Salts and intermediates for advanced industrial applications

METAL FINISHING

TIB CHEMICALS AT A GLANCE

We, TIB Chemicals AG, are an internationally oriented, medium-sized chemical company. We offer our customers a diversified product range as well as customer-specific solutions in the fields of basic chemicals, inorganic specialty chemicals and coating systems.

Our diversification offers a complete product range and a stable financial base. With our streamlined organization and lean structure, our decision-making channels within the company are short. This enables us to respond flexibly and agilely to the requirements and wishes of our customers. The economic success of **TIB Chemicals** is largely based on three core factors:

COMPETENCE

We build on a broad product range and over 150 years of tradition.

EMPLOYEES

With our more than 450 motivated and committed employees, we guide the company on the road to success through a spirit of research, creativity and discipline.

QUALITY

We adapt flexibly to dynamic market conditions with innovative and customized products.

With our subsidiaries TIB Chemicals S.A. de C.V, San Luis Potosí, Mexico, and TIB Chemicals Corp., Pittsburgh, USA we are very well positioned internationally and can optimally meet the requirements of our customers. This has enabled us to grow continuously with our customers in the recent years.

Concentrate on your customers. Leave the chemistry to us!

TRUST YOUR PROCESS TO... TIB

TIB METAL FINISHING CHEMICALS - THE BASIS FOR YOUR INNOVATIVE FORMULATIONS

Metal finishing products from TIB Chemicals have a long tradition. Back in the 1980s, we were already supplying our customers with high quality metal compounds, such as tin sulfate, for traditional tin baths.

And our portfolio has been steadily expanding ever since. In doing so, we always respond to new requirements. This is reflected in our metal methanesulfonates, along with basic salts for cyanide free bath formulations or chrome bath wetting agents free of fluorotensides.

Our portfolio includes salts and solutions of a broad range of metals, especially tin, zinc, copper and nickel. These basic materials are characterized by their high quality, which we ensure through careful selection of the raw materials and reliable process management.

The range of metal compounds is supplemented by acids and organic intermediates and by a growing range of ready-to-use formulations. In terms of the breadth of materials, the **TIB Chemicals** product portfolio represents a unique offer to metal finishing customers. It allows them to participate in value added chains in vital industries such as automotive and electronics.

METAL METHANESULFONATES

Metal methanesulfonates are suitable for the formulation of electroplating baths, especially in the electronics sector, when plating metal and alloy layers for manufacturing and surface modification of, for example, printed circuit boards and connectors.

Years ago, our customers' focus on lead-free solders encouraged the development of electrolytes of this type. **TIB Chemicals** supported this pathway from the beginning. Well prior the relevant guidelines came into effect, we ensured the success of those advanced bath types by providing our respective raw materials.

This product group is characterized by the highest standards of purity and stability.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Tin(II) methanesulfonate	Solution	300 g/l Sn	Tin plating, alloy plating
Copper(II) methanesulfonate	Solution	125 g/l Cu	Alloy plating
Silver(I) methanesulfonate	Solution	275 g/l Ag	Cyanide-free electrolytic and immersion silver baths, for Sn/Ag alloy plating
Bismuth(III) methanesulfonate	Solution	210 g/l Bi	Stabilizer for electroless nickel, alloy plating
Lead(II) methanesulfonate	Solution	450 g/l Pb	Bearing plating
Indium(III) methanesulfonate	Solution	200 g/l In	Indium plating, alloy plating
Chromium(III) methanesulfonate	Solution	100 g/l Cr	Cr(III) passivation, chromium deposition
Cobalt(II) methanesulfonate	Solution	120 g/l Co	Additive for passivation
Nickel(II) methanesulfonate	Solution	100 g/l Ni	Special alloys
Zinc methanesulfonate	Solution	120 g/l Zn	Metal finishing
Sodium methanesulfonate	Solution	120 g/l Na	Conductivity additive and grain refiner for MSA-electrolytes
Potassium methanesulfonate	Solution	200 g/l K	Metal finishing

FLUOROBORATES

Classic alloy baths based on fluoroboric acid are still used primarily in the field of functional plating. Our metal fluoroborates cover most of the range of the required salts. They are characterized by particularly high base metal concentrations in the solution.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Tin(II) fluoroborate	Solution	320 g/l Sn	Alloy plating
Copper(II) fluoroborate	Solution	210 g/l Cu	Basic salt for copper baths, alloy plating
Lead(II) fluoroborate	Solution	500 g/l Pb	Alloy plating

ADDITIONAL TIN PRODUCTS

Tin chemicals have been used worldwide for decades in many different areas of electroplating technology.

We manufacture our tin products at sites in Germany, the USA, and Mexico—always using raw materials of the highest quality. This ensures very low levels of disruptive foreign metals such as iron and lead. Our backward-integrated manufacturing means that almost all processes are based on tin metal, which enables us to optimize quality and cost control.

