

Buffered Oxide Etchant

- FUJIFILM Buffered Oxide Etchants are silicon oxide etchants formulated from high purity 49% Hydrofluoric Acid and high purity 40% Ammonium Fluoride.
- Formulations are available in standard NH₄F:HF ratios or made to customer specification.
- Stringent control of both hydrofluoric acid and ammonium fluoride content ensures lot to lot reproducibility of etch rate characteristics.
- A Certificate of Analysis is provided with every lot and includes assay, trace metal analysis, and particle count analysis at 0.2μ and 0.5μ.
- Formulations are also available with **OHS™** to improve surface wetting and promote etch uniformity.
- Buffered HF's are also used as pre-diffusion and premetallization surface preparations. Buffered hydrofluoric
- Etch rates may also vary in SiO₂ films due to changes in film densities that result from the presence of dopants. These variations are impacted by dopant type and concentration.
 - Phosphorous doped films are less dense and tend to etch faster. An increase in phosphorous concentration will increase etch rates.
 - Boron doped oxide (borosilicate glass) is more dense and tends to etch slower.
- Elevated temperatures also increases SiO₂ sidewall sloping.
- Etching should be done in polypropylene, polyethylene, Teflon® or other fluorocarbon containers.
- To minimize fluctuations in etch rate, etch bath temperature should be controlled to ±0.5°C.
- Substrates can be etched for a predetermined time or to visual dewet. A 10 to 20 second overetch ensures isolation of features.

Fig 1. Etch Rate vs Weight Percent Hydrofluoric Acid

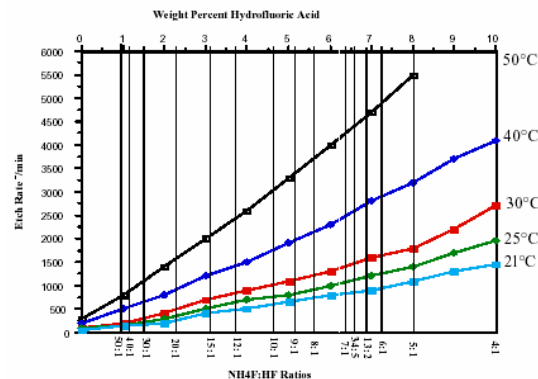


Fig. 2 Etch rate vs. Temperature

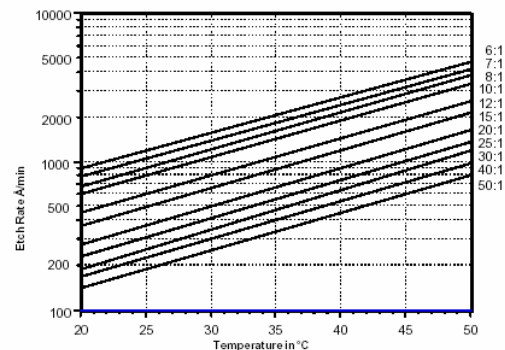


Table 1. Analytical Specifications, Etch Rate Parameters, Physical Properties, and Minimum Storage Temperatures:

NH ₄ F : HF Ratio	Assay in Weight %		Etch Rates for Undoped Thermal Oxide @21°C in Å per minute	T _C * °F/°C	Specific Gravity @ 25°C
	%HF	%NH ₄ F			
4:1†	9.97 - 10.27	31.24 - 32.24	1540 - 1620	76/24	1.115
5:1†	8.29 - 8.59	32.61 - 33.61	1140 - 1210	64/18	1.113
6:1	7.10 - 7.40	33.59 - 34.59	910 - 980	56/13	1.112
13:2	6.61 - 6.91	33.98 - 34.98	830 - 900	53/12	1.112
34:5	6.36 - 6.66	34.19 - 35.19	790 - 860	50/10	1.111
7:1	6.19 - 6.49	34.33 - 35.33	760 - 830	49/ 9	1.111
8:1	5.49 - 5.79	34.89 - 35.89	655 - 725	44/ 7	1.110
9:1	4.93 - 5.23	35.35 - 36.35	580 - 650	40/ 4	1.110
10:1	4.47 - 4.77	35.73 - 36.73	520 - 590	37/ 3	1.109
12:1	3.76 - 4.06	36.31 - 37.31	430 - 500	32/ 0	1.109
15:1	3.03 - 3.33	36.90 - 37.90	345 - 415	30/-1	1.109
20:1	2.27 - 2.57	37.52 - 38.52	260 - 330	26/-3	1.107
25:1	1.81 - 2.11	37.90 - 38.90	220 - 270	25/-4	1.107
30:1	1.47 - 1.77	38.05 - 39.05	180 - 230	22/-6	1.107
40:1	1.09 - 1.39	38.49 - 39.49	140 - 190	21/-6	1.106
50:1	0.85 - 1.15	38.68 - 39.68	115 - 165	20/-7	1.106

* T_C - Ammonium Bifluoride Crystallization Temperature

† Modified oxide etchants that do not crystallize at room temperature are recommended.