

3M™ Electronic Surfactant 4200

Product Description

3M™ Electronic Surfactant 4200 was designed as an additive to improve wetting in buffered HF (BHF) or buffered oxide etch (BOE) solutions in semiconductor, flat panel display and solar panel applications. 3M surfactant 4200 is an anionic fluorochemical surfactant having 25% active material in dilute aqueous ammonia. When used in BOE/HF solutions, 3M surfactant 4200 significantly lowers the surface tension and improves the wetting of the solution. This improved wetting can improve the etch uniformity of BOE/BHF solutions while having little to no effect on the etch rate. Aligning with semiconductor clean processing, 3M surfactant 4200 has low metals (typically <500 ppb of specified metals) and solutions can be filtered without impacting the surfactant performance. 3M surfactant 4200 has low adsorption to wafer surfaces, and complete removal can be achieved by using a bake step following the etch process.

Key Features

- Improved wetting of etch solutions
- Little to no effect on the etch rate
- Solubility in wide range of BOE / BHF blend ratios
- Effective at low concentrations
- Low metals
- Filterable
- Limited surface adsorption
- Surfactant is volatile and can be removed by heating
- Low foaming

Applications

- Cleaning or etching of silicon, quartz or glass surfaces in manufacture of semiconductors, flat panel displays and solar panels

Composition

Component	3M™ Electronic Surfactant 4200
Ammonium fluoroalkyl sulfonamide	25% by weight
Water	75% by weight

Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Property	3M™ Electronic Surfactant 4200
Appearance	Clear, colorless liquid
Specific Gravity	1.14 (9.5 lb/gal; 1.14 kg/L)
Surfactant Type	Anionic

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Typical Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product.

Surface Tension (dyn/cm) of 3M™ Electronic Surfactant 4200 in Various Solutions					
Solution	0 ppm	50 ppm	100 ppm	200 ppm	300 ppm
7:1 Buffered HF ^A	70	19	20	20 ⁺	20 ⁺
500:1 Buffered HF ^B	56	20	17	17	18 ⁺

A – 7 parts 40% ammonium fluoride to 1 part 49% hydrofluoric acid by volume

B – 500 parts 40% ammonium fluoride to 1 part 49% hydrofluoric acid by volume

+ – Not fully soluble

* Concentration of 3M™ Electronic Surfactant 4200 by weight based on active material

* Surface tension measured using Wilhelmy plate method of ASTM D1331

Surface Tension (dyn/cm) of 3M™ Electronic Surfactant 4200 in Various Solutions				
Solution	0 ppm	500 ppm	1000 ppm	2000 ppm
Water	73	68	62	57
100:1 Hydrofluoric Acid ^A	72	28	18	18

A – 100 parts water to 1 part 49% hydrofluoric acid by volume

+ – Not fully soluble

* Concentration of 3M™ Electronic Surfactant 4200 by weight based on active material

* Surface tension measured using Wilhelmy plate method of ASTM D1331

Product Safety and Handling

3M™ Electronic Surfactant 4200 is intended for use in semiconductor wafer fabs and manufacture of solar panels and flat panel displays.

The recommended method of disposal is high temperature incineration in a facility capable of handling halogenated materials.

Release of 3M™ Electronic Surfactant 4200 to the environment must be prevented. Prevention includes, but is not limited to, treatment of surfactant containing aqueous waste streams.

For additional product safety and handling information, please read the product label and Material Safety Data Sheet before using this product.

Regulatory

The components of 3M™ Electronic Surfactant 4200 are in compliance with the chemical notification requirements of the United States (TSCA), China (IECSC), Taiwan (TCSI), and Korea (KECI). Certain restrictions apply. Contact 3M representative for an update on the regulatory status of 3M™ Electronic Surfactant 4200.

Storage and Shelf Life

The shelf life of 3M™ Electronic Surfactant 4200 is 24 months from the date of manufacture when stored in the original packaging materials and stored at 21°C (70°F) and 50% relative humidity.

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is manufactured and deemed commercially available from 3M. The COA contains the 3M test methods, specifications limits and test results for the product's performance attributes that the product will be supplied against. Contact your local 3M representative for this product's COA.

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Safety Data Sheet: Consult Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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