

## **Safety Data Sheets**

### **Safety Data Sheets**

**CLEANER 110**

**CLEANER 210**

**ACTIVATOR 310**

**COPPER PLATER 400**

**SHINE 400**

# CLEANER 110

## THROUGH-HOLE PLATING SYSTEM

### DESCRIPTION

CLEANER 110 is a two components, slightly alkaline liquid solution designed to clean and condition glass fibers and epoxy surfaces. It is used in preparation for through-hole plating with the LPKF Lasers & Electronics Contac III and MiniContac through-hole plating systems.

### EQUIPMENT

Conveyor equipment should be made of Polypropylene or another suitable plastic material. Consult your LPKF technical representative for an approved vendor.

### OPERATING PARAMETERS

|             |                    |
|-------------|--------------------|
| Temperature | 51 - 57°C          |
| Normality   | 0.08 - 0.11 Normal |
| pH          | > 9.6              |

### BATH MAINTENANCE & REPLENISHMENT

Because of the small volumes and low prices it is suggested not to maintain or replenish these baths. They must be changed on an average every 3 month.

### SAFETY & HANDLING

LPKF recommends that the company/process operator read and review the LPKF Lasers & Electronics Material Safety Data Sheets for the appropriate health and safety warnings before use.

Material Safety Data Sheets are available from LPKF Lasers & Electronics.

# **CLEANER 110**

## **THROUGH-HOLE PLATING SYSTEM**

### **WASTE DISPOSAL**

Prior to using any recommendations or suggestions by LPKF for waste treatment, the user is required to know the appropriate local and state regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local and state regulations take precedent.

### **ORDER INFORMATION**

#### **Product**

CLEANER 110

#### **Standard Package**

# CLEANER 110

## THROUGH-HOLE PLATING SYSTEM

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EEC SAFETY DATA SHEET

### 1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

**Product :** Cleaner 110  
**Application :** An alkaline liquid used in the manufacture of printed circuit boards.

**Supplier :**

LPKF Lasers & Electronics  
28220 SW Boberg Road  
Wilsonville, OR 97070  
Telephone: (503) 454-4200

### 2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

#### Hazardous ingredients

| Name                                    | %            | Hazard symbol/Risk & safety phrases  |
|---|--------------|--|
| Sodium metaborate<br>CAS-No.:10555-76-7 | 1.5 % by wt. | Xi: R36/38: Irritating to eyes and skin.<br>S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. |
| Polymer dispersion                      | 1 % by wt.   | S37/39: Wear suitable protective gloves, and eye protection.   |

### 3. HAZARDS IDENTIFICATION

**Ingestion :** IRRITANT: Will irritate the throat, and stomach. Sickness and nausea may occur.

**Eye contact :** IRRITANT: Intense watering and soreness. Prolonged contact may cause visual impairment.

**Skin contact :** IRRITANT: Prolonged contact will cause skin cracking, leading to dermatitis.

**Inhalation :** IRRITANT: Unlikely in normal industrial practice. Prolonged inhalation will cause irritation and sneezing.

This information is given in good faith, being compiled from sources considered to be dependable. It is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It does not constitute an assessment in use as required under COSHH regulations.

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#### 4. ECOLOGICAL EFFECTS

| Test type | Species  | Low | Qua | High | Units |
|-----------|----------|-----|-----|------|-------|
|           | Time/Ref |     |     |      |       |

Not established.

#### 5. FIRST AID PROCEDURES

**Eyes :** Flush continuously with clean running water, holding eyelids apart during flush. Do not stop for at least 20 minutes. Consult physician.

**Skin :** Flush with copious amounts of water while removing contaminated clothing. Seek medical advice.

**Ingestion :** Do not induce vomiting. Give several glasses of water to drink. Consult physician immediately.

**Inhalation :** Remove casualty to fresh air. Wash nose, mouth and throat (gargle) with water. Seek medical advice.

#### 6. FIRE FIGHTING PROCEDURES

**Extinguishing media :** Material not flammable. Use as appropriate to surroundings.

**Fire and explosion hazards :** Will release toxic fumes.

**Protective procedures :** Wear full protection including self-contained breathing apparatus and fight fire from remote locations.

#### 7. SPILL OR LEAK PROCEDURES - SEE ALSO (14) DISPOSAL CONSIDERATIONS

**Personal precaution :** Ensure adequate ventilation. Wear protection as detailed in (9).

**Environmental precautions :** If product has entered drains, advise local river authority.

**Recovery :** Mop up using inert media and plastic tools. Place waste in plastic containers and allow to stabilize prior to sealing lid.

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### 8. STORAGE AND HANDLING (IN NORMAL USE)

**Storage :** Store in a cool, dry, well-ventilated area away from direct sunlight.

**Storage temp:** minimum: 4°C maximum: 49°C

**Handling :** Wear protective clothing, footwear, hand/eye protection. Ensure adequate ventilation in use.

### 9. EXPOSURE CONTROLS/PERSONAL PROTECTION (NORMAL USE)

#### OCCUPATIONAL EXPOSURE LIMITS

| Name              | 8hr TWA (EH40)       | 10 min (EH40) | EEC No | CAS No     |
|-------------------|----------------------|---------------|--------|------------|
| Sodium metaborate | 15 mg/m <sup>3</sup> | --            |        | 10555-76-7 |
| LD50 oral (rat) = | 1700 mg/kg           |               |        |            |

