umicore
Jewellery &
Electroplating

Issue 27/2003

GOLDPOST

For friends and associates of Umicore Galvanotechnik

OMG Galvanotechnik GmbH becomes Umicore Galvanotechnik GmbH

New: AURUNA® 517 and AURUNA® 8400

YKK STOCKO with a new electroplating plant

Sigrist Metallveredelung – equipped for the future

GOLDPOST Interview: Tyco Electronics

Dear ladies and gentlemen,

I am pleased to present to you the latest issue of our GOLDPOST to inform you about current developments in our electroplating business. Since the last issue, which we still presented under the company name of Degussa Galvanotechnik GmbH, many things have changed.
First, I would like to address the issue of the two name changes: when Degussa AG decided to part with its precious metals sector, it was sold to OMG, an American manufacturer of metal-based chemicals in Cleveland. After months of integration. OMG restructured and announced the sale of the precious metals group.
Among the international bidders, the Umicore emerged as the buyer. As an international corporation based in Belgium with about 12,500 employees, Umicore is the ideal platform for the development and expansion of our electroplating business.

Umicore CEO Thomas Leysen from Brussels (right) with the MD from Schwaebisch Gmuend, Thomas Engert.

Umicore – to some of you perhaps better known as Union Miniére – is a corporation whose business tradition spans a century, and whose focal points are metal production and recycling. At a capacity of 2,400 t of silver and 100 t of gold per year, Umicore is one of the world's largest producers of precious metals and has received the internationally renowned "Good Delivery Status" of the London Bullion Market Association.

With the acquisition of Degussa's precious metal activities, Umicore takes a leading position in the global precious metal business, and follows its strategy of expansion in the sector of advanced materials. The divisions "Precious Metal Refining" and "Precious Metal Management" cross over into the new owner's activities and will be gathered in the new business segment "Umicore Precious Metals Services". The divisions "Precious Metals Products" – including electroplating – and "Automotive Catalysts" will form a new business segment. Under Umicore's lead, all responsibilities remain unchanged.

But back to our electroplating business – to our products and to our clients. Reading this issue, you will note that the world of electroplating does not stand still. Despite the negative economic situation in the past few years, electroplating offers a great chance of success to flexible and highly motivated companies. As a base technology, electroplating is applied in many innovative sectors. True to our new Umicore maxim "Materials for a better life", we will face future challenges as Umicore Galvanotechnik GmbH with our experienced team.

Sincerely,
Thomas Engert

Managing Director
Umicore Galvanotechnik GmbH
Schwaebisch Gmuend

Fair Review

Surface Finishing Korea 2002 in Seoul:

At this very successful fair in October 2002, Galvanotechnik exhibited with its Korean partner. They were able to reach many clients from the technical and decorative sectors. The various MIRALLOY® processes received special attention.

Surface Finishing China 2002 in Guangzhou:

At this fair for technical and decorative applications in November 2002, Galvanotechnik was able to interest many potential clients in its gold and MIRALLOY® applications.

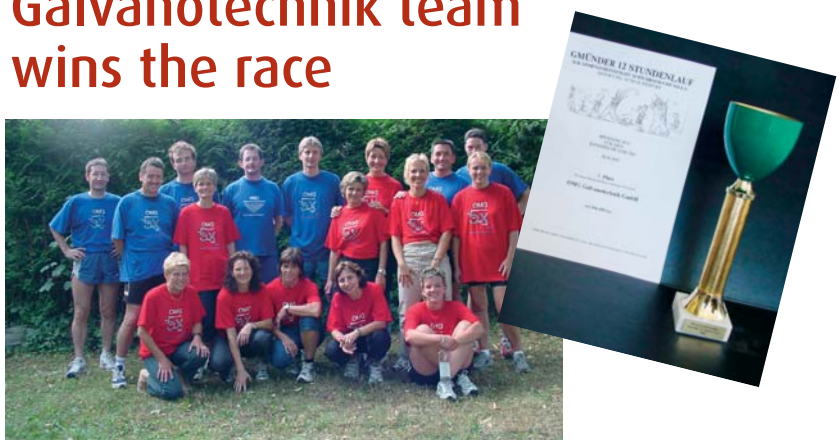
CPCA Show 2003 in Shanghai:

The circuit board fair of the Chinese Printed Circuit Board Association took place in March 2003. As in previous years, Galvanotechnik had a booth at the fair. The team of China was supported by colleagues from Schwaebisch Gmuend.

