Innovative. Reliable. Precise.

www.solo.swiss

Continuous furnaces
Automatic heat treatment lines
Batch furnaces

HK 2018
Read all about the upcoming Heat Treatment Congress
HK 2018
Find out the latest news in the Product Preview
HK 2018
All companies present in the Index of Exhibitors
Get-together for the Heat Treatment Congress

Wednesday, 17 October 2018 from 5 p.m. onward

Vulkan Verlag cordially invites authors, readers and business partners to an informal get-together for the 2018 Heat Treatment Congress in Cologne.

The focus: the latest publications, industry news and just exchanging ideas, opinions and experience in a relaxed atmosphere with contacts and colleagues.

We look forward to welcoming you to Booth E-079 in Hall 4.1.

Please register (without obligation) by 24 September 2018

Sabrina Finke
Tel.: 0201 82002-91
E-Mail: s.finke@vulkan-verlag.de
Heat Treatment Congress 2018 deals with electromobility as key issue

The Heat Treatment Congress is approaching. The upcoming 74th Heat Treatment Congress of the Association for Heat Treatment and Materials Technology (AWT) takes place in the halls of Cologne fairgrounds from 16–18 October 2018. European’s largest symposium on heat treatment combines an exhibition of the heat treatment sector that has expanded enormously in recent years with a lecture event of excellent quality due to outstanding speakers who are well-known from research and industry.

For the first time, the Heat Treatment Congress takes place from Tuesday to Thursday. Hence, the unpopular Friday which had moreover not really been frequented could be avoided.

The day of heat treatment practice introduced two years ago and very much appreciated by the participants starts on Tuesday with the practitioners’ seminar on the topic “Distortion after heat treatment”.

After lunch, further contributions from practice will discuss the topics of predictive maintenance, safety of heat treatment plants, charge planning and hardness testing as well as various heat treatment processes and hard machining after heat treatment. Of course, as in the last two years, exhibitors can purchase favourable tickets for this day of heat treatment practice again.

The Wednesday first deals with the development of steel and then for the first time AWT offers a discussion forum on the subject “Materials and heat treatment for electromobility”.

The discussion forum comprising lectures as well contributions to a discussion will take approx. two hours and give you a general overview on changes that are necessary regarding required components and manufacturing processes for the drive train depending on current development forecasts. The plenary lecture is replaced by the discussion forum and a separate entrance ticket for the forum will be offered.

On Wednesday afternoon, the main focus will be on additive manufacturing and surface hardening. On Thursday, the latest findings concerning integration of heat treatment in the production line, quenching and quality control will be presented.

Do not miss to visit our AWT fair booth (C-120). At fixed times you can meet members of the board and leaders of the heat treatment circles, with whom you are welcome to discuss current topics. We hope to have appealed to you and to encourage you to participate in these committees.

We cordially invite you to join AWT’s general meeting of members on Tuesday at 18:00 and the reception of F&E Technologiebroker Bremen GmbH on Wednesday at 18:00.

In this issue you find a special part from this page on giving you information on our Heat Treatment Congress. By means of this material you are in advance able to choose the lectures that are of interest to you.

Hoping to have sparked your interest in the Heat Treatment Congress and looking forward to meeting you in Cologne in October.

I remain with best regards!

Dr. Winfried Gräfen
Executive Chairman of AWT
Heat Treatment Congress 2018

This year’s Heat Treatment Congress (HK) will have a number of new things for exhibitors and visitors to the congress – for the first time, the event will be taking place on weekdays: Tuesday, Wednesday and Thursday.

The programme of lectures starts at 10.45 a.m. on Tuesday, the “Heat Treatment Practice Day”, with an introductory seminar on the theme of “Distortion after Heat Treatment”. Further key topics dealt with at the “Heat Treatment Symposium” on Wednesday and Thursday are: materials and heat treatment for electromobility, materials and heat treatment of additive manufactured components, integration of heat treatment into the production line, quenching, surface layer hardening and steel development.

THE NEW HK APP

Four weeks before the event, the HK app will be available for Android and iOS devices. The app will accompany both visitors and exhibitors throughout the event. The programme and extracts from the congress lectures will be integrated into the app. It will also be possible to deal with appointment administration from the app and to synchronize appointments with Outlook.

DISCUSSION ON MATERIALS AND HEAT TREATMENT FOR ELECTROMOBILITY

This year, for the first time, there will be a discussion forum at the congress, to be held on Wednesday morning, on the theme of materials and heat treatment for electromobility. AWT has invited experts from research and industry to take part in this forum. The discussion will focus on challenges in terms of materials technology for the electrically powered drive train. Guests will receive an overview of the requirements for changes with regard to the required components and production processes for the drive train depending on current development forecasts. In addition, some metallic components will be highlighted by technology experts. These are, for example, electrical steel sheets, stator housings and rotors. A separate entrance ticket for the discussion forum can be purchased for € 150.00.

The complete congress programme, the current exhibition hall plan as well as a list of exhibitors presenting the companies’ products can also be found on the website of the event. Admission to the exhibition is included in the entrance ticket to the congress. Hotel reservations could also be done with a link on the website: www.hk-awt.de
BASIC DATA

Location
Koelnmesse
Messeplatz 1
50679 Köln, Germany
Hall 4.1
Entrance West

Organizer Congress
Arbeitsgemeinschaft Wärmebehandlung und Werkstofftechnik e.V. (AWT)
Paul-Feller-Straße 1
28199 Bremen, Germany
+49 (0)421 / 522-9339
info@awt-online.org
www.awt-online.org

Organizer Exhibition
F&E Technologiebroker Bremen GmbH
Wiener Str. 12
28359 Bremen, Germany
Bureau HK 2018
+49 (0)421 / 3972850
contact@congressmanagement.info
www.hk-awt.de

Schedule Congress
Tuesday, 16 October, 10:45 – 18:00
Wednesday, 17 October, 9:00 – 18:00
Thursday, 18 October, 9:00 – 13:00

Opening hours Exhibition
Tuesday, 16 October, 9:00 - 18:00
Wednesday, 17 October, 9:00 – 18:00
Thursday, 18 October, 9:00 – 14:00

Congress prices
Entire event 780,00 €
Tuesday/Heat Treatment Practice Day 400,00 €
Wednesday 490,00 €
Discussion forum on e-mobility 150,00 €
Thursday 400,00 €
2 Days Tues/Wed 620,00 €
2 Days Wed/Thurs 620,00 €
Transferrable company ticket for exhibitors (limited to 1 per stand) 330,00 €
Tuesday/Practice day for exhibitors 150,00 €
Speaker/university representative 400,00 €
Retired AWT members 90,00 €
Students 0,00 €

All Congress prices incl. 7 % VAT

The congress event will be interpreted simultaneously (German/English and vice versa)

Exhibition prices

<table>
<thead>
<tr>
<th></th>
<th>Ticket Shop</th>
<th>Box Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday</td>
<td>35,00 €</td>
<td>40,00 €</td>
</tr>
<tr>
<td>Wednesday</td>
<td>35,00 €</td>
<td>40,00 €</td>
</tr>
<tr>
<td>Thursday</td>
<td>35,00 €</td>
<td>40,00 €</td>
</tr>
<tr>
<td>3-day ticket</td>
<td>55,00 €</td>
<td>65,00 €</td>
</tr>
<tr>
<td>Exhibitor ticket</td>
<td>25,00 €</td>
<td>30,00 €</td>
</tr>
</tbody>
</table>

All Exhibition prices incl. 19 % VAT

The annual Heat Treatment Congress of AWT (German association on heat treatment and materials science) is the biggest event on heat treatment issues in Europe:

- 500 congress participants
- 3,000 visitors of the trade fair
- More than 220 exhibitors on 200 booths
- 13,000 m² exhibition space
- Website: www.hk-awt.de
- Congress event interpreted simultaneously German/English and vice versa

The HK ticket shop is open! You can now register for congress and exhibition in the ticket shop on www.hk-awt.de.
### Programme

**HK Congress Cube Hall 2.2**

**Tuesday, 16 October 2018**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
<th>Institution/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:45 - 12:15</td>
<td>Practitioners' seminar</td>
<td>Dr.-Ing. Dieter Müller</td>
<td>voestalpine eieler Coating GmbH, Schnaittach</td>
</tr>
<tr>
<td>12:15 - 13:30</td>
<td>Break</td>
<td>Winfried Gräfen</td>
<td>Chairman of AWT</td>
</tr>
<tr>
<td>13:30 - 13:50</td>
<td>Opening</td>
<td>Winfried Gräfen</td>
<td>Chairman of AWT</td>
</tr>
<tr>
<td>13:50 - 14:15</td>
<td>Predictive maintenance for heat treatment furnaces</td>
<td>Dennis Miller</td>
<td>IVA Schmetz GmbH, Dortmund</td>
</tr>
<tr>
<td>14:15 - 14:40</td>
<td>Development of an interactive charge planning system for plasma nitriding furnaces</td>
<td>Dominik Büschgens</td>
<td>Institut für Industrieofenbau und Wärmetechnik, RWTH Aachen University</td>
</tr>
<tr>
<td>14:40 - 15:05</td>
<td>UCI-hardness testing in the production industries – experiences made from practical work</td>
<td>Manfred Tietze</td>
<td>New Sonic GmbH, Reutlingen</td>
</tr>
<tr>
<td>15:05 - 15:30</td>
<td>Simulation and process control of carbonitriding</td>
<td>Marian G. Skalecki</td>
<td>Leibniz-Institut für Werkstofforientierte Technologien – IWT Bremen</td>
</tr>
<tr>
<td>15:30 - 16:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PROGRAMME

Chair: Rainer Braun, Marco Jost

5 16:00 - 16:35  Survey lecture
    Hard machining of heat treated components

6 16:35 - 17:00  Case hardening outside valid standards –
    new knowledge regarding grindability and distortion

7 17:00 - 17:25  Laser beam hardening for combustion engines

8 17:25 - 17:50  Water to the oil – early fire detection and automatic
    extinguishment with low-pressure water mist

18:00  General meeting of AWT members

FAIRGROUND

HK Kongress
HK Congress
Halle/Hall 2.2.
(Cube)

Restaurant

Passage

HK Ausstellung
HK Exhibition
Halle/Hall 4.1.

Eingang West / Entrance West

Restaurant

Piazza
### Development of steel

**Chair:** Britta Rentrop, Till Schneiders

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>New steel grades for deep carburizing of windmill transmission components</td>
<td>Simon D. Catteau</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ascometal Holding France</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CREAS, Hagondange, France</td>
</tr>
<tr>
<td>9:25</td>
<td>Influence of the phase transformation behavior on the microstructure and mechanical properties of a 4.5 wt.-% Mn Q&amp;P steel</td>
<td>Simone Kaar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of Applied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science Upper Austria, Wels, Austria</td>
</tr>
</tbody>
</table>

**Discussion forum – Materials and heat treatment for electromobility**

**Chair:** Britta Rentrop, Till Schneiders

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:10</td>
<td>Introduction</td>
<td>Michael Lohrmann</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Klaus Löser</td>
</tr>
<tr>
<td>10:15</td>
<td>Survey lecture</td>
<td>Oliver Schauerte</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VW AG, Wolfsburg</td>
</tr>
<tr>
<td>10:50</td>
<td>Electrification of the powertrain – impact on machine industry and plant engineering</td>
<td>Michael Wittler</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FEV Consulting GmbH, Aachen</td>
</tr>
<tr>
<td>11:25</td>
<td>Group of experts – short lectures and discussion</td>
<td>Rabea Steuer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lehrstuhl für Werkstoff-technik, Fakultät Maschinenbau und Schiffstechnik, Universität Rostock</td>
</tr>
</tbody>
</table>

### Materials and heat treatment of additively manufactured components

**Chair:** Hans-Werner Zoch, Michael Jung

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:40</td>
<td>Survey lecture</td>
<td>Claus Emmelmann</td>
</tr>
<tr>
<td></td>
<td>Characterization of mixed martensite and lower bainite microstructure austempered below martensite start temperature</td>
<td>Fraunhofer-Einrichtung für Additive Produktionstechnologien (IAPT), Hamburg</td>
</tr>
</tbody>
</table>
**Wednesday, 17 October 2018**

14 14:15 - 14:40  
Ti-6Al-4V, 316L and IN718 processed by selective laser melting – effect of post-process heat treatments on the microstructure and mechanical performance under quasi-static and cyclic loading  
Florian Brenne  
Institut für Werkstofftechnik, Universität Kassel

15 14:40 - 15:05  
Examinations of the intrinsic heat treatment during additive manufacturing of the steel X38CrMoV-1  
Martin Hunkel  
Leibniz-Institut für Werkstofforientierte Technologien – IWT Bremen

16 15:05 - 15:30  
Development of a hot isostatic press with integrated heat treatment  
Stephanie Bohrt  
Institut für Industrofenbau und Wärmetechnik, RWTH Aachen University

15:30 - 16:00  
Break

**Surface heat treatment**  
Chair: Hansjürg Stiele, Jörg Kleff

17 16:00 - 16:25  
Effect of multiple induction hardening on the hardened surface of parts manufactured of quenched and tempered AISI4140  
Claudia Grau  
Institut für Angewandte Materialien-Werkstoffkunde (IAM-WK), Karlsruher Institut für Technologie

18 16:25 - 16:50  
Influencing residual stress due to preheating or mechanical straining before induction surface hardening  
Alwin Schulz  
Leibniz-Institut für Werkstofforientierte Technologien – IWT Bremen

19 16:50 - 17:15  
Adjustment of lifetime-increasing surface layer states by complementary machining  
Michael Gerstenmeyer  
wbk Institut für Produktions-technik, Karlsruher Institut für Technologie

20 17:15 - 17:40  
Experimental and simulative studies on residual stress formation for laser-beam surface hardening  
Dominik Kiefer  
Institut für Angewandte Materialien-Werkstoffkunde (IAM-WK), Karlsruher Institut für Technologie

18:00  
Reception of F&E Technologiebroker Bremen GmbH  
Bestowal of the Karl-Wilhelm-Burgdorf Award
### Integration of heat treatment into the production line

**Chair:** Olaf Kessler, Olaf Irretier

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
<th>Institution/Company</th>
</tr>
</thead>
</table>
| 21 9:00 - 9:35 | Survey lecture  
Integration of heat treatment into the production line | Michael Alsmann | Volkswagen AG, Baunatal |
| 22 9:35 - 10:00 | Direct integration of case hardening into the manufacturing stream | Ben Kahle | ALD Vacuum Technologies GmbH, Hanau |
|        | **Quenching**                                                          |                                               |                                                 |
| 23 10:00 - 10:25 | Mechanisms and process control for quenching with aqueous polymer solutions | Steffen Waldeck | Fachgebiet Mechanische Verfahrenstechnik, Universität Bremen |
| 24 10:25 - 10:50 | Quenching of aluminium alloys in silicatic solutions | Peter Krug | Institut für Fahrzeugtechnik IFK, TH Köln |

