

Item	Nickel Selective Etchant-NC	Nickel Etchant-H	Copper Selective Etchant-CS	Copper Selective Etchant-CSD	Copper Selective Etchant-CSS	Alkaline Chromium Etchant
Function	Nickel etchant	Nickel etchant	Copper etchant	Copper etchant	Copper etchant	Chromium etchant
Applications	Etchant for thin film nickel layer on substrate	Etchant for nickel layer (high speed)	Etchant for copper layer on substrate	Etchant for copper layer on substrate	Etchant for copper layer on substrate	Etchant for chromium layer on substrate or photomask
Features	<ul style="list-style-type: none"> ·Sulfuric acid type. ·Superior etching selectivity. ·Etching nickel layer on mild condition. ·Etching rate can be adjusted by temperature and time. ·Easy analytical control under moderate condition. 	<ul style="list-style-type: none"> ·Hydrogen peroxide type. ·Superior etching selectivity. ·Tenfold of Nickel Selective Etchant NC etching rate. ·Suitable for thick film and fast etching. ·Easy analytical control under moderate condition. 	<ul style="list-style-type: none"> ·Hydrogen peroxide type. ·Superior etching selectivity. ·Etching copper layer on mild condition. ·Etching rate can be adjusted by temperature and time. ·Stability of the hydrogen peroxide is excellent, so bath control is easy. ·High-speed and uniform etching is possible. 	<ul style="list-style-type: none"> ·Hydrogen peroxide type. ·Superior etching selectivity. ·Etching copper layer on mild condition. ·Etching rate can be adjusted by temperature and time. ·Stability of the hydrogen peroxide is excellent, so bath control is easy. ·High-speed and uniform etching is possible. ·There is little under-cut. Etching to fine pattern is possible. 	<ul style="list-style-type: none"> ·Hydrogen peroxide type. ·Superior etching selectivity. ·Etching copper layer on mild condition. ·Etching rate can be adjusted by temperature and time. ·Stability of the hydrogen peroxide is excellent, so bath control is easy. ·High-speed and uniform etching is possible. ·Superior etching selectivity allows wide application. 	<ul style="list-style-type: none"> ·Superior etching selectivity. ·Substrate (polyimide film, silicon wafer etc.) not damaged.
Dissolved metal	Ni	Ni	Cu	Cu	Cu	Cr
Remained metal	Ti, Au, Al, Cr, Cu, Ag, etc.	Ti, Au, Al, Cr, Cu, W, Ag, etc.	Ti, Cr, Sn, W, Au, NiCr, SUS, etc.	Ti, Cr, W, Au, NiCr, SUS, Ag, Mo, etc.	Ti, Cr, W, Au, NiCr, SUS, Ni, Sn, Ag, Mo, etc.	Au, Cu, Co, Ni, Pd, Si, Sn, Ta, Ti, etc.
Processing method	Dipping or rocking	Dipping or spray	Dipping or spray	Dipping or spray	Dipping or spray	Dipping
Bath temperature	45°C (Range 35-55°C)	30°C (Range 25-40°C)	25-40°C	25-40°C	25-40°C	25-45°C
Processing Time	Optional (adjusted by thickness of Ni)	Optional (adjusted by thickness of Ni)	Optional (adjusted by thickness of Cu)	Optional (adjusted by thickness of Cu)	Optional (adjusted by thickness of Cu)	Optional (adjusted by thickness of Cr)
Etching rate	0.2 μm/min.(45°C)	3.5 μm/min.(30°C)	3.0 μm/min.(30°C)	1.4 μm/min.(30°C)	1.75 μm/min.(30°C)	80nm/min.(30°C)
Item	FLICKER-YL	FLICKER-MH	Etchant for Chromium	50%CAN Solution	The nickel activation liquid	Copper alloy chemical polisher CP-17
Function	Nickel-chromium etchant	Nickel-chromium etchant	Chromium etchant	Raw material or replenishment for chromium etchant	Liquid to remove nickel oxide film	Copper alloy chemical polisher
Applications	Removal of seed layer (Ni-Cr) of metallizing 2 layer CCL	Removal of seed layer (Ni-Cr) of metallizing 2 layer CCL	Etchant for chromium layer on substrate and photomask	Raw material or replenishment for Cr etchant on substrate or photomask	Nickel oxide film remover. Adhesion enhancement of next plating process.	Surface polisher, cleaning agent for copper alloy
Features	<ul style="list-style-type: none"> ·Suitable for both Subtractive process and Semi-additive process. ·FLICKER-YL can remove the seed layer selectively without dissolving most of copper. ·Bath control is easy. ·Stability of liquid is excellent. 	<ul style="list-style-type: none"> ·Preferentially remove unetched nickel-chromium alloy by iron chloride or copper chloride. ·FLICKER-MH can remove the seed layer selectively without dissolving most of copper. ·Bath control is easy. ·Stability of liquid is excellent. 	<ul style="list-style-type: none"> ·Etching to fine pattern is possible. ·Even when used repeatedly, deterioration is small. ·Thermal stability is excellent. ·The content of impurities such as heavy metals is extremely low. ·Particles are kept low due to production in clean environment. 	<ul style="list-style-type: none"> ·Thermal stability is excellent. ·The content of impurities such as heavy metals is extremely low. ·Particles are kept low due to production in clean environment. ·Raw material or replenishment for home-brew bath. 	<ul style="list-style-type: none"> ·Removing oxide film for nickel is excellent. At the next process, adhesion of plating is improved. ·Damage to the material is less than when using sulfuric acid/hydrochloric acid. ·No acid mist is released. 	<ul style="list-style-type: none"> ·Hydrogen peroxide type. ·It clean the copper and copper alloy (phosphor bronze, brass, beryllium copper etc.), and make the surface suitable for plating. ·Polished to uniform appearance. ·Stability of polish rate is excellent. ·Stability of the hydrogen peroxide is excellent.
Dissolved metal	Ni, Cr	Ni, Cr	Cr	Cr	Nickel oxide film	Copper alloy
Remained metal	Cu	Cu	—	—	—	—
Processing method	Dipping	Dipping or spray	Dipping or spray		Dipping	Dipping
Bath temperature	35-50°C	50-60°C	25-45°C		30°C (Range 25-35°C)	25-45°C
Processing Time	30-120sec. (adjusted by thickness of seed layer and substrate)	1~5min. (adjusted by thickness of seed layer and substrate)	Optional (adjusted by thickness of Cr)		30-60sec. (In case of baked film at 200 °C -30 min.)	Optional (adjusted by thickness of Cu)
Etching rate			0.2 μm/min. (40°C)			1.6 μm/min.(40°C, Phosphor bronze)

*Please feel free to contact our sales for details.