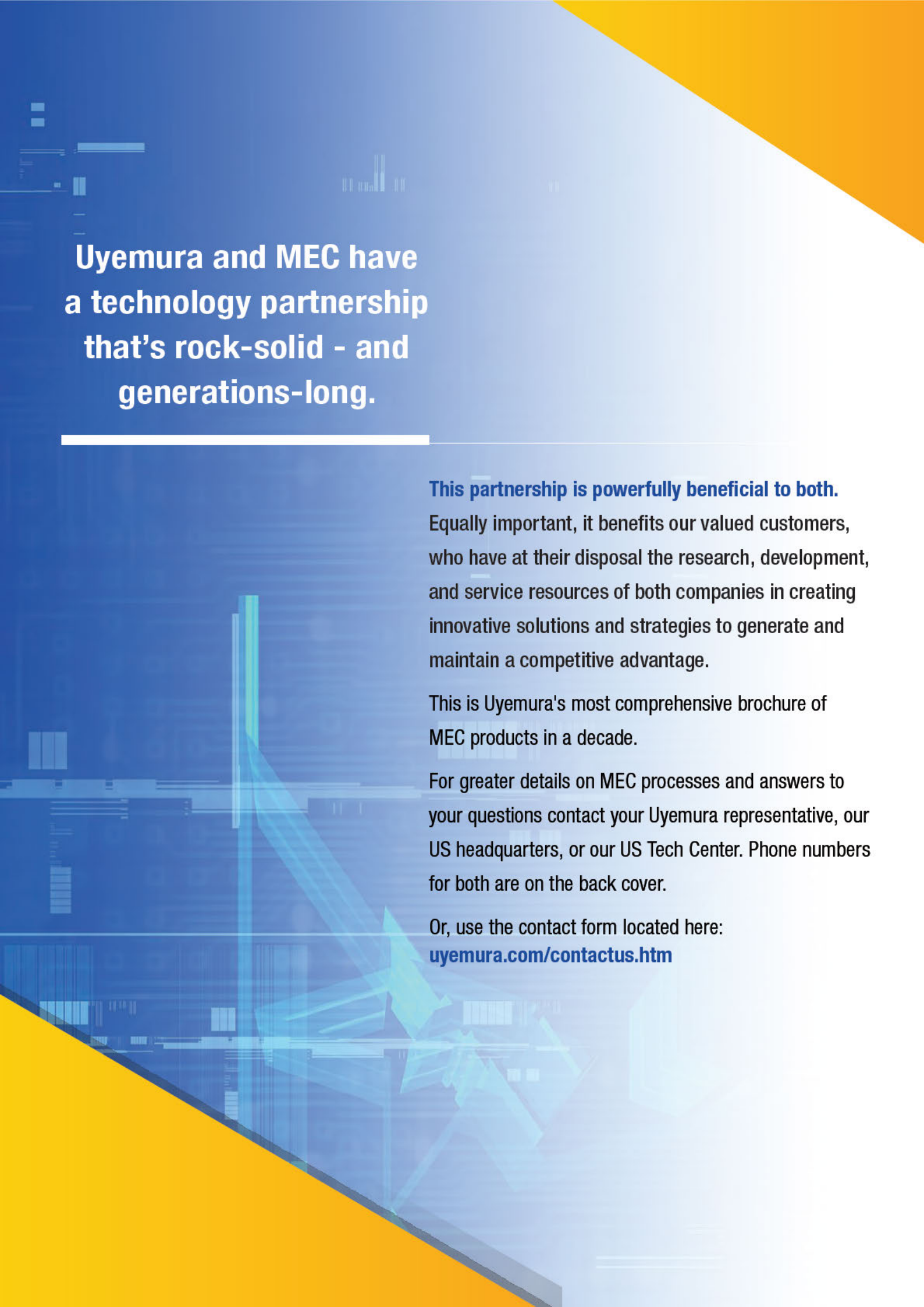


MEC from Uyemura

The Roadmap for
High Density &
Ultra High Density
Circuits



UYEMURA



**Uyemura and MEC have
a technology partnership
that's rock-solid - and
generations-long.**

This partnership is powerfully beneficial to both.

Equally important, it benefits our valued customers, who have at their disposal the research, development, and service resources of both companies in creating innovative solutions and strategies to generate and maintain a competitive advantage.

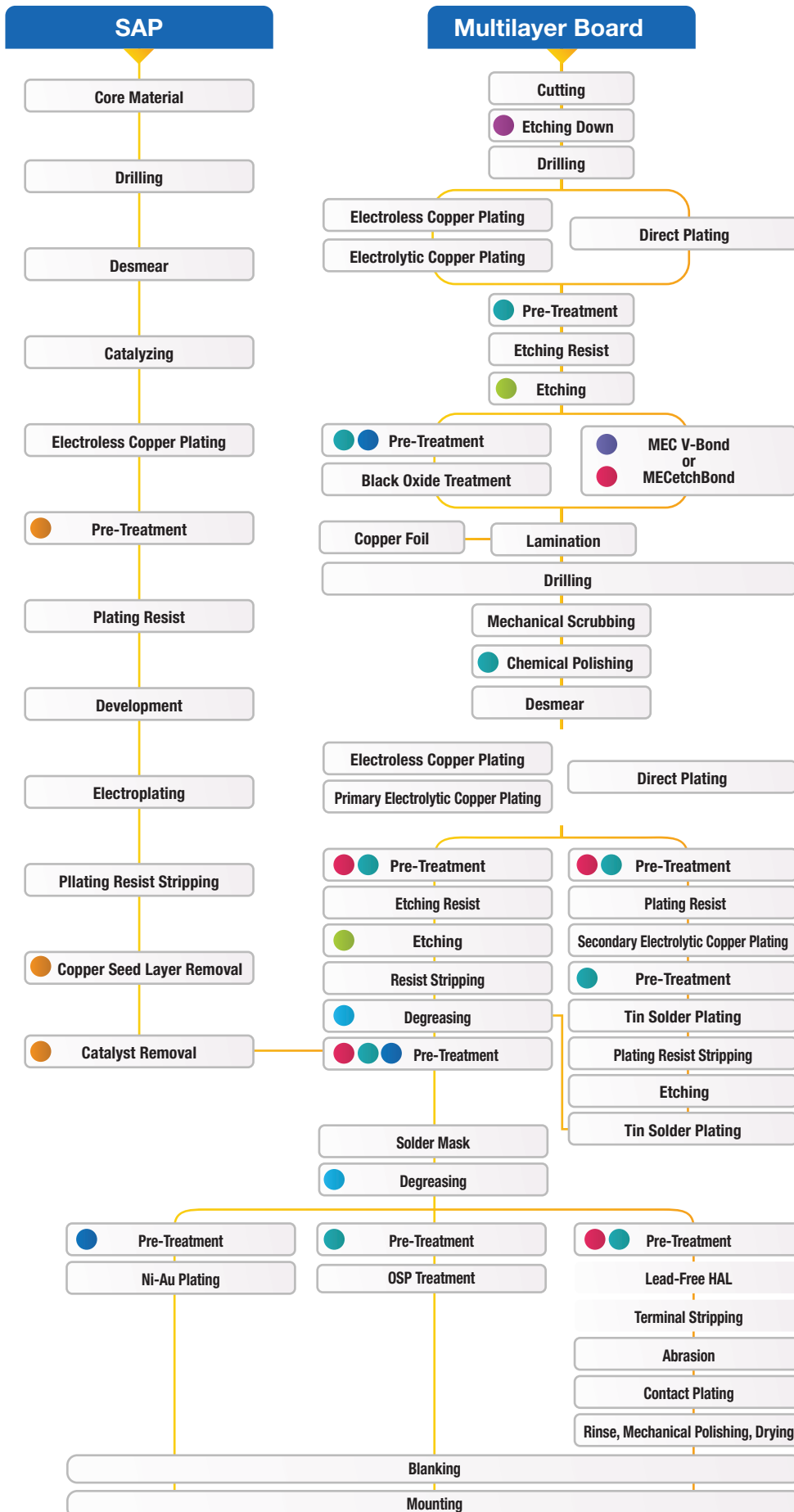
This is Uyemura's most comprehensive brochure of MEC products in a decade.

