

German Innovation Award 2021

WBT-Industrie has been chosen as the winner of the **German Innovation Award 2021** in the medium-sized companies category for its development of the “**3D gold-plating of connectors using PVD plasma**” process (PVD = Physical Vapour Deposition), internal brand name: **WBT-PlasmaProtect™**.

With this plant technology it has, for the first time, been possible to develop a significantly more environmentally-friendly process to use instead of the electroplating process used previously. The effectiveness was increased from 20 to 80% by a new 3D process, the energy requirements were reduced by around 26% and resource consumption was reduced by about 35%.

At the same time, the long-term stability and contact quality was improved by a thin but extremely pure (high vacuum) and still elastic layer of gold (Hertzian stress).

The German Innovation Award is one of the most prestigious awards for new developments “made in Germany”, and is jointly presented by Accenture, EnBW and the magazine WirtschaftsWoche. Awards are given to companies that change technology and markets with their innovative strength.

Click here for an editorial on the winner of the German Innovation Award on wiwo.com:

www.dip2021.de.

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Revolutionary disruptive innovation for improved contact quality

In the 2021 Germany-wide innovation competition, organised by WirtschaftsWoche*, EnBW and Accenture under the auspices of the German Federal Ministry of Economic Affairs and Energy,

WBT was chosen as the winner for its WBT-PlasmaProtect™ PVD process development.

The contact quality and long-term stability of audio connectors can be improved with this process:

- 1) The surface roughness of the signal conductor, which is damaging to the contact, is significantly smoothed through pre-treatment with high-current polishing so that the “Van der Waals forces” can be activated considerably more strongly, thus making it possible to plate directly in the PVD process, see attached graphic.
- 2) The PVD (gold) surface is faultless and pure (high vacuum), has a crystalline structure, is thinner and at the same time more flexible with good elastic deformability (Hertzian stress) for improved contact quality.

In addition, an award was given for four further development achievements which form the basis for the leap from previous electroplating to modern PVD plasma technology:

- 1) The 3D coating in PVD plasma, combined with the improvement of effectiveness from approx. 20 to 80%,
- 2) The energy saving of approx. 26%,
- 3) The conservation of resources (saving of gold) of approx. 35%, and
- 4) The reduction of environmental impact owing to the elimination of toxic electroplating baths.

The process development with the direct connection between high-current polishing and PVD plasma coating allows for improvements in quality, reduction of the burden on the environment and conservation of resources. In principle, this new technique can be used for all plug-in connectors, e.g. in measurement and control technology. Particularly where large bandwidth and high current carrying capacity, and at the same time improved long-term stability, are desired.

