THE STECKVERBINDER

ODU®

A PERFECT ALLIANCE.

GALVANIC

Spring 2020 issue

JOURNAL No. 87

Electroplating solutions

An interview with
Volker van der Pütten
Head of Surface Technology

Medical technology

Making smarter decisions!
News & trends by Mathias Wuttke
Business Development Manager Medical Europe

ODU

2020

From left: **Dr. Josef Leitner**, **Dr.-Ing. Kurt Woelfl** and **Denis Giba**

Editorial

Dear readers,

The coronavirus has been at the forefront of our lives for weeks now. Wherever we look – from the world of business to our own family life to the news – it impacts and informs everything.

We held off on writing our editorial until the very end of compiling this issue of THE STECKVERBINDER. But now the time has come. And, as usual, we've decided to focus on the latest from the world of ODU.

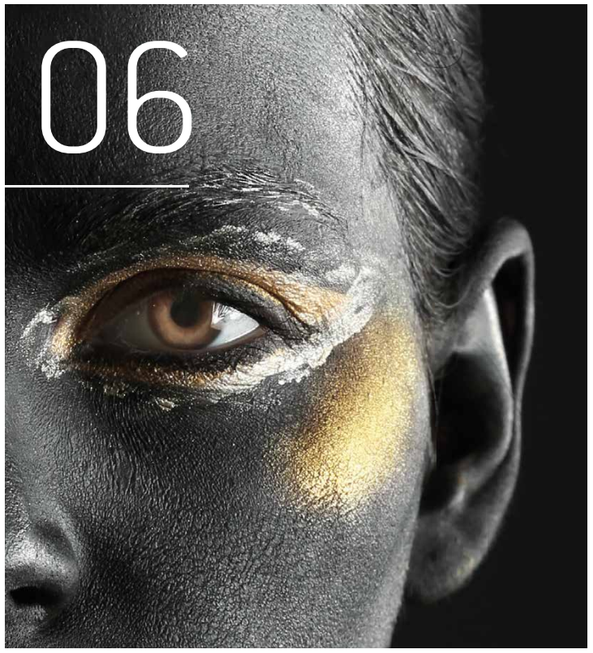
As you'll notice in the photo, our management team has been strengthened, since January 2020 by the addition of Dr. Josef Leitner, a colleague who heads up the areas of Finance, HR and IT.
These areas have now become an additional focus for our management strategies.

Find out more about the ODU MEDI-SNAP® product line on page 22.

ODU's financial stability is proving a particularly valuable asset for long-term collaboration – especially in times of crisis. Despite the coronavirus, our medium and long-term perspective for the future remains positive.
Our main topic for THE STECKVERBINDER, an overview of the medical technology market, has unexpectedly turned out to be even more relevant in the current situation.

Stay safe.

With warm wishes and hopes that you'll enjoy your read,
Dr.-Ing. Kurt Woelfl, Denis Giba and Dr. Josef Leitner



ELECTROPLATING

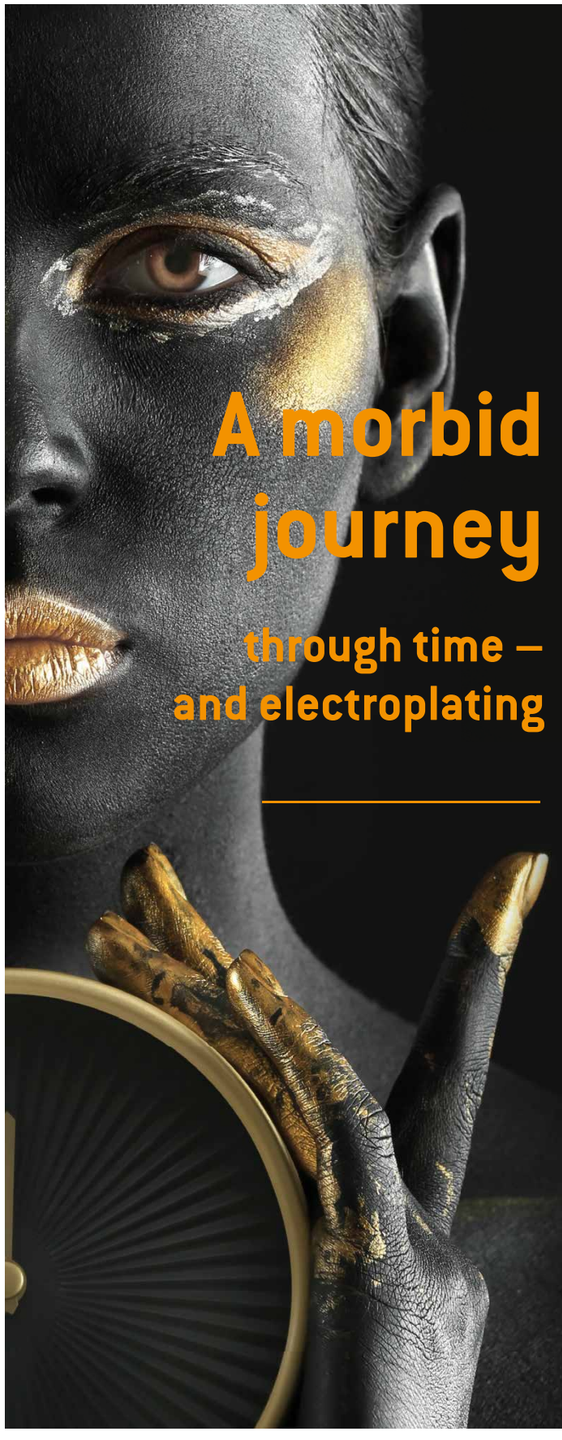
MEDICAL TECHNOLOGY

ODU MEDI-SNAP® | NEW AND INFORMATIVE

ODU PRODUCTS AND PRODUCTION PROCESSES

NEW PRODUCTS

ODU PARTNERS



A morbid journey through time – and electroplating

What we know as electroplating today was formerly known as galvanization, after Luigi Galvani from the 17th century, who discovered the foundations for developing electrochemical cells.

It's the year 1836, 100 years after galvanic gold plating was discovered. Then as now, gold-finished objects served as status symbols.

Moritz Hermann von Jacobi invented a process for galvanically coppering non-conductive, and therefore also **organic materials**, by means of a conductive graphite layer.

Sculptures and artisans were among the first to understand the wide range of options this opened up at the time. And from there, it was but a small step for a truly morbid idea to arise:

the preservation of dead bodies through electroplating, so as to retain a gilded statue of the deceased.

ETHICALLY UNOBJECTIONABLE AT THE TIME.

It's possible that electroplaters Eugène Théodore Noualhier and Jean Baptiste Prevost were the first to conceive of this obscure idea – their patent application seems to prove this.

Using metallic salts, animal and human skin was meant to be made more conductive so it could better absorb metallic ions in electrolytic baths. These ions were then meant to attach themselves to, and fully coat, the body in a thin layer, thereby forming a human statue.

Bringing this idea into today's world…

would have turned Noualhier, Prevost and many others into the heroes of the brotherhood of morticians.

Had they been able to establish the idea that a high-class funeral should involve gilding, these old pioneers surely would have been gifted with a golden statue – which wouldn't even have required too much gold.

This article is an edited extract from the book *Der viktorianische Vibrator (The Victorian Vibrator)* by Frank Patalong.

FINISHING TECHNOLOGY

It's all about material properties that we can touch: smooth or rough, flexible or stiff, heat conductive or insulating – the list is long.

Many of these properties are part of the material itself.

From the point of view of physics, electroplating means the separation of metals in an aqueous solution though an external source of electricity or a chemical reaction.

Electroplating is classified in three groups:

- Ⓐ **Protecting against corrosion**
- Ⓑ **Decoration and design**
- Ⓒ **Changing and combining physical properties.**

What are functional surfaces?

What new opportunities are opening up to ODU through the expansion of its electroplating capacities?

Find out more on the following pages.

COATING PROCESSES FOR **CONTACTS AND HOUSINGS**

FUNCTIONAL SURFACES

Turned and punched contacts obtain their specific electrical and mechanical properties through application-specific surface treatment, otherwise known as “functional surfaces.”