For greater details on MEC processes and answers to your questions contact your Uyemura representative, our US headquarters, or our US Tech Center. Phone numbers for both are on the back cover.

Or, use the contact form located here:

uyemura.com/contactus.htm

MEC from Uyemura IC Substrate Process Chart

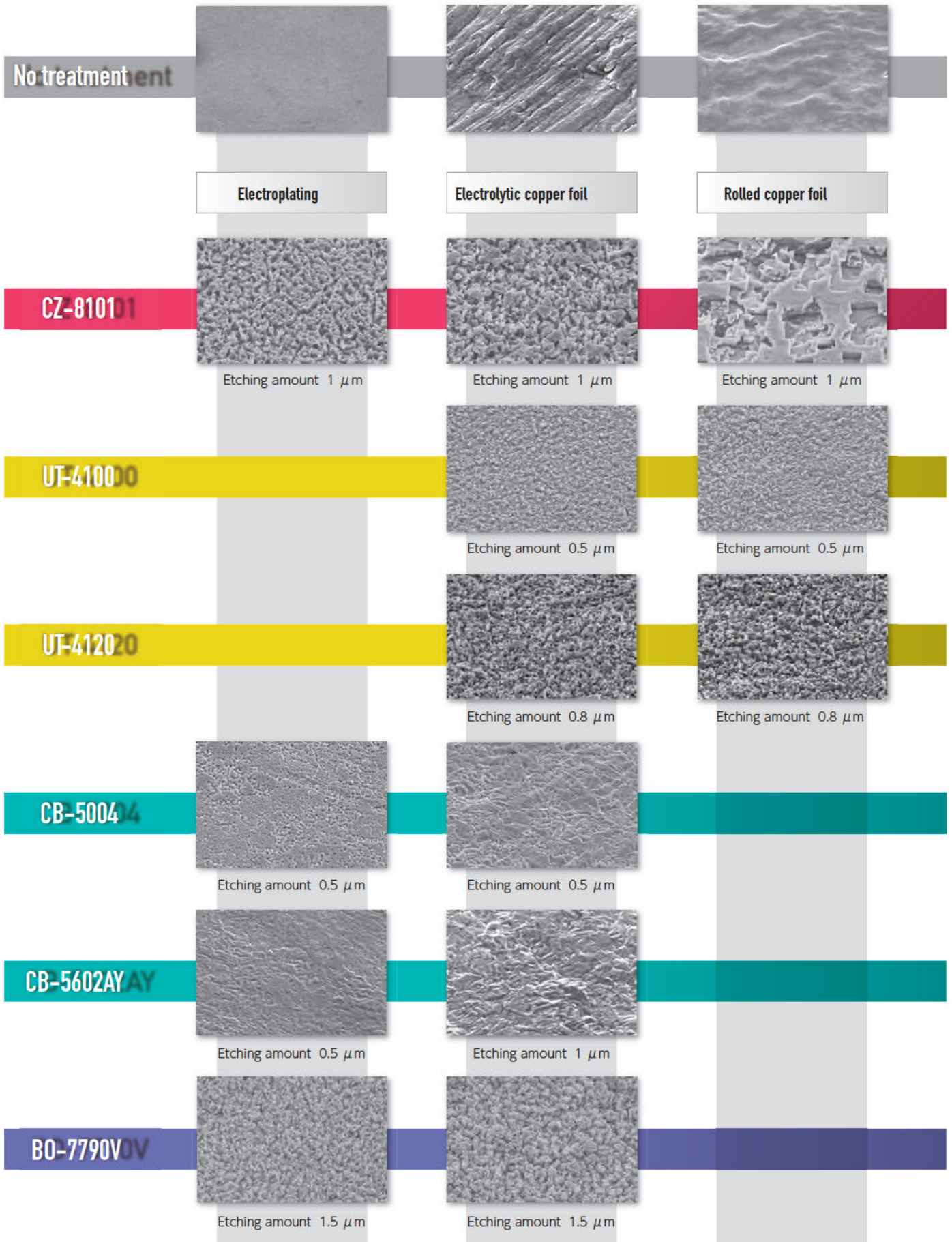


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Copper surface topography created by MEC processes from Uyemura

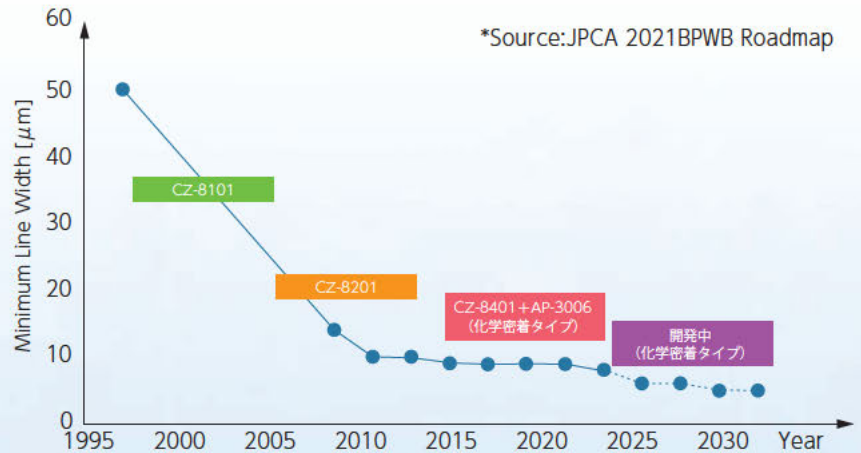


超粗化系
密着向上処理

Super-roughening type
adhesion enhancement

Optimal, application-based copper surface topographies that improve product reliability.