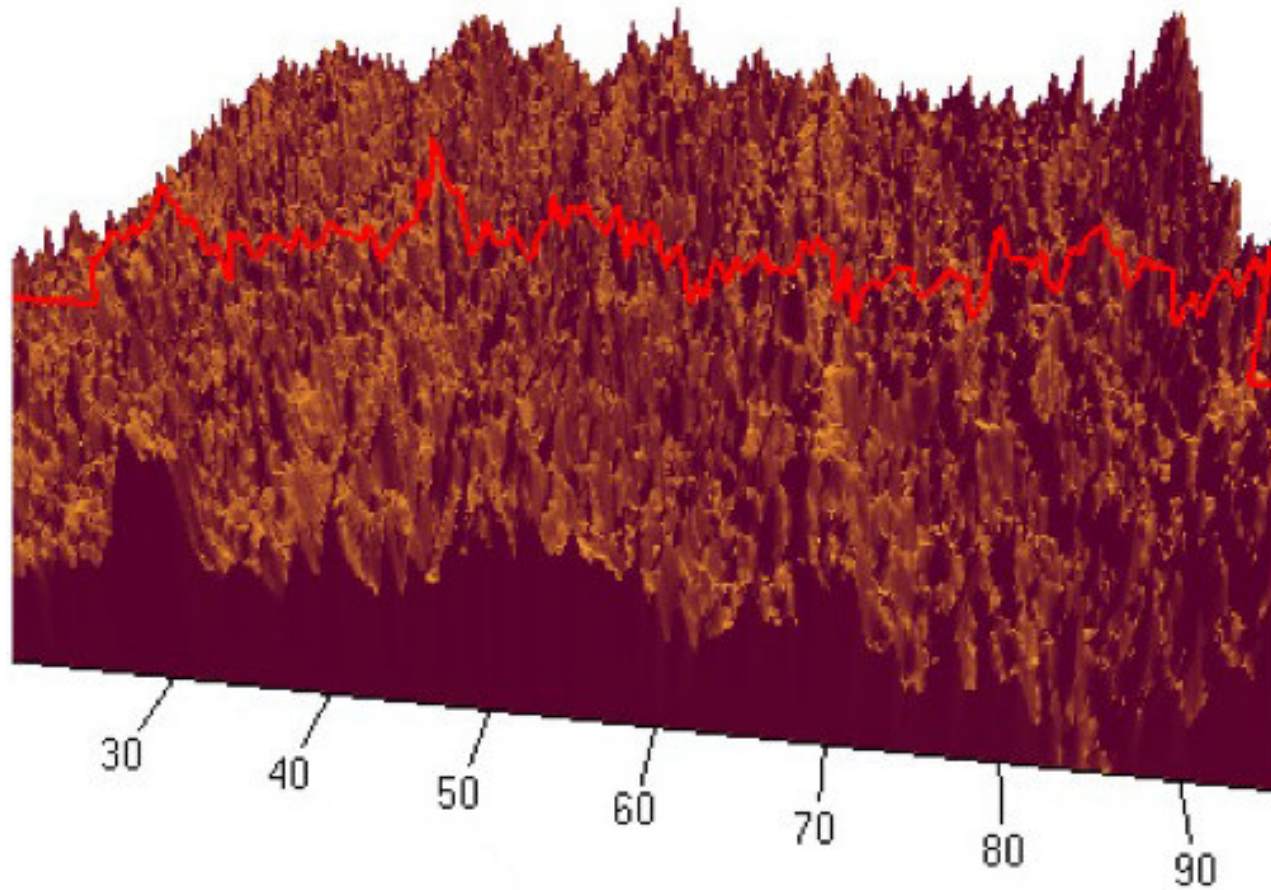
*WiWo award ceremony: 25 June 2021 in Düsseldorf
PVD: Physical Vapour Deposition
Van der Waals forces: Chemical interaction of atoms and molecules
Hertzian stress: Qualitative definition of contact surfaces