### Break

10:50 - 11:10

---

**Exchange. Knowledge. Technology.**
### Thursday, 18 October 2018

**Chair:** Brigitte Haase, Peter Krug

#### 11:10 - 11:35
**The advantages of oil quenching in the low-pressure carburizing**

Masahiro Okumiya  
Toyota Technological Institute, Nagoya, Japan

#### 11:35 - 12:00
**New opportunities of hardening crack detection by induction excited thermography**

Christian Srajbr  
edevis GmbH, Stuttgart

#### 12:00 - 12:25
**Fast, velocity independent material sorting using multifrequency eddy current inspection with reversal-point detection**

Aschwin Gopalan  
Rohmann GmbH, Frankenthal

#### 12:25 - 12:50
**An improved tint etching method for lower bainite formed below Ms**

Marc Wettlaufer  
Werkstoffzentrum – Hochschule Heilbronn

#### 12:50
**Summary**

Brigitte Haase

**Publication of Paul-Riebensahm Award 2017**

#### 13:00
**End of the event**

---

**Visit us at the HK 2018**

Vulkan-Verlag  
Hall 4.1 / Booth E 079  
16 - 18 October 2018  
Koelnmesse, Cologne, Germany
SyncroTherm plants with additional control features

Six years ago, “One-Piece-Flow (OPF)” for case hardening processes, a feature of the first generation SyncroTherm plants, was introduced into the gear industry for the first time. The advantages of this technology, which is based on low-pressure carburizing and high-pressure gas quench, set the path for the direct integration into the production line, thus closing the gap between soft machining and hard machining in the gear production chain. These advantages include high quality parts, short process times, less part distortion as well as high environmental compatibility.

In the meantime, further fields of application for the SyncroTherm technology were explored, offering great advantages to the users which include, for example, the expansion to other processes such as tool hardening, annealing, brazing and sintering. In addition to the OPF application, i.e. sequential case hardening of gear parts in the mechanical machining cycle, another possible use has become established regarding flexible heat treatment of small batches or lots, i.e. the so-called “Small Batch Production (SBP)”. The priority lies not in the rigid production cycle but in the timely, individually customized heat treatment of small lots containing various parts in one heat treatment plant.

Meanwhile, the industry has gained substantial production experience for both applications of the SyncroTherm technology. More than 30 systems are operational, from a manually operated single plant to a complex, highly automated plant system, including automated charging of the parts on a charge carrier.

Based on the proven first generation plant technology, the new SyncroTherm 2.0 now offers additional control features in order to meet all the requirements of a modern Internet of Things (IoT) setting. These include standardized interfaces for the simple integration of external plant components into the SyncroTherm 2.0 furnace system and IoT-compatible interfaces (XML) for data transmission to superior customer-ERP-systems.

The new plant generation offers even higher process flexibility through optional process routings within and outside of the SyncroTherm 2.0 plant. Improved part and process documentation and continuous tracking of the parts during the entire production process by means of process integrated laser coding of the parts will become possible.

The web-based visualization will allow viewing plant and charge data on any mobile device. Extensive logistic planning tools enable to optimize resource planning for the entire heat treatment process. Easy handling through plain text alarms and notifications including the display of additional information will increase the ease of operation.

An efficient automation and digitalization based on TIA portal as well as compliance to important quality standards in the automotive and aerospace industry, e.g. CQI-9 and NADCAP complete the advantages of the new system.

A tried-and-tested plant system was developed further with the SyncroTherm 2.0, meeting all the demands of Industry of Things. Target markets include, among others, the automotive industry and their suppliers, especially parts for electromobility in the OPF. The SyncroTherm technology is also used successfully in the aviation industry. The use of flexible “Small Batch Production (SBP)” broadens the application range for captive heat treaters and commercial heat treaters.

ALD Vacuum Technologies GmbH
www.ald-vt.com
Hall 4.1 / Booth C-059

Engineering of process measuring technology

The scope of supply and services of Bax Engineering GmbH includes engineering of process measuring and control technology as well as providing field instrumentation and verification of heat treatment facilities. This includes: TUS, SAT, instrument testing as well as optimization of processes.

This package may include the following services and products: pyrometric tests (TUS, SAT, instrument test), thermocouples, oxygen sensors and vacuum / pressure seal fittings.

Bax Engineering GmbH
www.bax-gmbh.de
Hall 4.1 / Booth A-031
Power controller with new Profinet interface

Profinet protocol is now available for the JUMO power controller series. The real-time fieldbus protocol enables the user access to all process data of the power controller. In addition, the configuration can be set using the interface. An additional configuration through a setup software is no longer necessary. This considerably simplifies device startup.

With the new Profinet interface, users benefit from less wiring and thus quick commissioning of systems and machines. In addition, costs are saved because no additional analogue inputs and outputs are required.

The power controller series is available in currents from 20 to 250 A for single-phase and three-phase applications. The new interface allows more data to be made available in a shorter time. This also enables the constant transfer of process data such as load current, load voltage, and impedance. However, data concerning energy consumption and diagnostic functions such as mains voltage fluctuations, partial load failure, and excess temperature are also evaluated.

The real-time capability of the interface enables several power controllers to be synchronized in combination with an automation system as well as the implementation of a load current management. The system determines the overall output of the process and regulates the individual output of the power controllers to prevent the exceedance of the predefined current limits. This avoids energy peaks and reduces power costs.

A further advantage is the “Teach-in” function, which allows the alarm limit values for the detection of partial load failures to be set automatically. The cyclical calibration ensures permanent and precise detection of partial load failure even if the specifications of the heating element are changed.

JUMO GmbH & Co. KG
www.jumo.net
Hall 4.1 / Booth E-031
Programmable gateway and universal I/O module

Industry 4.0 calls for fully digitalized processes that extend all the way to sensor/actuator level. To simplify the realization of intelligent networking, Bürkert Fluid Control Systems has developed EDIP – the Efficient Device Integration Platform. This enables customized solutions that can function as a stand-alone or autonomous subsystem, as well as detailed device diagnostic capabilities.

The platform is now being expanded to include two new components: With the I/O module ME44, various sensors and actuators can be integrated into the EDIP environment. The fieldbus gateway ME43 allows simple integration at process control level with the help of standard fieldbuses and Industrial Ethernet (see image). Intuitive graphical programming allows autonomous subsystems to be realized quickly without the need for intervention in the control system. This is particularly advantageous when extensive documentation is required. The user receives a scalable, customized digital complete solution from a single source.

To integrate EDIP at process control level, Bürkert provides the gateway ME43, which communicates via Profinet, EtherNet/IP, Modbus TCP, EtherCAT or Profinet. It also serves as a central control unit for any EDIP device and offers the possibility of graphical programming for automating the subsystem. In each case, the gateway transmits up to 128 input and output variables. Optional upward or downward cable outlets simplify installations in cramped control cabinets. This ensures flexibility during assembly along with exceptional reliability as well as reduced cost and time expenditure during commissioning.

With the I/O module ME44 from Bürkert, various sensors and actuators can be integrated in an EDIP system. The modules process standard signals and are compatible with 2- and 3-wire sensors as well as mechanical limit switches. Some channels can also be configured as frequency inputs, which allow the user to adjust them individually to suit requirements. Expanding the modules is easy as they simply snap together using a 3-slot backplane without the need for tools. Easily removable terminal block connectors for quick and easy assembly and the use of LED indicators to display short circuits and cable breaks help streamline installation and maintenance work.

Bürkert Fluid Control Systems
www.burkert.com
Hall 4.1 / Booth E-010

Development of chamber furnace systems

Cieffe Thermal Systems designs and manufactures high-quality industrial equipment and solutions for the heat treatment of metal components.

One of the strengths is the development, design, realization and installation of chamber furnace systems. Thanks to its flexibility, this equipment is very easy to integrate into automatic treatment lines. Since it represents the core product, it is constantly being developed and, together with the customers, always adapted to the highest level of technology. Chamber furnaces are used in various heat treatments such as carburizing, annealing, carbonitriding with quenching in oil, in protective atmosphere and in salt.