Corrosion protection, contact resistance, wear resistance and many other properties are achieved by means of a layering system applied to the base body.

This of course also applies to metal housings, which often require resistance to environmental influences such as chemicals, seawater or aggressive air pollutants.

Harsh environmental conditions, a high degree of mechanical stress, a particular vibration load: Connectors’ coating systems must be able to withstand a wide variety of factors.

At the same time, they must also ensure the required application-specific properties: from inrush current behavior to tribology[1], solderability and optics.

This results in reproducible surfaces that can be made biocompatible, sterilizable, autoclavable, saltwater resistant, high loss, light-absorbing matt, corrosion resistant, solderable or simply pleasing to the eye.

[1]Tribology: the study of the friction between surfaces in relative motion including their wear and necessary lubrication.

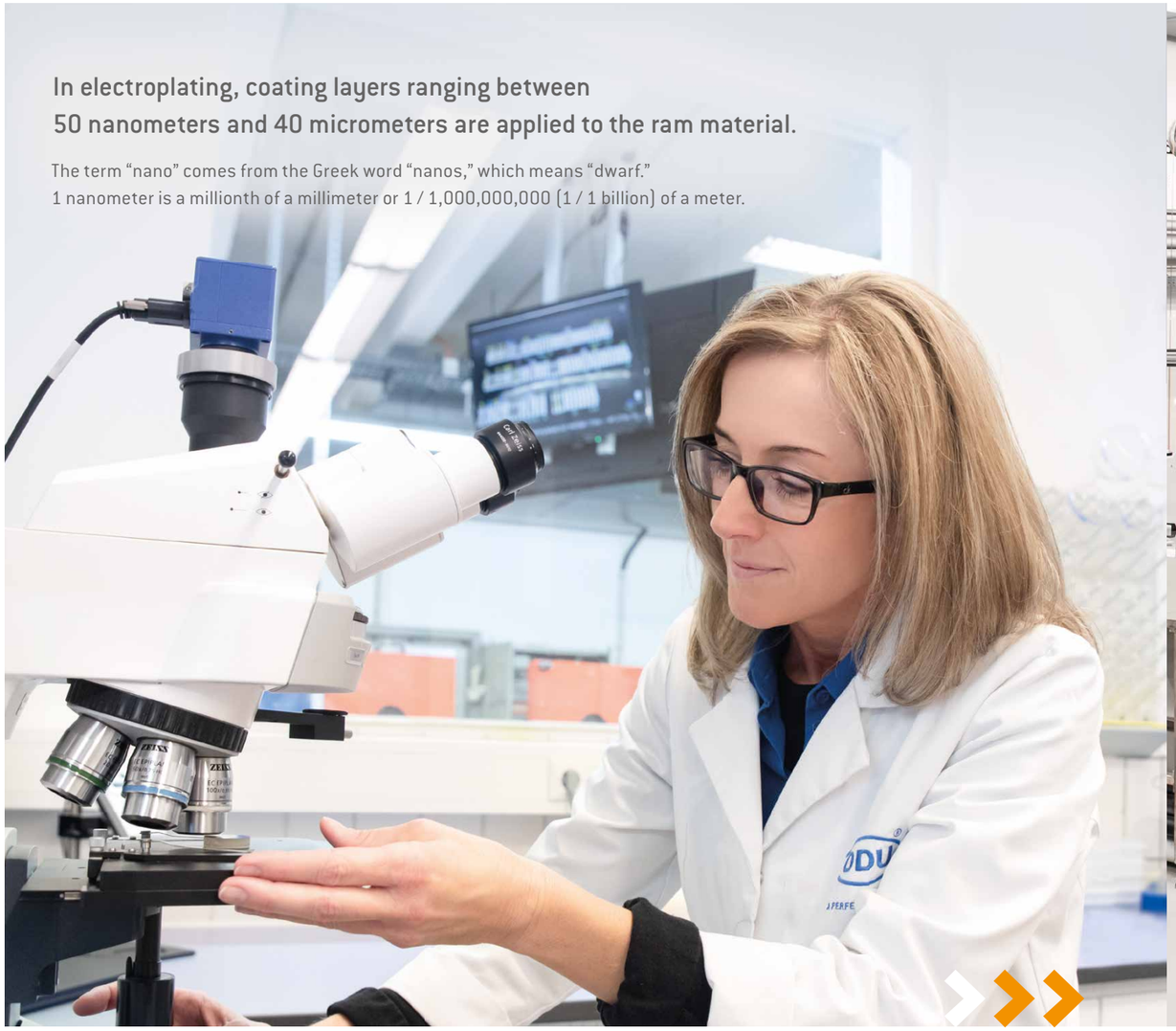
128

employees in electroplating

17 electroplating and multiple chemical procedures in 55 applications on a wide range of base materials are carried out in our electroplating shop.

For an overview of possible surface materials and properties, go to:

www.odu-connectors.com/surface-engineering



In electroplating, coating layers ranging between 50 nanometers and 40 micrometers are applied to the ram material.

The term “nano” comes from the Greek word “nanos,” which means “dwarf.”
1 nanometer is a millionth of a millimeter or 1 / 1,000,000,000 (1 / 1 billion) of a meter.

In selecting the right procedure, the functional requirements of the respective surface, in particular the geometry, number of units and further processing of the coated components, are all decisive factors.

Thanks to a high level of vertical integration, all parameters can be controlled. Barrel, rack, vibrobot or conveyor systems are used for coating procedures.

Facility optimization for increased capacity:

CONVEYOR BELT SYSTEM	Capacity tripled, silver finishing added
RACK SYSTEM	Capacity increased by 30 %
BARREL / VIBROBOT PROCEDURE	Capacities for silver increased by 50 %, for gold by 30 %, with electrolytic polishing included

COATING PROCEDURES FOR CONTACTS AND HOUSINGS

CONVEYOR BELT SYSTEM

For coatings with **nickel**, **palladium nickel 80 / 20**, **cobalt-alloyed gold**, **brushed gold**, **immersion gold**, **tin** and **white ruthenium**.

- Conveyor belt material made of copper and copper alloys
- Maximum conveyor belt speed: 15 meters / minute
- Maximum conveyor belt height: 120 mm
- Maximum conveyor belt width: 1 mm

BARREL / VIBROBOT PROCEDURE

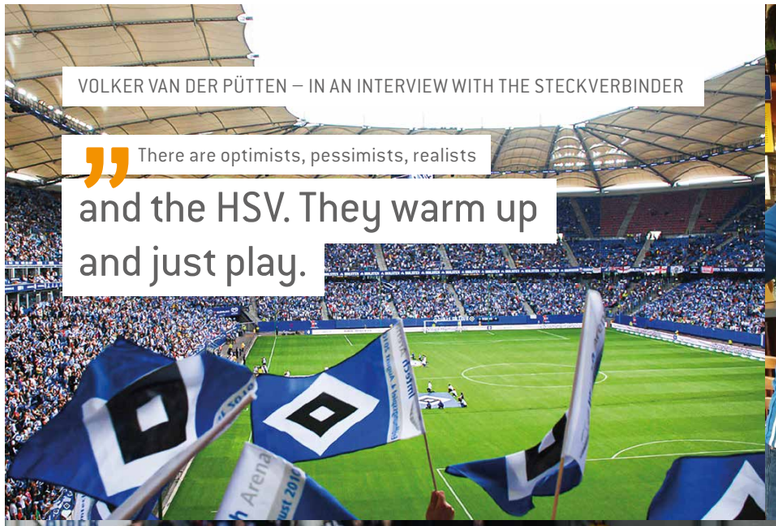
For coatings with **copper**, **nickel**, **electroless nickel** (mid-phos. / high phos.), **nickel-alloyed gold**, **silver** and **white bronze**.

- Barrel width across flats: 250 mm
- Max. weight: 20 kg
- Vibrobot: max. 280 mm / min. 160 mm
- Suitable for small parts starting at a diameter of 0.5 mm

RACK SYSTEM

For coatings with **matt / bright chrome**, **black chrome**, **structured nickel**, **electroless nickel** (mid-phos. / high phos.), **silver**, **white ruthenium**, **black ruthenium**, **palladium**, **palladium-nickel**, **15 tin-nickel black** and **copper**.