WBT-PlasmaProtect™

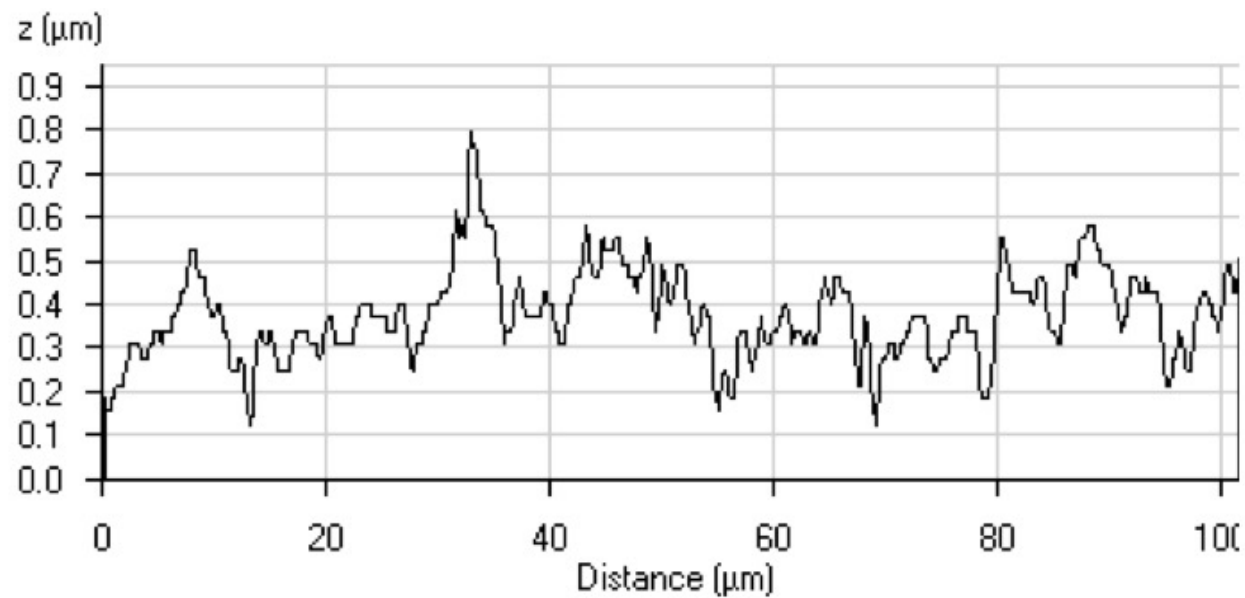


WBT high current 3D polishing process

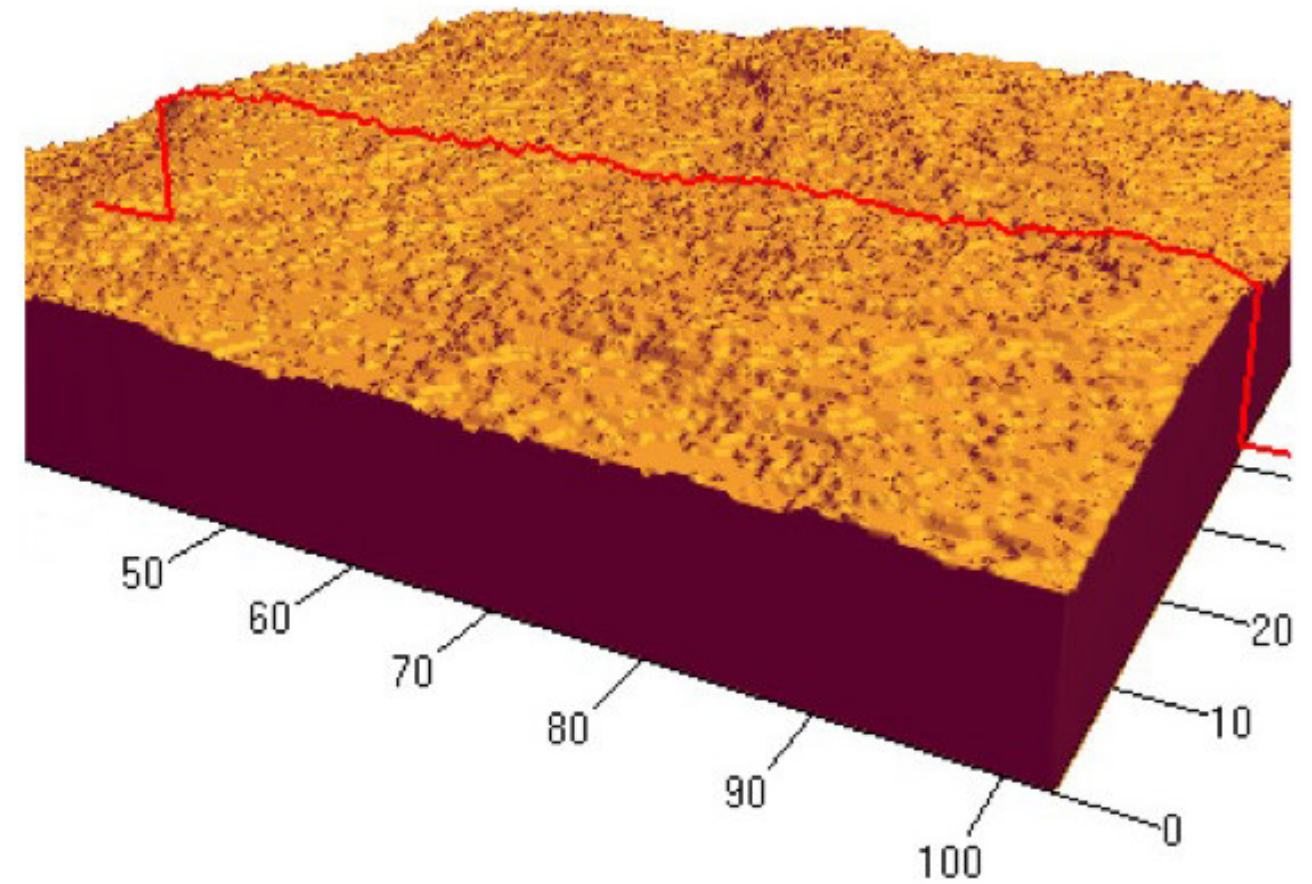
Before



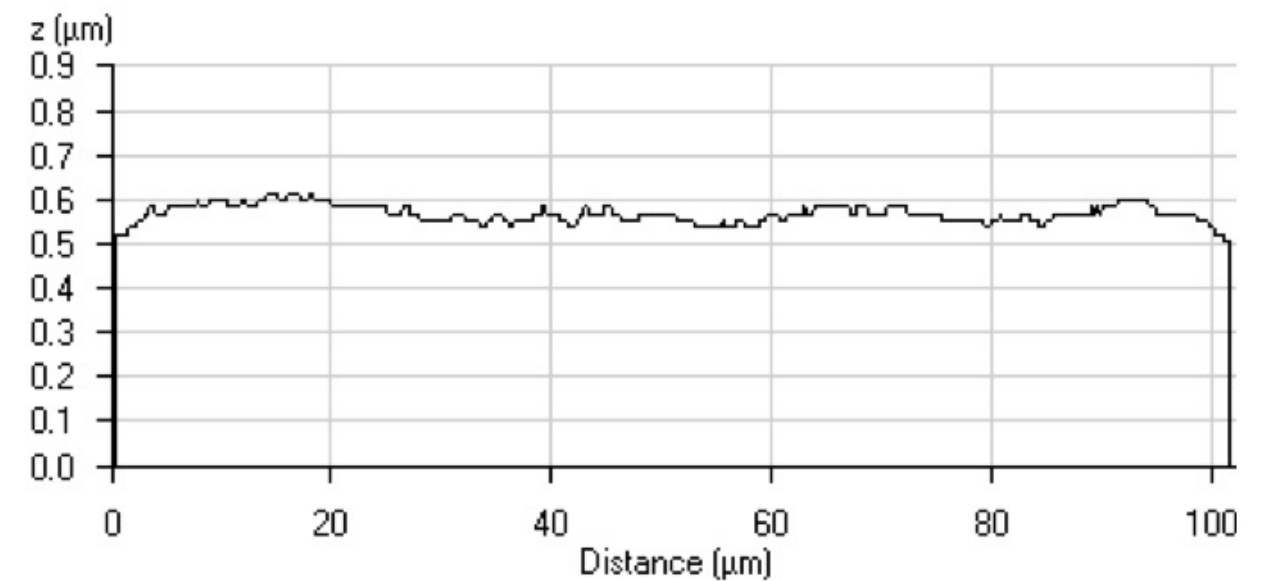