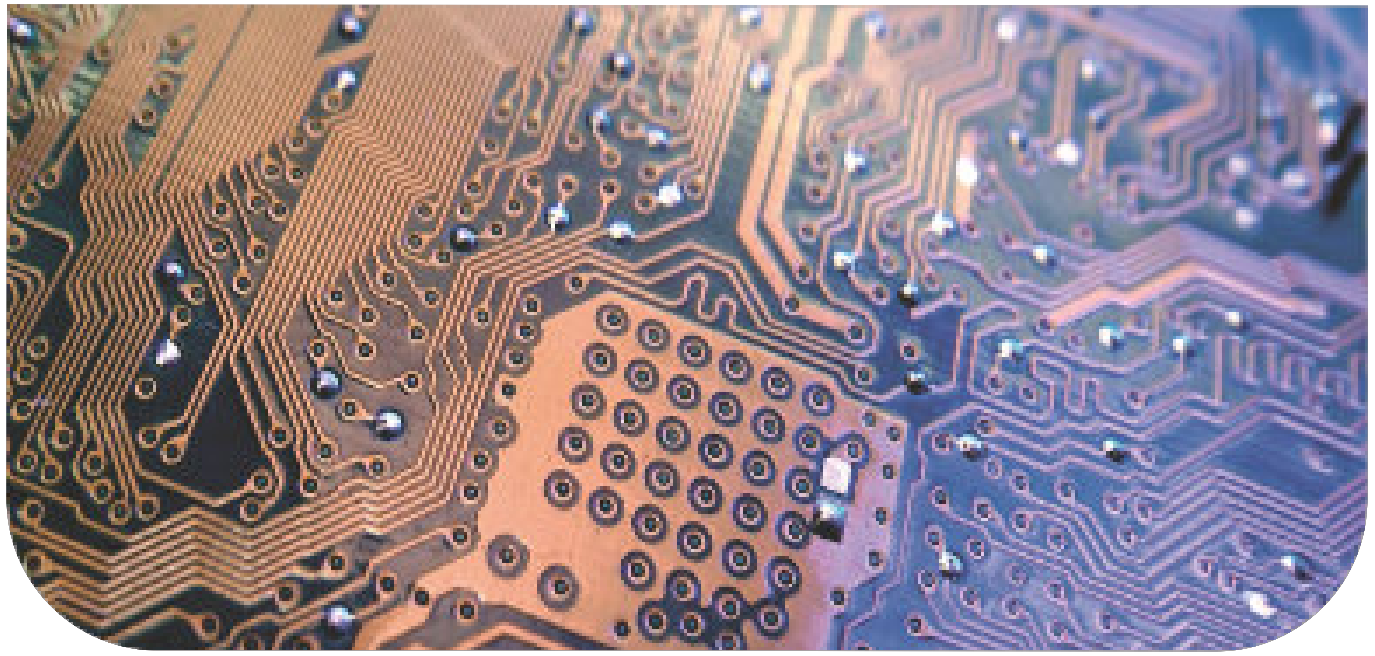
Long-standing and trusting business relationships with our suppliers ensure that the tin metal we use is 100 % conflict-free.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Tin(II) chloride	Anhydrous, dihydrate and as a solution	62 % Sn (anhydrous) 52 % Sn (dihydrate) up to 500 g/l Sn (solution)	Immersion tin plating, formulation of palladium-colloid activator
Tin(II) sulfate	Crystalline and as a solution	55 % Sn (crystalline) 125 g/l Sn (solution)	Immersion and electrolytic tin plating
TIB Stanal TS	Crystalline	43 % Sn	Acidic immersion tin plating of aluminum surfaces based on tin sulfate
TIB Stannocolor	Solution	219 g/l $SnSO_4$	Electrolytic coloring of aluminum surfaces based on tin sulfate
TIB SpeedPlate	Crystalline	10 % Sn	Acidic immersion tin plating of copper and brass surfaces based on tin sulfate
Tin(II) oxide	Tin oxide black	88 % Sn	Metal finishing
Tin(II) pyrophosphate	Crystalline	55 % Sn	Alloy plating
Sodium hexahydroxostannate	Crystalline and as a solution	43 % Sn (crystalline) 125 g/l Sn (solution)	Alkaline immersion tin plating on aluminum surfaces, white bronze plating
Potassium hexahydroxostannate	Crystalline and as a solution	38 % Sn (crystalline) 160 g/l Sn (solution)	Alkaline immersion tin plating on aluminum surfaces, white bronze plating

ADDITIONAL COPPER PRODUCTS

Plating on copper and copper alloys is important for all types of metal finishing processes. Our copper containing products are used primarily for functional plating, as in PCB production for example. They are therefore characterized particularly by low levels of critical impurities.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Copper(II) nitrate	Solution	15 – 20 % Cu	Metal finishing
Copper(II) acetate	Monohydrate and as a solution	32 % Cu (crystalline) 4 % Cu $(CH_3COO)_2$ (solution)	Metal finishing
Copper(II) oxide EPG	Very pure	79 % Cu	Replenisher for copper baths in PCB production
Copper(II) hydroxide carbonate	Bulk density > 1.5 kg/l	55 % Cu	Replenisher for copper baths in PCB production
Copper(II) sulfate EPG	Solution	70 g/l Cu	Basic solution for copper electrolytes
Copper(II) pyrophosphate	Crystalline	34 % Cu	Basic salt for copper baths



ADDITIONAL NICKEL PRODUCTS

The applications for nickel salts in electroplating ranges from corrosion protection for metal surfaces through decorative layers of nickel on metal-plated plastics to electronics applications.

Our nickel products are made using ultra-pure metals as the only nickel raw material. They thus meet the toughest standards of product quality for our customers in the electroplating industry. Not only do we guarantee a permanently low level of impurities, we offer our customers both customized product modifications and the exclusive contract manufacture of complete bath formulations.

The production site in Hagen fulfills the particular requirements of occupational safety and environmental protection that nickel chemicals manufacturers have to meet.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Nickel sulfate	Heptahydrate and as a solution	21 % Ni (crystalline) 10 % Ni (solution)	Basic salt for nickel baths
Nickel chloride	Hexahydrate and as a solution	23.5 % Ni (crystalline) 13.4 % Ni (solution)	Basic salt for nickel baths
Nickel nitrate	Hexahydrate and as a solution	19.7 % Ni (crystalline) 14 % Ni (solution)	Corrosion protection formulations
Nickel hydroxidecarbonate	Dust-free or as a powder	Up to 48 % Ni	Electroplating
Nickel acetate	Tetrahydrate	24 % Ni	Electroplating, anodizing
Nickel sulfamate	Solution	12 % Ni	Electrolytic nickel plating
Nickel phosphate	Solution	9 % Ni	Phosphating