- Total length: 27 m
- Up to 7 goods carriers possible
- > 500 parts per hour
- Suitable for parts with a diameter of 5 mm up to a total length of 1,000 mm



VOLKER VAN DER PÜTTEN – IN AN INTERVIEW WITH THE STECKVERBINDER

> There are optimists, pessimists, realists and the HSV. They warm up and just play.

Volker van der Pütten (right)

 © Matthias Herman, Calcio Culinaria Kiel

ELECTROPLATING, SOCCER AND HOW A RHINELANDER CAME TO BAVARIA – AND STAYED.

AN INTERVIEW

With Volker van der Pütten, Head of Surface Technology

THE STECKVERBINDER

Mr. van der Pütten, if you ask anyone at ODU for a surface technology expert, they'll name you without exception.
So, without any noble reserve please – what have been your biggest successes in the field so far and how did they come about?

VOLKER VAN DER PÜTTEN

Since I was born and bred in the Rhineland, my journey to electroplating was quite self-evident – because the Rhineland is the stronghold of Germany's electroplating expertise. I got lucky and was able to graduate from the Solingen School of Electroplating Technology with solid knowhow and then I directly started my career at a large locking system manufacturer for the automotive industry. I continued along this path all the way to managing director and was then given the opportunity to set up a new company in Accra in Ghana, West Africa. What can I say?
I took it and the two years in Africa were amazing.

THE STECKVERBINDER

Without wanting to seem indiscreet – you have a walking aid.
Is the medical care in Germany the reason you came back?

VOLKER VAN DER PÜTTEN

Initially yes, but then ODU started this project – planning and implementing a rack system for nickel and chrome plating, and setting up a team for it, too. It was a one-year project I was able to commit myself to as a transitional solution, just for a year.

THE STECKVERBINDER

...and you're still here 14 years later. Is that because ODU has since invested a double-digit million figure in electroplating facilities?

VOLKER VAN DER PÜTTEN

Definitely. We're a fantastic team, we've built up every single new facility from scratch, created expertise, and just kept growing, with one project after the other, and this is all continuing today.
Now we boast the strength of a 128-person team with all available plant engineering options (barrel, rack, vibrobot and conveyor systems) and the most versatile electroplating process technology in Germany – all right here in Mühldorf.
That's not something you would easily leave behind.

THE STECKVERBINDER

So ODU has achieved the impossible: Tying a Rhinelander to Bavaria for the long term. What they haven't been able to do is get you on the side of Bavarian soccer, though, right?
You're still a fan of Hamburg's HSV!
For those who don't know the HSV: It's one of the German Bundesliga's 16 founding clubs and has always ranked among the top clubs. The only minor tarnish is that it was relegated to the second league in 2018 although you're absolutely certain that it will be promoted to the first league again in 2020.
Mr. van der Pütten, can you tell us a HSV story?

VOLKER VAN DER PÜTTEN

The HSV has been with me my whole life. My father even took me to see Uwe Seeler play at the stadium – and quite honestly, you remain true to your roots, don't you? Even if you landed yourself in Bavaria a long time ago. And also, a bit of dynamite is always fun – especially when it comes to soccer.
Here's a good story for you: The phone rang one day while I was at work and it was a regional radio station asking me to turn on the radio. So I turned on the radio over the loudspeakers in our production area, and guess what? They played a song about me, the FC Bavaria Munich and the HSV. A very furious fan song, simply ingenious, wonderfully sarcastic and live on the radio. Everyone heard it, which is why they all know I'm an incorrigible HSV fan and always will be.

THE STECKVERBINDER

That's a wonderful story!

And you can listen to the song here – it's awesome but only available in German.

Volker van der Pütten, Star of the North

THE STECKVERBINDER

Mr. van der Pütten, let's talk about your most recent project. What's new for ODU customers?

VOLKER VAN DER PÜTTEN

We have a new M-shaped conveyor system with a stretched length of some 90 meters, with 113 process positions and a vertical entry and exit storage of around 50 meters each.

This has allowed us to triple our existing conveyor system capacity for stamped contacts and also integrate another surface – silver.

This way, we've also increased supply security through integration and expansion.

THE STECKVERBINDER

Every electroplating product underlies controls and processes. Can you explain this cycle for us in simple terms?

VOLKER VAN DER PÜTTEN

It starts with an inspection of the component parts of electrolytes and their adjustment. The coating procedure starts after the process has been selected and it ends with the checking of the layer thicknesses via x-rays, microsections and corrosion testing. For the rack process, it can include a 100 % visual inspection and a wide range of other required physical analyses.

THE STECKVERBINDER

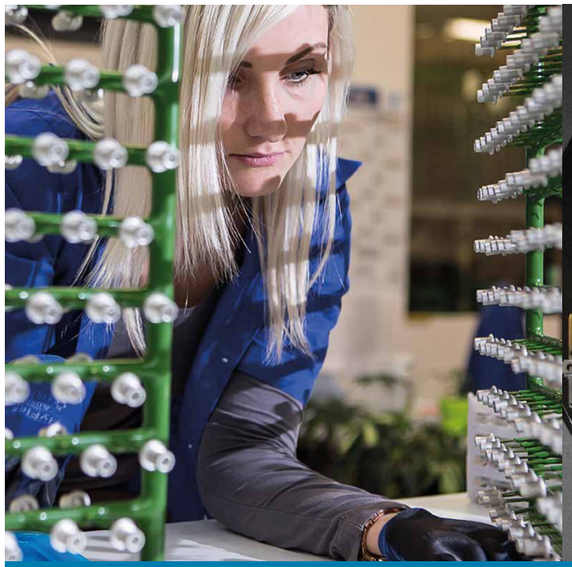
How does the material determination occur with or for the customers?

VOLKER VAN DER PÜTTEN

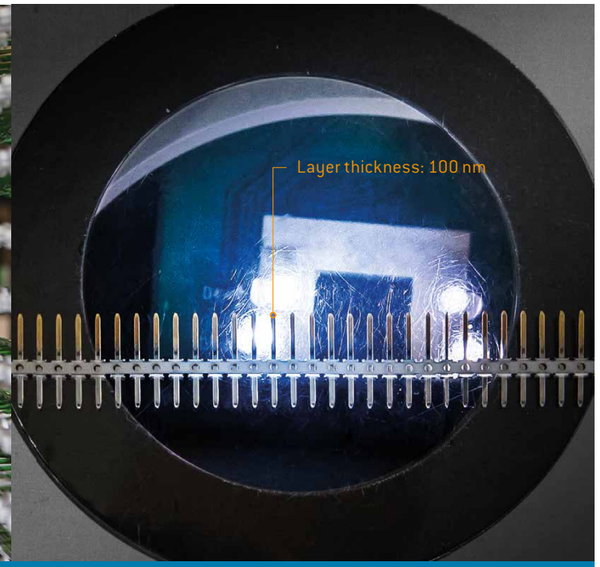
Before choosing a surface, the specifications must always be defined first. This is done in meetings with our customers and the respective departments.

Together, we create the perfect surface.

Rack system with 100 % visual inspection



X-ray testing of layer thickness



www.odu-connectors.com
/surface-engineering

Volker van der Pütten
Head of Surface Technology
E-mail: volker.vanderpuetten@odu.de

MEDICAL TECHNOLOGY | **AN ARTICLE BY MATHIAS WUTTKE**

smarter DECISION-MAKING

Miniature dosing devices, operation robots and remote medical interventions that can be controlled across national borders via screens. Medicine is growing ever more precise and networked.

The new age of healthcare has arrived. Whether this is truly desirable for all medical fields is a separate question.

What would it take to make the best use of digitalization?

It would take a great deal. Basic structures and core processes must be reviewed. The strict distinction that currently exists between outpatient and inpatient care would need to be replaced with a distinction between primary medical and specialist care. An integration of specialist expertise would need to be integrated into larger organizational units and networked with inpatient structures – to mark a path towards reducing the comparably high number of hospital beds and realistically implement the integration of "digital medicine" in an economical fashion.

