3M

Product Information

Novec™ 4300
Electronic Surfactant

Introduction

3M™ Novec™ 4300 Electronic Surfactant is an anionic fluorochemical surfactant available as a 20 wt% solution in glacial acetic acid with low metal content, typically containing < 30 ppm of each specified metal. Novec 4300 surfactant provides low surface tensions in low pH solutions, such as Phosphoric/Acetic/Nitric Acid mixtures for metal etching. It also provides low surface tension in a variety of other aqueous solutions. Novec 4300 surfactant offers :

- Improved wetting
- Good solubility
- Low effective concentration
- Stability in bath
- Filterability

On the basis of toxicity testing conducted on Novec 4300 surfactant and life cycle assessment of its intended applications, 3M characterizes Novec 4300 surfactant as sustainable technology. Additional EHSR data on this product is available from 3M.

Typical Applications
For use in metal etch solutions including Phosphoric/Acetic/Nitric ("PAN Etch") blends, and in other aqueous microelectronic process chemicals including low pH solutions.

Material Description

Ingredients	Novec 4300
Ammonium Fluoroalkylsulfonate	20% by weight
Glacial Acetic Acid	80% by weight

Typical Physical Properties

All values determined at 77°F (25°C) unless otherwise specified.
Not for specification purposes.

Properties	Novec 4300
Appearance	Clear white or light yellow liquid
Specific gravity	1.1 (9.13 lbs./gal, 1.1 kg/l)
Viscosity	1.2 centipoise
Type	Anionic

3M™ Novec™ 4300 Metal Impurities

Not for specification purposes.

3M™ Novec™ 4300 Electronic Surfactant contains <30 ppm of each of the following metals:

Sodium
Copper
Iron
Manganese
Nickel
Arsenic

The product also contains <40 ppm of each of the following metal:

Potassium

Surface Tension

All values determined at 77°F (25°C) unless otherwise specified. Not for specification purposes

Surface tension in dyne/cm

	0 ppm	100 ppm	200 ppm	500 ppm	1000 ppm	2000 ppm
Water	73	43	34	27	22	19
10% KOH	77	*19	*19	*19	*19	*19
50% H_2SO_4	67	19	19	*19	*19	*19
40% HNO_3	54	31	25	19	19	19
18.5 M HCl	63	19	19	19	19	18
85% H_3PO_4	78	19	19	19	19	18
1:50 NH_4OH/H_2O	73	34	23	22	19	19
5% $H_2C_2O_4$	72	26	21	19	19	19

*Precipitate

Surface tension in dyne/cm

Metal Etch Solutions	0 ppm	50 ppm	100 ppm	200 ppm	500 ppm
Metal Etch 1**	~70	25	20	20	19
Metal Etch 2**	~60	27	24	23	21

** Metal etch 1 and metal etch 2 are different mixture of phosphoric acid, nitric acid, and glacial acetic acid which may be used for etching Al metal.

Product Safety and Handling

Novec 4300 surfactant is intended for use in metal etch solutions at semiconductor fabrication and microelectronic processing facilities.

Recommended disposal of the 20 wt% solution of Novec 4300 surfactant is high temperature incineration.

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

3M™ Novec™ 4300 Regulatory Summary

- All components of 3M™ Novec™ 4300 Electronic Surfactant are fully compliant with the chemical regulations of TSCA. Novec 4300 surfactant contains a PFBS-based fluorosurfactant that was notified to the US EPA under a low volume exemption (LVE). The use of this as a surfactant in semiconductor fabrication and microelectronics processing is allowed. Proper exposure control can be managed by use of personal protective equipment (PPE) as suggested in the Material Safety Data Sheet (MSDS).
- PFBS-based surfactants are not included in the U.S. EPA's PFAS Final Significant New Use Rule (Perfluoroalkyl Sulfonates; Significant New Use Rule, 67 Fed. Reg. 72, 854, Dec. 9, 2002).

Resources

For additional technical information on Novec 4300 electronic surfactant in the United States, call 3M Electronics Markets Materials Division: **800 810 8513**

For other 3M global offices, and information on additional 3M Electronics products, visit our web site: **www.3m.com/electronics**

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3M Center
Building 224-3N-11
St. Paul, MN 55144-1000

800-810-8513

www.3m.com/electronics

Issued: 9/05

5028(HB)
60-5002-0095-5