Cieffe’s target is to create advanced systems able to produce autonomously, constantly decreasing operating costs and emissions in the atmosphere.

CIEFFE Thermal Systems s.r.l.
www.cieffe.it
Hall 4.1 / Booth C-011
Generators for induction heating

Cobes GmbH develops and manufactures high and medium frequency generators for the induction heating of small and medium power for a wide range of applications in industry, e.g. automotive, packaging technology, material testing, but also for universities and research institutes.

Temperature measurement and control technology for induction heating and the 3D simulation of the heating task quickly leads to targeted application solutions with powerful partners.

Cobes works according to DIN ISO 9001:2015 and offers customized individual and serial production of complex electronic and mechanical components and devices with the highest quality and delivery reliability.

In a team of 17, the people at Cobes develop and produce series and special equipment for customers of induction heating, capacity (dielectric) heating and plasma power supplies. In the market segments since the founding year 2002, special solutions as customer solutions and series devices were developed, which show that customer proximity together with innovations and a network of powerful partners can be a successful strategy.

COBES GmbH
www.cobes.de
Hall 4.1 / Booth D-119

CE certification for charging equipment

The current issue of Directive 2006/42/EC on machinery includes a very self-explanatory clause of lifting accessories. By definition, a “lifting accessory” means a component or equipment not attached to the lifting machinery, allowing the load to be held, which is placed between the machinery and the load or on the load itself, or which is intended to constitute an integral part of the load and which is independently placed on the market; slings and their components are also regarded as lifting accessories; …(see Art. 1a / Art. 2d).

For those of us who are not fully familiar with this type of language, you might want to work with this short summary: the machinery directive applies if you can hoist it and if it is used to hold a load. At least relevant for baskets, furnace fixtures and customized lifting equipment.

Therefore, Friedr. Lohmann GmbH Stainless foundry not only labels its product with a CE identification but also has voluntarily run through a complex process of type examination observed by an independent third-party inspection. All lifting equipment must pass a stress analysis and risk assessment in the design stage and is fully quality checked during production. Any item comes up with an operator manual and CE certification. And since we like to keep it easy, you will get an inspection log to support your day-to-day business in terms of checking and releasing your equipment for production incl. valuable inspection recommendations.

Friedr. Lohmann GmbH
www.lohmann-stahl.de
Hall 4.1 / Booth C-020/D-021
Modular systems for integrated heat treatment

Specializing in manufacturing a range of customized industrial furnaces controlled under protective atmosphere, Codere is active worldwide in a number of fields, including the automotive, aeronautical, fastener, tooling, spring, precious metal, medical, optical, armament and hydraulic industries, as well as serving a number of international contract heat treatment shops.

Codere specializes in the processes of hardening, case hardening, nitriding, tempering and annealing among various different quenching options oil, salt, water or polymer.

Codere has unique advantages against traditional batch furnaces. There has been growth especially in salt quenching processes (ADI, martertempering, bainitic hardening), titan treatment, aerospace projects respecting AMS 2750E or automobile (CQI-9) and multi product series (flexibility needed for temperature & atmosphere).

Against traditional IQ batch systems, Codere records a furnace-quench tank transfer time of under 15 s. Moreover, the quench transfer under atmosphere happens without a loss of temperature before quenching the load. The Codere system is also very flexible, for example two furnaces with one oil bath or two quench tanks with one furnace work in the same line. In addition, the quench transfer system for loading from furnace to quench tank is carried out by simple sliding the load without any hooking mechanism.

The Codere system is modular so that it is possible to meet future production by purchasing additional modules. Moreover, the maintenance of the system is easy and user-friendly and finally, it is fully automatic so that a non-stop production process is ensured.

CODERE SA
www.codere.ch
Hall 4.1 / Booth F-056

Reduce downtime in heat treatment industry

Seco/Warwick, a leading global manufacturer, leverages the potential of latest technologies to offer a game-changing way to reduce downtime, improve production processes and enhance equipment maintenance and operation.

Seco/Warwick is a manufacturing company of heat treatment furnaces and equipment that has always been interested in unconventional and innovatory approaches. The company has developed a set of intelligent tools enhancing production processes through the use of AI, IoT and latest Industry 4.0 concepts, like Seco/Predictive, a platform for monitoring heat treatment furnaces utilizing advanced data analysis algorithms that ensure the greatest effectiveness in detecting potential failures, or Seco/Lens, a holographic technology offering remote training, maintenance, operations and service capabilities.

During the HK, Seco/Warwick will also showcase UniCase Master, which has been recognized by the Intelligent Development Award, the latest technology for continuous heat treatment based on vacuum carburizing and tempering in high pressure gas. It is used mainly in the automotive industry for hardening toothed gears and bearing rings.

“Unlike conventional methods, UniCase Master ensures high repeatability, and thanks to a dedicated, single chamber detail equipped with an omnidirectional gas cooling system with simultaneous 4D quenching, minimizing such common and cumbersome hardening deformations,” explains Maciej Korecki, Vice President, Segment of Vacuum Equipment.

Seco/Warwick will also present the exclusive proprietary ZeroFlow method of economical gas flow control, and a hybrid system enabling heat treatment with either gas or oil quench – CaseMaster Evolution – the preferred heat processing technology of vacuum case hardening for the most challenging industries, such as automotive, aerospace, machinery, wind energy, transmission and commercial heat treat facilities. Explore the innovations in the field of heat treatment, materials technology, manufacturing technology and process engineering and discover the potential associated with predictive maintenance of heat treatment plants.

SECO/WARWICK S.A.
www.secowarwick.com
Hall 4.1 / Booth E-060
Automated crack testing in hardening processes

Crack testing of hardened components is often required in automated manufacturing processes due to quality and safety demands. Edevis GmbH developed Induction Thermography ITvis, a new advanced crack testing method, available for use in industrial environments. ITvis enables you to even test complex shaped components for hardening cracks – fully-automated, contactless and within typical production cycle times.

The method is based on a defect selective principle: The direct inductive heating of cracks. Robust image processing algorithms detect even small cracks in simultaneously recorded thermal images. Further advantages are short testing duration (few tenths of a second), robustness to external disturbances and the ability to test components while cooling down.

ITvis crack testing systems are increasingly used in manufacturing processes of hardened components, where it replaces personnel intensive magnetic particle testing. The reliability of the ITvis systems is another key to the high acceptance by its users.

Edevis GmbH designs and delivers the modular ITvis crack testing system adapted to customer’s needs. They are a competent partner within the entire project scope, supporting from the specification and development of the inspection process to the implementation with a machine builder of the customer’s choice.

edevis GmbH
www.edevis.com
Hall 4.1 / Booth Newcomer

Industrial furnaces and related accessories

Industrieofen- & Härtereizubehör GmbH Unna (IHU) is engaged in the design, manufacture and sale of annealing, carburization, nitriding, and hardening furnaces as well as the supply of related accessories and spare parts. Moreover, IHU also carries out maintenance work for all usual industrial furnaces. The company can fall back to decades of experiences in the building of industrial furnaces with all necessary equipments.

Furthermore, IHU is particularly specialized in manufacturing of tubes made of sheets in more than 80 different qualities. IHU holds a certification under the provisions of DIN EN ISO 9001:2008.

Industrieofen- und Härtereizubehör GmbH Unna
www.ihu.de
Hall 4.1 / Booth A-030
Automatic **hardness tester** for high test loads

At the Heat Treatment Congress in Cologne, Emco-Test will present the fully automatic DuraVision G5 macro and low-load hardness tester, which features a motorized cross slide, making it ideally suited for quick and precise serial testing. Furthermore, the hardness tester combines a uniquely wide standard load range with a large selection of test methods for diverse applications, such as fully automatic curve measurements (CHD, NHD, SHD and Jominy).