ADDITIONAL ZINC PRODUCTS

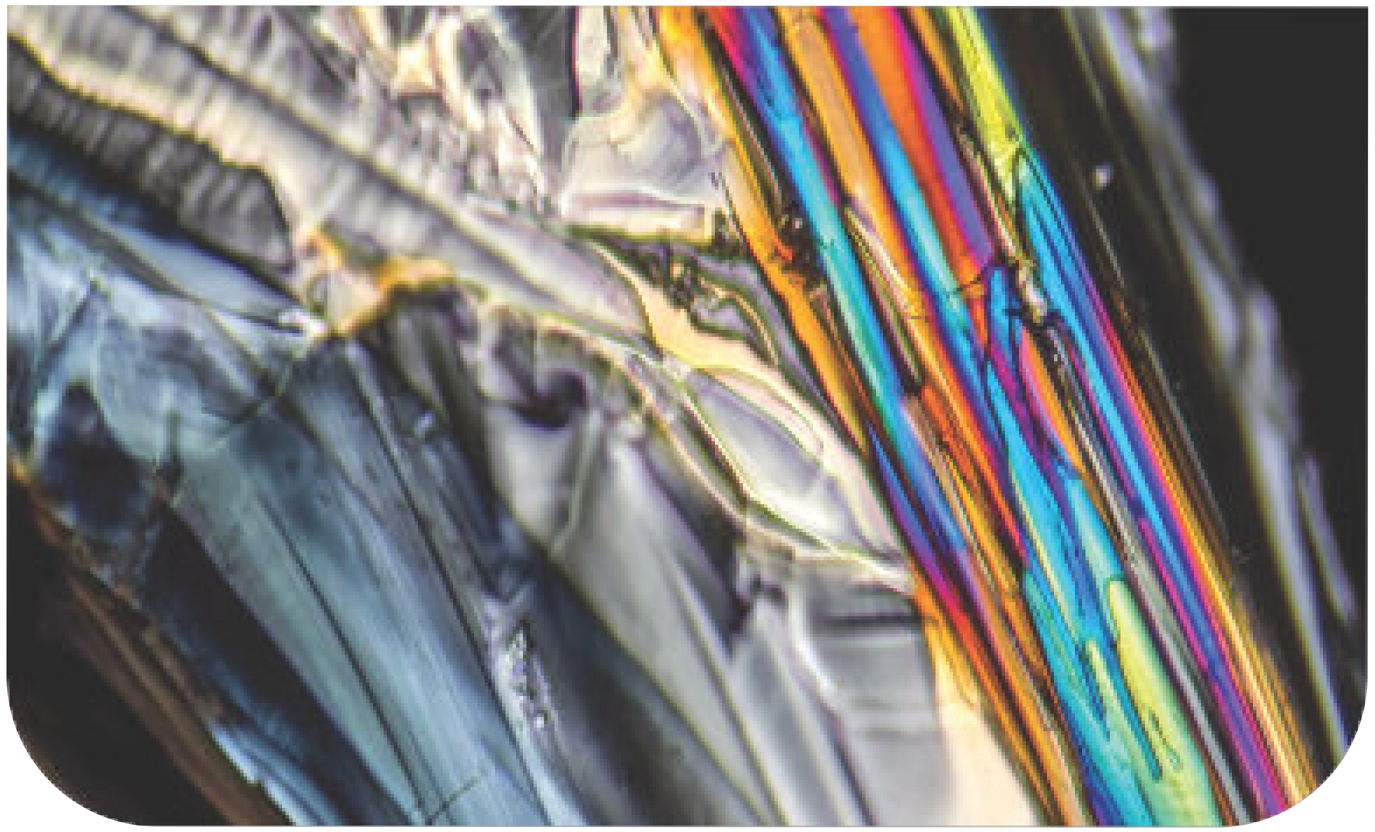
We cover a wide range of electroplating applications in which the use of zinc compounds is essential, whether as a basic salt in electroplating baths or as a component in corrosion protection formulations.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Zinc chloride	Crystalline and as a solution	96–97 % $ZnCl_2$ (crystalline) 40–65 % $ZnCl_2$ (solution)	Basic salt
Zinc nitrate	Solution	680 g/l $Zn(NO_3)_2$	Corrosion protection
Zinc citrate	Powder	32 % Zn	Metal finishing

ADDITIONAL TRIVALENT CHROMIUM SOLUTIONS

Chromium(III) salts are used as raw materials for chromium(VI)-free passivation formulations and chrome plating baths. Our solutions are characterized by a particularly low content of disruptive organic impurities.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Chrom(III) chloride	Solution	50 % hydrate 9 – 10 % Cr	Cr(VI)-free passivation and chrome plating baths
Chrom(III) sulfate	Solution	50 % hydrate 8 – 9 % Cr	Cr(VI)-free passivation and chrome plating baths
Chrom(III) nitrate	Solution	74 % hydrate 9 – 10 % Cr	Cr(VI)-free passivation
Chrom(III) hydrogenphosphate	Solution	20 % salt 6 – 7 % Cr	Cr(VI)-free passivation



ACIDS

Acids are components of many metal finishing formulations. They are used as a basic acid or additive in plating baths. We supply the standard mineral acids and some organic acids of utmost purity and in variable concentrations.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Sulfuric acid	Solution	98 %	Metal finishing
Methanesulfonic acid	Solution	70 %	Metal finishing
Methanedisulfonic acid	Solution	50 %	Metal finishing
Hydroxyethanesulfonic acid	Solution	70 %	Metal finishing
Fluoroboric acid	Solution	50 %	Metal finishing
Sulfosuccinic acid	Solution	70 %	Metal finishing

ORGANIC CHEMICALS

Our range of organic chemicals comprises both intermediates and mixtures. It thus perfectly complements our range of inorganic basic materials for metal finishing applications.

Organic intermediates, especially surfactants, are important raw materials for the formulation of electroplating baths. They are used here as grain refiners, brighteners or solubilizers for other bath components.