PKG基板ロードマップとメックの技術
Line Width Roadmap vs. MEC's Technology



*Source: JPCA 2021BPWB Roadmap

前処理

Pre-treatment

メックブライト
MECBRITE

CA-5330A, CA-5340

銅表面超粗化剤メックエッチボンドCZの専用前処理剤です。CZの粗化能力を阻害する物質（例えば、指紋、酸化物汚れ、ドライフィルムの接着剤等）を非常に軽微なエッチングによって、効率よく除去します。メックエッチボンドのパフォーマンスを最大限に引き出し、最終製品の信頼性向上を図ります。

CA-5330A is a pre-treatment agent, developed especially for the copper surface super-roughening agent MECetchBOND CZ. Through very gentle etching, it effectively removes contaminants (such as fingerprints, oxide contamination, and dry film adhesives) that obstruct CZ roughening performance through very gentle etching. It maximizes MECetchBOND performance and is designed to improve the reliability of finished products.

銅表面の粗化

Copper surface roughening

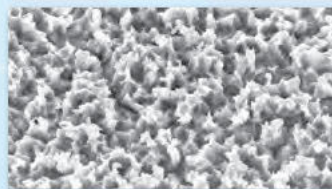
メックエッチボンド
MECetchBOND

CZ-8100, CZ-8101, CZ-8201

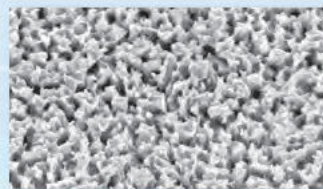
銅表面の超粗化を実現した有機酸系マイクロエッチング剤です。銅表面の独特の凹凸形状により、樹脂との高い密着性を実現します。ビルドアップ樹脂積層前、ドライフィルムラミネート前、ソルダーレジスト塗布前、穴埋め樹脂前など、高い密着性を要求される場合の銅表面粗化剤として幅広くご使用いただけます。

This series consists of organic acid based microetching agents that carry out ultrafine roughening for copper surfaces.

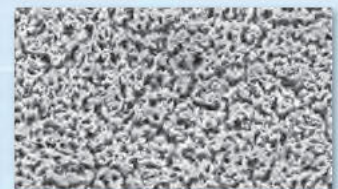
The unique uneven topography of the copper surface enhances adhesion with resins. The agents can be widely used as copper surface roughening agents when a high level of adhesion is required, such as pre-treatment of lamination for build-up boards, pre-treatment of dry film lamination, pre-treatment solder mask printing, and pre-treatment of hole plugging.



CZ-8100



CZ-8101



CZ-8201

防錆効果/化学密着性向上

Anti-tarnish effect, Improved chemical adhesion

メックエッチボンド
MECetchBOND

CL-8300, CL-8301

メックエッチボンドCZ-8100シリーズにより粗化した銅表面を酸化から保護すると、高材料着させ有皮を形成します。また、C-8301は、材料にても着を致します。メックボ1りと合わせてご用下さい。

In addition to protecting copper surfaces roughened by the MECetchBOND CZ-8100 series from oxidation, this series also creates an organic film that improves adhesion with high Tg materials. CL-8301 also demonstrates a high level of adhesion with FR-4 materials.

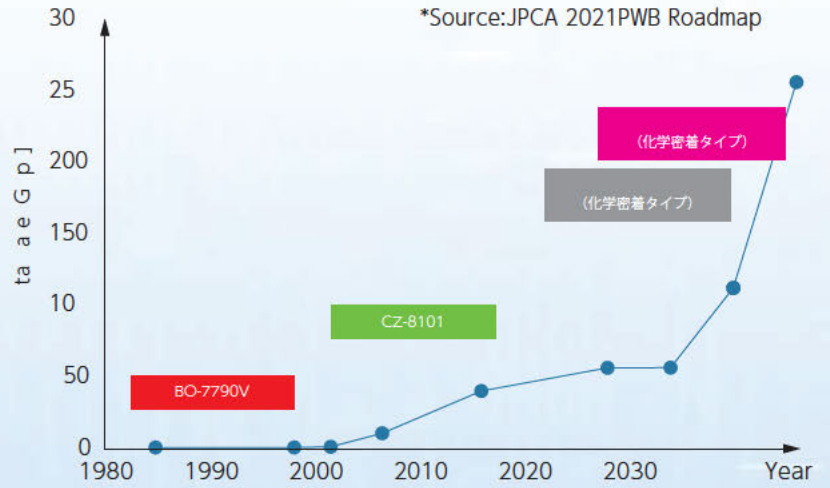
Use this series in combination with the MECetchBOND CZ-8100 series.

周板 密着向上処理

Adhesion enhancement
for high-frequency substrates

Adhesion-enhancing process developed as a conductor surface treatment for high-frequency PCBs.

イサネ トップ 技
Ethernet Roadmap vs. MEC's Technology



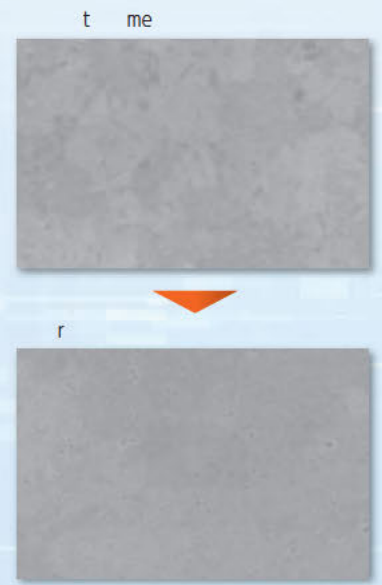
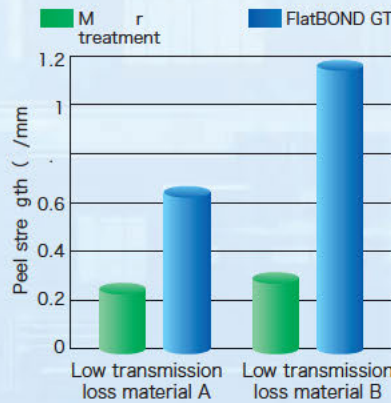
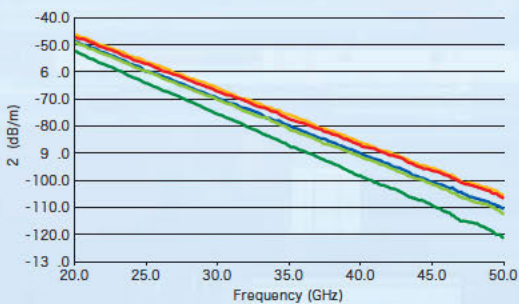
メックフラットボンド FlatBOND

GT process

従来、表面粗化による密着性向上処理が使用されてきましたが、高周波領域においては導体の表面凹凸による伝送損失の問題があります。メックフラットボンドGTプロセスはエッチングや表面粗化を伴わないため、高周波領域において伝送損失を最小限に抑え、電率に対して優る性能を確保します。

Conventionally, surface roughening has been used to improve adhesion, but this led to transmission loss in the high frequency range. The MEC FlatBOND GT process is capable to minimize loss in the high frequency range, since it does not involve etching or surface roughening. It is suitable for adhesion to the low dielectric constant materials used in high-frequency PCBs.