KPCA Show 2003:

In April 2003, the Korean Printed Circuit Board Association hosted its first fair. The Korean representatives participated in the small but successful fair where they presented Galvanotechnik products to existing and potential clients.

Galvanotechnik team wins the race



Galvanotechnik team at the 12-hour-run

The seventh 12-hour-run was launched on June 26, 2003 in Schwaebisch Gmuend.
For the fifth time Galvanotechnik had its own team participating in the race. With a total of 166 kilometres, not only did they win in the team category, but also set a new personal record.
Also entering the race, for the second time now, was a women's team, who won special recognition for their total of 114 kilometres. All in all, 15 individual runners of Galvanotechnik and further 8 teams took part in the race. Together they covered a distance of 2,400 kilometres.

MIRALLOY® – extended product range

The MIRALLOY® product range has been extended by a number of newly developed electrolytes.

MIRALLOY® 841

MIRALLOY® 841 is an electrolyte for rack operation to deposit a white alloy coating of copper, tin, zinc and lead. The electrolyte distinguishes itself with ist easy operating conditions and stability. The thickness distribution of the alloy layers is excellent.MIRALLOY® 841 is recommended for decorative applications.

Belt buckles,
die-cast zinc – coated with
MIRALLOY®841

MIRALLOY® 2841

With this electrolyte, alloy coatings of copper, tin and zinc can be deposited in barrel or rack operation.
The colour of the coating is white and similar to silver. The electrolyte is easy to handle and has a high stability. MIRALLOY® 2841 can be used in many ways for both decorative and functional applications.

High-frequency connector coated with
MIRALLOY® 2841

MIRALLOY® 2842

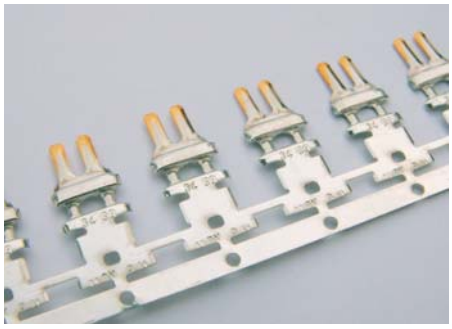
MIRALLOY® 2842 - for rack operation - deposits white alloy coatings of copper, tin and zinc. The electrolyte's strength lies in the high brightness and high deposition speed. MIRALLOY® 2842 can be used for decorative and functional purposes.

MIRALLOY® 846 S

MIRALLOY® 846 S is an electrolyte for the deposition of a levelling, yellow alloy coating of copper, tin zinc and lead. The coatings are very ductile and brilliant. MIRALLOY® 846 S is recommended for decorative applications.

AURUNA® 8400

A new high-speed electrolyte for the deposition of gold-nickel coatings.



Connectors - selectively gold plated with
AURUNA® 8400

After the successful market launch of the gold-cobalt electrolyte AURUNA® 8100, a similar high-performance process is available for the high-speed deposition of gold-nickel coatings.

The new nickel-alloyed AURUNA® 8400 offers the essential advantages of the AURUNA® 8100, which has performed with excellence.

- High-speed deposition:
  With a comparably low gold content, a high deposition speed can be achieved.
- Wide operating range:
  Also on complex shaped parts an even thickness distribution can be achieved.
- Easy maintenance:
  All components can be analysed.
- Excellent coating properties:
  The coatings are very fine-grained, have a low stable contact resistance.They are abrasion resistant and hard.

The highly brilliant coatings are classified according to ASTM B-488 Type 2-3, Code C-D, which makes AURUNA® 8400 highly suitable for coating contacts and connectors.