Our ready-to-use formulations include components mixed in the correct ratio for certain applications in the electroplating sector, for example, for the pretreatment and finishing of plated components.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
TIB Suract A25	Solution	30 % Di-4-methyl-2-amylestersulfosuccinate	Additive for electroless nickel plating, avoids pores
TIB Suract A40	Solution	40 % Di-isoamylestersulfosuccinate	Additive for electroless nickel plating, avoids pores
TIB Suract B30 P	Solution	30 % Polysiloxanebetaine	Surfactant for degreasing and rinse baths
TIB Suract B35	Solution	35 % Cocoamidopropylaminoxide	Wetting agent for copper baths
TIB Suract N19	Solution	19 % Fatty alcohol ethoxylate C9 – C11, 6 EO	Surfactant stable in acids, for solubilizing benzalacetone (TPB/TPB 10)
TIB Suract ETG	Powder	99 % 2,2-Ethylenedithiodiethanol	Complexing agent for precious metal baths (Ag, Sn/Ag)
TIB Suract TPB 10	Solution	10 % Benzalacetone	Brightener, grain refiner
TIB Suract S20	Solution	20 % N-(2-aminoethyl)ethanolamine-epichlorohydrin copolymer	Additive for alkaline zinc baths
TIB Suract IME	Solution	35 % 1H-imidazole-epichlorohydrin copolymer	Basic brightener for alkaline zinc baths
TIB Suract Trigonellin 20	Solution	20 % Nicotinic acid betaine	Brightener for alloy electrolytes such as Zn/Ni or Ni/Fe
TIB Suract DRY	Solution	Aqueous solution of modified fatty amides	Water-repellent additive for rinse baths

ORGANIC CHEMICALS

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
TIB Suract CR-H	Solution	Concentrate	Fluorine-free surfactant, wetting agent for chrome plating baths
TIB Suract AC 101	Solution	Concentrate, contains oleic acid amidoethanolpolyethoxylate	Corrosion inhibitor
TIB Clean A 300	Solution	Concentrate	Alkalescent low-temperature degreaser
TIB Lux OV / OV 21	Solution	Concentrate	Peroxide stabilizer
TIB Lux NPS	Solution	50 % Sulfonated naphtholpolyether	Additive for acidic high-performance zinc electrolytes
TIB Lux BN 13	Solution	>98 % Naphtholethoxylate	For the formulation of brightener systems
TIB Stanno Plus	Solution	Concentrate	Additive for the electrolytic coloring of aluminum
TIB SpeedPlate Plus	Solution	Concentrate	Grain refiner and tarnish protection for immersion tin plating
TIB Stanal DG	Solution	Concentrate	Cleaner for alkaline degreasing
TIB Stanal DG-B	Solution	Concentrate	Demulsifying surfactant formulation for alkaline degreasing
TIB Stanal CP	Solution	Concentrate	Additive for nitric acid pickling baths
TIB Stanal CL	Solution	Concentrate	Additive for sulfuric acid pickling baths
TIB Stanal TP	Solution	Concentrate	Additive for immersion tin plating
Potassium methanedisulfonate	Crystalline	>99 %	Catalyst for chromic acid electrolytes

A WIDE RANGE OF APPLICATIONS

PRETREATMENT

We offer several surfactant formulations to optimize your alkaline degreasing.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
TIB Stanal DG	Solution	Concentrate	Cleaner for alkaline degreasing
TIB Stanal DG-B	Solution	Concentrate	Demulsifying surfactant formulation for alkaline degreasing
TIB Suract B35	Solution	35 % Cocoamidopropylaminoxide	Amphoteric surfactant
TIB Clean A 300	Solution	Concentrate	Alkalescent low-temperature degreaser

PICKLING AND BRIGHTENING

We offer the following products for processing methods such as deburring, bright pickling, etc.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Sulfuric acid	Solution	Up to 98 %	Basic acid
Methanesulfonic acid	Solution	70 %	Basic acid
TIB Suract B35	Solution	35 % Cocoamidopropylaminoxide	Amphoteric surfactant
TIB Lux OV/OV 21	Solution	Concentrate	Peroxide stabilizer

TIN PLATING ON ALUMINUM PISTONS

Our TIB Stanal product group is a ready-to-use portfolio of process chemicals for the chemical tinning of aluminum components.

The process covers pretreatment, activation, plating and posttreatment and can be adapted to the needs of the basic material. TIB Stanal is used mostly in the production of aluminum pistons for engines and compressors.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Sodium hexahydroxostannate	Crystalline and as a solution	43 % Sn (crystalline) 125 g/l Sn (solution)	Alkaline immersion tin plating
Potassium hexahydroxostannate	Crystalline and as a solution	38 % Sn (crystalline) 160 g/l Sn (solution)	Alkaline immersion tin plating
TIB Stanal DG	Solution	Concentrate	Cleaner for alkaline degreasing
TIB Stanal DG-B	Solution	Concentrate	Emulsifying surfactant formulation for alkaline degreasing
TIB Stanal TS	Crystalline	43 % Sn	For the acid immersion tin plating on aluminum surfaces based on tin sulfate
TIB Stanal TP	Solution	Concentrate	Additive for immersion tin plating
TIB Stanal CP	Solution	Concentrate	Additive for nitric acid pickling baths
TIB Stanal CL	Solution	Concentrate	Additive for sulfuric acid pickling baths
TIB Lux OV/OV 21	Solution	Concentrate	Peroxide stabilizer

ALUMINUM BEARING PLATING

TIB Stanal can also be used for the tin plating on aluminum bearing components.

