

3MS.004 Alumina-Based Adhesives



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TECHNICAL DATA

Physical variables included in this documentation are provided by way of indication only and do not, under any circumstances, constitute a contractual undertaking. Please contact our technical service if you require any additional information.

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Final Advanced Materials is collaborating with Cotronics to offer highly effective alumina-based adhesive products. They are extremely resistant and can be used in many applications.

Areas of application:

- Research and development, electronics, metallurgical, industrial and nuclear applications, etc.

Applications:

- Automatic application for industrial production
- Hardening protection coating
- Bonding

Advantages:

- Maximum operating temperature up to 1,790 °C
- Resistant to thermal shock, corrosion, oxidation, erosion
- Electric and thermal insulation
- Use in harsh environments, both reducing and oxidising
- Resistance to molten metals, steam, to most solvents and chemical products

Safety

Do not inhale the powders! Wear a mask when handling in large quantities.

Avoid all contact with the eyes or skin.

In the event of an accident, quickly clean skin and eyes with water and consult a doctor.

We will provide you with the material safety data sheets.

info@final-materials.com

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Alumina-Based Adhesives



Resbond™ 901

The refractory adhesive, Resbond™ 901, is a creamy adhesive composed of a pure alumina powder suspended in an inorganic liquid hardening binder (Resbond™901A). These products do not contain asbestos, organic solvents or volatile organic compounds. They are used to harden, coat or impregnate porous surfaces while retaining a certain flexibility.

Properties

- Maximum operating temperature: 1,700 °C
- Peak temperature: 1,780 °C (Resbond™ 901)
- Resistance to thermal shocks, corrosion, oxidisation and erosion
- Insulation against electricity and heat
- Can be used in reducing or oxidising atmospheres
- Resistant to molten non-ferrous metals, steam and most chemicals and solvents
- Increases the resistance, hardness and reflective capacity of mouldable and malleable ceramics.

Applications

- Hard protective coating
- Creation of moulds, potting, electronic or mechanical components
- Coatings for graphite, aluminium, galvanised pipes and tools, induction coils, electrical resistors, heat sensors and thermocouples
- Manufacture of infra-red reflectors for heating resistors
- Assembly and laminating of biosoluble paper, ceramic felt and Rescor™ 360 boards.

Implementation

- Easy application using a brush, spraying or dipping
- Curing at room temperature
- No toxic or unpleasant odour
- Ideal for bonding two flexible materials
- To obtain a compact and rigid mass: add the 901 hardener binder

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Alumina-Based Adhesives



Resbond™ 901A Binder

The Resbond™ 901A ceramic binder in liquid phase resists high temperatures. Once cured, it penetrates into the surface of porous ceramics to form a strong ceramic bond. It is composed of extremely fine grains of alumina to optimise its penetrative power.

Implementation

- It can be poured, applied with a brush or by spraying or dipping
- Curing: in 24 hours at room temperature
- Fast curing: in 4 hours at 65 °C
- Use as thinner: with the Resbond™ 901 adhesive

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Alumina-Based Adhesives



Resbond™ 903HP

The Resbond™ 903HP ceramic adhesive is an alumina compound and is smooth, creamy paste.

Properties

- Maximum operating temperature: 1,650 °C
- Peak temperature: 1,790 °C
- Excellent electrical insulation
- Resistant to liquid metals and many solvents and chemicals
- Can be used in reducing or oxidising atmospheres

Applications

- Bonding of dense ceramics, non-reactive metals and elements that do not withstand water.

Implementation

- Application using a brush, trowel or by spraying
- Application of multiple, thin waterproofing layers
- Curing at room temperature
- Fast curing:
 - 2 hours at 120 °C is sufficient to give the part good adhesion
 - 4 hours at 370 °C are required for total hardening

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Alumina-Based Adhesives



Resbond™ 908

The Resbond™908 adhesive bonds and protects up to 1,650 °C. Its application facilitates high-speed production operations: its viscosity is adjusted for automatic dispensing and measuring.

Properties

- Maximum operating temperature: 1,650 °C
- Not very abrasive
- Good electrical insulator
- Good thermal conductor
- Insoluble in water after curing
- Excellent chemical inertness
- High resistance to chemicals
- Excellent resistance to compression
- High hardness

Applications

- High speed production operations
- Electronic equipment

Implementation

- Easy to use
- Curing in 24 hours at room temperature
- Fast curing in 30 minutes at 120 °C

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Alumina-Based Adhesives



Resbond™ 920

The Resbond™ 920 adhesive is composed of alumina. It can replace up to seven different ceramic cements at certain manufacturing plants.