Productronica 2003

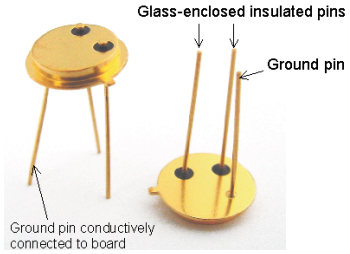
We will present our new products at the Productronica fair in Munich from November 11th to 14th, 2003 in hall B4, booth B4.205.

AURUNA® 517

Electroless gold plating of electronic parts for barrel applications.

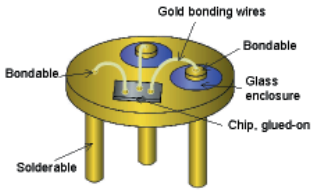
AURUNA® 517 is a new, electroless electrolyte for the deposition of high-purity gold coatings with an excellent bondability and solderability. The neutral sulphite-based electrolyte does not contain cyanide, is free of heavy metals and problematic substances, such as EDTA or hydrazine.

AURUNA® 517 enables excellent coating thickness distributions and saves considerable amounts of gold.



Transistor parts TO39 – gold plated with AURUNA®517

A typical application is the gold plating of glass-to-metal-seals, e.g. TO 39 (transistor headers). A minimum and even coating thickness should be applied on all functional surface areas. Conventional electrolytic gold processes deposit mainly on the board. Until the necessary coating thickness is reached on the pins, the board is coated excessively, and thus gold is wasted. AURUNA® 517 allows for a considerably more even coating distribution. The deposition on the pins is even favoured, i.e. the coating thickness is reached without excessive deposits on the board. The amount of gold saved for a coating thickness of, for example, 0.8 µm can be as high as 50 percent.



Transistor TO39 (schematically)

Research Institute for Precious Metals and Metals Chemistry (FEM) celebrates its 80th anniversary

„Forschungsinstitut fuer Edelmatalle und Metallchemie (FEM)“ (Research Institute for Precious Metals and Metals Chemistry) in Schwaebisch Gmuend is looking back on eighty years of research activities.

In a topping-out celebration for the building's extension of FEM, Baden-Wuerttemberg's Secretary of Commerce Walter Döring recognised the institute as a mediator between science and industry. Hasso Kaiser, chairman of the institute's society, welcomed many guests, among them parliament representatives and members of the Bundestag.

In his speech, director Dr. Andreas Zielonka described FEM's many activities. Currently, the institute offers the services of 180 testing procedures. Its clients are large international corporations as well as medium-sized companies, and private parties. At this point, the institute employs sixty people, and its great strength lies in the interdisciplinary cooperation of the different sections: within FEM's young team, physicists, chemists, engineers and metallurgists work closely together. The institute also focuses on fundamental research. The innovative results support companies in the areas of aviation, medical and dental technology, automotive and engineering technology, as well as traditional jewellery manufacturers.

The Ministry of Economics recognised the importance of FEM's research with a grant of € 3 million for its new building. In the course of the institute's extension, a total of € 7 million has been invested so far.

FEM celebration

(left)
Secretary of Commerce (BW) W. Doering recognises FEM

(right)
Welcome speech by H. Kaiser, Chairman of the FEM Society

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Simone Zaremba quotes Umicore's current prices of precious metals!

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YKK STOCKO invests € 1,7 million in new electroplating facilities

The Wuppertal-based company STOCKO, a long-standing business partner of Umicore Galvanotechnik can look back on an impressive company history.

Launch of the new facility by YKK president Tadahiro Yoshida

The company has produced fastening systems for the clothing industry for a hundred years. In 1994, STOCKO Verschlusstechnik GmbH & Co became a member of the Japanese corporate group YKK with more than 35,000 employees worldwide. At the Wuppertal production site, YKK STOCKO FASTENERS currently employs 320 people. Apart from various fastening systems, e.g. for infant and children's clothing, professional attire, sports and leisure outfits, YKK STOCKO is a partner of the international fashion industry, offering fashion accessories in many colours, designs and materials.

In June, 2002, YKK STOCKO had two reasons for celebration: the centennial company anniversary and a modern electroplating facility was put into operation. Japanese management representatives honoured the occasion by their presence. The company invested € 1.7 million in the new facility, consisting of four fully automated lines. The large investment was followed by the introduction of an environmental management system according to DIN EN ISO 14001. Currently, STOCKO produces more than 100 different surfaces, with nickel-free layers becoming increasingly important – particularly for baby clothes. One line of the new facility is used for nickel-free production: the line is operating 24 hours a day with 5.200 litres of MIRALLOY® 2844.