In this specific case, both electroless and electrolytic processes are used to plate tin alloys with further typical bearing metals, such as copper, lead or bismuth. We offer the basic salts and acids for the formulation of such baths.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
TIB Stanal TS	Crystalline	43 % Sn	For the acid immersion tin plating on aluminum surfaces based on tin sulfate
TIB Stanal TP	Solution	Concentrate	Additive for immersion tin plating
TIB Stanal CL	Solution	Concentrate	Additive for sulfuric acid pickling baths
Sodium hexahydroxostannate	Crystalline and as a solution	43 % Sn (crystalline) 125 g/l Sn (solution)	Bronze plating
Potassium hexahydroxostannate	Crystalline and as a solution	38 % Sn (crystalline) 160 g/l Sn (solution)	Bronze plating
Tin(II) fluoroborate	Solution	320 g/l Sn	Alloy plating
Copper(II) fluoroborate	Solution	210 g/l Cu	Basic salt for copper baths, alloy plating
Lead(II) fluoroborate	Solution	500 g/l Pb	Alloy plating
Fluoroboric acid	Solution	50 %	Basic acid
Tin(II) methanesulfonate	Solution	300 g/l Sn	Tin plating, alloy plating
Copper(II) methanesulfonate	Solution	125 g/l Cu	Alloy plating
Bismuth(III) methanesulfonate	Solution	210 g/l Bi	Alloying additive
Lead(II) methanesulfonate	Solution	450 g/l Pb	Bearing plating
Methanesulfonic acid	Solution	70 %	Basic acid

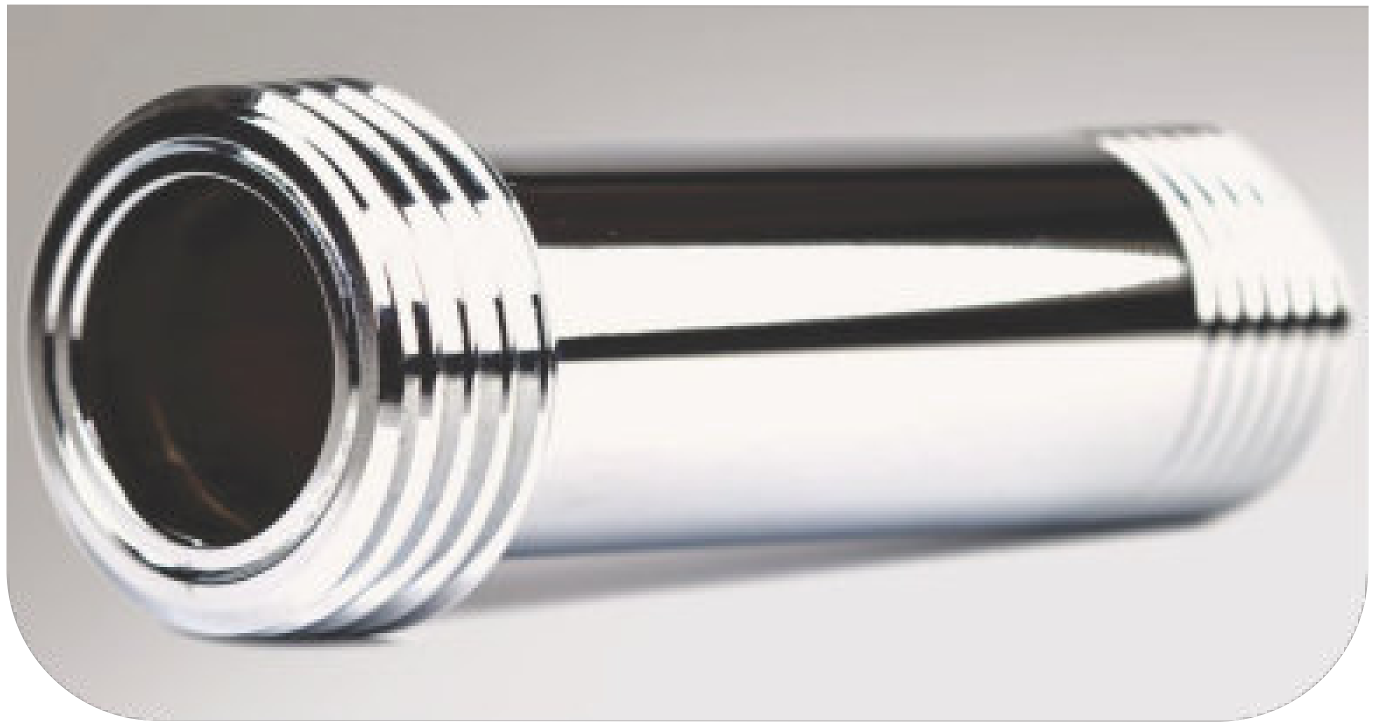
ALLOY PLATING

We offer a wide range of basic salts for alloy plating baths based on methanesulfonic acid and fluoroboric acid. The range is supplemented by selected organic intermediates.

PRODUCT NAME/ CHEMICAL NAME	FORM/ PROPERTY	TYPICAL METAL CONTENTS/ CONCENTRATIONS	TYPICAL AREAS OF APPLICATION
Tin(II) methanesulfonate	Solution	300 g/l Sn	Tin plating, alloy plating
Copper(II) methanesulfonate	Solution	125 g/l Cu	Alloy plating
Silver(I) methanesulfonate	Solution	275 g/l Ag	Cyanide-free electrolytic and immersion silver baths, for Sn/Ag alloy plating
Bismuth(III) methanesulfonate	Solution	210 g/l Bi	Alloying additive
Lead(II) methanesulfonate	Solution	450 g/l Pb	Alloy plating
Indium(III) methanesulfonate	Solution	Up to 200 g/l In	Indium plating
Chromium(III) methanesulfonate	Solution	100 g/l Cr	Trivalent chrome plating
Cobalt(II) methanesulfonate	Solution	120 g/l Co	Passivation additive
Nickel(II) methanesulfonate	Solution	100 g/l Ni	Special alloys
Zinc methanesulfonate	Solution	120 g/l Zn	Electroplating
Sodium methanesulfonate	Solution	120 g/l Na	Conductivity additive and grain refiner for MSA-electrolytes
Potassium methanesulfonate	Solution	200 g/l K	Electroplating
Methanesulfonic acid	Solution	70 %	Basic acid

ALLOY PLATING

PRODUCT NAME / CHEMICAL DESIGNATION	FORM / PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) fluoroborate	Solution	320 g/l Sn	Alloy plating
Copper(II) fluoroborate	Solution	210 g/l Cu	Basic salt for copper baths, Alloy plating
Lead(II) fluoroborate	Solution	500 g/l Pb	Alloy plating
Fluoroboric acid	Solution	50 %	Basic acid
TIB Suract ETG	Powder	99 % 2,2-Ethylenedithiodiethanol	Complexing agent for precious metals (Ag, Sn/Ag)
TIB Suract TPB 10	Solution	10 % Benzalacetone	Brightener, grain refiner