Transmission loss



セミアディティブ 工法向け

Chemicals for SAP

Solutions and processes that meet customers' specifications.

銅シード層除去 Cu seed layer etching

SAP

メックブライト
MECBRITE

QE-7330

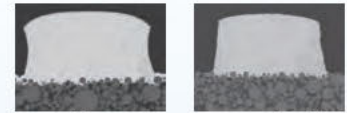
MSAP

メックブライト
MECBRITE

CI-7220

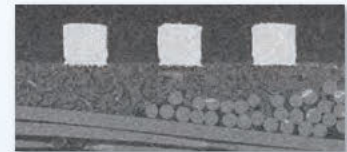
次世代向け平滑銅シード層除去剤です。シード層除去の際、パターン表面の粗化を抑え、平滑なパターン表面を維持することが可能です。硫酸・過酸化水素系の薬品でありながら高い耐塩素性があります。

QE-7330 can prevent the conductor pattern surface from being roughened during copper seed layer etching, which makes it possible to maintain flat conductor pattern surface. This flush etching solution can etch the copper seed layer stably because it has high chlorine resistance though it is $H_2SO_4-H_2O_2$ type solution.



未処理

QE-7330処理後



CI-7220処理後の断面

Cross section after CI-7220 treatment

Tiシード層除去 Ti seed layer etching

メックリムーバー
MEC REMOVER

QT-1100

フッ化水素酸やアンモニア・過酸化水素等を含まない為、環境に優しく安定した液質です。Cuへの影響が少なく、アンダーカット発生を抑える事ができます。

Since it does not containing hydrofluoric acid, ammonia, hydrogen peroxide, etc., it is an environmentally friendly solution having a stable liquid quality. It has little effect on copper and can suppress the occurrence of undercuts.

パラジウム触媒残渣除去 Removal of palladium catalyst residue

メックリムーバー
MEC REMOVER

PJ-9720

SAP工法において、銅配線をほとんど侵すことなく絶縁樹脂上に残留するパラジウム(Pd)触媒を除去し、回路の絶縁信頼性を飛躍的に向上する、Pd触媒残渣除去剤です。

In the SAP process, PJ-9720 acts as a Pd (palladium) catalyst remover that removes the remaining Pd catalyst from the insulating resin with very limited corrosion on copper, while also drastically improving the insulation reliability of the circuit.

ドライフィルム前処理 Pre-treatment for DFR

物理密着タイプ
Mechanical adhesion

メックエッチボンド
MECetchBOND

STZ-3100

無電解銅めっきシード層を対象とした有機酸系エッチング剤です。0.1 μ m~0.2 μ mといった極めて少ないエッチング量で無電解銅めっきシード層表面を粗化することができ、その凹凸形状によりセミアディティブ用ドライフィルムとの密着性を向上させる効果があります。

STZ-3100 is an organic acid based etching agent for electroless copper plating seed layer. It can roughen a copper seed surface with an extremely small etching amount of 0.1 μ m to 0.2 μ m, and utilizes the corresponding uneven topography to effectively increase adhesion for SAP dry film.

化学密着タイプ
Chemical adhesion

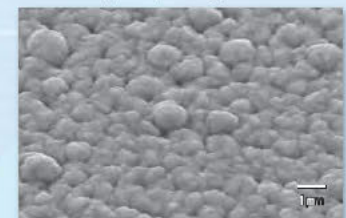
メックエッチボンド
MECetchBOND

STL series

銅シード表面をエッチングすることなく、セミアディティブ用ドライフィルムとの密着性を向上させる銅表面処理剤です。セミアディティブ用ドライフィルムとの密着性を向上させる独特の有機皮膜を銅シード表面上に形成します。

The STL series consists of copper surface treatment agents that improve adhesion with dry film for SAP without etching copper seed surface. The agents form a unique organic film on the copper seed surface that improves adhesion with dry film for SAP.

E-less copper plating



Before treatment



After STZ-3100 treatment

圧延銅粗化处理

Chemicals
for rolled copper

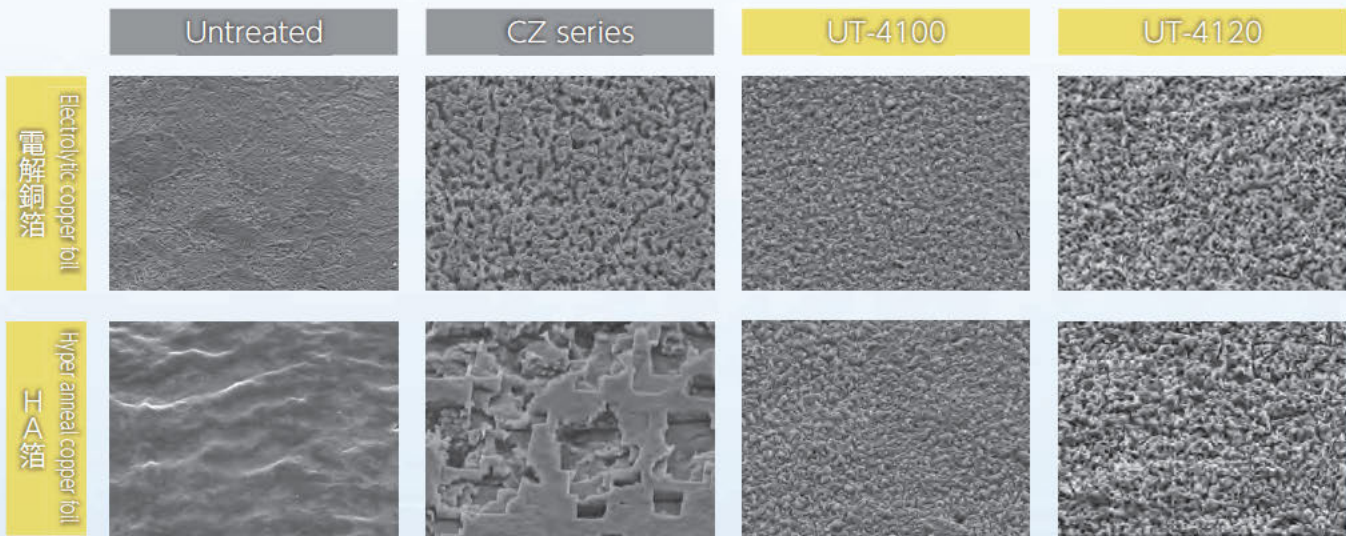
Uniform topographies for rolled copper foil surfaces.

