

**IGOS**

**Institute**

for Electroplating and  
Surface Treatment Solingen

# On the **face** of it ...and **beyond**

Consulting  
Electroplating  
Corrosion testing  
Damage assessments  
Chemical analyses  
Coating analyses  
Expert opinions  
Training



Your independent partner when it comes to surface treatments

## About the publisher

### **Publisher:**

**IGOS**

Institut für Galvano- und Oberflächentechnik Solingen  
GmbH & Co. KG

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# The institute



**IGOS** is a key independent, impartial contact for enterprises involved in coatings, surface finishing and electroplating.

By bringing together experts from a number of different fields of surface treatments, we have imbued the **IGOS** team with an impressive spectrum of core skills and knowledge. This carefully balanced blend of electroplating, materials science, chemistry and corrosion protection has proved its worth many times over by finding answers to numerous tough questions. Discussing the task and associated issues as a team enables us to approach the job from all sides and achieve the ideal solution.

Where specific issues require clarification that extends beyond the joint technical expertise available within **IGOS**, we can draw on a broadly based network of specialists and organisations to answer your queries.

The demands made on the quality of services are increasing inexorably due to the requirements of consumers, enterprises and the legislature. Certification is a means of ensuring the ability of an institute to guarantee that the products it analyses, its processes, services and systems are reliable in terms of quality and safety, that they conform to prescribed minimum technical standards and comply with the provisions laid down by the relevant standards, directives and laws.

It was for this reason that **IGOS** originally faced this challenge and took the step, in 2006, of applying for certification to DIN EN ISO 17025.

Recertification performed by DAkkS at the end of 2011 and the beginning of 2012 provided confirmation of the reliability of our services. In this way, we can ensure that we will continue to be your reliable contact in the future in line with these increased demands.

Josef Andrek  
*Managing Director*

Rainer Schmidtberg  
*Managing Director*

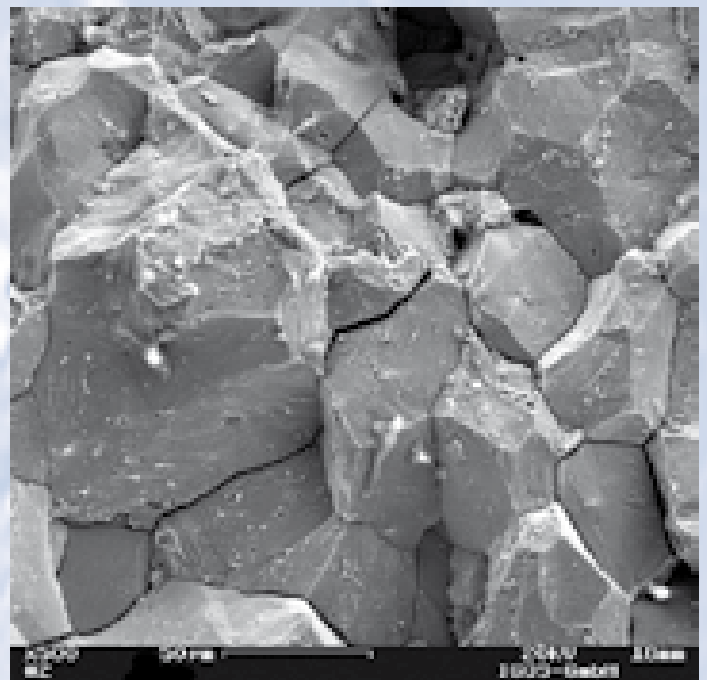
# Services



## Material analyses

When it comes to solving problems with materials and their surfaces, and for evaluating issues with surface coatings, we have a comprehensive array of laboratory equipment at our disposal for analysing and testing surfaces, coatings and materials in connection with damage analyses and quality assurance.

A further crucial service offered by IGOS is the examination of damage caused by accidents followed by production of an expert opinion on the surface issues involved that can be used in a Court of Law.



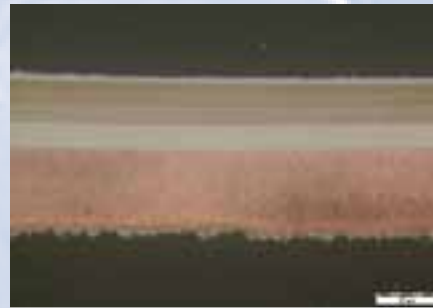
Ruptured surface clearly showing grain boundary embrittlement as an indicator of hydrogen-induced brittle fracture

## Layer analysis & coating thickness measurement

- Non-destructive measurement of the layer thickness using the X-ray fluorescence method to DIN EN ISO 3497
- Measurement of the thickness of non-magnetic coatings on magnetic substrates to DIN EN ISO 2178
- Measurement of the thickness of electrically non-conducting coatings on non-magnetic metallic substrates to DIN EN ISO 2360
- Layer thickness measurement under the light-optical microscope using a ground sample to DIN EN ISO 1463 or as an oblique section for thinner layers
- The simple ball-cratering grinding-method for PVD & CVD coatings from 0.3 - 30  $\mu\text{m}$