ACID TIN PLATING

This is where you will find basic materials for the formulation of acid baths for tin plating. In addition to tin sulfate and tin fluoroborate for classic formulations, we also offer tin methanesulfonate for more sophisticated plating processes, e.g. in the electronics industry.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) chloride	Anhydrous, dihydrate and as a solution	62 % Sn (anhydrous) 52 % Sn (dihydrate) Up to 500 g/l Sn (solution)	Electroless tin plating
Tin(II) sulfate	Crystalline and as a solution	55 % Sn (crystalline) 125 g/l Sn (solution)	Chemical and electrolytic tin plating
Tin(II) fluoroborate	Solution	320 g/l Sn	Alloy plating
Tin(II) methanesulfonate	Solution	300 g/l Sn	Tin plating, alloy plating
Sulfuric acid	Solution	Bis 98 %	Basic acid
Methanesulfonic acid	Solution	70 %	Basic acid
Fluoroboric acid	Solution	50 %	Basic acid
TIB SpeedPlate	Powder	10 % Sn	For the acid immersion tin plating on copper and brass surfaces based on tin sulfate
TIB SpeedPlate Plus	Solution	Concentrate	Grain refiner and tarnish protection for immersion tin plating
TIB Suract N19	Solution	19 % Fatty alcoholethoxylate C9–C11, 6 EO	Acid-resistant wetting agent
TIB Lux NPS	Solution	50 % Sulfonated naphtholpolyether	Grain refiner
TIB Lux BN 13	Solution	>98 % Naphtholethoxylate	For the formulation of brightener systems

IMMERSION TIN PLATING

We offer basic materials and ready-to-use formulations for the alkaline and acid electroless tin plating on various metal surfaces.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM / PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) chloride	Anhydrous, dihydrate and as a solution	62 % Sn (anhydrous) 52 % Sn (dihydrate) Up to 500 g/l Sn (solution)	Electroless tin plating
Sodium hexahydroxostannate	Crystalline and as a solution	43 % Sn (crystalline) 125 g/l Sn (solution)	Alkaline immersion tin plating
Potassium hexahydroxostannate	Crystalline and as a solution	38 % Sn (crystalline) 160 g/l Sn (solution	Alkaline immersion tin plating
Tin(II) sulfate	Crystalline and as a solution	55 % Sn (crystalline) 125 g/l Sn (solution)	Chemical and electrolytic tin plating
Sulfuric acid	Solution	Up to 98 %	Basic acid
TIB Stanal DG	Solution	Concentrate	Cleaner for alkaline degreasing
TIB Stanal DG-B	Solution	Concentrate	Demulsifying surfactant formulation for alkaline degreasing
TIB Stanal TS	Crystalline	43 % Sn	For the acid immersion tin plating on aluminum surfaces based on tin sulfate
TIB Stanal TP	Solution	Concentrate	Additive for immersion tin plating
TIB Stanal CL	Solution	Concentrate	Additive for sulfuric acid pickling baths
TIB Stanal CP	Solution	Concentrate	Additive for nitric acid pickling baths
TIB SpeedPlate	Crystalline	10 % Sn	For the acid immersion tin plating on copper and brass surfaces based on tin sulfate

IMMERSION TIN PLATING

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
TIB SpeedPlate Plus	Solution	Concentrate	Grain refiner and tarnish protection for immersion tin plating
Tin(II) methanesulfonate	Solution	300 g/l Sn	Tin plating, alloy plating
Methanesulfonic acid	Solution	70 %	Basic acid
TIB Suract N19	Solution	19 % Fatty alcohol ethoxylate C9–C11, 6 EO	Acid-resistant wetting agent & solvent for benzalacetone (TPB/TPB 10)
TIB Suract TPB 10	Solution	10 % Benzalacetone	Brightener, grain refiner

ALKALINE TIN PLATING & BRONZE PLATING

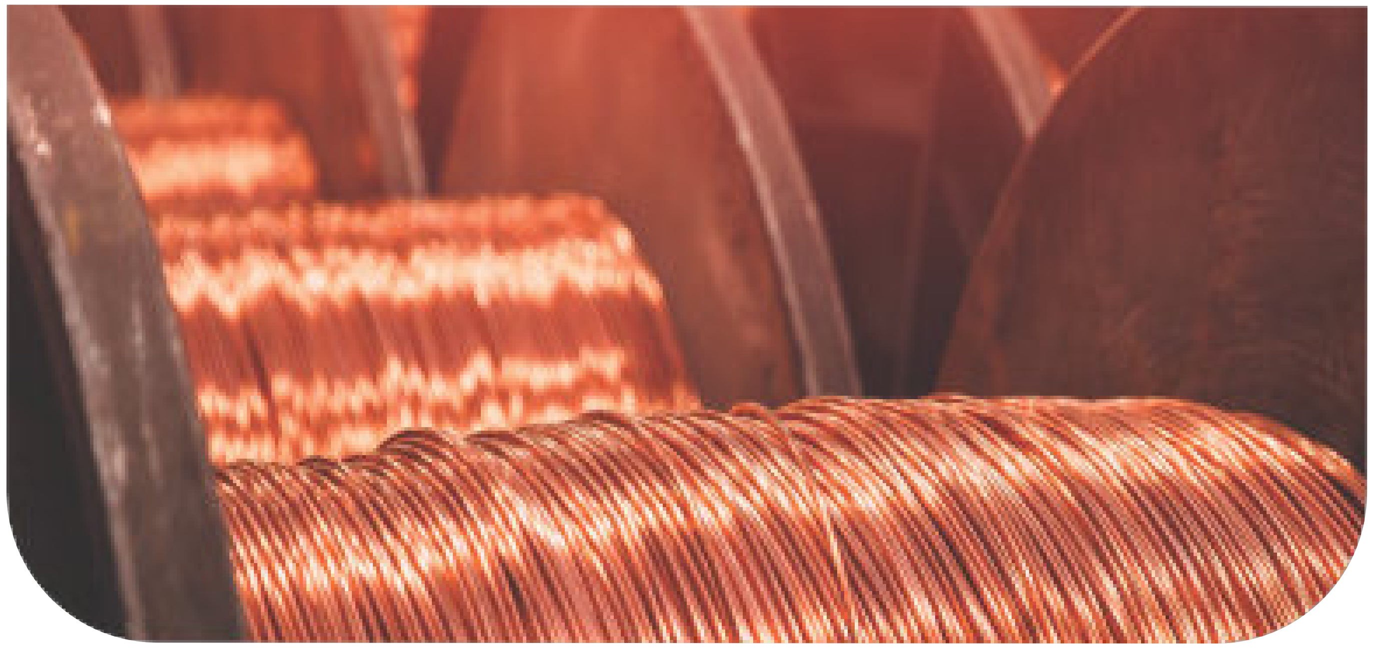
This is where you will find basic materials for the formulation of alkaline tin plating baths. They are also used for white bronze plating.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Sodium hexahydroxostannate	Crystalline and as a solution	43 % Sn (crystalline) 125 g/l Sn (solution)	Bronze plating
Potassium hexahydroxostannate	Crystalline and as a solution	38 % Sn (crystalline) 160 g/l Sn (solution)	Bronze plating