The hardness testing machine is available in two load-range variants. The DuraVision 250 G5 covers the load range of 0.3–250 kgf and the DuraVision 350 G5 the load range of 3–3,000 kgf. The electronically controlled test cycle provides for a large selection of test methods. Brinell, Vickers and Rockwell can be measured in compliance with EN ISO and ASTM standards, while the DuraVision 250 G5 also offers Knoop.

Evaluation of the test indents is performed in the DuraVision G5 series with fully automatic brightness control and fast autofocus. Test load application is electronically controlled and the motorized cross slide positions the test points with a high degree of repeatability and positioning accuracy, without any operator influence.

The Emco-Test ecos Workflow C5 operating software guides the user simply, step-by-step through the measuring process all the way to data archiving. Additional ease of use offer the new functions for automatic row-positioning as well as the new line-tools.

DuraVision hardness testers are equipped as standard with the xChange interface, which enables bidirectional data exchange, not only with ERP and CAQ systems, but also with IoT and Cloud solutions.

**EMCO-TEST Prüfmaschinen GmbH**
www.emcotest.com
Hall 4.1 / Booth F-071

---

**Multi chamber** and modular heat treatment furnaces

ECM Technologies has been manufacturing vacuum furnaces for heat treatment since 1964. This strong heritage and expertise allow them to design and manufacture innovative and high-performance installations.

Indeed, its very own patented process Infracarb has become a reference on the market for low pressure carburizing and carbonitriding. Infracarb is used in all the ICBP range, dedicated to high cadence LPC & LPCN.

In addition to the ICBP Flex, which made the reputation of ECM Technologies, the ICBP Jumbo is dedicated to the heat treatment of large loads, high volumes and at high cadence. This multi chamber furnace is also modular, but has a central shuttle working under vacuum while dispatching loads among treatment cells instead of a tunnel.

Furthermore, the dimension of this furnace is not only linked to the process it exploits. Indeed, the Jumbo has been designed to be the most performant installation ever built; maintenance operations can be conducted while the installation is in production by isolating heating cells, its flexibility is optimized since it is convenient to add treatment cells to increase its productive capacity and both gas and oil quenching are possible on the same line.

Also, the ICBP Jumbo is the largest installation of the ECM range but the fact that heating cells are facing one another allows to reduce its footprint.

Overall, the high maintainability aspect of this installation, the capacity to treat large volumes, and the heritage and reliability of this equipment are key points for automotive transmission manufacturers.

**ECM Technologies**
www.ecm-fours-industriels.fr
Hall 4.1 / Booth F-039
Vulkan Verlag cordially invites authors, readers and business partners to an informal get-together for the 2018 **Heat Treatment Congress** in Cologne.

The focus: the latest publications, industry news and just exchanging ideas, opinions and experience in a relaxed atmosphere with contacts and colleagues.

We look forward to welcoming you to **Booth E-079 in Hall 4.1**.

Please register (without obligation) by 24 September 2018

Sabrina Finke
Tel.: 0201 82002-91
E-Mail: s.finke@vulkan-verlag.de
**Digital Service** to avoid unnecessary downtimes

Any one who signs a service contract with IVA Schmetz in the future will benefit from predictive maintenance and remote assistance – both components of the so-called “Digital Service”, a new service offer of IVA Schmetz. Furnaces will be equipped with sensors at all relevant points and connected to the IVA Schmetz Digital Diagnostic Center. For example, the current consumption of the heater or the motor vibration is monitored. The data is evaluated in real time so that the customer can find out about the condition and performance of his furnace anytime and anywhere via computer, tablet or smartphone. If a deterioration of condition should occur or maintenance be necessary, the customer will be informed immediately. Proactive action is taken – before unnecessary downtimes occur. This principle is called predictive maintenance and represents the first half of digital service. This service is in use at a pilot customer for one year now.

Remote assistance, the second part of the Digital Service, is used as soon as support from the Digital Diagnostic Center is required during maintenance or commissioning. The IVA Schmetz service technician is equipped with mixed reality glasses and is accompanied during the operation by his colleagues from the Digital Diagnostic Center via live video stream. They see what the technician sees, have all the information on the system at hand and can display these and other annotations directly in his field of vision. The service technician is well informed and has at the same time both hands free to work. For the customer, this means faster and more efficient service.

The “Digital Service” will be released at Heat Treatment Congress 2018 and will be presented there live and hands-on for the first time.

**IVA Schmetz GmbH**
www.iva-schmetz.de/en
Hall 4.1 / Booth A-080/C-089

**Fine and ultra-fine parts cleaning**

As one of the leading manufacturers of parts cleaning systems, HEMO reliably manages the entire spectrum of parts cleaning, whether tiny watch parts or voluminous components for the aerospace industry.

The solvent and hybrid cleaning systems are designed and manufactured in the Swabian headquarters. They are appreciated around the globe by renowned companies. HEMO is both a pioneer and pacemaker in the field of industrial fine and ultra-fine cleaning. Minimum operating costs with maximum cleaning performance and availability – the patented cleaning systems set standards worldwide. And thus, also HEMO is represented worldwide with international branches and service partners.

With the VAIÖCS product ranges, the EMO brand stands above all for high-quality cleaning of large, heavy batches. VAIÖCS is the abbreviation for Vacuum Assisted Inorganic Organic Cleaning System. The VAIÖCS technology developed by EMO allows the use of chlorinated hydrocarbons, hydrocarbons and modified alcohols in a single plant for the first time. Typical applications are cleaning before and after heat treatment, cleaning of voluminous components in the aerospace industry or cleaning long pipes and other semi-finished products. Depending on the task, VAIÖCS systems can be expanded so that they can also be used for the Beyond-process or as Hybrid-systems for combined processes with solvents and water.

**HEMO GmbH**
www.hemo-gmbh.de
Hall 4.1 / Booth A-038
Consulting service for various industrial sectors

Well-known process management systems of various industrial sectors are CQI-9, VDA 6.3, NADCAP and MedAccred. m. milde – heat treatment and nadcap consulting service provides neutral professional competence for the execution of process audits, auditor training, practice seminars and workshops. Practical seminars can be directly connected with a live audit so that your internal employees are highly and efficiently qualified. In order to optimize the qualification measure, Temperature Uniformity Survey (TUS), System Accuracy Tests (SAT) and the Accuracy Test of your Equipment can be applied in practice at a laboratory furnace in the seminar room or at a production furnace in your company.

The practical exercises are supported by a service technician who has been checking the pyrometry of heat treatment furnaces / systems daily for many years. The tests and reports are in accordance with the CQI-9 and AMS2750 requirements. m. milde – heat treatment and nadcap consulting service does not only detect possible deviations from the CQI-9, NADCAP or MedAccred standard, they can also offer an all-round carefree package. This package can include the following services: Audit execution; Creation action plan; Implementation of all necessary measures, including training of employees; Supervision of the certification audit; Deviation processing; Maintaining the process management system; Pyrometry tests (SAT, TUS, Equipment); Furnace / System modification.

m. milde – heat treatment and nadcap consulting service
www.mmilde.com
Hall 4.1 / Booth A-031

SE-701 - The Compact Program Controller

Programmer • Controller • Data Logger • Alarming
Visualisation • PLC • Modbus-S7 Connection
Integrated analogue and digital I/O’s
Housing 96 x 96 mm

www.stange-elektronik.com
Process monitoring of protective gas atmospheres

Air Products has developed a new “Process Intelligence” overall concept for heat treatment in the metalworking industry, which optimizes the provision of carburizing atmospheres and the monitoring and control of protective gas atmospheres. The system helps to achieve reproducible and reliable quality characteristics such as hardness and surface finish, which are essential for metalworking.