Large tech companies such as Google, Amazon, Apple and Facebook have recognized the potential of digitalization in healthcare early on. For instance, the American healthcare organization Ascension now uses Google cloud computing solutions, and Apple has begun offering essential parts of an electronic patient file, although only for research purposes at this stage.[1]

[1] The collaboration began back in 2018, according to a Handelsblatt report. More information on this project can be found on the internet under the keywords "Project Nightingale."

Data protection requirements must be weighed against medical and healthcare benefits.

For patients and staff alike around the world, the advantages of using big data for everyone are evident. The results of an MRI are a great example: On their own, a single doctor can surely not always guarantee error-free diagnostics in difficult cases. But if this doctor has an additional database available containing thousands of suitable sets of patient data and can compare them, the resulting diagnosis will become significantly more precise – and safer.

Networked diagnostics is a truly helpful feature based on big data. For over 18 months now, software with a high level of evaluation quality has been available on the market. Hospitals are already using it as their basis for developing interfaces with external servers and computer centers offering medical services and analyses.

But it's about so much more than just big data – it's about overall trends in medical technology.

We can safely call sensorization, miniaturization, medical robotics and automation, along with modular connectors, as hyped markets.

Improved patient monitoring through sensor technology

This means that a growing number of sensors are able to record vital signs, lying position and other data regarding the patient. The benefits: Data replaces erroneous patient assessments of their own health situation and doctors are able to respond quickly and safely to any changes that may occur. A well-known example from this area is the SPO2 sensor, which measures oxygen saturation in the blood. Further areas of application for sensor technology connectors include interfaces with the hospital computer center and in-house video management system, which analyzes data from endoscopes, microscopes, CTs and MRTs.

Conclusion on requirement

Dependability, manufacturing quality and robustness are required for connectors used in the operating area – as well as for connector modules for data transmission that are frequently disconnected from the devices for servicing and cleaning.

This ensures longevity and a high number of mating cycles combined with maximum transmission quality, packing density and vibration resistance.

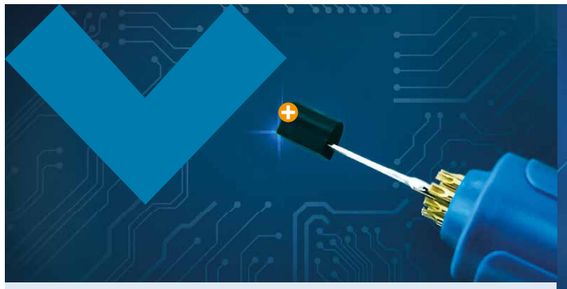
ODU offers circular connectors with push-pull locking from the ODU MINI-SNAP® and ODU MEDI-SNAP® series as well as break-away connectors such as the ODU MINI-MED®.
In the case of hybrid connectors, which enable fiber optics, power, signals and other media to be transmitted, modular rectangular connectors from the ODU-MAC® series are used. These also come with secure push-pull locking.

ODU MINI-SNAP®
Push-Pull connector

ODU MEDI-SNAP®
Break-Away connectors with silicone overmolding

ODU MINI-MED®
Assembled plastic connector

www.odu-connectors.com
/products-solutions/push-pull-circular-connectors



Trend market **device recognition**

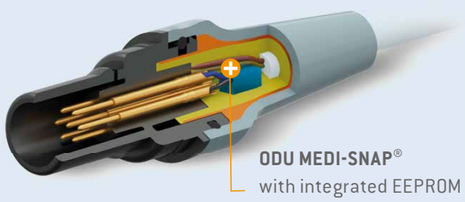
Classic ODU Push-Pull connectors such as the ODU MEDI-SNAP® are suitable for both single use and reusable areas. This is made possible through integrated microchips (EEPROMs, RFID and NFC) with read-only memories programmed with the respective number of cycles or ID.

The EEPROM controls device recognition while also ensuring the correct utilization quantity through tracking. Should a defined utilization quantity be exceeded, a warning sound is emitted, for example.

What's more, the memory also contains precise product and production identification numbers, offering copy protection and preventing the possibility of second use.

Product result

Patient and user safety are paramount.
ODU is therefore mostly working with highly secure plastic connectors from the ODU MEDI-SNAP® series with push-pull locking, which meets the highest demands regarding electromagnetic compatibility (EMC), along with the easy-to-handle break-away connectors from the ODU MINI-SNAP® series. All connectors from these series can be ordered with integrated EEPROMs.



ODU MEDI-SNAP®
with integrated EEPROM

QCore insulin injection system

Trend market **miniaturization**

For long-term patients from the home care area, the daily care for their own body is facilitated both through small devices and big data applications, too. A typical example of this is insulin injection devices for diabetes patients. Today, these devices consist of small stickers attached to the body that can administer the right daily dose through a mini cartridge. Such devices can be controlled by means of an app and tracking. The patient's doctor can monitor whether the dose is correct and can intervene and prevent secondary diseases.

Product result

Such devices are as small as a matchbox and have an integrated cannula and medication supply. Tiny pins and contacts are required with specific properties regarding clearance and creepage distances, and surface quality combined with specific design properties. Customer-specific requirements of any kind can be met thanks to ODU's in-house electroplating and turning facilities.

ELECTRICAL CONTACTS

Growth market **"Smart operating room"**

One of the best-known devices currently in use is the robot-assisted da Vinci Surgical System, which is mostly used for minimally invasive surgical interventions. The system possesses remote-control robot arms with attachable systems, thereby enabling the simultaneous use of surgical devices such as endoscopes for different application areas. This way, the surgeon can carry out more complex interventions without requiring the same amount of support from other highly qualified doctors. Particularly in times of high cost pressure and a scarcity of qualified doctors, this is a significant advantage. In Israel, for example, research is being carried out regarding the development of robot systems for use in complex spine surgery.

The current trend is towards the development of less expensive surgical robots with only one or two arms holding surgical instruments – of the type already being used today for replacing artificial knee joints. The "smart operating room" is certain to gain further momentum in the years to come.

Conclusion on requirement

Posing a challenge to manufacturers, the newly required interfaces are often designed in a modular fashion, as a removable disk with various contacts, so they can be used with a range of different devices. Thereby, the use of different media, such as compressed air, fluids, power, data and others is guaranteed.

In vehicle manufacturing, these systems are already in use. In medical technology, the development is more complex due to the special sensitivity of the operating environment. An added difficulty is the current lack of basic standards. ODU is in the fortunate position of possessing a wealth of experience from the MRI area. Which direction the "smart operating room" will take in the future, however, is not yet clear. In the end, interfaces will be everywhere, and, when external, may also be wireless. In such cases, the devices will be snapped into a docking station or tower that is suspended from the ceiling and connected via modular elements.

ODU-MAC® White-Line
From the modular connector series

Data matrix code, lasered

New labeling obligations such as the UDI (unique device identifier) must now be intergrated in the production process. Documentation, identification and product tracking is currently a huge requirement, one that ODU can meet thanks to a 2D matrix lasered onto the connector. Extremely careful inspections and records about this make using high-quality ODU connectors easier for manufacturers worldwide.

ODU WHITEPAPER | PUBLICATION
Connector with integrated EEPROMs

This publication can be downloaded as a PDF at
www.odu-connectors.com/downloads/whitepapers

www.odu-connectors.com
/products-solutions/electrical-contacts

www.odu-connectors.com
/products-solutions/modular-connectors

MEDICAL TECHNOLOGY | **INTERVIEW**

ODU's medicine man

MATHIAS WUTTKE

Business Development Manager Medical Europe

THE STECKVERBINDER

What exactly is your job as Business Development Manager (BDM) Medical at ODU?

MATHIAS WUTTKE

To find new products and applications. I look for new ways for our connectors to be used in the medical technology of the future. What direction is medical technology taking? Which connectors will be needed in the future? These are the questions I'm interested in. And that's what I'm on the lookout for.

I talk to clients, developers, and medical experts along with technical innovators and trailblazers. I try to notice when new requirements pop up and take them back to ODU. Then we can develop new products that we believe will be needed in the area of medical technology in the future.

THE STECKVERBINDER

How do you see the development of medical technology in the future?

MATHIAS WUTTKE

Medical technology remains an important market segment and will only become more important in the future.
Technical developments will have to be created more quickly, and new devices will need to be better, smaller, more modular and more precise.