**ENGINEERING MEASURES :** Provide local exhaust ventilation at point of use.

#### PERSONAL PROTECTIVE EQUIPMENT

**Respiratory :** If mists or vapors are generated, suitable respiratory protection (for amine vapors) must be worn.

**Hand :** Suitable rubber gloves.

**Eye :** Safety glasses/face shield to BS 2092 or equivalent standard.

**Other :** Protective clothing and footwear.

### 10. PHYSICAL/CHEMICAL PROPERTIES

|                                |                    |
|--------------------------------|--------------------|
| <b>Appearance :</b>            | Pale yellow liquid |
| <b>Odor :</b>                  | Mild               |
| <b>pH (as delivered) :</b>     | >9.6               |
| <b>Viscosity :</b>             | N/A                |
| <b>Boiling point :</b>         | >100°C             |
| <b>Flash point :</b>           | N/A                |
| <b>Vapor pressure :</b>        | N/A                |
| <b>Vapor density :</b>         | N/A                |
| <b>Relative density (SG) :</b> | > 1                |
| <b>Solubility :</b>            | Complete in water  |

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### 11. STABILITY AND REACTIVITY

Stability : Stable  
Conditions to avoid : Do not freeze.  
Materials to avoid : Acids, oxidizing agents.  
Hazardous decomposition products : Oxides of carbon and nitrogen. Boron oxides.

### 12. TOXICOLOGICAL INFORMATION

(Acute) short term effects :

Eyes : Prolonged contact will result in corneal damage.  
Skin : Prolonged contact will result in dermatitis.  
Ingestion : Prolonged contact will result in gastrointestinal tract impairment.  
Inhalation : Deliberate or prolonged inhalation will result in degreasing and drying of the mucous membranes.

(Chronic) long term effects : Lung, liver and kidney impairment if ingested in significant quantities.

### 13. ECOLOGICAL INFORMATION

Biodegradability : Not established.  
Bioaccumulative potential : Not established.  
Aquatic toxicity : Toxic to fish and aquatic invertebrates.  
Other :

### 14. DISPOSAL CONSIDERATIONS

The Environmental Protection Act (Duty of Care) Provisions/SI 1994 No. 1137 The Transfrontier Shipment of Waste Regulations 1994/EEC Directives: 91/156/EEC, 84/631/EEC & 76/464/EEC (Europe). Control of Substances Hazardous to Health Regulations.  
Do not empty into drains. Do not allow to enter waterways or sewers. Always check and comply with local and state regulations. Dispose of residues at an approved chemical treatment facility.

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### 15. TRANSPORT

IMDG code : NR    IMDG page No: NR    Marine pollutant : No  
UN No:        NR    ICAO/IATA:                            Transport symbol : None  
Packing group: NR    RID/ADR:        NR    Tremcard No:        NR  
Further information :

16. REGULATORY INFORMATION : Refer to the „Chemicals (Hazard Information & Packaging) Regulations“.

Supplied by : LPKF Lasers & Electronics • 28220 SW Boberg Road • Wilsonville, OR 97070

Label : „St. Andrew’s cross“ IRRITANT. R36/38. S26-S37/39. See section 9 for occupational exposure limits.

### 17. OTHER INFORMATION

Container type : High density polyethylene drum



# CLEANER 210

## THROUGH-HOLE PLATING SYSTEM

### DESCRIPTION

CLEANER 210 is a two component, slightly alkaline liquid solution designed to condition glass fibers and laminate surfaces. It is used in preparation for through-hole plating with the LPKF Lasers & Electronics Contac III and MiniContac through-hole plating systems.

### EQUIPMENT

Conveyor equipment should be made of Polypropylene or another suitable plastic material. Consult your LPKF technical representative for an approved vendor.

### OPERATING PARAMETERS

|             |                    |
|-------------|--------------------|
| Temperature | 21 - 27°C          |
| Normality   | 0.08 - 0.11 Normal |
| pH          | >9.6               |

### BATH MAINTENANCE & REPLENISHMENT

Because of the small volumes and low prices it is suggested not to maintain or replenish these baths. They must be changed on an average after 3 month.

### SAFETY & HANDLING

LPKF recommends that the company/process operator read and review the LPKF Material Safety Data Sheets for the appropriate health and safety warnings before use.

Material Safety Data Sheets are available from LPKF Lasers & Electronics.

# CLEANER 210

## THROUGH-HOLE PLATING SYSTEM

### WASTE DISPOSAL

Prior to using any recommendations or suggestions by LPKF for waste treatment, the user is required to know the appropriate local and state regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local and state regulations take precedent.

### ORDER INFORMATION

| <u>Product</u> | <u>Product Code</u> | <u>Standard Package</u> |
|----------------|---------------------|-------------------------|
| CLEANER 210    | SP-200              | N                       |

# CLEANER 210

## THROUGH-HOLE PLATING SYSTEM

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### 1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

**Product :** CLEANER 210

**Application :** An alkaline liquid used in the production of printed circuit boards.

**Supplier :**

LPKF Lasers & Electronics  
28220 SW Boberg Road  
Wilsonville, OR 97070  
Telephone: (503) 454-4200

### 2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

**Hazardous ingredients**

| Name                                    | %            | Hazard symbol/Risk & safety phrases  |
|---|--------------|--|
| Sodium metaborate<br>CAS-No.:10555-76-7 | 1.5 % by wt. | Xi: R36/38: Irritating to eyes and skin.<br>S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.<br>S37/39: Wear suitable protective gloves, and eye protection. |

### 3. HAZARDS IDENTIFICATION

**Ingestion :** IRRITANT: Will irritate the throat and stomach. Sickness and nausea may occur.

**Eye contact :** IRRITANT: Intense watering and soreness. Prolonged contact may cause visual impairment.

**Skin contact :** IRRITANT: Prolonged contact will cause skin cracking, leading to dermatitis.

**Inhalation :** IRRITANT: Unlikely in normal industrial practice. Prolonged inhalation will cause irritation and sneezing.