The solution integrates digitally networked components and services, thus contributing to the industrial “Internet of Things” in heat treatment. The newly developed system includes control panels for the supply of atmospheres, an atmospheric measurement system for heat treatment furnaces, an intelligent nitrogen methanol lance, a cloud server for calling up process data and a system for tank monitoring of technical gases. This system collects process data and device parameters and stores them in a specified location. The data can also be integrated into customer systems via standardized interfaces and provide users with a useful data source for adapting and optimizing processes.

At the heart of the new offering is an intelligent nitrogen methanol lance that provides real-time pressure and temperature information in the lance. The status data of the lance provides information on quantity and composition fluctuations in the protective gas supply and thus in the process. In addition, it allows proactive maintenance to reduce downtime and rework and ensure optimal operation of the heat treatment furnace. All data can be uploaded to the cloud server and stored there.

“The quality of the products from a heat treatment furnace is largely determined by the atmosphere used and its reliable composition. With our new system, users can ensure that the inert gas atmosphere meets the specifications or that deviations are detected at an early stage”, explains Guido Plicht, Industry Manager Metals Processing at Air Products. “With our monitoring and control of the gas composition of binary gas mixtures, for example, density, temperature, pressure and purity of the gas can be monitored in real time. In addition, dew point, oxygen partial pressure, hydrogen and/or carbon monoxide content as well as the carbon or reduction potential of protective gas atmospheres can be controlled”, adds Plicht.

Air Products GmbH
www.airproducts.de
Hall 4.1 / Booth F-079

New programme controller as compact device

Stange Elektronik GmbH presents the new programme controller SE-701 with a 3.5” display. The system offers a high-resolution TFT display with 16 million colours and capacitive touch that supports finger moves on the panel. So, an easy and intuitive operation on relatively small area is supported.

It is common practice to integrate the required in- and outputs at devices with 96 x 96 mm housings. So the SE-701 contains four universal analogue inputs which are conform to the AMS specification. Furthermore, one analogue output as well as eight digital in- and outputs are integrated. Optionally, these can be duplicated.

In the programmer, up to 50 programmes including up to 50 segments, four set values, twelve digital tracks and four PID control loops can be stored.

Since the most functions are hard-coded, it is also possible to use the SE-701 as an easy pre-configured operator panel for Siemens plc systems like S7-1200/1500 via Modbus-TCP. Alternatively, the system contains an integrated plc with 1600 instruction list lines. For carburizing furnaces, a c-level option is available.

Optionally, a data recorder works also internally and the logged files can be analyzed by the ECS batch evaluation software.

A sophisticated user administration enables the assignment of user rights for prior created users like admin, foremen and operators. User and access profiles are pre-defined but can also be adjusted by the customer.

Not least, the process visualization arranges for a good overview of the system and the current process state on a small scale. The visualization can be created by a software tool which is free of charge downloadable on Stange’s homepage.

Application fields include industrial furnaces, cryogenic chambers, climatic simulation chambers, autoclaves, dryers, extruders, mixers or test benches.

Stange Elektronik GmbH
www.stange-elektronik.com
Hall 4.1 / Booth E-030
Furnaces for additive manufacturing

Additive manufacturing allows for the direct conversion of design construction files fully functional objects. With 3D printing, objects from metals, plastics, ceramics, glass, sand or other materials are built up in layers until they have reached their final shape.

Depending on the material, the layers are interconnected by means of a binder system or by laser technology. Many methods of additive manufacturing require subsequent heat treatment of the manufactured components. The requirements for the furnaces for heat treatment depend on the component material, the working temperature, the atmosphere in the furnace and, of course, the additive production process.

Also, concomitant or upstream processes of additive manufacturing require the use of a furnace in order to achieve the desired product properties, such as heat treatment or drying the powder.

Nabertherm offers solutions from curing for conservation of the green strength up to sintering in vacuum furnaces in which the objects of metal are annealed or sintered.

Nabertherm GmbH
www.nabertherm.com
Hall 4.1 / Booth C116

Stop-off paints for carburizing processes

The company Nüssle GmbH & Co. KG, world leader in the development, manufacturing and application consultancy of stop-off paints, has once again set standards with the water-based Condursal 790 for gas carburizing.

The Condursal 790 is part of a comprehensive product offensive and stands for the consistent implementation of the increasing requirements of national and international customers from all sectors, especially from commercial and production heat treatment shops.

The Condursal 790 was developed for gas carburizing and carburizing. It meets the requirement of water washability of the residues after heat treatment and can be used reliably for carburizing depths of up to 3.0 mm with a simple application.

In addition, the Condursal 790 is not only designed for classic coating applications by painting but is also available in a modified consistency, which enables both dipping and spraying applications as well as the application by extrusion.

Like all products of the new product generation, the Condursal 790 is characterized by particularly easy processing and a high yield with simultaneous low material consumption. As a result, the lowest possible process costs are realized.

In line with the high quality demands placed on the product properties, Nüssle provides its customers with unique application and process engineering expertise that has developed over decades and guarantees the reliable, reproducible and safe use of all the hardness protection agents offered.

NÜSSLE GmbH & Co. KG
www.nueslle-kg.de
Hall 4.1 / Booth C080/D-089
New generation of **hardness testing** equipment

**Struers** has introduced a completely new generation of own-designed hardness testing equipment for materialographic quality control in both laboratories and on production floors. The series of nine Duramin products offer a cost-efficient quality-control process to the market. Manufacturing industries and laboratories are facing a fierce global competition. Productivity targets must be met without compromising quality compliance of raw as well as processed solid materials. Therefore, especially highly-automated, reproducible and operator-friendly processes within hardness testing are in demand.

The series of Struers’ nine new generation hardness testing products, which also re-introduce the Duramin brand name, are specifically designed to meet the market-demands for higher productivity and the need to determine the quality and characteristics of solid materials with highest level of reliable accuracy.

The prime focus has been put into developing products that are robust and less time-consuming to use by any skilled operator. The new range of Duramin hardness testers follows international quality standards and obviously fits any need to conduct hardness tests like Vickers, Rockwell or Brinell.

In order to maximize productivity, the Duramin hardness tester has been built with great automation features and can be configured to almost any need with a wide list of supplementary accessories to provide fast and reliable data on quality in repeatable processes.

**Struers GmbH**

www.struers.com

Hall 4.1 / Booth F-089

---

**Testing laboratory for semi-finished products**

In April 2018, Dr. Sommer Werkstofftechnik GmbH from Issum, Germany, took over a material testing laboratory on the site of Schmolz + Bickenbach. Previous owner was the company IMS group Holding GmbH based in Düsseldorf. The following situation led to a change of address. The city border between Düsseldorf and Neuss runs right through the Schmolz + Bickenbach site. The test laboratory has always been on Neuss city territory, but the IMS administration as previous owner was on Düsseldorf city territory.

During the transaction, both parties attached great importance to maintaining the location in Neuss and securing jobs for the total of 10 employees. Both aspects were ensured by the takeover by Dr. Sommer Werkstofftechnik GmbH. The testing laboratory will be continued as an independent company under the name Dr. Sommer Werkstoffprüfservice GmbH.

While Issum mainly examines components and materials that have become noticeable or have been damaged in use, semi-finished products are tested in Neuss and supplier certificates are issued before the materials are delivered. This closes the material cycle from the steel producer, to the test laboratory, to the steel consumer, and to the damage expert. The range of services has been significantly expanded with the non-destructive testing methods of ultrasonic testing and magnetic crack testing.