## Damage assessment & analysis

- Corrosion problems, with or without coatings
- Adherence problems in metallic and organic coatings
- Quality issues – either aesthetic appearance or due to coating or material defects
- Analyses of ruptured surfaces
- Ruptures due to hydrogen-embrittlement-induced fractures



View showing typical layering in a decorative chromium plating on plastic



Ground sample of a nickel-plated brass component: substrate inclusion in the coating



# Services

## Coating analyses & physical tests

Hardness measurements to Vickers DIN EN ISO 6507 and DIN EN ISO 4516 on a ground sample or perpendicular to the surface

- Vickers microhardness testing of coatings from HV0.01 to HV1
- Hardness profiles after boundary layer hardening, e.g. to DIN EN 10328



Microhardening tester and monitor


## Tensile and compression tests

- To DIN EN ISO 6892-1
- Analysis of the adherence characteristics of various coatings
- Tensile and compression tests from 0.1 to 50 kN
- Tests for hydrogen embrittlement in static tensile loading



Tensile testing machine





## Roughness measurement (Geometrical product specifications (GPS))

Profile method for determining the surface finish and standard characteristics to DIN EN ISO 4287 and DIN EN ISO 4288.



Surface measuring device, Perthometer S3P

## Abrasion testing, abrasion wheel method

Determining the abrasion resistance of various materials using a TABER Rotary Platform Abrasion Tester or Taber Abraser. Suitable for metals, paint finishes, lacquer and paint coatings and electroplated coatings.



Taber Abraser



# Services

## Corrosion testing

Demands on coating systems are constantly increasing. The resistance of components to corrosion is a key indicator of the quality of an electrochemical coating. The quality of a coating is always dependent on the quality of the substrate and subsequent coating process.

In our analysis reports, we document not only the results of the tests but also interim observations as the test progresses.

Our testing chambers are large enough to accommodate components with a length of up to three metres.



Interim assessment during a corrosion test





- **Salt spray tests** in accordance with
  - DIN EN ISO 9227 NSS/AASS/CASS (previously DIN 50021)
  - ASTM B 117, ASTM B 368, DIN EN 60068-2-11

- **Constant and alternating condensation-water climate tests**  
to DIN EN ISO 6270-2 CH, AHT, AT

- **Condensation tests with corrosive gas**  
Simulation for industrial atmospheres involving alternating condensation climates containing sulphur dioxide SO<sub>2</sub>, DIN EN ISO 6988, DIN 50018

- **Corrodokote corrosion tests**  
DIN EN ISO 4541, DIN 50958

- **Climate simulation tests**  
Temperatures adjustable from -70 to +180°C with relative humidity from 5% to 95% for simulating climate zones and climate changes or for testing composite materials such as electroplated plastics, e.g.
  - VW PV 1200 + PV 2005
  - BMW PR 303.4 A-D



- **Combined test procedures**
  - DIN EN 60068-2-30
  - DIN EN 60068-2-52
  - DIN EN ISO 11997-1
  - Ford CEPT 00.00-L-467
  - GMW 14872
  - Porsche PPV 4017
  - VDA 621-415
  - VDA 233-102 new
  - Volvo STD 423-0014
  - Volvo VCS 1027, 149
  - Volvo VCS 1027, 1449
  - VW PV 1210 + PV 1209

- **Special tests**
  - Alkali resistance test pH 12.5 and pH 13.5 to VW TL 212, TL 182, BMW AH-0055, DBL 9201, ASTM G 85 SWAAT, Nissan CCT-I/II, Nissan CCT-IV, Renault ECC 1/D172028
  - Salt spray test with modified parameters (e.g. addition of calcium chloride)
  - Chemical resistance
  - Russian mud test



# Services

## Chemical analyses

The institute's well-appointed laboratory has at its disposal equipment and processes for both classic and instrument-based analyses, allowing electrolyte and environmental parameters to be determined across a broad range of concentrations.

- Assessing the concentration
- Creating hull cell plates for electrolyte monitoring
- Determining the concentration of hexavalent chrome on the surface of materials in compliance with DIN EN ISO 3613
- Analyses of electrolyte and waste water



Titrating solutions



## Atomic absorption spectrometry (AAS) (flame, graphite tube, cold vapour atomic absorption spectrometry)

For exact quantitative determination of various metals, an atomic absorption spectrometer equipped with hollow cathode lamps (HCL) as the light source is used for resonance absorption.