This information is given in good faith, being compiled from sources considered to be dependable. It is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It does not constitute an assessment in use as required under COSHH regulations.

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## THROUGH-HOLE PLATING SYSTEM

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#### 4. ECOLOGICAL EFFECTS

| Test type | Species  | Low | Qua | High | Units |
|-----------|----------|-----|-----|------|-------|
|           | Time/Ref |     |     |      |       |

Not established.

#### 5. FIRST AID PROCEDURES

**Eyes :** Flush continuously with clean running water, holding eyelids apart during flush. Do not stop for at least 20 minutes. Consult physician.

**Skin :** Flush with copious amounts of water while removing contaminated clothing. Seek medical advice.

**Ingestion :** Do not induce vomiting. Give several glasses of water to drink. Consult physician immediately.

**Inhalation :** Remove casualty to fresh air. Wash nose, mouth and throat (gargle) with water. Seek medical advice.

#### 6. FIRE FIGHTING PROCEDURES

**Extinguishing media :** Material not flammable. Use as appropriate to surroundings.

**Fire and explosion hazards :** None known.

**Protective procedures :** Wear full protection including self-contained breathing apparatus and fight fire from remote locations.

#### 7. SPILL OR LEAK PROCEDURES - SEE ALSO (14) DISPOSAL CONSIDERATIONS

**Personal precaution :** Ensure adequate ventilation. Wear protection as detailed in (9).

**Environmental precautions :** If product has entered drains, advise local river authority.

**Recovery :** Mop up using inert media and plastic tools. Place waste in plastic containers and allow to stabilize prior to sealing lid.

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### 8. STORAGE AND HANDLING (IN NORMAL USE)

Storage : Store in a cool, dry, well-ventilated area away from direct sunlight.

Storage temp: minimum: 4°C maximum: 48°C

Handling : Wear protective clothing, footwear, hand/eye protection. Ensure adequate ventilation in use.

### 9. EXPOSURE CONTROLS/PERSONAL PROTECTION (NORMAL USE)

#### OCCUPATIONAL EXPOSURE LIMITS

| Name              | 8hr TWA (EH40)       | 10 min (EH40) | EEC No | CAS No     |
|-------------------|----------------------|---------------|--------|------------|
| Sodium metaborate | 15 mg/m <sup>3</sup> |               |        | 10555-76-7 |
| LD50 oral (rat) = | 1700 mg/kg           |               |        |            |

ENGINEERING MEASURES : Provide local exhaust ventilation at point of use.

#### PERSONAL PROTECTIVE EQUIPMENT

Respiratory : If mists or vapors generated, suitable respirator protection (for amine vapors) must be worn.

Hand : Suitable rubber gloves.

Eye : Safety glasses/face shield to BS 2092 or equivalent standard.

Other : Protective clothing and footwear.

### 10. PHYSICAL/CHEMICAL PROPERTIES

|                         |                    |
|-------------------------|--------------------|
| Appearance :            | Pale yellow liquid |
| Odor :                  | Mild               |
| pH (as delivered) :     | > 9.6              |
| Viscosity :             | N/A                |
| Boiling point :         | >100°C             |
| Flash point :           | N/A                |
| Vapor pressure :        | N/A                |
| Vapor density :         | N/A                |
| Relative density (SG) : | > 1                |
| Solubility :            | Complete in water  |

# CLEANER 210

## THROUGH-HOLE PLATING SYSTEM

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### 11. STABILITY AND REACTIVITY

Stability : Stable  
Conditions to avoid : Do not freeze.  
Materials to avoid : Acids, strong oxidizing agents  
Hazardous decomposition products : Oxides of carbon and nitrogen, hydrochloric acid and boron oxides.

### 12. TOXICOLOGICAL INFORMATION

(Acute) short term effects :

Eyes : Prolonged contact will result in corneal damage.  
Skin : Prolonged contact will result in dermatitis.  
Ingestion : Prolonged contact will result in gastrointestinal tract impairment.  
Inhalation : Deliberate or prolonged inhalation will result in degreasing and drying of the mucous membranes.

(Chronic) long term effects : Lung, liver and kidney impairment if inhaled or ingested in significant quantities.  
High dose studies indicate reproduction impairment effects.

### 13. ECOLOGICAL INFORMATION

Biodegradability : Chemical Oxygen Demand = 482 mg O<sub>2</sub> per gm (Resin)  
Bioaccumulative potential : Not established.  
Aquatic toxicity : Toxic to fish and aquatic invertebrates.  
Other :

### 14. DISPOSAL CONSIDERATIONS

The Environmental Protection Act (Duty of Care) Provisions/SI 1994 No. 1137 The Transfrontier Shipment of Waste Regulations 1994 /EEC Directives : 91/156/EEC, 84/631/EEC & 76/464/EEC (Europe).

Control of Substances Hazardous to Health Regulations.

Do not empty into drains. Do not allow to enter waterways or sewers. Always check and comply with local and state regulations. Dispose of residues at an approved chemical treatment facility.