THE STECKVERBINDER

What do you take along with you when you meet a client?

MATHIAS WUTTKE

Our clients, especially from the medical field, have to comply with norms and regulations when they develop a new product.

So, they're interested in innovation and solutions that will help them advance in the work they do. That's where I come in.
I have extensive knowledge to offer when it comes to norms and regulations. Currently I take along with me a sample of a silicone-overmolded system solution and the EEPROM demonstrator.

I know exactly what ODU is capable of and I understand what the customer needs – and I'm able to bring that together.

EEPROM demonstrator

Sample box on silicone overmolding

FOR FURTHER INFORMATION, GO TO

www.odu-connectors.com
/application-areas/medical

Mathias Wuttke

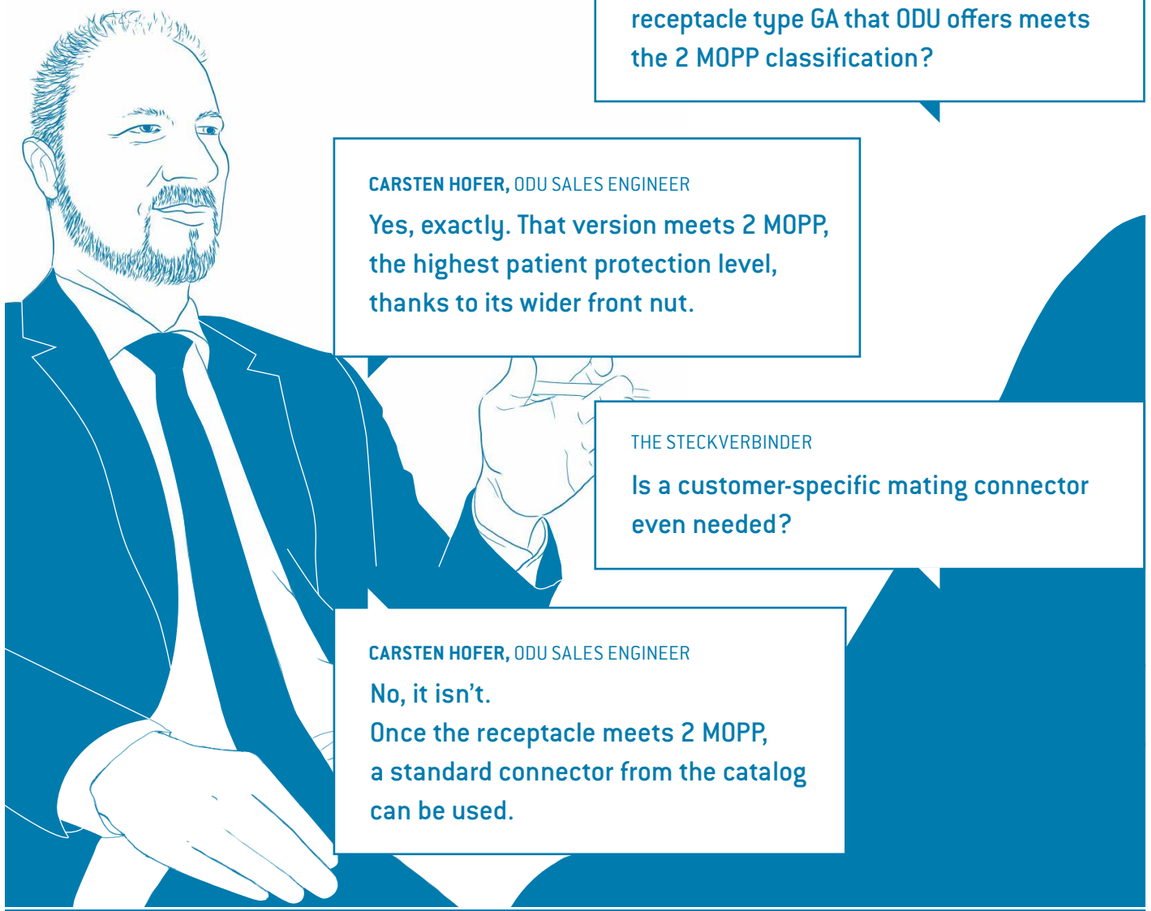
Business Development Manager Medical Europe

YOU'RE WELCOME TO CONTACT ME DIRECTLY

E-mail: mathias.wuttke@odu.de

QUESTIONS ON **IEC 60601-1**

ODU MEDI-SNAP® for medical technology | Patient and operator protection



THE STECKVERBINDER

Can we rightly assume that the receptacle type GA that ODU offers meets the 2 MOPP classification?

CARSTEN HOFER, ODU SALES ENGINEER

Yes, exactly. That version meets 2 MOPP, the highest patient protection level, thanks to its wider front nut.

THE STECKVERBINDER

Is a customer-specific mating connector even needed?

CARSTEN HOFER, ODU SALES ENGINEER

No, it isn't.
Once the receptacle meets 2 MOPP, a standard connector from the catalog can be used.

Further questions for **Carsten Hofer**?
Contact him at carsten.hofer@odu.de

The whitepaper regarding IEC 60601-1 is available for download at
www.odu-connectors.com/downloads/whitepapers

ODU MEDI-SNAP®

IEC 60601-1: 2 MOOP AND 2 MOPP VERSIONS

Meeting protection classes 2 MOOP and 2 MOPP
at the receptacle through the wider front nut.

HIGHEST PATIENT PROTECTION
according to IEC 60601-1 (2 MOPP)

HIGHEST OPERATOR PROTECTION
according to IEC 60601-1 (2 MOOP)

Front mounting

5,000 mating cycles

Up to IP67 (mated)

Optimized receptacles

Up to IP68 (demated)

Meets protection classes 2 MOOP and 2 MOPP
on the connector thanks to additional domes at the insulator.

www.odu-connectors.com
/products-solutions/push-pull-circular-connectors/odu-medi-snap

NEW: even better configurability of the **ODU MEDI-SNAP®** Break-Away connectors.

① Connector selection

SILICONE-OVERMOLDED SYSTEM SOLUTION
- Avoids stick-slip effect[1]
- Smooth overmolding transition
- Autoclavable

STRAIGHT VERSION
High level of assembly flexibility

ANGLED VERSION
Place-saving product design

OVERMOLDED VERSION
Highly economical system solution

② Cable selection

⊕ Sophisticated medical cables

⊕ Standard cables for medical and industrial electronics applications

③ Ready-made cable assembly

for **medical technology applications**

Test and measurement and **medical applications**

[1]Non-stick feel due to special surface

www.odu-connectors.com
/products-solutions/push-pull-circular-connectors/odu-medi-snap

TRANSPORT PROTECTION CAPS ODU MEDI-SNAP® | ODU MINI-SNAP®

NEW PROTECTION CAPS

Available for all connectors in the ODU MEDI-SNAP® and ODU MINI-SNAP® series

- ⊕ Protection against damage and foreign particles during production, assembly and dispatch
- ⊕ Temperature resistant for up to 150 °C
- ⊕ Flexible soft rubber
- ⊕ Shape adjusted to the contour for tight fit

For further information, please contact
sales@odu.de

ODU MEDI-SNAP® **MEDICAL TECHNOLOGY**

VENTILATORS

In use: The **ODU MEDI-SNAP® series**

ODU is making a small but important contribution.
Production of the ODU MEDI-SNAP® series was increased in the short-term to enable quick delivery.

www.odu-connectors.com
/products-solutions/push-pull-circular-connectors

COAX CONTACTS

Provocative, but true –

High-tech doesn't have to be expensive.

Continuing to improve on a good product is the typical product development path, but is it always the best way to achieve customer satisfaction? To please the customer, how should one approach optimization? By maintaining quality and lowering production costs.

ODU developers have achieved this goal for the MRI market.

This has resulted in a much cheaper connector solution and integrated testing procedure offering even better quality assurance.

Both the assembly and soldering of the coax contacts' inner and outer conductors are robot-controlled.

The final end-of-line testing procedure is carried out on the assembled connector solution – which is also fully integrated into the production process.