Copper contact, mechanically polished = R_a 0,081



After



Copper contact, WBT high current polished = R_a 0,015



WBT-PlasmaProtect™

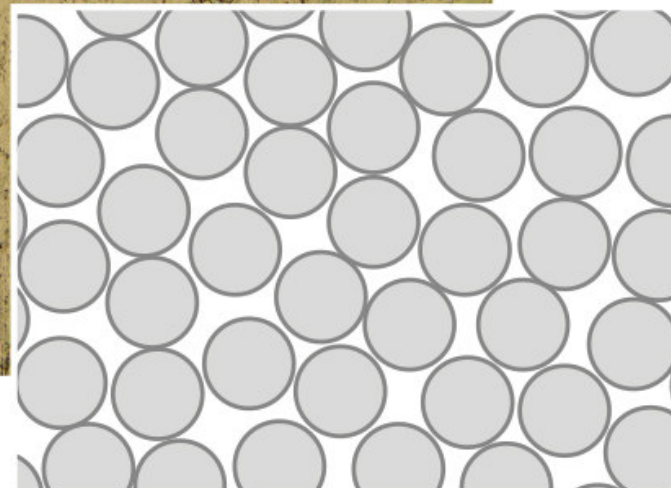
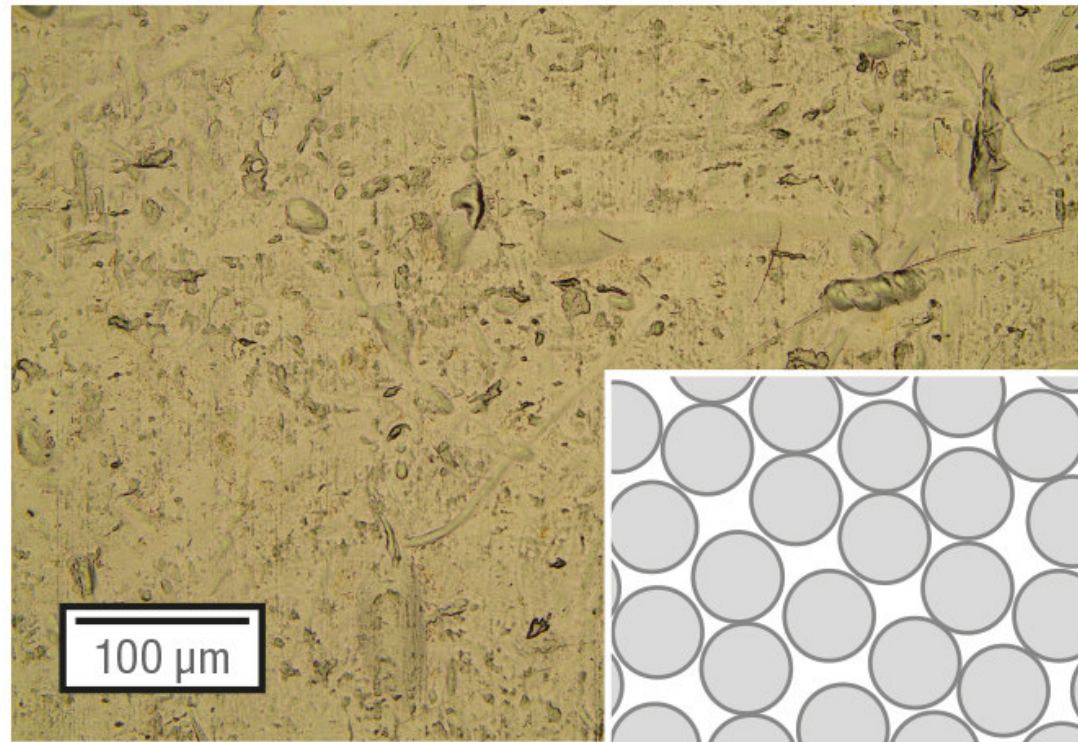