**CLEANER 210**  
**THROUGH-HOLE PLATING SYSTEM**

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**15. TRANSPORT**

|                |    |               |    |                    |      |
|----------------|----|---------------|----|--------------------|------|
| IMDG code :    | NR | IMDG page No: | NR | Marine pollutant : | No   |
| UN No:         | NR | ICAO/IATA:    |    | Transport symbol : | None |
| Packing group: | NR | RID/ADR:      | NR | Tremcard No:       | NR   |

Further information :

**16. REGULATORY INFORMATION :** Refer to the "Chemicals (Hazard Information & Packaging) Regulations".

Supplied by : LPKF Lasers & Electronics

Label : St. Andrew's cross " IRRITANT. R36/38. S26-S37/39. See section 9 for occupational exposure limits.

**17. OTHER INFORMATION**

Container type : High density polyethylene drum

# ACTIVATOR 310

## THROUGH-HOLE PLATING SYSTEM

### DESCRIPTION

Activator 310 is a slightly alkaline carbon black based suspension, with a viscosity which is close to that of water.

### EQUIPMENT

Conveyor equipment should be made of polypropylene or another suitable plastic material. Consult your LPKF technical representative for an approved vendor.

### SOLUTION MAKE-UP

Activator 310            100 % by volume

**IMPORTANT**        Before transferring the Activator 300N into the container 4 of the through-hole plating system, it must be re-circulated in the drum with a clean, dedicated electric drum pump.

### OPERATING PARAMETERS

|             |                       |
|-------------|-----------------------|
| Temperature | 32 - 35°C             |
| % Solids    | 1.9 - 2.3 optimum 2.1 |
| pH          | 9.6 - 10.4            |

### BATH MAINTENANCE & REPLENISHMENT

After six months an analysis, can be carried out by LPKF.                    When this is impossible, because of the distance or any other reason, the bath must be used until the fluid is defective. When normally used the bath should last for minimum one year.

**IMPORTANT**    Do never add water to the ACTIVATOR 310 otherwise the through-hole plating will be out of order. Steer the ACTIVATOR 310 before you put the PCB's into the bath.

### SAFETY & HANDLING

LPKF recommends that the company/process operator read and review the LPKF Material Safety Data Sheets for the appropriate health and safety warnings before use. Material Safety Data Sheets are available from LPKF Lasers & Electronics.



# ACTIVATOR 310

## THROUGH-HOLE PLATING SYSTEM

### WASTE DISPOSAL

Prior to using any recommendations or suggestions by LPKF for waste treatment, the user is required to know the appropriate local and state regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local and state regulations take precedent.

### ORDER INFORMATION

| <u>Product</u> | <u>Product Code</u> | <u>Standard Package</u> |
|----------------|---------------------|-------------------------|
| Activator 310  | AC-310              |                         |

# ACTIVATOR 310

## THROUGH-HOLE PLATING SYSTEM

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Date/Revision: 31.03.2000                      EEC SAFETY DATA SHEET

### 1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

**Product :**                      Activator 310  
**Application :**                An alkaline liquid used in the manufacture of printed circuit boards.

**Supplier:**  
LPKF Lasers & Electronics  
28220 SW Boberg Road  
Wilsonville, OR 97070  
Telephone: (503) 454-4200

### 2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

#### Hazardous ingredients

| Name                                     | %            | Hazard symbol/Risk & safety phrases   |
|--|--------------|---|
| Potassium carbonate<br>CAS-No.: 584-08-7 | 1-2 % by wt. | Xi: R36/38: Irritating to eyes and skin.<br>S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.<br>S37/39: Wear suitable gloves and eye/face protection, |

### 3. HAZARDS IDENTIFICATION

**Ingestion :**    IRRITANT:    Will irritate the throat, and stomach. Sickness and nausea may occur.

**Eye contact :** IRRITANT:    Intense watering and soreness. Prolonged contact may cause visual impairment.

**Skin contact :** IRRITANT:    Prolonged contact will cause skin irritation, leading to dermatitis.

**Inhalation :**    IRRITANT:    Unlikely in normal industrial practice. Prolonged inhalation will cause irritation and sneezing.

This information is given in good faith, being compiled from sources considered to be dependable. It is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It does not constitute an assessment in use as required under COSHH regulations.

# ACTIVATOR 310

## THROUGH-HOLE PLATING SYSTEM

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#### 4. ECOLOGICAL EFFECTS

| Test type | Species  | Low | Qua | High | Units |
|-----------|----------|-----|-----|------|-------|
|           | Time/Ref |     |     |      |       |

Not established.

#### 5. FIRST AID PROCEDURES

**Eyes :** Flush continuously with clean running water, holding eyelids apart during the flushing. Do not stop for at least 20 minutes. Consult physician.

**Skin :** Flush with copious amounts of water while removing contaminated clothing. Seek medical advice.

**Ingestion :** Do not induce vomiting. Give several glasses of water to drink. Consult physician immediately.

**Inhalation :** Remove casualty to fresh air. Seek medical advice.

#### 6. FIRE FIGHTING PROCEDURES

**Extinguishing media :** Material not flammable. Use as appropriate to surroundings.

**Fire and explosion hazards :** Reacts with aluminium liberating hydrogen gas.

**Protective procedures :** Wear full protection including self-contained breathing apparatus and fight fire from remote locations.

#### 7. SPILL OR LEAK PROCEDURES - SEE ALSO (14) DISPOSAL CONSIDERATIONS

**Personal precaution :** Ensure adequate ventilation. Wear protection as detailed in (9).

**Environmental precautions :** If product has entered drains, advise local river authority.

**Recovery :** Mop up using inert media and plastic tools. Place waste in plastic containers and allow to stabilise prior to sealing lid.