ODU-MAC® White-Line

Already available for the **ODU-MAC®** White-Line

www.odu-connectors.com
/products-solutions/modular-connectors/odu-mac-white-line

COAX CONTACTS **MEDICAL TECHNOLOGY** | **SYSTEM SOLUTIONS** INCLUDING CABLE ASSEMBLY

Significantly lower
production costs,
thanks to faster, more efficient solution and implementation.

COAX CONTACTS
ASSEMBLED SEMI-AUTOMATICALLY FOR SYSTEM SOLUTIONS

Semi-automatic assembly in detail:

Thanks to further product optimization and production based on automatic assembly, many benefits have arisen. The previous RX standard coax contact can be replaced in automatic assembly by a new product that has been optimized in terms of material costs. At the end of the production process, "Station 3" (at the end of the machine) provides a 100 % quality control of the finished connector solution. Ready for dispatch.

Station 1: Carries out the assembly of the inner conductor and insulator as well as other optimization processes

Station 2: Automates the soldering of the outer conductor

Station 3: End-of-line test machine
Here, the fully assembled coax contacts are subjected to a full inspection. The following aspects are checked as part of four tests:

- Concentricity
- Insulation voltage
- Depth gauge of outer and inner conductors
- Mating and demating force testing

+ 4
Integrated testing procedures

If you have questions about the project, please contact **Stefan Putz** at stefan.putz@odu.de

CABLE ASSEMBLY

SILICONE-BASED PRODUCTION PROCESSES

Flexible without softening agents, heat and cold resistant, gentle on skin, water repellant and permeable to steam: **Silicones offer properties that no other plastics can.**

There are two procedures for silicone overmolding: the LSR or the HCR procedure

Liquid silicone

LSR (LIQUID SILICONE RUBBER) **PROCEDURE**

Two silicone components are brought together – one containing the cross-linker and one the catalyst. The coloring occurs via an ink cartridge which can color the two components as desired. The components are mixed in the spraying machine at room temperature and injected into the hot tool.

This procedure is suitable for high-quantity production.

Solid silicone

HCR (HIGH CONSISTENCY RUBBER) **PROCEDURE**

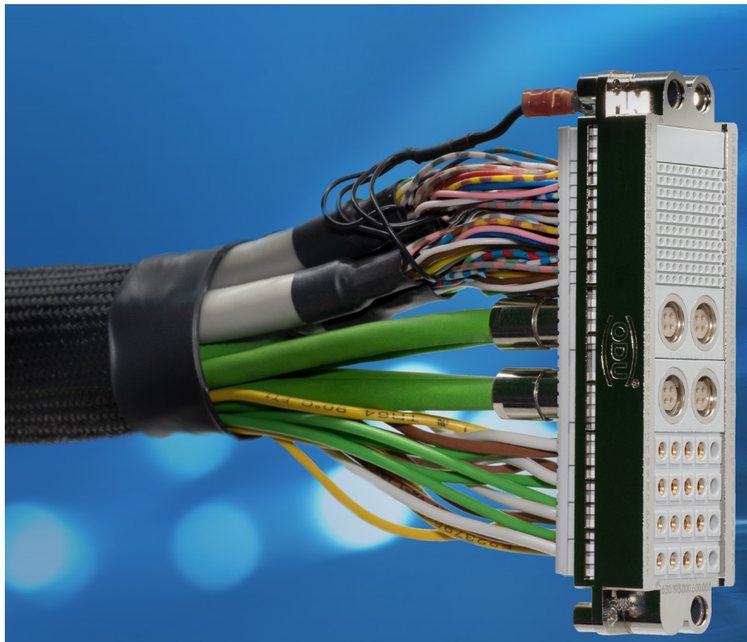
In the HCR procedure, a pre-mixed colored compound is fed into the injection molding machine via a pneumatic in-feed system before being injected into the hot tool.

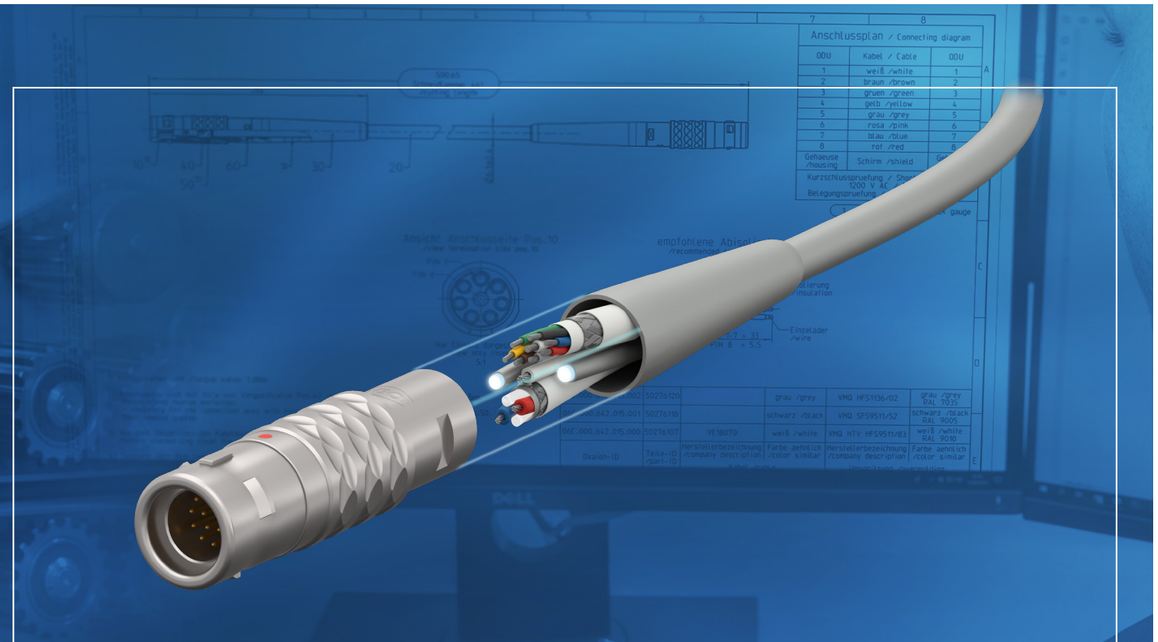
The HCR procedure is suitable for smaller or customer-specific series since it is easier to clean the machines and more quickly change colors and materials.

The tempering of the silicone is important for applications in sensitive areas such as medical technology.

As part of the production process, volatile fission products (siloxanes) are removed from the silicone during tempering, thereby increasing the cross-linking degree of the components.

www.odu-connectors.com
/silicone-overmolded-system-solutions





NEW IN THE AREA OF CABLE ASSEMBLY

STANDARDIZATION

One article number and contact person will take you to the fully assembled connector solution.

- Complete solution
- 1 contact person
- Quick delivery
- Fast sample construction
- Swift quoting

Quoting is becoming faster.
The goal is to be able to offer a cable assembly order process similar to that of the modular connector system.

If the connector and cable assembly are linked in a standardized manner, our customers have one contact person for the complete system solution – which saves them time and resources.

Particularly when it comes to complex and individually configurable ODU-MAC® products, standardization in the area of cable assembly makes a great deal of sense.

Standard processes and a predefined additional **pool of purchased parts**[1] enables quick and proactive delivery.

The additional purchase components such as standard cables and accessories can also be used for customer-specific projects – which also increases the speed of quoting and delivery.

[1]A clearly defined selection of suppliers for standard cables and accessories

CABLE ASSEMBLY | OUR SERVICES AT A GLANCE

- One contact partner for the complete system
- Many years of cable assembly experience
- Extensive knowhow about our own connectors and technical understanding of how to integrate third-party products
- Standard and customized overmolding in both hot-melt and high-pressure in straight and right-angled versions
- Silicone overmolding for medical technology products
- 100 % final inspection
- Customer-specific labeling and cable printing
- Cutting-edge production facilities for small, medium and large quantities at our worldwide production sites
- Close collaboration with leading cable manufacturers for the respective markets
- Process-controlled soldering and crimp force monitoring from the sample stage to series maturity
- Clean room production available according to EN ISO 14644-1
- High-speed data technology for system solutions
- Production available according to UL (File: E333666)

www.odu-connectors.com
/products-solutions/cable-assembly

ODU-MAC® Black-Line TEST AND MEASUREMENT

ODU-MAC® Black-Line TEST AND MEASUREMENT

The Mass Interconnect Solution with up to 4,440 signal contacts and electromechanical operation at the touch of a button

- **Electromechanical engagement option** at the touch of a button or by remote control
- **Modular design:** Flexible configuration through exchangeable ODU-MAC® modules

NEW ODU-MAC® Black-Line
MASS INTERCONNECT SOLUTION

Mass interconnect systems are necessary for testing PCB boards and electronically assembled units. This new product line for the test and measurement market has been launched and is already being used in practical applications.