メックエッチボンド
MECetchBOND

UT series

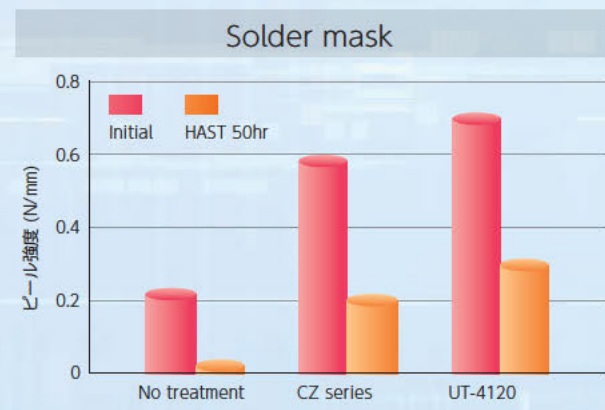
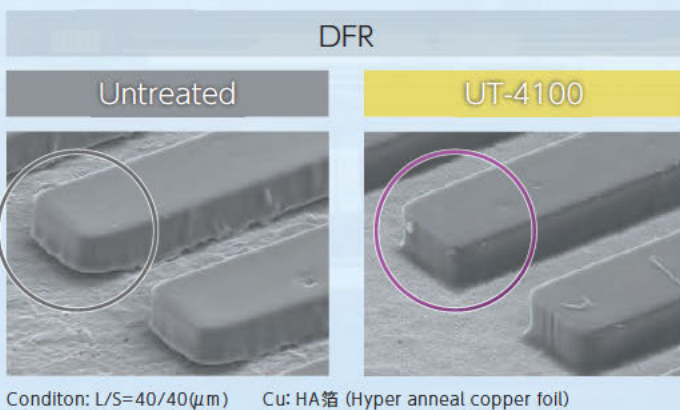
電解銅/圧延銅に均一で同様な表面粗化を形成し、樹脂との力を高めることができます。が小さい為、高周波FPC用途としても期待されております。

Regardless of the type of copper foil, it can enhance mechanical adhesion strength between resin and copper by producing unique copper surface topography uniformly. UT series have a small effect on transmission loss, it is also expected to be used for high-frequency FPC applications.

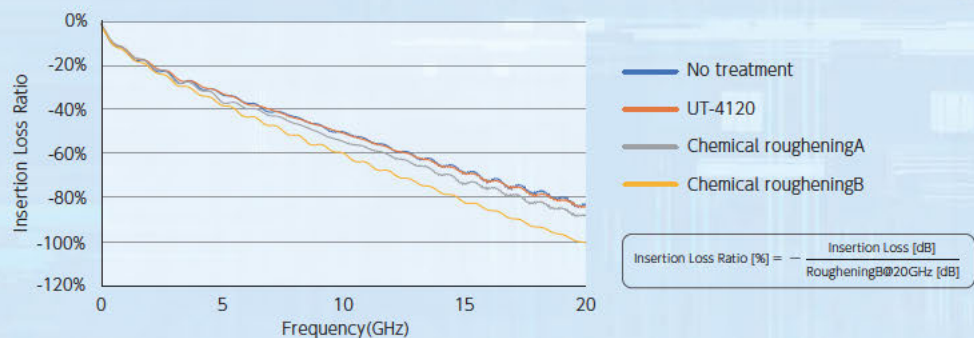


密着性 Adhesion

UT-4100はドライフィ、UT-4120はソルダーレジストの密着向上
UT-4100 is for improving adhesion with DFR. UT-4120 is for improving adhesion with Solder mask.



伝送損失 Transmission loss



異方性エッチング処理

Anisotropic etching treatment

We enhance the accuracy of fine wire patterning.

メックブライト
MECBRITE

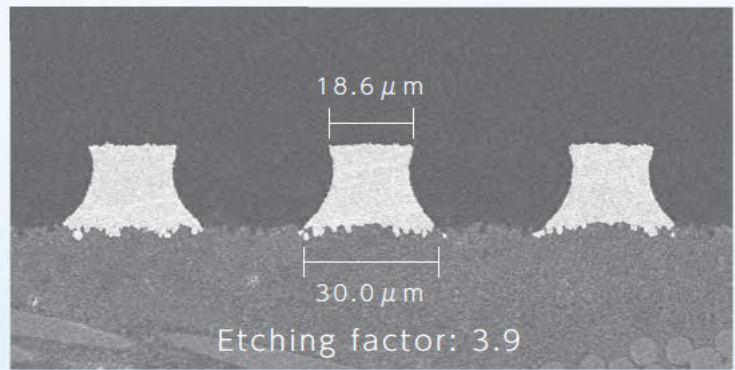
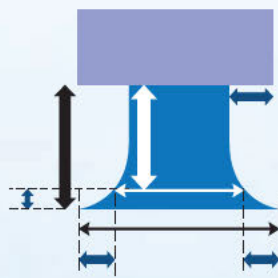
EXE series

塩化銅エッチャント向け10%添加剤タイプです。
通常の塩化銅エッチャントよりも高いEFを得ることができます。
エッチング後の配線幅ばらつきを抑制することができます。

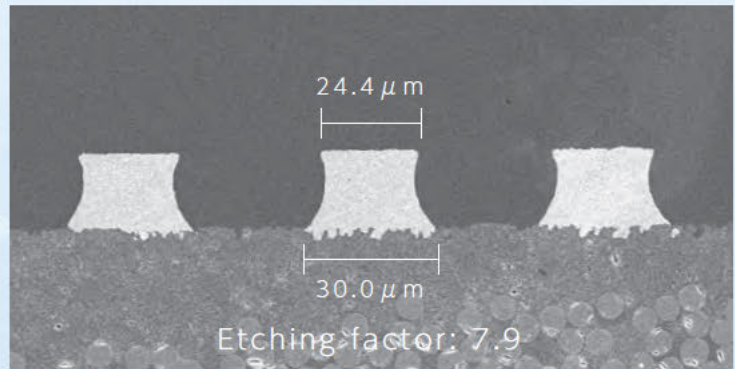
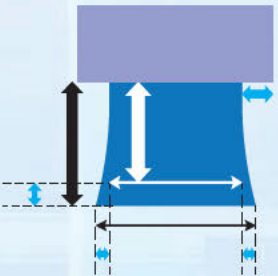
10% additive type for copper chloride etchant.
Higher etching factor compared to conventional copper chloride etchant.
Variation in pattern width after etching can be suppressed.