WBT-PVD-Plasma 3D-high-vacuum-coating process

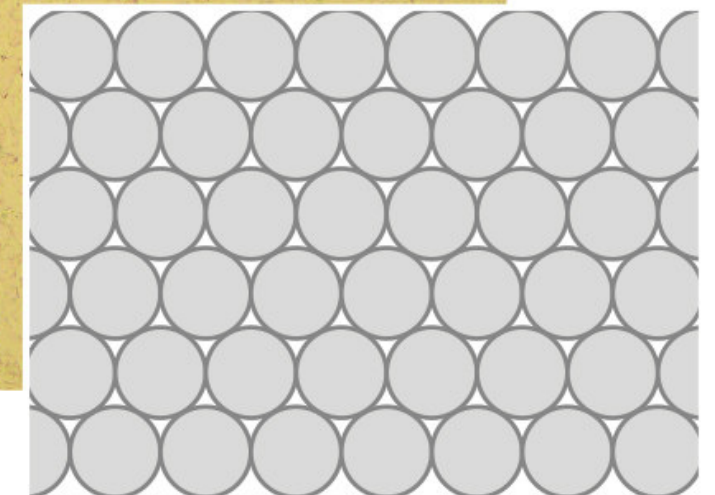
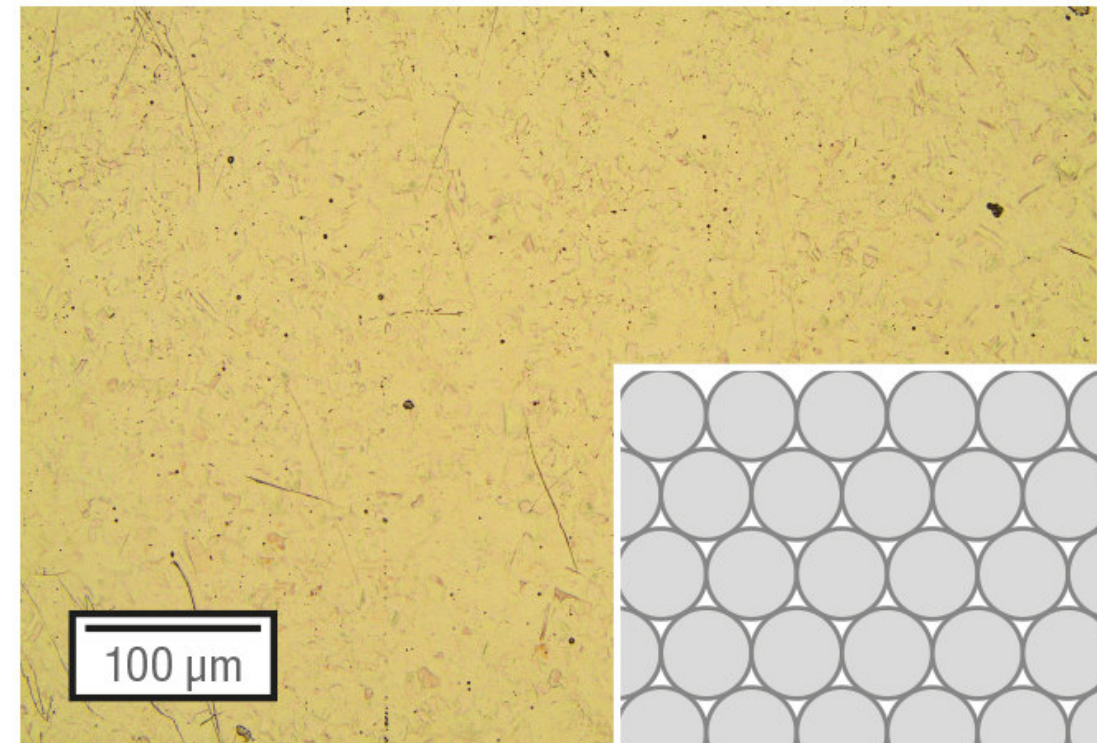