ACID COPPER PLATING

We offer the following products for the formulation of acid copper plating baths.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM / PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPISCHE ANWENDUNGSGEBIETE
Copper(II) methanesulfonate	Solution	125 g/l Cu	Basic salt for copper baths
Copper(II) sulfate EPG	Solution	75 g/l Cu	Basic salt for copper baths
Copper(II) fluoroborate	Solution	210 g/l Cu	Basic salt for copper baths, alloy plating
Copper(II) oxide EPG	Highly pure	79 % Cu	Replenisher
Methanesulfonic acid	Solution	70 %	Basic acid
Sulfuric acid	Solution	Up to 98 %	Basic acid
Fluoroboric acid	Solution	50 %	Basic acid



PYROPHOSPHATE BATHS

We offer the following basic materials for pyrophosphate based baths as a cyanide-free alternative to highly acid or alkaline formulations.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM / PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) pyrophosphate	Crystalline	55 % Sn	Basic salt for tin baths
Copper(II) pyrophosphate	Crystalline	34 % Cu	Basic salt for copper baths
TIB Suract B35	Solution	35 % Cocoamido-propylaminoxide	Wetting agent for copper plating baths

ALKALINE ZINC PLATING

This is where you will find basic materials for the formulation of alkaline zinc plating baths. They are also used for alkaline zinc/nickel plating.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM / PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
TIB Suract S20	Solution	20 % N-(2-aminoethyl)ethanolamine-epichlorohydrin copolymer	Additive for alkaline zinc baths
TIB Suract IME	Solution	35 % 1H-imidazole-epichlorohydrin copolymer	Basic brightener for alkaline zinc baths
TIB Suract Trigonellin 20	Solution	20 % nicotinic acid betaine	Brightener for alloy electrolytes such as Zn/Ni or Ni/Fe

ACID ZINC PLATING

We offer basic salts and intermediates for the cyanide-free acid zinc plating on various metal surfaces.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Zinc chloride	Crystalline and as a solution	96–97 % $ZnCl_2$ (crystalline) 40–65 % $ZnCl_2$ (solution)	Basic salt
Zinc nitrate	Solution	680 g/l $Zn(NO_3)_2$	Basic salt
Zinc citrate	Powder	32 % Zn	Basic salt
TIB Suract TPB 10	Solution	10 % Benzalacetone	Brightener, grain refiner
TIB Lux NPS	Solution	50 % Sulfonated naphtholpolyether	For high-performance electrolytes
TIB Lux BN 13	Solution	>98 % Naphtholethoxylate	Solubilizer for brighteners

IMMERSION SILVER PLATING

The following basic materials are suitable for the formulation of a cyanide-free baths for the chemical plating of thin silver layers.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Silver(I) methanesulfonate	Solution	275 g/l Ag	Basic salt for cyanide-free plating
Methanesulfonic acid	Solution	70 %	Basic acid
TIB Suract ETG	Powder	99 % 2,2-Ethylenedithiodiethanol	Complexing agent for precious metal baths
TIB Suract TPB 10	Solution	10 % Benzalacetone	Brightener, grain refiner

PLATING ON PLASTICS

We provide key components for various stages of the POP process.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) chloride	Anhydrous, dihydrate and as a solution	62 % Sn (anhydrous) 52 % Sn (dihydrate) bis 500 g/l Sn (solution)	Basic salt for palladium-colloid activators
TIB Suract CR-H	Solution	Concentrate	Fluorine-free surfactant, wetting agent for chrome plating baths

CHROME PLATING

This is where you will find additives for the formulation of chromic acid baths.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
TIB Suract CR-H	Solution	Concentrate	Wetting agent free of fluorotensides
Methanedisulfonic acid	Solution	50 %	Catalyst
Potassium methanedisulfonate	Crystalline	>99 %	Catalyst

CR(VI)-FREE CHROME PLATING

We offer the right solutions for the formulation of trivalent chromium plating baths.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Chromium(III) chloride	Solution	50 % hydrate 9–10 % Cr	Basic salt
Chromium(III) sulfate	Solution	50 % hydrate 8–9 % Cr	Basic salt
Chromium(III) methanesulfonate	Solution	100 g/l Cr	Basic salt