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## THROUGH-HOLE PLATING SYSTEM

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### 8. STORAGE AND HANDLING (IN NORMAL USE)

**Storage :** Store in a cool, dry, well-ventilated area away from direct sunlight.

**Storage temp:** minimum : 3°C      maximum : 48°C

**Handling :** Wear protective clothing, footwear, hand/eye protection. Ensure adequate ventilation in use.

### 9. EXPOSURE CONTROLS/PERSONAL PROTECTION (NORMAL USE)

#### OCCUPATIONAL EXPOSURE LIMITS

| Name                | 8hr TWA (EH40)      | 15 min (EH40) | EEC No    | CAS No   |
|---------------------|---------------------|---------------|-----------|----------|
| Potassium carbonate | --not established-- |               | 209-529-3 | 584-08-7 |

**ENGINEERING MEASURES :** Provide local exhaust ventilation at point of use.

#### PERSONAL PROTECTIVE EQUIPMENT

**Respiratory :** If mists or vapours are generated, suitable respiratory protection should be worn.

**Hand :** Suitable rubber gloves.

**Eye :** Safety glasses/face shield to BS 2092 or equivalent standard.

**Other :** Protective clothing, footwear and barrier creams.

### 10. PHYSICAL/CHEMICAL PROPERTIES

|                                |                   |
|--------------------------------|-------------------|
| <b>Appearance :</b>            | Black liquid      |
| <b>Odor :</b>                  | Mild              |
| <b>pH (as delivered) :</b>     | 10.1              |
| <b>Viscosity :</b>             | N/A               |
| <b>Boiling point :</b>         | >100°C            |
| <b>Flash point :</b>           | N/A               |
| <b>Vapour pressure :</b>       | N/A               |
| <b>Vapour density :</b>        | N/A               |
| <b>Relative density (SG) :</b> | 1.01              |
| <b>Solubility :</b>            | Complete in water |

# ACTIVATOR 310

## THROUGH-HOLE PLATING SYSTEM

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### 11. STABILITY AND REACTIVITY

Stability : Stable  
Conditions to avoid : None known  
Materials to avoid : Acids  
Hazardous decomposition products : Oxides of carbon  
Contact with aluminum liberates hydrogen gas.

### 12. TOXICOLOGICAL INFORMATION

(Acute) short term effects :

Eyes : Prolonged contact will result in corneal damage.  
Skin : Prolonged contact will result in dermatitis.  
Ingestion : Prolonged contact will result in gastro-intestinal impairment.  
Inhalation : Deliberate or prolonged inhalation will result in defatting and drying of the mucous membranes.

(Chronic) long term effects : Lung, liver and kidney impairment if ingested in significant quantities.

### 13. ECOLOGICAL INFORMATION

Biodegradability : N/A  
Bioaccumulative potential : Not considered to bioaccumulate  
Aquatic toxicity : Toxic to fish and aquatic invertebrates.  
Other :

### 14. DISPOSAL CONSIDERATIONS

The Environmental Protection Act (Duty of Care) Provisions/SI 1994 No. 1137 The Transfrontier Shipment of Waste Regulations 1994/EEC Directives: 91/156/EEC, 84/631/EEC & 76/464/EEC (Europe) Control of Substances Hazardous to Health Regulations.  
Do not empty into drains. Do not allow to enter waterways or sewers. Always check and comply with local and state regulations. Dispose of residues at an approved chemical treatment facility.

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### 15. TRANSPORT

|                |    |               |    |                    |              |
|----------------|----|---------------|----|--------------------|--------------|
| IMDG code :    | NR | IMDG page No: | NR | Marine pollutant : | No           |
| UN No:         | NR | ICAO/IATA:    |    | Transport symbol : | NR           |
| Packing group: | NR | RID/ADR:      | NR | Tremcard No:       | Not required |

Further information :

16. REGULATORY INFORMATION : Refer to the „Chemicals (Hazard Information & Packaging) Regulations“.

Supplied by : LPKF Lasers & Electronics • 2820 SW Boberg Road • Wilsonville, OR 97070

Label : „St Andrew’s cross“ IRRITANT. R36/38. S26-S37/39. See section 9 for occupational exposure limits.

### 17. OTHER INFORMATION

Container type : High density polyethylene drum

# **COPPER PLATER 400**

## **THROUGH\_HOLE PLATING BATH**

### **DESCRIPTION**

The Copper Plater 400 is a liquid solution designed to produce ductile, crack-resistance, semi-bright copper electrodeposits. It has been specifically formulated for the plating of circuit boards up to a current density of 5 ASD. The solution consists of two components ( Copper Sulfate =75g/l and Sulphuric Acid, 66° Electronic grade = 200 ml/l)

### **EQUIPMENT**

Conveyor equipment should be made of Polypropylene or another suitable plastic material. Consult your LPKF technical representative for an approved vendor.

### **SOLUTION MAKE-UP**

Fill the COPPER PLATER 400 in the tank  
Add 2ml/l Shine

### **OPERATING PARAMETERS**

Temperature ambient ~ 24°C, completed with mechanical agitation.

### **BATH MAINTENANCE**

In order to keep the P.C.B. surface shiny and smooth add Shine to the bath if they become granulated or dull. The chemical admix SHINE 400 is used up in dependence on the throughput. Fill up 10 ml SHINE after 100 ampere-hours.