Innovation Awards 2002 Ostwuerttemberg

Werner Kuhn and Wolfgang Zilske, electrolyte developers for Umicore Galvanotechnik GmbH, were among the laureates of the Innovation Awards 2002, Ostwürttemberg.

The award was presented for the European patent EP 0907767 in recognition of the achievements of Umicore in the development of new, environmentally friendly electroplating processes. Umicore Galvanotechnik holds about 50 active European and international patents.

Italbras, distributor of Umicore products in Italy

The company Italbras is the sales and marketing organization that handles all precious metal activities of the former Degussa Italia.

The company combines the areas of electroplating, soldering, metal trading, technical materials, jewellery materials and catalysts.

The Electroplating Division of Italbras is based in Vicenza, and has been successfully distributing products of Umicore Galvanotechnik since many years.

Especially MIRALLOY® electrolytes have emerged as sales hits. Italy is one of Europe's leading textile producers. Many renowned manufacturers of textile accessories are aiming at nickel-free production, and have been replacing nickel layers on zippers or buttons with MIRALLOY®. Another focal point is the Italian jewellery market. In this area, Umicore's rhodium electrolytes are among the most successful products.

Italbras, Vicenza, Italy.

Italbras has modern storage facilities for chemicals, which enable safe deliveries on schedule. The company's own laboratory conducts the necessary bath analyses promptly. Short ways and quick reactions ensure good customer service. The sales team of Italbras has been reinforced by a new colleague this year. Experienced and qualified staff members handle the distribution of Umicore products.

Plans for the future include an expansion of market shares in the decorative sector, as well as in the field of functional precious metal plating.

Sigrist Metallveredelung on new premises – well equipped for the future

With its relocation into the new building at Wilferdinger Hoehe, the Pforzheim-based company Sigrist Metallveredelung GmbH, a good business partner of Umicore Galvanotechnik, has taken an important step into the future.

The new building is distinguished by its functional design, and an architecture arranged optimally to meet the needs of the company's administration, work scheduling and production. Moreover, the premises offer enough space for future expansions. The building's conception as well as the certification according to ISO 14001 demonstrates the fact that environmental protection is a priority for Sigrist Metallveredelung. To ensure ecologically compatible production, the company invested in modern exhaust and waste water systems. Another focal point is profound quality assurance. As early as 1985, the company began to establish a quality management system, and since 1996 the company is DIN EN ISO 9002 certified.

Sigrist Metallveredelung's range of products includes decorative coatings for jewellery, writing implements, spectacle frames and coatings for special applications. But the company also offers functional coatings for electronic parts, electric contacts, connectors, sensors and medical appliances. In the field of precious metals electrolytes, a long-standing business relationship evolved between Sigrist and Umicore Galvanotechnik. Because of many different coating requirements, the company employs a variety of precious metals processes, for example AURUNA® 311, AURUNA® 526, AURUNA® 536, AURUNA® 558, ARGUNA® 621, Rhodium TD and Platin K.

New entrance area of Sigrist Metallveredelung, Wilferdinger Hoehe, Pforzheim.

Trumpet, 2 µm hard gold plated with AURUNA® 536

Designer ring, 10 µm hard gold plated with AURUNA® 536

Pressure sensor, coated with 1 µm Rhodium TD

Glass-to-metal seals, selectively fine gold plated with AURUNA® 558

Niphos 965 and Niphos 966 – new processes for the electrolytic deposition of nickel-phosphorus alloy coatings

Electrolytically deposited nickel-phosphorus coatings possess and excellent abrasion and corrosion resistance.

They are solderable, diamagnetic (> 11% of phosphorus) and the hardness can be increased by tempering. These qualities make them very attractive for many functional applications.

Niphos 965 is used on reel-to-reel plating lines expecially for the deposition of intermediate layers on connectors.

