

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.

EQUIPMENT

Conveyor equipment should be made of Polypropylene or another suitable plastic material.

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

It is recommended that the company/process operator reads and reviews the Safety Data Sheets for the appropriate health and safety warnings before use.

WASTE DISPOSAL

Prior to using any recommendations or suggestions 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. EAK 110 107.

ORDER INFORMATION

Product

Standard Package

CLEANER 110

CLEANER 110
THROUGH-HOLE PLATING SYSTEM

CLEANER 110

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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 Laser & Electronics AG

Osteriede 7
30827 Garbsen
Germany

Phone.: +49 (0) 5131 70 95 -0

Fax: +49 (0) 5131 70 95 - 90

2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

Hazardous ingredients

Name	%	Hazard symbol/Risk & safety phrases
Sodium metaborate CAS-No.:10555-76-7	1.5 % 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,
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.

CLEANER 110

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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.

CLEANER 110

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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 LD50 oral (rat) = 1700 mg/kg	15 mg/m ³	--		10555-76-7

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

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 110

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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. EAK 110 107.

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 110

THROUGH-HOLE PLATING SYSTEM

EEC SAFETY DATA SHEET

Page 5 / 5

Issue: D

Date/Revision: 31.03.2000

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“.

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.

EQUIPMENT

Conveyor equipment should be made of Polypropylene or another suitable plastic material.

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

It is recommended that the company/process operator reads and reviews the Safety Data Sheets for the appropriate health and safety warnings before use.

WASTE DISPOSAL

Prior to using any recommendations or suggestions by LPKF AG 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. EAK 110 107.

ORDER INFORMATION

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

CLEANER 210
THROUGH-HOLE PLATING SYSTEM

CLEANER 210

THROUGH-HOLE PLATING SYSTEM

EEC SAFETY DATA SHEET

Page 1 / 5

Issue: D

Date/Revision: 31.03.2000

EEC SAFETY DATA SHEET

1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

Product : CLEANER 210

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

Supplier:

LPKF Laser & Electronics AG

Osteriede 7
30827 Garbsen

Germany

Phone.: +49 (0) 5131 70 95 -0

Fax: +49 (0) 5131 70 95 - 90

2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

Hazardous ingredients

Name	%	Hazard symbol/Risk & safety phrases
Sodium metaborate CAS-No.:10555-76-7	1.5 % 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. 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.

CLEANER 210

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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.

CLEANER 210

THROUGH-HOLE PLATING SYSTEM

Issue: A

Date/Revision: 31.03.2000

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 ³			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

Issue: D

Date/Revision: 31.03.2000

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 O₂ 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. EAK 110 107.

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

EEC SAFETY DATA SHEET

Page 5 / 5

Issue: D

Date/Revision: 31.03.2000

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”.

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.

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. 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

It is recommended that the company/process operator reads and reviews the Safety Data Sheets for the appropriate health and safety warnings before use.

ACTIVATOR 310

THROUGH-HOLE PLATING SYSTEM

WASTE DISPOSAL

Prior to using any recommendations or suggestions 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.
EAK 110 107.

ORDER INFORMATION

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

ACTIVATOR 310

THROUGH-HOLE PLATING SYSTEM

EEC SAFETY DATA SHEET

Page 1 / 5

Issue: D

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 Laser & Electronics AG

Osteriede 7
30827 Garbsen
Germany

Phone.: +49 (0) 5131 70 95 -0

Fax: +49 (0) 5131 70 95 - 90

2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

Hazardous ingredients

Name	%	Hazard symbol/Risk & safety phrases
Potassium carbonate CAS-No.: 584-08-7	1-2 % 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. 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

EEC SAFETY DATA SHEET

Page 2 / 5

Issue: D

Date/Revision: 31.03.2000

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.

ACTIVATOR 310

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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

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

ACTIVATOR 310

THROUGH-HOLE PLATING SYSTEM

Issue: D

Date/Revision: 31.03.2000

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. EAK 110 107.

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.

ACTIVATOR 310

THROUGH-HOLE PLATING SYSTEM

EEC SAFETY DATA SHEET

Page 5 / 5

Issue: D

Date/Revision: 31.03.2000

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“.

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.