大
Variation in pattern width
小

Conventional Etchant



EXE Series

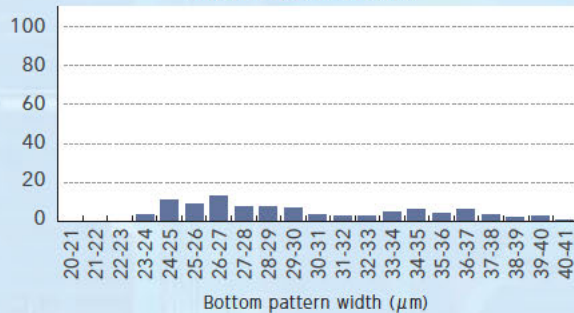


高いエッチングファクター
配線ボトムのリッジが少ない

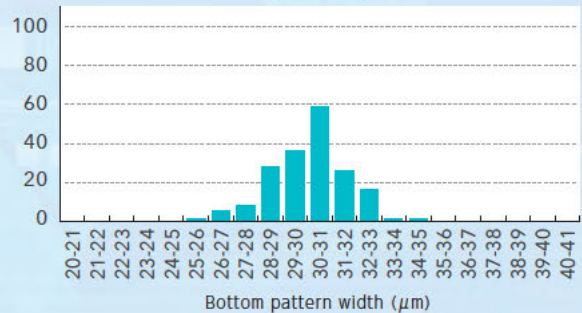
Higher etching factor
Reduce variation in bottom line width

Test panel design
Copper thickness: 22 μm
DF design: 36/24 (compensation 6 μm)
DF thickness: 25 μm
L/S=30/30

Conventional Etchant



EXE Series



Evaluation board size 410 × 510 mm
Copper thickness: 23 μm
DF thickness: 25 μm

各種金属表面処理 (選択エッチング)

Metal surface treatment
(Selective etching)

We have applied to surface treatment the technologies of selective metal etching and copper microetching that were cultivated in metal resist stripping, enabling us to meet a wide range of needs.

各種金属表面処理

Metal surface treatment

メックのエッチング液での 最大エッチング速度

Maximum etching rate with MEC's etchant

| | Al | Zn | Fe | Co | Ni | Sn | In | Bi | Cu | Pd | W | Mo | cITO | NiCr (Cr20%) | SUS304 |
|-------------------------|--------|-------|------|------|------|------|-------|------|------|------|-------|------|------|-----------------|--------|
| エッチング速度 Etching rate | 0.77 | 123.6 | 17.4 | 16.7 | 17.0 | 57.7 | 164.5 | 39.1 | 31.2 | 0.57 | 0.034 | 0.77 | 0.12 | 12.1 | 15.7 |
| | μm/min | | | | | | | | | | | | | | |

選択エッチング性

Selective etching characteristics

メックのエッチング液での 取り除きたい金属と保護したい金属の組み合わせ表

Combination table of metals to be removed and metals to be protected with MEC's etchant

- S** 処理可能 (保護対象はエッチングしない) エッチング対象は100nm/min以上
Possible (Protection target does not etching) Etching rate : over 100nm/min
- A** 処理可能 (エッチング速度比 10倍以上)
Possible (Etching rate more than 10 times)
- S** 処理可能 (保護対象はエッチングしない) エッチング対象は10~100nm/min
Possible (Protection target does not etching) Etching rate : 10~100nm/min
- B** 処理可能 (その他)
Possible (Other)
- 無印** 不可
No mark Impossible

エッチング対象金属 (取り除きたい) Metals for etching

| | Al | Zn | Fe | Co | Ni | Sn | In | Bi | Cu | Pd | W | Mo | cITO | NiCr (Cr20%) | SUS304 |
|-----------------|----|----|----|----|----|----|------|------|----|----|---|----|------|-----------------|--------|
| Al | | A | A | S | A | A | S | A | S | | S | S | | | |
| Zn | A | | | | | | | | | | | | | | |
| Fe | S | A | | S | | B | S | S | S | | S | S | | | |
| Co | A | A | A | | | A | A, S | | S | | S | S | | | |
| Ni | S | A | S | A | | A | A | S | S | | S | S | | | |
| Sn | A | | | S | | | S | | S | | S | S | | | |
| In | A | A | | A | B | A | | | S | | | | | | |
| Bi | A | A | | S | | B | S | | S | | S | S | | | |
| Cu | | A | | A | A | A | A | | | | | | | B | |
| Pd | S | S | S | S | S | S | S | S | S | | S | S | | A | A |
| W | S | S | S | S | S | S | S | S | S | S | | S | S | S | S |
| Mo | S | A | A | A | A | A | A | A, S | A | | | | | A | A |
| Ag | S | S | S | S | S | S | S | S | S | | S | S | | | |
| Pt | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Au | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Si | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Ti | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Ta | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| Nb | S | S | S | S | S | S | S | S | S | S | S | S | S | S | S |
| cITO | S | S | S | S | S | S | S | S | S | S | S | S | | S | S |
| NiCr (Cr20%) | S | S | S | S | S | S | S | S | S | S | S | S | | | |
| SUS304 | S | S | S | S | S | S | S | S | S | S | S | S | | | |

部材の構成によっては対応できない場合があります。SUS304とSUS316、SUS430は同様の傾向です。
Some combinations may not be compatible, depending on the type of elements on the boards. SUS304 and SUS316, SUS430 are similar trends.

選択エッチング

Selective etching

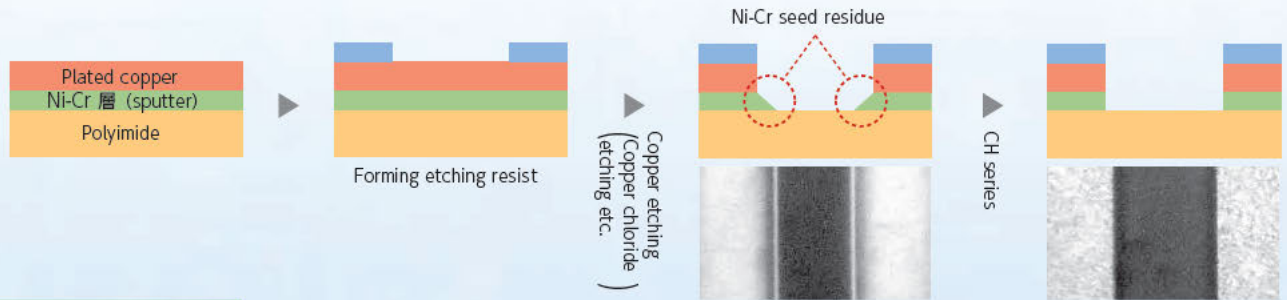
ニッケル-クロム合金
Ni-Cr Alloy

メックリムーバー
MEC REMOVER

CH series

銅とニッケル-クロムの共存基板から、銅をほとんど侵すことなく、ニッケル-クロム合金を選択的にエッチングします。スパッタ系2層フレキ材でのニッケルクロム皮膜残渣の除去や内蔵抵抗膜のエッチングなどにご使用いただけます。

The CH series is characterized by its selective etching of nickel-chromium alloys with nearly no copper corrosion on copper and nickel-chromium multi-metal PWBs. It is useful for removing nickel-chromium film residue or etching the embedded resistance film on 2-layer sputter-type flexible boards.