The result for the customer: The electromechanical engagement option at the touch of a button enables ergonomic handling and can be controlled remotely.

Another important aspect of this solution is that it can be combined with the most varied ODU-MAC® modules and signal blocks, with ODU's reliable contact technology. This results in a very high packing density with maximum flexibility. What's more, customers can obtain complete one-stop solutions, including cable assembly, that are tailored to their specific requirements.

THE BENEFITS

- **Reliable contacting:** Even tensioning on 8 tensioning points prevents frame distortion.
- **Defined tolerance compensation:** The connectors' floating support compensates for misalignments, thereby maximizing their life span.
- **Quick-lock:** Time-saving quick-lock system for releasing the connector from the receiver frame.
- **Flexible thanks to a wide variety of possible modules:** signals, power, high power, high voltage, HF signals (coax), compressed air and fluids, vacuum, fiber optics and data rates / high-speed.
- **Top packing density:** The system is currently available in two units, either 3 RU or 5 RU, and offers space for up to 4,440 signal contacts in the 5 RU.

Your contact persons for the ODU-MAC® Black-Line

"The remarkably successful market launch of the ODU-MAC® Black-Line demonstrates that its technical benefits fully cover the market's needs. Thanks to our international sales network, the ODU Group can ensure excellent consulting and service for its customers. For me personally, it's a real pleasure to fully get to know this future-forward market and support our customers in selecting and designing their ODU-MAC® Black-Line interface.

Stephan Rottmeier, Application Manager, ODU-MAC® Black-Line

"I really appreciate the outstanding user-friendliness we're able to offer our ODU-MAC® Black-Line customers. The quick access design makes the new or expanded configuration of the frames with application-specific modules simple and flexible. That's a highly convincing factor for our customers – and for us.

Maximilian Baumann, Product Manager ODU-MAC® Black-Line

The **ODU-MAC® Black-Line** overview (including available modules) can be downloaded as a PDF at **www.odu.de**.

To download this publication, simply scan the QR code.

Please contact **Stephan Rottmeier** or **Maximilian Baumann** with any questions you may have about the product:

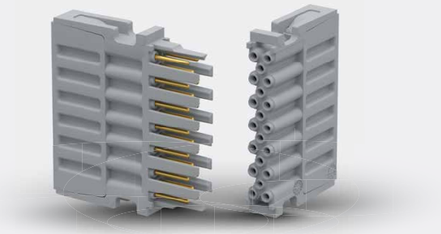
Stephan Rottmeier, Phone: +49 8631 6156-1681, E-mail: stephan.rottmeier@odu.de
Maximilian Baumann, Phone: +49 8631 6156-1605, E-mail: maximilian.baumann@odu.de

odu-connectors.com
/mass-interconnect

MODULES HIGHLY VERSATILE | High packing density of signal contacts

Silver-Line White-Line

NEW **ODU-MAC® High-Density SIGNAL MODULE** | 20 CONTACTS



Product summary: A highly space-saving 20-pole module with pin protection against mechanical damage.

This high-density module is impressive with its minimal space requirements – just 2 units instead of the previously required 4 units. A similar 20-contact signal module already exists in the ODU-MAC® Blue-Line and, through its versatility, has proven extremely successful in practice. We're now pleased to also be able to offer you the module extension for the ODU-MAC® Silver-Line and ODU-MAC® White-Line, too.

TECHNICAL DATA

- **Mating cycles:** minimum 100,000
- **Contact diameter:** 0.76 mm | 2 units
- **Current-carrying capacity**[1]: 11 A, with 0.38 mm² conductor cross-section
- **Operating voltage**[2] up to 250 V
- PCB termination available

For more information on the **ODU-MAC® High-Density Signal Module** | 20 contacts visit our News & Trade Fairs section.

www.odu-connectors.com
/news-trade-fairs/news

ODU AMC® High-Density **INDUSTRIAL ELECTRONICS | MEDICAL TECHNOLOGY | TEST AND MEASUREMENT**

THE **ODU AMC® High-Density** SERIES
NEW: WITH CHROME COATING

Product summary: Smaller, lighter, faster. The miniaturization trend continues.

The mini circular connector series is highly robust and allows for a wide range of configurations: This includes autoclavable versions, many different sizes, connector types and contact inserts.

TECHNICAL DATA

- Housing diameters from 7 mm to 18.5 mm
- High-density configuration
- Watertight: IP6K8 to 2 m
- Autoclavable varieties (upon request)
- USB® 3.2 Gen 1x1[3], USB® 2.0[3] and HDMI®[3]
- Compact and low weight
- Break-Away for quick mating and demating
- System solution including cable assembly
- **Silicone-overmolded system solutions**

Find out more about silicone overmolding on page 28.

www.odu-connectors.com
/products-solutions/push-pull-circular-connectors/odu-amc/odu-amc-high-density

[1] Definition max. continuous current see ODU-MAC® Silver-Line | ODU DOCK Silver-Line catalog, page 197 [2] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) [3] These ODU specific connectors can transmit common data transmission protocols such as USB® 3.2 Gen 1x1, USB® 2.0 and HDMI®, but they are not USB® and HDMI-standard connectors.

GOLD-PLATED CONTACTS **INDUSTRIAL ELECTRONICS | MEDICAL TECHNOLOGY | MILITARY AND SECURITY**

GOLD-PLATED CONTACTS

Our product portfolio of Electrical Contacts is being expanded to include gold-plated varieties.

In the future, a gold-plated version of all contact systems (sockets and pins) of up to 4 mm will be available. Gold-plated contacts are already standard in our other product areas. Due to growing demand, ODU has now expanded its product portfolio of Electrical Contacts to include a gold-plated variety.

The extraordinary oxidation resistance of gold makes it an ideal material for Electrical Contacts.

Next to platinum, gold is the most corrosion-resistant of all precious metals. It doesn't react with other materials, which means it's highly chemically inert.

Gold doesn't react with water or air, for instance. It won't corrode even if it is exposed to harsh weather conditions over a long period of time. Only aqua regina, a special mixture of concentrated hydrochloric acid and nitric acid, can damage the precious metal and dissolve it.

Gold is a mineral resource in high demand which means this precious metal is therefore only used in a galvanically separated form for thin coatings.

Product summary

Thanks to its outstanding resilience when faced with environmental impacts as well as its chemical inertness, gold coatings can be found in many different application areas today.

Whether for a classical industrial signal application, as a particularly durable and robust connection in military and security technology, or as a permanently reliable contact in medical technology – gold is always the right choice.

www.odu-connectors.com
/products-solutions/electrical-contacts

BlueFlow® nozzle series

From left: **Dipl.-Ing. Marco Kwiatkowski**, Head of Production and Development Thick Film, **Mario Rausch**, ODU Sales Engineer, and **Thorsten Schnell**, Development / Project Management

ODU PARTNERS | **GÜNTHER HOT RUNNER TECHNOLOGY**

BlueFlow®

GÜNTHER is a leading manufacturer of hot and cold runner technology. With over 230 employees, the company produces innovative and user-friendly injection systems for the plastics and rubber-processing industries.

Its international clientele includes leading companies from the areas of automotive, electrical and electronics technology, medical technology, packaging and consumer goods.
GÜNTHER Hot Runner Technology achieved a trailblazing technological development with its introduction of the BlueFlow® heating system, which is manufactured in the clean room by means of a silk-screen printing process.

The innovation

With the BlueFlow® heating system, the heat output is adjusted precisely to the need of the respective nozzle length section, thereby achieving a homogenous temperature in the hot runner nozzle.