CONVERSION COATING AND PASSIVATION

Our product portfolio contains various basic salts for phosphating and other corrosion protection measures.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Nickel nitrate	Hexahydrate and as a solution	19.7 % Ni (crystalline) 14 % Ni (solution)	Corrosion protection
Nickel phosphate	Solution	9 % Ni	Phosphating
Zinc nitrate	Solution	680 g/l $Zn(NO_3)_2$	Corrosion protection
Chromium(III) chloride	Solution	50 % hydrate 9–10 % Cr	Cr(VI)-free passivation
Chromium(III) nitrate	Solution	74 % hydrate 9–10 % Cr	Cr(VI)-free passivation
Chromium(III) hydrogenphosphate	Solution	20 % salt 6–7 % Cr	Cr(VI)-free passivation

PRINTED CIRCUIT BOARDS

For this branch of industry, our product portfolio contains various metal methanesulfonates, very pure tin and copper salts plus acids and organic intermediates.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) methanesulfonate	Solution	300 g/l Sn	Tin plating, alloy plating
Copper(II) methanesulfonate	Solution	125 g/l Cu	Alloy plating
Silver(I) methanesulfonate	Solution	275 g/l Ag	Cyanide-free electrolytic and immersion silver plating baths, for Sn/Ag alloy plating
Bismuth(III) methanesulfonate	Solution	210 g/l Bi	Alloying additive
Lead(II) methanesulfonate	Solution	450 g/l Pb	Alloy plating
Methanesulfonic acid	Solution	70 %	Basic acid
Tin(II) sulfate	Crystalline and as a solution	55 % Sn (crystalline) 125 g/l Sn (solution)	Chemical and electrolytic tin plating
Sulfuric acid	Solution	Up to 98 %	Basic acid
Copper(II) oxide EPG	Very pure	79 % Cu	Replenisher for copper baths
Copper(II) hydroxide carbonate	Bulk density > 1,5 kg/l	55 % Cu	Replenisher for copper baths
TIB Suract ETG	Powder	99 % 2,2-Ethylenedithiodiethanol	Complexing agent for precious metals (Ag, Sn/Ag)
TIB Lux BN 13	Solution	>98 % Naphtholethoxylate	For the formulation of brightener systems
TIB Lux OV/OV 21	Solution	Concentrate	Stabilizer for sulfuric acid pickling baths

NICKEL PLATING

Our product portfolio covers a wide range of nickel salts. It incorporates nickel salts of both strong and weak acids.

The product range is completed by nickel hydroxide carbonate as a replenisher on various drying levels. In this way, we take into account the requests of our customers regarding an optimum occupational safety when handling nickel chemicals.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Nickel sulfate	Heptahydrate and as a solution	21 % Ni (crystalline) 10 % Ni (solution)	Basic salt
Nickel chloride	Hexahydrate and as a solution	23.5 % Ni (crystalline) 13.4 % Ni (solution)	Basic salt
Nickel sulfamate	Solution	12 % Ni	Basic salt
Nickel methanesulfonate	Solution	100 g/l Ni	Special alloys
Nickel hydroxide carbonate	Dust-free or as a powder	Up to 48 % Ni	Basic salt
Nickel acetate	Tetrahydrate	24 % Ni	Basic salt
TIB Suract A25	Solution	30 % Di-4-Methyl-2-amylestersulfosuccinate	Additive for electroless nickel plating, avoids pores
TIB Suract A40	Solution	40 % Di-isoamylester-sulfosuccinate	Additive for electroless nickel plating, avoids pores
Bismuth(III) methanesulfonate	Solution	210 g/l Bi	Stabilizer for chemical nickel plating

ANODIZING

For the electrolytic coloring of aluminum surfaces, we offer not only basic salts such as tin sulfate and nickel products for sealing but also ready-to-use TIB Stannocolor.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
Tin(II) sulfate	Crystalline and as a solution	55 % Sn (crystalline) 125 g/l Sn (solution)	Basic salt for electrolytic coloring baths
TIB Stanno Plus	Solution	Concentrate	Stabilizer
TIB Stannocolor	Solution	219 g/l $SnSO_4$	Electrolytic coloring of aluminum surfaces based on tin sulfate
Tin(II) oxide	Tin oxide black	88 % Sn	For pH regulation
Sulfosuccinic acid	Solution	70 %	For coloring and hard anodizing
Nickel acetate	Tetrahydrate	24 % Ni	Additive for cold and hot sealing processes
Nickel sulfate	Heptahydrate and as a solution	21 % Ni (crystalline) 10 % Ni (solution)	Additive for cold sealing
TIB Lux OV/OV 21	Solution	Concentrate	Stabilizer for sulfuric acid pickling baths

POSTTREATMENT

We offer additives for the spot-free drying of plated parts at room temperature. The hydrophobic film that forms during application also provides temporary tarnish protection for the freshly plated metal surface.

PRODUCT NAME / CHEMICAL DESIGNATION	FORM/ PROPERTY	TYPICAL METAL CONTENTS / CONCENTRATIONS	TYPICAL APPLICATIONS
TIB Suract DRY	Solution	Aqueous solution of modified fatty amides	Hydrophobing additive for rinsing baths
TIB Suract B30 P	Solution	30 % Polysiloxanebetaine	Amphoteric surfactant

RECYCLING

An essential component of sustainable production is the careful and efficient use of natural resources. By recycling waste into secondary raw materials, **TIB Chemicals** closes material cycles and promotes the ecological manufacture of high-quality products.

We are prepared to take back the metal-containing waste and residues that arise when our products are used. Thanks to our many years of experience in the fields of zinc, copper, and tin, we are regarded as a reliable partner with expert know-how.

TIB Chemicals is authorized to take back waste on a voluntary basis and recycles a wide variety of waste in a simplified process in accordance with the German Closed Substance Cycle Waste Management Act. TIB Chemicals also has a large number of notifications abroad and can take over large quantities of waste and recycle them in an environmentally friendly manner.

We would be pleased to examine your waste for individual recycling options.

METAL FINISHING

TIBCHEMICALS

Download PDF

TIB Chemicals AG
Muelheimer Strasse 16-22
68219 Mannheim
Germany

Phone: +49 621 8901-800
E-mail: msc@tib-chemicals.com
www.tib-chemicals.com