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

It is recommended that the company/process operator reads and reviews the Material Safety Data Sheets for the appropriate health and safety warnings before use.

WASTE DISPOSAL

Prior to using any recommendation or suggestion by LPKF AG 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. EAK 110 105.

ORDER INFORMATION

Product

COPPER PLATER 400

Standard Package

COPPER PLATER 400

THROUGH_HOLE PLATING BATH

COPPER PLATER 400

THROUGH_HOLE PLATING BATH

EEC SAFETY DATA SHEET

Page 1 / 5

Issue: A

Date/Revision: 20/04/96

EEC SAFETY DATA SHEET

1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

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

Supplier:

LPKF Laser & Electronics AG
Osteriede 7
30827 Garbsen
Germany

Phone.: +49 (0) 5131 70 95 -0
Fax: +49 (0) 5131 70 95 - 90

2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

Hazardous ingredients

Name	%	Hazard symbol/Risk & safety phrases
Sulphuric acid (95-97%) CAS-No.:7664-93-9	370g/l	C: R35 Cause severe burns. S2: Must not get into children's hands. 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 CAS-No.:7758-98-7	75g/l	Xn: R22 harmful by swallow. R36/38: Irritating to eyes and skin 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.

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.

COPPER PLATER 400

THROUGH_HOLE PLATING BATH

EEC SAFETY DATA SHEET

Page 2 / 5

Issue: A

Date/Revision: 20/04/96

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.

COPPER PLATER 400

THROUGH_HOLE PLATING BATH

Issue: A

Date/Revision: 20/04/96

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 ³	231-639-5	7664-93-9
Copper Sulfate		0,2mg/m ³ (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

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

COPPER PLATER 400

THROUGH_HOLE PLATING BATH

EEC SAFETY DATA SHEET

Page 4 / 5

Issue: A

Date/Revision: 20/04/96

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. EAK 110 105

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.

COPPER PLATER 400 THROUGH_HOLE PLATING BATH

Issue: A

Date/Revision: 20/04/96

15. TRANSPORT

IMDG code : 8 **IMDG page No:**

UN No: 2796 **ICAO/IATA:** 8 UN 2796

Packing group: II **RID/ADR:** 8,1°(b)

Further information :

Transport symbol : Corrosive diamond N°8

Tremcard No:

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

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. Alternatively add 10 ml SHINE 400 after every 100 ampere-hours in operation (keep a lab diary)

SAFETY & HANDLING

It is recommended that the company/process operator reads and reviews the Material Safety Data Sheets for the appropriate health and safety warnings before use.

WASTE DISPOSAL

Prior to using any recommendations or suggestions 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

SHINE 400

Additive to Copper Plater 400

Issue: A

Date/Revision: 31.03.2000

EEC SAFETY DATA SHEET

1. IDENTIFICATION OF SUBSTANCE OR PREPARATION

Product : SHINE 400
Application : A liquid used in the manufacture of printed circuit boards.

Supplier:

LPKF Laser & Electronics AG

Osteriede 7
30827 Garbsen
Germany

Phone.: +49 (0) 5131 70 95 -0

Fax: +49 (0) 5131 70 95 - 90

2. COMPOSITION/INFORMATION ABOUT INGREDIENTS

Hazardous ingredients

Name	%	Hazard symbol/Risk & safety phrases
Sulphuric acid 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 CAS-No.:50-00-0	0.1 % by wt.	Xn: R40: Irreversible damage possible 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.

SHINE 400

Additive to Copper Plater 400

Issue: A

Date/Revision: 31.03.2000

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.

SHINE 400

Additive to Copper Plater 400

Issue: A

Date/Revision: 31.03.2000

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 ³	--	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

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

SHINE 400

Additive to Copper Plater 400

Issue: A

Date/Revision: 31.03.2000

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

Issue: A

Date/Revision: 31.03.2000

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:** 80 G 20 C modified
Further information : Corrosive liquid, n.o.s., (Formaldehyde solution, Sulphuric acid).

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

Label : „St. Andrew’s cross“ IRRITANT. R36/38-R43. S26-S27-S28. S37/39 See section 9 for occupational exposure limits.

17. OTHER INFORMATION

Container type : High density polyethylene drum

SHINE 400

Additive to Copper Plater 400