Niphos 966 can be used for barrel and rack systems. With this electrolyte the deposition of hard, non-abrasive finishes nickel are possible, thus being an alternative for the conventional coating with electroless nickel.

	Niphos 965	Niphos 966
Application	Reel-to-reel plating	Rack plating Barrel plating Vibration plating
Nickel content	100 g/l	80 g/l
Phosphorus content	30 g/l	25 g/l
pH-value	2.6	2.6
Current density	10 - 30 A/dm²	4 A/dm² (rack plating) 1.5 A/dm² (barrel plating)
Deposition speed	1 - 3 µm/min (10 - 30 A/dm²) to 5 µm/min depending on flow speed and desired phosphorus content of the layer	0.4 µm/min (4 A/dm²) 0.15 µm/min (1.5 A/dm²)
Layer phosphorus content	6 - 12 weight %	11 - 13 weight %
Area of application	- in combination with gold-cobalt as layer system for connectors - as a solderable surface - for high frequency connectors	- alternative for conventional plating with electroless nickel - corrosion-resistant finish, e.g. on nickel or copper materials - for components with high impact of abrasive stress

Alloy layers of nickel-phosphorus, electrolytically deposited, possess a hardness of approx. 600 HV 0.1, and are very abrasion resistant. Similar to electroless nickel the hardness can be increased by tempering to more than 1,100 HV 0.1. The layers are diamagnetic (> 11% P) and amorphous. Furthermore, the layers are corrosion resistant according to salt spray and Kesternich tests.

Your opinion is as good as gold!

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Please tell us what you think about the new GOLDPOST.
Write to: karin.barth@eu.umicore.com

Please take the opportunity to give us your positive input, thus contributing to a still better edition in future.

On our homepage www.umicore-galvano.com, GOLDPOST is published in German and English as a pdf-file under "Topical/Goldpost27".

Mobile telecommunication and electroplating technology

Mobile telephones have become synonymous with modern telecommunication.

In recent years, their use has spread rapidly across the globe, and in some countries there are already more mobile phone subscribers than fixed line connections. Meanwhile, the introduction of new multimedia-compatible systems like UMTS will increase the worldwide importance of mobile networks yet further.

All electronic devices contain a printed circuit board (PCB) on which the various components are attached. So plating techniques play a vital role in the manufacture of mobile telephones. As the trend towards ever greater miniaturisation gathers pace, the demands on the methods used to produce PCBs steadily grow. The NIRUNA® processes are perfectly suited to cope with such increasingly complex tasks. NIRUNA® electrolytes are used to coat PCBs with electroless nickel and gold, creating a bondable and solderable surface.

But plating has other uses in the manufacture of mobile phones aside from coating PCBs. Contact pins for external connections can be gold plated using, for example, the AURUNA® 8100 electrolyte. Bondable coatings for semiconductor devices are coated with AURUNA® 559.

Plating is also very important in mobile radio transmission. Plugs and couplers for transmitting high-frequency (HF) signals from antennae to signal distribution devices can be coated with nickel or using MIRALLOY® (copper, tin, zinc alloys). The MIRALLOY® techniques developed by Umicore Galvanotechnik have significant advantages over conventional nickel plating methods. Surfaces treated in this manner have better soldering properties and corrosion resistance, generate fewer HF losses and produce less signal falsification.

New generation of cellular phones which also allow for taking and transmitting photos.

New book „Edelmetallschichten“ by Hasso Kaiser

Kurt Reichert (right) of Eugen G. Leuze Verlag, Bad Saulgau, presents an off-the-press copy of the new book to Hasso Kaiser.

Since its foundation more than ten years ago, the Precious Metals Committee of the „Deutsche Gesellschaft fuer Oberflaechentechnik e.V. (DGO)“ (German Society of Surface Technology), Duesseldorf, has compiled data and experiences concerning precious metals deposition. These data have been edited by the members of the committee, and published by Hasso Kaiser, chairman of the committee and former CEO of Degussa Galvanotechnik GmbH, Schwaebisch Gmuend.

The new book offers a valuable and comprehensive overview on the knowledge about electrolytic deposition of gold, silver and metals of the platinum group. There is information about the mining and market situation of these metals, different deposition methods and coating techniques, process supervision, recovery, electrolyte and layer properties as well as quality assurance. Also norms and testing methods are listed.