This keeps the stress load of the plastics in the melt channel low, so that the desired physical properties of the final product can be achieved with certainty – even with thermally sensitive plastics or for small molded parts. Part weights of 0.004 grams have already been produced through direct gating.

Hot and cold runner systems are tempered, thermally insulated gating systems for the effective injection of plastic into tool forms.

BlueFlow® thick film heating for hot runner nozzles

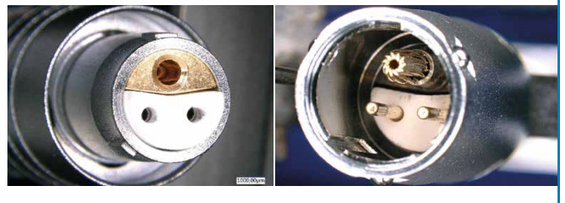
GÜNTHER systems are tailored to customers' specifications. To this end, the GÜNTHER online product catalog offers a wide portfolio of modular component parts.

The BlueFlow® hot runner nozzle is setting new standards for the quality and design of molded parts made of thermally sensitive plastics. Depending on the application area in different industries, better or completely new application opportunities are being created this way.

The tailored nozzles can be applied in an optimal way for the processing of technically sophisticated filled or flame-retardant thermoplastics.

Connectors play an important role here.

They need to work perfectly at high temperatures, be connected and disconnected quickly and easily during maintenance work, and be hermetically sealed. One of the most important technical challenges for the new plug:
an ambient temperature of 300 °C.



Connector after a 12-hour endurance test at 300 °C.

Mario Rausch, ODU Sales Engineer:

"I'm thrilled with our collaboration with GÜNTHER Hot Runner Technology, both in terms of technological knowhow and on a human level. This kind of project work in particular has shown me once again just how innovative the approach of the ODU team is and how creative they are in seeking solutions. GÜNTHER Hot Runner Technology and ODU think the same way, speak the same language and strive for the highest standards in their products. And we do it all with the same passion – to develop the best possible product for our customers.

Marco Kwiatkowski and **Torsten Schnell**
from GÜNTHER HOT RUNNER TECHNOLOGY GmbH:

"We asked ODU for a solution

This innovative heating system needed a special connector: min. 300 °C, 230 V with push-pull locking, as small as possible, to be connected directly to the BlueFlow® heating. Can ODU deliver?

Soon afterwards, we received a concept presentation with innovations that truly surprised us:

- Ceramics insulator
- Ball locking
- PE contact according to VDE
- Special geometries

Yes, ODU can deliver.

Prototyping, testing, lab testing, GHK[1] tests – all these steps then followed.

GÜNTHER HOT RUNNER TECHNOLOGY GmbH:

"The very next year, we placed our order with ODU for the serial production for the market launch.

Since then, over 15,000 connectors have been delivered and integrated.

[1] GÜNTHER HOT RUNNER TECHNOLOGY

ODU DENMARK | AN INTERVIEW WITH

Kenneth Pedersen

Regional Sales Manager at ODU Denmark

ODU is all about bringing solutions and opportunities to the customer's desk.

The company's way of thinking so impressed me that I agreed to become part of the ODU team myself.

Kenneth Pedersen

THE STECKVERBINDER

Kenneth Pedersen took up his new role as Regional Sales Manager, Denmark in November 2019.

Since then he's visited and talked to many customers all over Denmark. Mr. Pedersen, may we ask you about your qualifications and experience?

KENNETH PEDERSEN

With pleasure. I've been dealing with connectors for eight years now and with electromechanical or customer-specific solutions for over 30 years. ODU possesses a world of its own with an amazing number of different products. There was a great deal to learn and discuss. I found it very helpful and a positive experience to be involved in the project meetings right from the start. The internal training I was given at the ODU headquarters in Mühldorf was just as beneficial.

THE STECKVERBINDER

Can you describe your first impression of the company?

KENNETH PEDERSEN

My experience of ODU is that of a highly flexible company with people who focus on opportunities rather than on limits.

When it comes to startup companies, it's not necessarily their size or business case that motivates ODU to support them in their development phase – we're supporting future potential.

THE STECKVERBINDER

What would you like to tell your customers about ODU and its products?

Customer sample for
COLDPLASMATECH GmbH

ODU circular connectors with specific insulator designs to increase clearance and creepage distances

KENNETH PEDERSEN

ODU works in a solution-oriented manner and precisely understands what customers need. Even at a very early stage, we can provide samples or prototypes. Prototypes can even be made from the serial production material thanks to 3D printing. During customer meetings we discuss potential solutions and suitable combinations.

I look forward to each and every project.

PLEASE CONTACT KENNETH PEDERSON DIRECTLY WITH ANY QUESTIONS YOU MAY HAVE:

E-mail: kenneth.pedersen@odu-denmark.dk

LiDAR with ODU MINI-SNAP® and ODU MEDI-SNAP® contact technology

CHINA | ODU CONNECTS HIGHWAY NETWORK

At the start of 2020, the Chinese highway network was fitted with an ETC (electronic toll collection) and surveillance system.

Automation and surveillance devices will replace manpower in the future. The ODU MINI-SNAP® and ODU MEDI-SNAP® are being used as in the measuring units of this nationwide project.

ODU partner VanJee Technology, a renowned state-owned company, is in charge of these intelligent traffic solutions. The company was looking for a solution-oriented partner with high-quality connectors to use as an interface between the ETC systems and their LiDAR.
VanJee opted for ODU, which was in a position to fully meet the high demands and technical specifications of the project.

The range of application lies between –40 °C and around +80 °C with protection class IP68. In addition, fast data transmission and long-lived reliable operation are necessary.

"In December 2019, the ODU North China Sales Department organized a workshop in the VanJee conference center with some 80 participants. ODU's high-performance products and customer-specific one-stop solutions profoundly impressed our customers."

Lisa Yang, Marketing Supervisor, China

www.vanjee.net

A PERFECT ALLIANCE.

A PERFECT ALLIANCE.

HEADQUARTERS

ODU GmbH & Co. KG
Pregelstraße 11, 84453 Mühldorf a. Inn, Germany
Phone: +49 8631 6156-0, Fax: +49 8631 6156-49, E-mail: sales@odu.de

SALES LOCATIONS

ODU (Shanghai) International Trading Co., Ltd.
Phone: +86 21 58347828-0
E-mail: sales@odu.com.cn
www.odu.com.cn

ODU Denmark ApS
Phone: +45 2233 5335
E-mail: sales@odu-denmark.dk
www.odu-denmark.dk

ODU France SARL
Phone: +33 1 3935-4690
E-mail: sales@odu.fr
www.odu.fr

ODU Italia S.R.L.
Phone: +39 331 8708847
E-mail: sales@odu-italia.it
www.odu-italia.it

ODU Japan K.K.
Phone: +81 3 6441 3210
E-mail: sales@odu.co.jp
www.odu.co.jp

ODU Korea Inc.
Phone: +82 2 6964 7181
E-mail: sales@odu-korea.kr
www.odu-korea.kr

ODU Romania Manufacturing S.R.L.
Phone: +40 269 704638
E-mail: sales@odu-romania.ro
www.odu-romania.ro

ODU Scandinavia AB
Phone: +46 176 18262
E-mail: sales@odu.se
www.odu.se

ODU-UK Ltd.
Phone: +44 330 002 0640
E-mail: sales@odu-uk.co.uk
www.odu-uk.co.uk

ODU-USA, Inc.
Phone: +1 805 484-0540
E-mail: sales@odu-usa.com
www.odu-usa.com

Further information and specialized representatives can be found at:
www.odu-connectors.com/contact

PRODUCTION AND LOGISTICS SITES

Germany	Otto Dunkel GmbH
China	ODU (Shanghai) Connectors Manufacturing Co., Ltd.
Mexico	ODU Mexico Manufacturing S. de R.L. de C.V.
Romania	ODU Romania Manufacturing SRL
USA	ODU North American Logistics Inc.

IMPRESSUM

Publisher
ODU GmbH & Co. KG · Pregelstraße 11 · 84453 Mühldorf a. Inn · Germany
Editor
ODU Corporate Communications & Marketing

carbon neutral print production

Simply scan the QR code
to download the entire publication.