銅
Copper

非粗化タイプ
Non-roughening type

メックブライト
MECBRITE

SF-5404, SF-5420

粗化タイプ
Roughening type

メックエッチボンド
MECetchBOND

CZ-8500

SF-5404は中性、SF-5420、CZ-8500は共に弱アルカリ性のエッチング剤で、共存する金属を侵すことなく、銅をエッチングすることができます。SF-5404、SF-5420は非粗化タイプ、CZ-8500は粗化タイプとご要望に応じて選択してご使用いただけます。いずれの製品も浸漬、スプレー処理が可能です。

SF-5404 is a neutral chemical SF-5420 and CZ-8500 are alkaliescent etching agents that can etch copper without corroding coexisting metal. Choose an agent based on your application needs: SF-5404, SF-5420 are non-roughening type, while CZ-8500 is a roughening type. These products designed for flood-immersion treatment and spray treatment.

各種選択エッチング液の選択性
(カッコ書きは浸漬処理時のE.R.)

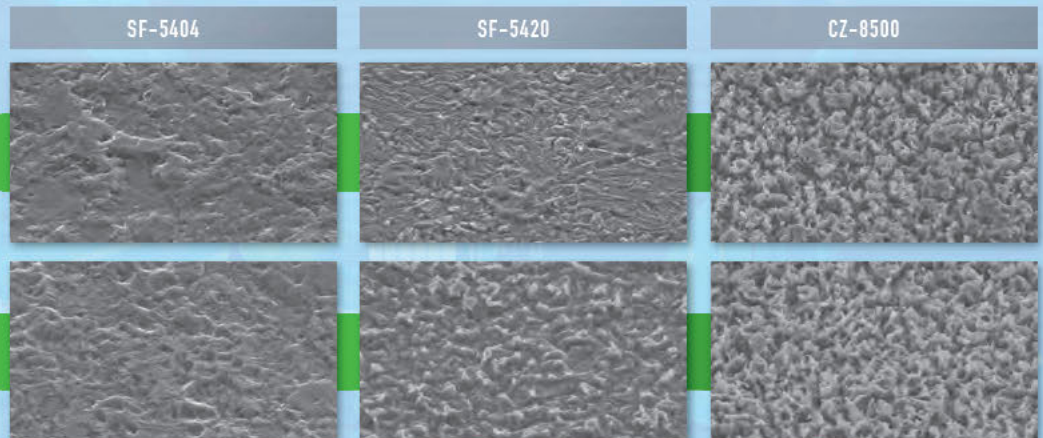
Selective etching characteristics (E.R. in parentheses are the values at the time of flood-immersion treatment.)

| Metal | | Cu | Al | Au | Sn | Solder | Ni |
|------------------|---------|-------------|-----|-----|-----|--------|-----|
| E.R. [μm/min] | SF-5404 | 0.86 (0.38) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | SF-5420 | 1.95 (0.75) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | CZ-8500 | 1.26 (0.59) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

処理後の銅表面観察
Observation of copper surface
after treatment

スプレー処理
Spray treatment

浸漬処理
Flood-immersion treatment



パラジウム触媒残渣
Pd catalyst residue

メックリムーバー
MEC REMOVER

PJ-9720

銅パターンをほとんど侵すことなく、絶縁樹脂表面に付着しているパラジウム触媒残渣を除去します。

PJ-9720 removes palladium catalyst residue adhered to insulating resin surfaces with nearly no copper pattern corrosion.

マイクロエッチング

Microetching

Optimally designed microetching agents for all types of processes and applications.

ソルダーレジスト前処理
Pre-treatment for solder resist

メックブライト
MECBRITE

CB-5004

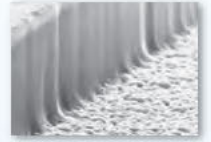
ドライフィルム前処理
Pre-treatment for DFR

少ないエッチング量で銅表面に独特の粗化形状を形成する硫酸-過酸化水素系マイクロエッチング剤です。ド

CB-5004 is a sulfuric acid-hydrogen peroxide based microetching agent that forms a unique roughened topography on copper surfaces, even with a low etching amount. It is suitable for processes prior to dry film lamination and solder resist formation, and improves the adhesion. The process can reduce the running costs because of the excellent hydrogen peroxide stability and the high copper capacity.



従来品



CB-5004

小径穴断線低減

Reduce micro via disconnection

メックブライト
MECBRITE

SF-5420

弱アルカリ性のマイクロエッチング剤です。スルーホール断線の危険性を低減します。HALや耐熱性プリフラックスなどの最終仕上げ前処理として、また銅-はんだ共存基板の処理にも適しています。

SF-5420 is an alkaliescent microetching agent. It reduces the risk of through-hole disconnection. It is suitable as a pretreatment for HAL and thermal resistant OSP finishing, as well as in treatment of copper-solder multi-metal PWBs.

汎用タイプ

General-purpose type

メックブライト
MECBRITE

CA-91Y, CB-801Y, CB-5602AY

硫酸-過酸化水素系のマイクロエッチング剤です。銅表面の酸化物を除去すると共に、表面を活性化させます。HALや耐熱性プリフラックスなどの最終仕上げ前、ドライフィルムラミネート前など、各種工程の前処理としてご使用ください。

This series consists of sulfuric acid-hydrogen peroxide based microetching agents. The agents remove oxides from copper surfaces, while also re-activating the surfaces. Use these agents to perform a pretreatment for HAL and thermal resistant OSP finishing, dry film lamination, and other processes.

銅の除錆、防錆

Anti-tarnish / Rust removal

銅表面保護に幅広く対応し、品質の向上を実現します。

Improving quality through wide-ranging copper surface protection.

脱脂
Degreasing

メックブライト
MECBRITE

CA-5302

銅および金属表面上に付着した指紋等の油分や酸化物の汚れを速やかに除去する酸性脱脂剤です。

CA-5302 is an acidic degreasing agent that quickly removes contaminants such as fingerprint oils and oxides adhered to copper and metal surfaces.

脱脂
Degreasing

メックブライト
MECBRITE

CA-5370
CA-5372

銅表面の錆や指紋、酸化物・有機物の汚れ、ドライフィルムの接着剤などを効果的に除去する弱アルカリ性の表面処理剤です。

This series is a mildly alkaline chemical that effectively removes adhesives of dry films as well as fingerprints, oxide, rust and organic matters on copper surface without leaving any residues.

AOI検査前処理
Pre-treatment for AOI

メックブライト
MECBRITE

CAU-5214

[有機酸系]
[Organic acid type]

CAU-5220

[硫酸系]
[Sulfuric acid type]

AOI検査前に使用することで、誤判定を防ぎます。良品と不良品との区別を明確にし、検査作業の効率と精度を高めます。This series prevents incorrect measurements when used before AOI inspection. It improves the efficiency and accuracy of inspection work by clearly distinguishing between good and defective products.

各種残渣除去

residue removal

Effectively remove residues including resist and adhesive.