The book was published as Volume 31 of the series „Galvanotechnik und Oberflaechentechnik“ (Electroplating and Surface Technology) of Eugen G. Leuze Verlag, Bad Saulgau.

Price: EUR 57,00, 144 pages, 14 figures and 43 charts
(In German laguage).

Direct orders can be placed with:

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Tyco Electronics – global supplier of passive electromechanical components uses the precious metals processes of Umicore Galvanotechnik

Marketing and Technology Center Bensheim.

Tyco Electronics is the largest supplier of passive electronic components worldwide and the leading producer of active components in the areas of Wireless and Fibre Optics as well as energy supply technology. With subsidiaries in 51 countries and more than 78,000 employees, the company realized a business volume of $10.5 billion for the business year 2002. GOLDPOST talked to Walter Mueller, Manager Plating Automotive EMEA at Tyco Electronics, and with Dr. Jochen Horn, Manager Engineering Support at the Marketing and Technology Center Bensheim.

GOLDPOST:
Dr. Horn, please give us a brief impression of your company. What are your production focuses, and which markets are you targeting with your products?

Dr. Jochen Horn:
For the automotive industry, Tyco Electronics is the biggest supplier of passive electric and electronic components worldwide, a large part of which are connectors for cars' communications and boardnet systems. Apart from that, we sell our products to companies in the communication technology sector, specifically network hardware, transfer technology, and wireless communication. Other segments of our wide range of products are computers and entertainment, domestic appliances, and energy supply.

GOLDPOST:
What kind of electroplated surfaces and coating techniques do you use?

Walter Mueller:
For our wide variety of products and quality range, we need different precious metal coating systems, e.g. hard gold, fine gold and silver. Our standard is the coating in reel-to-reel systems with various selective techniques.

GOLDPOST:
Mr. Mueller, the good business relations between Tyco Electronics and Umicore Galvanotechnik has been established more than ten years ago. Which Umicore processes do you employ? What do you like about the products?

Walter Mueller:
We use AURUNA® 311 for gold plating of surfaces that are difficult to activate. The electrolyte is very stable. We also coat contact surfaces with the new high-speed electrolyte AURUNA® 8100. The process has an exceptionally wide operating range, and it is easy to handle, because all components can be analysed. Tyco Electronics is employing these processes at three plants in Germany, as well as in the Czech Republic, Italy and Spain. Furthermore, we use the silver electrolytes ARGUNA® CF and ARGUNA® HSG. With these baths, we can deposit semi-brilliant respectively brilliant surfaces, meeting all important requirements of electrical engineering.

Participants form left to right: Klaus-Peter Beck (Technical Customer Service and Sales Umicore Galvanotechnik), Willi Mueller (Sales Manager Umicore Galvanotechnik), Walter Mueller (Manager Plating Automotive EMEA at Tyco Electronics), Dr. Jochen Horn (Manager Engineering Support at the Marketing and Technology Center Bensheim) and Albrecht Voelker (Purchasing Manager Tyco Electronics Germany).

GOLDPOST:
How did you hear about the Umicore products?

Walter Mueller:
The product range was introduced by Umicore representatives at presentations and lectures. We also visited various events of the "Zentrum fuer Oberflaechentechnik Schwaebisch Gmuend e. V. (Z.O.G)" (Surface Technology Center).

GOLDPOST:
What do you appreciate the most about Umicore Galvanotechnik?

Walter Mueller:
The development of new electrolytes and the adaption of existing electroplating processes to customers needs in combination with great customer orientation.This means that our wishes and special requirements are always taken into account. Good service is important to us, and the analyses and performance tests are conducted quickly and safely.

GOLDPOST:
Which future trends do you see in the connector industry?

Walter Mueller:
The introduction of lead-free products will play a big role. We will also see a re-definition of various parameters of environmental and scrap metal regulations. With the changed requirements, new materials will be needed, which in turn will influence production processes.

GOLDPOST:
Thank you for this informative interview. We are looking forward to continuing our fruitful business relations.