Properties

- Can be used from 60 °C to +1,500 °C.
- Dielectric strength of 10.5 kV/mm
- Resistivity of $10^9 \Omega \cdot m$ at room temperature

Applications

- Moulding or coating where a combination of high electrical resistance and good thermal conductivity is required
- Bonding pyrometers, heating elements, furnace elements, resistors

Implementation

- Easy to use:
 - Mix the powder with distilled water in a ratio of 100 to 14
- Pot life (handling time after mixing): 30 minutes
- Curing in 24 hours at room temperature
- Fast curing: 4 hours at 65 °C.

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Alumina-Based Adhesives



Resbond™ 989

The Resbond™ 989 adhesive is the one-component product with the greatest number of applications in this range. It is composed of two types of alumina particles: the biggest measure between 50 and 120 microns and represent approximately 15 % of the weight of the product, and the smallest measure between 1 and 25 microns.

Applications

- Bonding metals, ceramics, graphites and glass
- Bonding silicon carbide nozzles into a ceramic sleeving
- Bonding nickel pins with a diameter of 0.5 mm into an alumina nitride sleeve during a heat treatment at 900 °C
- Production of heating elements with Kanthal® heating elements and a mullite substrate

Implementation

- Easy to apply with a brush in thin layers
- Can be applied by serigraphy.

Advice for use:



- Mix the paste with a mechanical mixer until it hardens. Mixing should not be less than 3 minutes.
- The smooth, creamy paste should be used within 20 minutes of its preparation, especially if the atmosphere in the workshop is dry.
- If waiting before use, the paste should be stored in a hermetic or humid chamber.
- Complete Curing after a minimum of 4 hours at room temperature or 1 hour at 95°C
- This product is the ideal choice for production applications where automation is required.

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Alumina-Based Adhesives



Resbond™ 989FS

This variation of the Resbond™ 989 is a fast-setting adhesive: It fully cure in 120 minutes at 23°C or after 5 minutes at 95°C. This property makes it ideal for applications with automatic dispensing



3MS.004**Alumina-Based Adhesives****Resbond™ 989F & 940HT****Resbond™ 989F Pre-Nano Adhesive**

This second variant of the Resbond™ 989 is manufactured with a new radial dissipation formula. It combines a high temperature colloidal ceramic with nanometric alumina particles. The ceramic adhesive passes through an ultra-fine sieve to ensure a particle diameter of less than 0.6 µm. Thanks to this specific manufacturing method, it has the ability to bond ultra-fine layers up to 1,650 °C.

Properties

- Maximum operating temperature: 1,650 °C

Applications

- Ideal for automatic dispensing in industrial production

Implementation

- Curing: identical to Resbond™ 989FS

Resbond™ 940HT

The Resbond™ 940HT adhesive is the general purpose product in this range.

Properties

- Maximum operating temperature: 1,540 °C

Applications

- Resistant to molten metals and most chemicals and solvents
- Can be used in reducing or oxidising atmospheres

Technical Data

Property	Unit	901	903HP	908	920	940HT	989	989FS	989F
Max. Operating Temperature	°C	1,650	1,790	1,650	1,650	1,540	1,650	1,650	1,650
Components		1	1	2	2	2	1	1	1
Appearance		Paint	Paint	Paste	Paste	Paste	Paint	Paint	Creamy
Filler		Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃
Compressive Strength at 20 °C	MPa	8.3	48.3	20.7	31	29	20.7	19.3	24.1
Flexural Strength at 20 °C	MPa	4.1	24.1	7.6	3.1	13.1	7.6	6.5	8.6
Thermal Conductivity	W.m ⁻¹ .K ⁻¹	0.29	5.76	2.16	2.16	2.16	2.16	2.16	1.73
Thermal Expansion	10 ⁻⁶ .K ⁻¹	7.2	7.2	8.1	8.1	7.2	8.1	8.1	8.1
Dielectric Strength	kV/mm	7.8	9.75	7.8	10.5	4.9	7.8	7.8	7.8
Resistivity	Ω.m	10 ¹⁰	10 ⁸	10 ⁸	10 ⁹	10 ⁶	10 ⁶	10 ⁶	10 ⁶
Mix Ratio	Powder - Binder	-	-	100 - 33	100 -14	100 - 30	-	-	-
Cure at Room Temperature	Hrs	24	-	24	24	24	2h to 4h	30min to 2h	2h to 4h
Fast Cure		2 hrs at 65 °C	2 hrs at 120 °C	30 min at 120 °C	4 hrs at 65 °C	5-10 min at 93 °C	30 min to 1h at 95°C	5 min at 95 °C	1h to 2h at 95°C
Post-Cure		-	4 hrs at 370 °C	-	-	-	-	-	-

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