The management of the testing laboratory will be continued seamlessly by Dipl.-Ing. Karsten Beyer, who also held this position in the past. With his employees, all of whom have been with the company for over 20 years, and the well-equipped testing laboratory, he has the ideal prerequisites for a successful new start. The Düsseldorf team is supported by the Issum trio Dr. Peter Sommer, Philipp Sommer M.Sc. and Jens Sommer B.Eng. The two entrepreneurial sons also took over the management.

**Dr. Sommer Werkstofftechnik GmbH**

www.werkstofftechnik.com

Hall 4.1 / Booth A-050
Temperature monitoring for the aluminium processing industry

In today’s demanding aluminium processing industry, a need for accurate, comprehensive product temperature monitoring is becoming even more critical to guarantee product quality, enhance process efficiency and drive down processing costs. The PhoenixTM system offers a solution to meet such requirements, a system that provides a complete temperature record of the product throughout the complete heat treatment process.

The PhoenixTM system is able to travel through the process, with the product, measuring the temperature at up to 20 critical points as it passes through the furnace under normal production conditions as part of the production batch. A complete historical temperature record (temperature profile) of the product(s) can be seen either live in real time (RF Telemetry option) or downloaded post run. Protected with a thermal barrier designed for the demands of the process (temperature, pressure, quench) the datalogger is safely protected from start to finish. Thermocouple type options can be chosen to suit the process temperature range and positioned on or in the product being monitored. Using the powerful ThermalView software as part of a PhoenixTM system allows the furnace profile or survey to be carried out quickly and creates AMS2750 and CQI-9 compliant reports with just a few clicks.

Whether reheating aluminium slabs/ingots or log homogenization in a continuous pusher or walking beam furnace, solution reheating (T6) aluminium automotive parts, CQI-9 & AMS2750 TUS, CAB brazing radiators or powder coating aluminium extrusions a unique PhoenixTM system solution is available.

PhoenixTM GmbH
www.phoenixtm.com
Hall 4.1 / Booth F-061/F-069

Furnace for recovery of rare earth elements

A heat treatment furnace for the recovery of rare earth elements is under development by the Italian company IVR Advanced Industrial Furnaces.

The concept consists in separating precious “rare earth” materials (Scandium, Yttrium, Lanthanum, Cerium, Praseodymium, Neodymium, Promethium, Samarium, Europium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Ytterbium, Lutetium), to then reuse them in many technological fields, realizing components such as superconductors, catalysts, components of hybrid vehicles, optical fibres, etc. These fields can be aerospace and defense, nuclear energy, optical fibre cables, PC and phones, steel or e-cars.

IVR Advanced Industrial Furnaces is carrying out this project in collaboration with its historical client.

IVR s.r.l. Advanced Industrial Furnaces
www.ivrsrl.it/en/
Hall 4.1 / Booth E-038
**Blast cleaning** and shot peening processes

Cleaning and, above all, shot peening processes for heat-treated components require continuous control, regulation and monitoring of process-influencing parameters. Sentenso Strahlprozesstechnik presents technologies of process and quality management in blast cleaning and shot peening technology.

The newly developed flux:on media flow management allows the fully automated and integrated adjustment and calibration of sensors and actuators for throughput control in blasting systems. The system, which can be fully integrated into the plant PLC, is operated via an intuitive menu that guides the user step by step through the adjustment – and calibration process leads.

The fully automatable and integrable system operates independently of the sensor and actuator technology in use and allows fastest adjustment and calibration procedures, often without any additional set-up effort. It incorporates flow rate adaption to changing media properties and can be used for both air and wheel blast systems.

At HK, Sentenso will demonstrate the complete calibration and calibration procedure as an elementary component of process management in blast cleaning and shot peening machines in the age of Industry 4.0.

Parallel to the current shot peening process different quality parameters have to be monitored. These include the abrasive as a tool, the peening intensity, the coverage as well as the achieved compressive residual stress in the surface of the component.

The X-Ray stress analyzer μ-X360s enables the analysis of residual stress and retained austenite in near-surface layers – and this also in production environments. By using a 2D detector, the device is mobile, compact and inexpensive, the measurement is extremely fast at the same time.

The automatable and industrially compatible system offers user-oriented design, safe handling and is completely mobile at the same time. The low X-ray power allows simple air cooling and requires little effort in radiation protection. Shortest measuring cycles of less than 60 s and close-meshed stress mapping allows for highly efficient measuring operation.

In Cologne, Sentenso will demonstrate an automated measurement application that can be integrated in a space-saving and flexible manner into the manufacturing process and into quality management in the age of Industry 4.0.

**Infrared cameras** with line-scan function

The Optris PI 05M and PI 1M infrared cameras, which have been specially developed for the metal industry, can be operated as line-scan cameras using the free, public domain Optris PIX Connect software. Whenever the surfaces of linearly moving objects need to be measured, this function enables both quality assurance and increased production.

The line-scan function of the Optris metal cameras allows the surface temperatures of linearly-moving objects to be measured precisely using minimal apertures. Of particular note is the sampling rate of up to 1 kHz. The infrared image is formed using a randomly-selected line from the detector array which can then be analyzed and integrated into the automation process. With measurement ranges from 450 to 2,000 °C, the sensors are optimally employed in continuous casting, in rolling trains or for inspecting steel slabs.

When it comes to precisely measuring temperatures using infrared technology, emissivity is a major factor and must be adjusted depending on the application. For physical reasons, the non-contact temperature measurement of metal surfaces and molten metal is almost always carried out in the short-wave range. The Optris PI 05M and the PI 1M, with a spectral sensitivity of 500 nm and 1 µm respectively, have been optimized for applications in the metal sector.
Efficient and ecological heat treatment

ALD Vacuum Technologies latest development SyncroTherm® offers the highest flexibility for heat treatment. Hardening and casehardening of small batches is possible in stand-alone units and in one-piece-flow production with full integration into the manufacturing line. Charging in single layers leads to short process times and minimum distortion.

For more information please contact us!
Advanced solutions in metallography

Metkon brings total preparation solutions in metallography, petrography and spectroscopy. They cover the complete range of instruments and consumables for sample preparation, from manual machines to sophisticated PLC controlled preparation systems.

Founded in 1993 as a 3-man-enterprise, Metkon today employs over 120 people. Customers around the world have trusted them to deliver technologically advanced solutions. Their state-of-the-art engineering and product development centre includes teams of engineers working together to create and test ideas that will be incorporated into instruments designed to meet customer needs.

At the in-house manufacturing facility, quality drives production. From sheet metal parts to complex mechanical assemblies, Metkon produces most of the components needed in the products, allowing strict control over the entire manufacturing process in accordance with the quality standards of ISO-9001.

As a final check before shipping, instruments are thoroughly tested to assure quality and functionality.

Since 1993, Metkon has delivered more than 20,000 instruments globally. The customer list covers the spectrum from small to large international companies and laboratories in many different industries, including: automotive, aerospace, bearings industry, foundries and steelworks, electronics, universities and institutes.

Together with the distributors in more than 30 countries, dedicated aftersales support includes trained service and support personnel, applications laboratories, customer training courses, and mobile laboratories featuring a hands-on experience with Metkon products and specialists.

SCHÜTZ + LICHT Prüftechnik GmbH
www.schuetz-licht.de
Hall 4.1 / Booth A-002

Vacuum furnaces with a high temperature uniformity

TAV Vacuum Furnaces designs and manufactures top-quality vacuum furnaces for a wide range of industries and applications worldwide always focusing on a constant innovation and following the most stringent criteria and procedures to ensure a high temperature uniformity.

The R&D department is constantly working to ensure a tailored product to customer needs. Moreover, the high know-how in the vacuum engineering provides training and prompt assistance both for machinery maintenance and for each aspect related to the process technology.