- Flame atomic absorption spectrometry (F-AAS)
- Graphite furnace atomic absorption spectrometry (GF-AAS)

This technology is of particular importance in trace analysis, such as the concentration levels of metals in waste water (waste water analysis), and in electroplating baths (analysing the concentrations of foreign metals).

- Waste water analysis
- Assessing foreign metals in electrochemical baths



# Services

## Electroplating

A fully equipped chemistry laboratory is on hand for developing new coating processes or simulating existing ones and for electrocoating individual parts.

For larger batches, the institute's fully-automated electroplating test line enables small-run series to be plated, processes to be optimised and production problems analysed.

This test line closes the gap between laboratory experiments and full production environments.

### Typical application examples

- Demetallising high-grade products, enabling them to be passed through the manufacturing process again
- Gold-plating complex tools & dies made of a variety of substrate metals to facilitate the market launch of new products
- Coating semi-finished products for the manufacture of bipolar plates for fuel-cell stacks
- Developing processes for coating sintered materials
- Trial coatings on various individual parts for a range of development projects
- Optimising processes for coating polyamide and other plastics using newly developed treatments



Electroplating test line at IGOS

## Training workshops & further training

IGOS offers vocational qualifying and further training facilities that are individually tailored to customers' precise needs. Simply let us know your needs and your intentions, however abstract, however rough they may be, and allow IGOS to work out the details and content of the training course you need.

Once we have agreed the details with you, we can carry out the training course in our own seminar facilities or, if you prefer, on-site at your company.

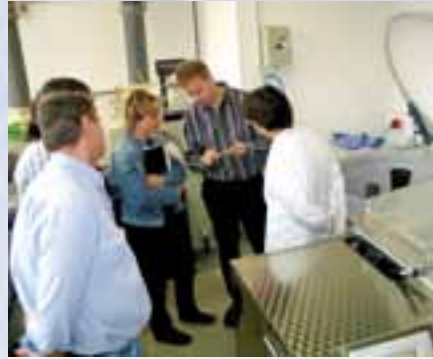


Seminar room well equipped with teaching aids

### Seminar topics

- Fundamentals of corrosion and corrosion testing
- Paint technology for electroplaters
- Fundamentals of electroplating
- Electrochemical coating of electrically non-conducting materials
- Incoming goods inspections of electroplated products
- Analysing damage to coated workpieces

# Services

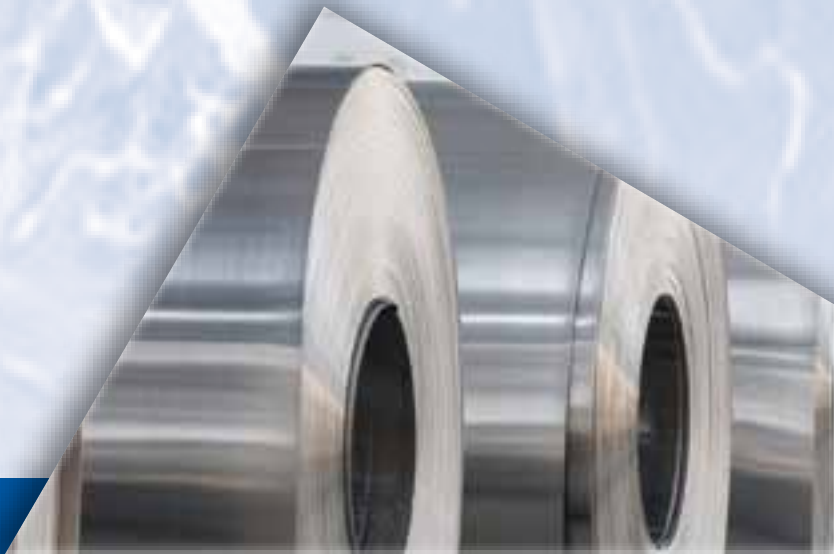


Hands-on demonstration during a seminar

## Consulting

When it comes to surface treatments, our highly qualified staff are pleased to advise.

- Assistance with selecting a suitable electroplating company
- Assistance with selecting a suitable coating
- Assistance with questions or problems relating to a specific production process
- Assistance with abstract issues regarding surface treatments
- Assistance with the manufacture of special-purpose coatings



# Contacts and directions

## IGOS

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## Arrival by car

IGOS is located in the "Gründer- und Technologiezentrum Solingen" (start-up and technology centre) opposite the red-brick administration block of J.A. Henckels AG (Zwilling), situated on the B 229 main road.

We will be pleased to send you more detailed directions on request. Or access them online here: [www.igos.de](http://www.igos.de) under Contact.

## Parking facilities

There is ample parking in the grounds of the start-up and technology centre close to the IGOS premises.

## By rail

Get off the main-line train at the main station for Solingen (Solingen Hbf), change to the regional train for "Solingen" and get off at "Solingen Grünewald". From here, it is a mere hundred metres on foot.



