon nanomaterials.	Offers ultra-high interfacial surface area and rapid ion diffusion channels, maximizing specific capacitance and rate performance.
Water Electrolysis & Hydrogen Production	Applied as gas-diffusion electrode cores and electrocatalyst supports in alkaline water electrolyzers and PEM hydrogen production systems.	Enhances hydrogen and oxygen evolution kinetics with rapid bubble detachment and exceptional long-term stability in concentrated alkaline solutions.
Chemical Distillation & Column Packing	Integrated as structured packing inside industrial rectification and distillation columns to optimize vapor-liquid equilibrium.	Delivers uniform liquid distribution, expansive contact surface area, and remarkably low operational pressure drops.
High-Efficiency Heat Dissipation	Embedded in high-power electronics, heat pipes, and compact condenser heat exchangers as a permeable convective cooling core.	Provides high thermal conductivity exceeding 3 W/(m ² ·K) combined with enhanced turbulent fluid mixing for accelerated heat transfer.
Precision Liquid & Gas Filtration	Deployed in petrochemical, pharmaceutical, and metallurgical processing to remove particulate contaminants from high-temperature or corrosive streams.	Features high liquid permeability (95% to 98%), customizable filtration ratings down to 3 μm, and easy backwash cleaning.
Electromagnetic Interference (EMI) Shielding	Installed in aerospace, telecommunications, and defense enclosures to attenuate high-frequency electromagnetic radiation and acoustic noise.	Provides broadband electromagnetic shielding attenuation combined with lightweight open-cell acoustic absorption and vibration damping.
Catalytic Converter Substrates	Acts as a high-surface-area porous metallic catalyst carrier for industrial VOC treatment, syngas production, and automotive emission control.	Withstands thermal shock up to 500°C, enhances mass transfer, and minimizes catalyst washcoat spalling during thermal cycling.

Parameter	Specification (Item FZ55 Series)	Reference Standards & Testing Conditions
Product Identification	FZ55	Open-Cell Porous Metallic Foam Substrate
Base Material Purity	Ni ≥ 99.0% (residual trace C and chemical deposits)	Spectrometric / Gravimetric Metallurgy Analysis
Material Thickness	1.0 mm - 25.0 mm	Precision Caliper / Optical Micrometer Measurement
Pore Diameter Range	0.1 mm - 10.0 mm	Scanning Electron Microscopy (SEM) / Optical Micrography
Pores Per Linear Inch (PPI)	5 - 130 PPI	Microscopic Linear Pore Count Inspection
Volumetric Porosity	60% - 98%	Volumetric Gravimetric Water Displacement Method

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Through-Hole Ratio (Open Porosity)	≥ 98%	Fluid Permeability / Gas Breakthrough Technique
Bulk Density	> 0.1 g/cm ³	Standard Dimensional Gravimetric Density Test
Tensile Strength	8 – 50 MPa	Standard Ambient Tensile Pull Testing
Compressive Strength	≥ 250 kPa	Measured at 50% Uniaxial Compressive Strain
Overall Mechanical Strength	> 2 – 7 MPa	Dynamic Flexural and Compressive Shear Testing
Continuous Operating Temperature	≥ 500°C	Inert / Passivated Atmospheric Thermal Stability
Heat Transfer Coefficient	> 3 W/(m ² ·K)	Steady-State Convective Thermal Flow Testing
Standard Filtration Accuracy	200 µm – 5 mm	Standard Open-Cell PPI Rating (5 to 130 PPI)
Custom Ultra-Fine Filtration Precision	3 µm – 50 µm	Available via Specialized Densification / Post-Processing
Liquid Permeability (Water Baseline)	95% – 98% (≥ 80% across diverse industrial fluids)	Gravity / Hydrostatic Liquid Flow Permeation Testing
Corrosion Resistance Profile	Resists HCl, H ₂ SO ₄ , alkalis, and organic acids; passivates in strong HNO ₃	Ambient to Elevated Chemical Immersion Standards
Hydrogen Absorption Characteristic	High hydrogen absorption capacity when passivated (inversely proportional to particle size)	Specialized Volumetric Gas Sorption Analysis
Maximum Geometric Dimensions	Standard 600 mm × 600 mm (Custom lengths and widths available)	CNC Cut-to-Size / Precision Shearing Capabilities