Electroplating - galvanically gold plated

PVD-Plasma - gold plated



Atomic structure:
Amorphous type with less packing density



Atomic structure:
Crystalline type with high packing density

Foreign inclusions and pores
(procedural required)

Very clean and faultless
(High vacuum)

Press release

Image material



Image 1:
WBT has been nominated for 3D gold-plating of connectors using PVD plasma



Image 2:
High current plasma polishing machine



Image 3:
PVD plasma reactor for nano-structured surface modifications with Au, Pd, Pt, Ag, Cu, etc.

Press release

German Engineering!

Since 1985, WBT has been specialising in the development and production of high-quality broadband connectors for state-of-the-art electronics. Based on precision turned parts, new standards in quality have been set. This technology has also put tight limits on attempts to improve the transmission parameters of connectors. The used brass reliably ensures stability and conducts signals but leaves little room for adjusting the increasingly sophisticated electronics.

The solution is still WBT-nextgen™!

The nextgen™ connector series is made from a combination of tailor-made functional materials such as copper and plastic.

The key success factors for nextgen™ are:

- high conductivity and large current capacity as well as high broadband capability
- low eddy current problems (skin effects)
- optimised for mass storage effects and vibration-proof

In 2019, when designing the conductor surfaces, the electroplating process used until then was replaced by the cutting-edge PVD* plasma process. This change in method for the goldcoating process is another development success for WBT. Thanks to this technology, WBT is creating a pure, flawless and more densely structured (crystalline) surface in a high vacuum, which allows the phase-correct transmission of complex signals with an even higher bandwidth.

WBT develops and manufactures all connectors in-house. All products are 100% made in Germany!

The individual development steps allow WBT to make its products in a resource-efficient and environmentally-friendly way. WBT is committed to sustainability – not only in technology but also in production.

WBT-Industrie GmbH

Industry sector

- Mechanical engineering, precision engineering
- Nanotechnology

Main focus

- Electromechanical connectors for consumer electronics
- Medical devices and measuring technology

Main principles

- Implementation of the highest quality standards
- Effective and resource-efficient production
- Protection of jobs in the domestic economy

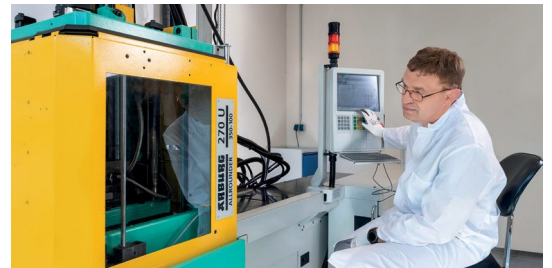
* PVD = Physical Vapor Deposition



Head office in Essen-Kettwig – the home of WBT since 2003



Stamping and bending technology for optimum signal conductors made of copper (Cu), silver (Ag) or aluminium (Al)



Plastic injection moulding technology for the machining and processing of hybrid constructions



PVD plasma reactor for nano-structured surface modifications with Au, Pd, Pt, Ag, Cu, etc.



environmentally friendly & resource saving