### **SAFETY & HANDLING**

LPKF recommends that the company/process operator read and review the LPKF Material Safety Data Sheets for the appropriate health and safety warnings before use.

Material Safety Data sheets are available from LPKF Lasers & Electronics.

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### **WASTE DISPOSAL**

Prior to using any recommendation or suggestion by LPKF for waste treatment, the user is required to know the appropriate local and state regulations for on-site or off-site treatment. If there is any conflict regarding our recommendations, local and state regulations take precedent.

### **ORDER INFORMATION**

#### **Product**

#### **Standard Package**

COPPER PLATER 400



# COPPER PLATER 400

## THROUGH\_HOLE PLATING BATH

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EEC SAFETY DATA SHEET

### 1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

**Product :** Copper Plater 400  
**Application :** A liquid used for through-hole plating.

**Supplier :**

LPKF Lasers & Electronics  
28220 SW Boberg Road  
Wilsonville, OR 97070  
Telephone: (503) 454-4200

### 2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

**Hazardous ingredients**

| Name  | %      | Hazard symbol/Risk & safety phrases  |
|---|--------|--|
| Sulphuric acid ( 95-97%)<br>CAS-No.:7664-93-9 | 370g/l | C: R35 Cause severe burns.<br>S2: Must not get into children's hands.<br>S26: In case of contact with eyes , rinse immediately with plenty of water and seek medical advice. S30 Never add water to this product. S36/37/39 Wear suitable clothing, gloves and eye/face protection.. |
| Copper Sulfate<br>CAS-No.:7758-98-7           | 75g/l  | Xn: R22 harmful by swallow. R36/38: Irritating to eyes and skin<br>S36/37/39 Wear suitable protective clothing and eye protection  |

### 3. HAZARDS IDENTIFICATION

**Ingestion :** CORROSIVE Burn lips, mouth and esophagus. Nausea,vomiting(maybe with blood), abdominal pain.

**Eye contact :** CORROSIVE Severe pain, intense watering and redness, progressing to corneal burns unless treated promptly.

**Skin contact :** CORROSIVE Pain followed by redness of skin blistering may occur. Symptoms may be delayed.

**Inhalation :** CORROSIVE. Shortness of breath, cough,soreness of chest.Symptoms may be delayed.

## **COPPER PLATER 400**

### **THROUGH\_HOLE PLATING BATH**

This information is given in good faith, being compiled from sources considered to be dependable. It is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It does not constitute an assessment in use as required under COSHH regulations.

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#### 4. ECOLOGICAL EFFECTS

| Test type | Species  | Low | Qua | High | Units |
|-----------|----------|-----|-----|------|-------|
|           | Time/Ref |     |     |      |       |

Not established.

#### 5. FIRST AID PROCEDURES

**Eyes :** Flush continuously with clean running water, holding eyelids apart during flush. Do not stop for at least 20 minutes. Consult physician.

**Skin :** Flush with copious amounts of water while removing contaminated clothing. Seek medical advice.

**Ingestion :** Do not induce vomiting. Give several glasses of water to drink. Consult physician immediately.

**Inhalation :** Remove casualty to fresh air. Seek medical advice.

#### 6. FIRE FIGHTING PROCEDURES

**Extinguishing media :** Material not flammable. Use as appropriate to surroundings.

**Fire and explosion hazards :**

**Protective procedures :** Wear full protection including self-contained breathing apparatus and fight fire from remote locations.

#### 7. SPILL OR LEAK PROCEDURES - SEE ALSO (14) DISPOSAL CONSIDERATIONS

**Personal precaution :** Ensure adequate ventilation. Wear protection as detailed in (9).

**Environmental precautions :** If product has entered drains, advise local river authority.

**Recovery :** Mop up using inert media and plastic tools. Place waste in plastic containers and allow to stabilize prior to sealing lid.

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### 8. STORAGE AND HANDLING (IN NORMAL USE)

**Storage :** Store in a cool, dry, well-ventilated area away from direct sunlight.

**Handling :** Wear protective clothing, footwear, hand/eye protection. Ensure adequate ventilation in use.

### 9. EXPOSURE CONTROLS/PERSONAL PROTECTION (NORMAL USE)

#### OCCUPATIONAL EXPOSURE LIMITS

| Name           | 8hr TWA (EH40) | 10 min (EH40)                | EEC No    | CAS No    |
|----------------|----------------|------------------------------|-----------|-----------|
| Sulphuric acid | --             | 1 mg/m <sup>3</sup>          | 231-639-5 | 7664-93-9 |
| Copper Sulfate |                | 0,2mg/m <sup>3</sup> (as Cu) | 231-847-6 | 7758-98-7 |

**ENGINEERING MEASURES :** Provide local exhaust ventilation at point of use.

#### PERSONAL PROTECTIVE EQUIPMENT

**Respiratory :** If mists or vapor are generated, suitable respiratory protection should be worn.

**Hand :** Suitable rubber gloves.

**Eye :** Safety glasses/face shield to BS 2092 or equivalent standard.

**Other :** Protective clothing and footwear.

### 10. PHYSICAL/CHEMICAL PROPERTIES

|                                |                    |
|--------------------------------|--------------------|
| <b>Appearance :</b>            | Blue liquid        |
| <b>Odor :</b>                  | Slightly sulfurous |
| <b>pH (as delivered) :</b>     | <0,1               |
| <b>Viscosity :</b>             | N/A                |
| <b>Boiling point :</b>         | >100°C             |
| <b>Flash point :</b>           | N/A                |
| <b>Vapor pressure :</b>        | N/A                |
| <b>Vapor density :</b>         | N/A                |
| <b>Relative density (SG) :</b> | N/A                |

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Solubility : Complete in water

### 11. STABILITY AND REACTIVITY

Stability : Stable  
Conditions to avoid : None known  
Materials to avoid : Strong alkalis.  
Hazardous decomposition products : Oxides of sulfur. Copper fume.