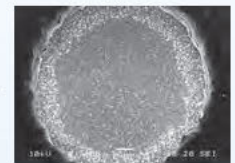
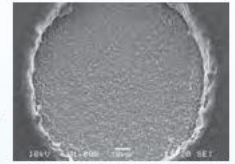
SRパッド残渣除去 SR pad residue removal

メックブライト
MECBRITE

CA-5330K, CA-5344

ソルダーレジストの現像残渣除去を目的としたマイクロエッチング剤です。
ブリード除去にも効果を発揮します。

CA-5330K is a microetching agent designed to remove residue of solder resist after development.
It is also effective in bleed removal.



有機物の汚れ除去 Removal of organic stains

メックブライト
MECBRITE

CA-5330H, CA-5342

フレキシブル基板の接着剤のにじみ出しや、ドライフィルムの現像残渣、ソルダーレジストの残渣など有機物の汚れを少量のエッチングにより、効率よく除去します。ニッケル-金 (Ni-Au) めっきおよびHAL仕上げの前処理など、幅広い用途にご使用ください。

CA-5330H efficiently removes, through very gentle etching, organic contaminants such as adhesive bleeding of flexible boards, development residue of dry film, and solder resist residue.

It can be used in a wide range of applications, such as Ni-Au plating and HAL finishing pre-treatment.



積層前処理

Pre-treatment
for lamination

Environmentally-favored products developed as alternatives to black oxide treatment. The process is controlled automatically.

前処理 Pre-treatment

メックVボンド
MEC V-Bond

CB-7612

メックブライト
MECBRITE

CA-5372

メックVボンドの前処理剤です。銅表面の錆や汚れを除去し、メックVボンドの効果を最大限に引き出します。特にCA-5372はパターン形成後のスマットの除去に効果を発揮します。

These series are pre-treatment agents prior to V-Bond.

The agents remove rust and dust from copper surfaces and maximize the effect of MEC V-Bond. In particular, CA-5372 is effective in removal of smut after pattern formation.

積層前処理 [スプレー処理] Pre-treatment for lamination (spray)

メックVボンド
MEC V-Bond

BO-7710V

積層前処理 [浸漬コンベア処理] Pre-treatment for lamination (flood-immersion)

メックVボンド
MEC V-Bond

BO-7790V

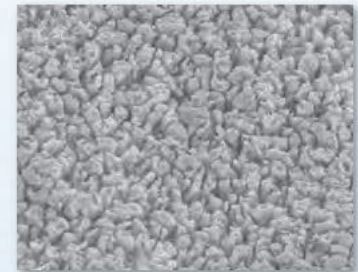
黒化処理代替用として開発した、環境負荷低減対応の硫酸-過酸化水素系マイクロエッチング剤です。スプレー処理専用のBO-7710V、浸漬コンベア処理専用のBO-7790V処理が、耐リフロー性に優れた表面形状を創ります。

FR-4材料はもちろん、高Tg材料、ハロゲンフリー材に対しても優れた密着性を実現します。

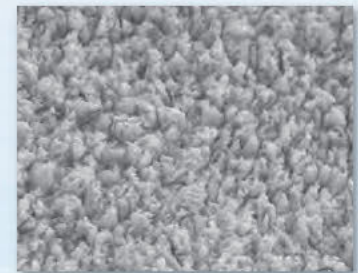
This series consists of environmentally-friendly sulfuric acid-hydrogen peroxide based microetching agents that were developed as alternatives to black oxide treatment.

Treatment with BO-7710V (designed for spray treatment) and BO-7790V (designed for flood-immersion treatment) creates a surface topography with excellent reflow resistance characteristics.

This series exhibits excellent adhesion with FR-4 materials, high Tg materials, and halogen-free materials.



BO-7710V



BO-7790V

エッチダウン

Etch down

銅箔の厚みを薄くし、
細線パターン製造の精度を高めます。

Reducing copper foil thickness and improving the accuracy of fine wire patterning.

メックパワーエッチ
MEC PowerETCH

HE-7002A

大量の銅を溶解するエッチダウン工程に適した硫酸-過酸化水素系のエッチング剤です。基板の表層銅を半分あるいはそれ以上薄くする場合にご使用ください。特に細線パターン形成を行う基板の前処理に最適です。適したエッチダウンをシステムでご提案します。

This series consists of sulfuric acid-hydrogen peroxide based etching agents suitable for etch down processes that dissolve large amounts of copper. Use the agents when thinning the copper layer by half or more. These agents are especially useful in the pretreatment of boards that form fine wiring patterns.



CO₂ダイレクト レーザ用銅表面処理

Copper surface treatment
for CO₂ Laser Direct Drilling

We offer a complete lineup of chemical agents for optimizing the finishing of copper surfaces in CO₂ direct laser processes.

ダイレクトレーザ前処理 Pre-treatment for laser direct drilling

メックVボンド
MEC V-Bond

BO-7790V

硫酸-過酸化水素系マイクロエッチング剤です。
使用するダイレクトレーザのエネルギー吸収率を向上させる表面形状を
創ります。

BO-7790V is a sulfuric acid-hydrogen peroxide based microetching agent.
It creates a surface topography that increases the energy absorption rate during direct
laser process.

ダイレクトレーザ後処理 Post-treatment for laser direct drilling

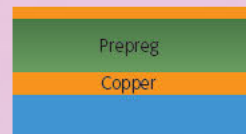
メックパワーエッチ
MEC PowerETCH

HE-7002A

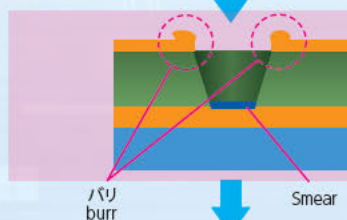
CO₂レーザを用いるダイレクトレーザ加工時に発生した銅の飛び散りやバリ
を効率よく除去するマイクロエッチング剤です。

HE-7002A is a microetching agent that efficiently removes copper splashes and burrs
generated during direct laser processing using a CO₂ laser.

ダイレクトレーザ
前処理
Pre-treatment for
laser direct drilling
BO-7790V



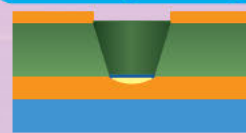
CO₂ laser process



バリ
burr Smear

バリ取りエッチング
Deburring etching

ダイレクトレーザ
後処理
Post-treatment for
laser direct drilling
HE-7002A



Desmear

Plating



Laser drilling: MITSUBISHI ELECTRIC CORPORATION (ML605GTWIII-5200U)

Uyemura's Mission is creating and delivering practical solutions to the competitive, operational and environmental challenges our customers face.

Together with MEC, we establish new benchmarks for performance, reliability and cost management.



**Global Leader in Final Finishes,
Specialists in Solutions for
High Density and Ultra-High
Density Circuits**

UYEMURA Corporate Headquarters:
3990 Concourse, #425 Ontario, CA 91764
ph: (909) 466-5635

UYEMURA Tech Center:
240 Town Line Road, Southington, CT 06489
ph: (860) 793-4011

uyemura.com