### 12. TOXICOLOGICAL INFORMATION

(Acute) short term effects :

Eyes : Corneal ulceration after eye contact.  
Skin : Tissue loss and scarring.  
Ingestion : Haematemesis and esophageal structure, gastric perforation.  
Inhalation : Pulmonary edema after inhalation: treat by positive pressure ventilation.

(Chronic) long term effects :

### 13. ECOLOGICAL INFORMATION

Biodegradability : Not to cumulate  
Bioaccumulative potential : Not considered to bioaccumulate  
Aquatic toxicity : Toxic to fish and aquatic invertebrates  
Other:

### 14. DISPOSAL CONSIDERATIONS

The Environmental Protection Act (Duty of Care) Provisions/SI 1994 No. 1137 The Transfrontier Shipment of Waste Regulations 1994/EEC Directives:91/156/EEC, 84/631/EEC & 76/464/EEC (Europe) Control of Substances Hazardous to Health Regulations.  
Do not empty into drains. Do not allow to enter waterways or sewers. Always check and comply with local and state regulations. Dispose of residues at an approved chemical treatment facility.

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### 15. TRANSPORT

IMDG code : 8      IMDG page No:  
UN No: 2796      ICAO/IATA: 8 UN 2796      Transport symbol : Corrosive diamond N°8  
Packing group: II      RID/ADR: 8,1°(b)      Tremcard No:  
Further information :

16. REGULATORY INFORMATION : Refer to the „Chemicals (Hazard Information & Packaging) Regulations“.

Supplied by : LPKF Lasers & Electronics • 2820 SW Boberg Road • Wilsonville, OR 97070

Label : Corrosive symbol „CORROSIVE“: R35. S2-26-30-36/37/39, See section 9 for occupational exposure limits.

### 17. OTHER INFORMATION

Container type : High density polyethylene drum

## **SHINE 400**

**Additive to Copper Plater 400**

### **DESCRIPTION**

The Shine Additive is a formulation which produces ductile, crack-resistance, semi-bright copper electrodeposits, while exhibiting excellent levelling characteristics and unusually high throwing power. It has been specifically formulated for the plating of circuit boards up to a current density of 5 ASD. The outstanding advantage of Shine is its exceptional levelling ability coupled with its ductile deposit and resistance to cracking.

Another advantage of the Shine is exceptional throwing power. A 1:1 ratio can be maintained on conventional panels plated, provided that the equipment and cell geometry are optimized.

### **BATH MAINTENANCE OF COPPER PLATER 400**

If the concentration of Shine is low, which will be indicated by a dull copper plating over the total surface of the panel, Shine should be added at the rate of 0,4 ml per one liter COPPER PLATER until the return of the former brightness.

### **SAFETY & HANDLING**

LPKF recommends that the company/process operator read and review the LPKF Material Safety Data Sheets for the appropriate health and safety warnings before use.

Material Safety Data Sheets are available from LPKF Lasers & Electronics.

**WASTE DISPOSAL**

Prior to using any recommendations or suggestions by LPKF for waste treatment, the user is required to know the appropriate local and state regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local and state regulations take precedent.

**ORDER INFORMATION**

Product

Standard Package

Shine 400



# SHINE 400

Additive to Copper Plater 400

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## 1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

**Product :** SHINE 400

**Application :** A liquid used in the manufacture of printed circuit boards.

**Supplier :**

LPKF Lasers & Electronics  
28220 SW Boberg Road  
Wilsonville, OR 97070  
Telephone: (503) 454-4200

## 2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

### Hazardous ingredients

| Name                                | %                    | Hazard symbol/Risk & safety phrases   |
|-------------------------------------|----------------------|---|
| Sulphuric acid<br>CAS-No.:7664-93-9 | 0.6 %by wt.          | Xi: R36/38: Irritating to eyes and skin. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.           |
| Formaldehyde<br>CAS-No.:50-00-0     | 0.097-0,099 % by wt. | R43: May cause sensitization by skin contact. S24 Avoid contact with skin, S23: Do not breathe vapor. S27: Remove sodden, dirty clothing immediately. |

## 3. HAZARDS IDENTIFICATION

**Ingestion :** IRRITANT: Will irritate the throat, and stomach. Sickness and nausea may occur.

**Eye contact :** IRRITANT: Intense watering and soreness. Prolonged contact may cause visual impairment.

**Skin contact :** IRRITANT: Prolonged contact will cause skin cracking, leading to dermatitis.

**Inhalation :** IRRITANT: Prolonged inhalation will cause irritation and sneezing.

This information is given in good faith, being compiled from sources considered to be dependable. It is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. It does not constitute an assessment in use as required under COSHH regulations.

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#### 4. ECOLOGICAL EFFECTS

| Test type | Species  | Low | Qua | High | Units |
|-----------|----------|-----|-----|------|-------|
|           | Time/Ref |     |     |      |       |

Not established.

#### 5. FIRST AID PROCEDURES

**Eyes :** Flush continuously with clean running water, holding eyelids apart during flush. Do not stop for at least 20 minutes. Consult physician.

**Skin :** Flush with copious amounts of water while removing contaminated clothing. Seek medical advice.

**Ingestion :** Do not induce vomiting. Give several glasses of water to drink. Consult physician immediately.

**Inhalation :** Remove casualty to fresh air. Seek medical advice.

#### 6. FIRE FIGHTING PROCEDURES

**Extinguishing media :** Material not flammable. Use as appropriate to surroundings.

**Fire and explosion hazards :** Gives off flammable vapors of formaldehyde.

**Protective procedures :** Wear full protection including self-contained breathing apparatus and fight fire from remote locations.

#### 7. SPILL OR LEAK PROCEDURES - SEE ALSO (14) DISPOSAL CONSIDERATIONS

**Personal precaution :** Ensure adequate ventilation. Wear protection as detailed in (9).

**Environmental precautions :** If product has entered drains, advise local river authority.

**Recovery :** Mop up using inert media and plastic tools. Place waste in plastic containers and allow to stabilize prior to sealing lid.

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## 8. STORAGE AND HANDLING (IN NORMAL USE)

**Storage :** Store in a cool, dry, well-ventilated area away from direct sunlight.

**Stage temp.:** minimum: 7°C maximum: 38°C

**Handling :** Wear protective clothing, footwear, hand/eye protection. Ensure adequate ventilation in use.

## 9. EXPOSURE CONTROLS/PERSONAL PROTECTION (NORMAL USE)

### OCCUPATIONAL EXPOSURE LIMITS

| Name           | 8hr TWA (EH40)      | 10 min (EH40) | EEC No    | CAS No    |
|----------------|---------------------|---------------|-----------|-----------|
| Sulphuric acid | 1 mg/m <sup>3</sup> | --            | 231-639-5 | 7664-93-9 |
| Formaldehyde*  | 2 ppm maximum       | 2 ppm maximum | 200-001-8 | 50-00-0   |

\*LD50 oral (rat) = 800 mg/kg

**ENGINEERING MEASURES :** Provide local exhaust ventilation at point of use.

### PERSONAL PROTECTIVE EQUIPMENT

**Respiratory :** If mists or vapor are generated, suitable respiratory protection should be worn.

**Hand :** Suitable rubber gloves.

**Eye :** Safety glasses/face shield to BS 2092 or equivalent standard.

**Other :** Protective clothing, footwear and barrier creams.

## 10. PHYSICAL/CHEMICAL PROPERTIES

|                                |                    |
|--------------------------------|--------------------|
| <b>Appearance :</b>            | Pale yellow liquid |
| <b>Odor :</b>                  | Slightly sulfurous |
| <b>pH (as delivered) :</b>     | 2.8                |
| <b>Viscosity :</b>             | N/A                |
| <b>Boiling point :</b>         | >100°C             |
| <b>Flash point :</b>           | N/A                |
| <b>Vapor pressure :</b>        | N/A                |
| <b>Vapor density :</b>         | N/A                |
| <b>Relative density (SG) :</b> | 1.013              |
| <b>Solubility :</b>            | Complete in water  |

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## 11. STABILITY AND REACTIVITY

Stability : Stable  
Conditions to avoid : None known  
Materials to avoid : Strong oxidizing agents.  
Hazardous decomposition products: Oxides of sulfur and carbon.

## 12. TOXICOLOGICAL INFORMATION

(Acute) short term effects :

Eyes : Prolonged contact will result in corneal damage.  
Skin : Prolonged contact will result in dermatitis.  
Ingestion : Prolonged contact will result in gastrointestinal impairment.  
Inhalation : Deliberate or prolonged inhalation will result in degreasing and drying of the mucous membranes.

(Chronic) long term effects : Lung, liver and kidney impairment if ingested in significant quantities, and sensitivity.  
Formaldehyde is a category 3 carcinogen.

## 13. ECOLOGICAL INFORMATION

Biodegradability : Complete  
Bioaccumulative potential : Not considered to bioaccumulate  
Aquatic toxicity : Toxic to fish and aquatic invertebrates.  
Other :

## 14. DISPOSAL CONSIDERATIONS

The Environmental Protection Act (Duty of Care) Provisions/SI 1994 No. 1137. The Transfrontier Shipment of Waste Regulations 1994/EEC Directives: 91/156/EEC, 84/631/EEC & 76/464/EEC (Europe) Control of Substances Hazardous to Health Regulations.  
Do not empty into drains. Do not allow to enter waterways or sewers. Always check and comply with local and state regulations. Dispose of residues at an approved chemical treatment facility.

# SHINE 400

Additive to Copper Plater 400

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## 15. TRANSPORT

IMDG code :           IMDG page No:           Marine pollutant :   No  
UN No:           1760 ICAO/IATA:8 UN 1760   Transport symbol :   Corrosive diamond No. 8  
Packing group: II   RID/ADR:           8,66 c           Tremcard No:  
Further information : Corrosive liquid, n.o.s., (Formaldehyde solution, Sulphuric acid).

16. REGULATORY INFORMATION : Refer to the „Chemicals (Hazard Information & Packaging) Regulations“.

Supplied by : LPKF Lasers & Electronics • 2820 SW Boberg Road • Wilsonville, OR 97070

Label : „St. Andrew’s cross“ IRRITANT. R36/38-R43. S23-S24-S26-S27. See section 9 for occupational exposure limits.

## 17. OTHER INFORMATION

Container type : High density polyethylene drum