The vacuum furnaces are used in a variety of processes: heat treatment, diffusion bonding, heat treatment of additive manufactured parts, sintering, brazing, advanced ceramics, UHV (ultra-high vacuum) and alumining.

TAV Vacuum Furnaces recently produced an advanced sintering furnace developed above all to process boron carbide parts, with 1,700 dm³ useful volume and 2,250 °C max. temperature, capable of operating in an argon partial pressure range usually avoided because of glow discharges, resulting in improved resilience of the sintered parts. Discharges have been avoided, thanks to a very low supply voltage (approximately 90 kA going into the furnace) and an optimized layout of the heating elements, maximizing the distance between parts at different potential and using high temperature insulation in every potentially conductive component.

TAV VACUUM FURNACES SPA
www.tav-vacuumfurnaces.com
Hall 4.1 / Booth F-040
Automated inductor changeover

For applications in the automotive industry, such as rack hardening, a tool interface has now been developed by SMS Elotherm that allows automated coupling of the inductor to the hardening machine. Due to its compact design, the tool interface can be completely integrated into an existing system and requires on the machine-side only compressed air supply for operation.

An extension of the machine periphery to, for example, a hydraulic system is therefore not necessary. By means of a pneumatic clamping mechanism integrated in the tool interface, necessary media for the inductive hardening process, such as current (up to 4,000 A), cooling water (2 x 20 l/min) and quenching agent (1 x 100 l/min) can be safely provided from the machine to the inductor. The connection of the inductor via the interface with the machine is carried out in a two-stage clamping operation, which allows the transfer of the inductor from an external handling unit to the interface in the first step. The actual connection of the inductor with all media interfaces is done in the second step with a single stroke of the clamping system, whereby the tool change is completed within a few seconds. Depending on the external handling system, very short set-up times can thus be generated. By means of integrated monitoring devices, individual states of the clamping process can be queried and thus a secure connection between hardening machine and inductor can be guaranteed. Even if the pneumatic pressure drops during the hardening process, the clamping pressure can be maintained by the self-holding of the system.

For induction hardening, maintaining a defined coupling gap between the workpiece and the heating conductor is of central importance for the hardening result. In order to achieve the same hardness results for every component to be hardened, a reproducible positioning of the heating conductor must be assured. With the aid of a backlash-free locking system, the positioning accuracy of less than 70 μm is achieved, thus keeping the hardening process within a defined process window. In addition, the automated inductor change is combined with an automated probing for the coil-to-workpiece air gap before processing the first part in the machine.

SMS Elotherm GmbH
www.sms-elotherm.com/en
Hall 4.1 / Booth C-040/D-049

Sealed quench furnace with roller hearth

Ut this has recently commissioned a sealed quench furnace with driven rolls in Finland, meant to the quenching under controlled atmosphere of drilling equipment parts for stones.

The furnace consists of three sections, heating section, holding section and cooling section. The cooling of the parts after austenitizing is performed in the water cooling tank integrated in the cooling section.

The transport of the batch through the furnace takes place automatically, by means of driven rolls. The furnace is endowed with supply circuits with endogas, propane and nitrogen, such as, it can be also used for carburizing.

The holding of the temperature level required for the cooling water in the quenching tank is achieved by means of a cooling system composed of a pump and a water-water heat exchanger.

UTTIS Industries SRL
www.uttisheat.com
Hall 4.1 / Booth B-079
**Diffusion process** to preserve non-magnetic properties

With the new Balitherm Ionit ST process, Oerlikon Balzers has developed a reliable diffusion process for austenites and non-corrosive martensites. Non-magnetic properties are preserved, and the steels become more reliably resistant to wear while retaining their corrosion resistance.

In the automotive industry, high-alloy steels are used primarily in mechanical components. They are valued not only for their amagnetic (non-magnetic) properties, but also for their high wear resistance.

Inlet and outlet valves, for instance, which are subject to high mechanical and thermal stresses, are made from a combination of martensitic steel and austenitic steel – the former is the ideal solution for the high, thumping stresses resulting from the cams in the camshaft, while the latter is resistant to the high temperatures and mechanical stresses on the valve plate.

The Balitherm Ionit ST process means that Oerlikon Balzers can now offer a nitriding process which significantly improves the wear resistance of the austenite without affecting its non-magnetic properties. As the two materials nitride differently, diffusion depths of 15 µm in the austenite and 30 µm in the martensite can be achieved without any problems, increasing the reliability of their wear resistance. The low process temperature also ensures that no chromium depletion occurs at the edges, helping retain corrosion resistance.

**Management application** platform to improve workflows

Eurotherm Online Services (EOS) is an integrated online platform and management application designed to improve conformance testing to regulatory standards using a hosted, mobile-first tool. EOS offers an automated, digitized process for easy collection and retrieval of test related data – from shop floor to top floor – when and where required.

Leveraging its online platform, EOS Advisor is a planning and scheduling tool that enables more efficient management of equipment and staff; meanwhile, the eCAT tablet application offers calibration process efficiency improvement using a mobile-compatible tool that helps to eliminate the drawbacks of paper-based record systems.

Plan activities within the tool – set up, schedule and assign tests of any type. Set rule-based workflows for calibrations and define flexible workflows for custom tests. Next, perform the necessary tests and improve the data collection process; conduct tests on-site and once completed satisfactorily, EOS Advisor enables the user to print QR labels and produce test certificates. The approver uses a robust, digital workflow, with secondary or peer approval and the ability to extend approval to customers. All asset testing is managed centrally using a dashboard view of asset status. Compliance can be displayed at every location with a printed QR code label attached to each asset.

The tool helps to reduce testing costs by simplifying data collection, approval and the distribution workflow. Centralizing test and compliance management minimizes testing costs and creates a more flexible, role-based service delivery model. Dedicated workflows and prescribed work instructions can aid test productivity by minimizing test errors and the need for re-testing. Production disruptions and downtime can be avoided by efficiently managing complex test schedules. EOS Advisor allows the user to verify asset compliance with real-time inventory status, visible across the organization. It will streamline audits with on-site calibration certificate retrieval via the QR code label: the business will be prepared for an audit. The tool can also be integrated with existing systems and workflows with optional API integration.

EOS Advisor is applicable to regulated industries such as heat treatment for aerospace, automotive, life sciences, healthcare, and food & beverage that require periodic testing to prove and maintain compliance. EOS Advisor applications leverage IIoT technology and are completely scalable and applicable to small manufacturing or large, multi-site businesses.

Oerlikon Balzers Coating Germany GmbH
www.oerlikon.com/balzers
Hall 4.1 / Booth C-098

Schneider Electric Systems Germany GmbH
>EUROTHERM<
www.eurotherm.de
Hall 4.1 / Booth E-070/E-078
Uttis has recently commissioned a case hardening line in controlled atmosphere and technology for planetary gears production at Daimler plant in Romania.

The case hardening line comprises two units sealed quench furnaces, washer unit, tempering furnace, endogas generator, loading/unloading devices, monitoring/control system for batches and other auxiliary equipment. Maximum gross weight of a batch is 1,000 kg and the equipment technical availability is 98%.

The case hardening line enables to reach a %C on the surface of the case hardened parts of about 0.75–0.85 %C, a hardness on the surface of parts in the range of 58–62 HRC (measured on 9 pieces in 9 points with tolerance of 1 HRC) and 0.08 mm difference in case hardened depths (measured on 9 parts in 9 points).

The monitoring/control system for batches controls case hardening programmes, batches traceability and process simulation. Cooling of the agitators and quenching oil from the atmosphere furnaces is ensured by a heat exchanger air-oil, without any cooling water. The endogas generator provides automatic adjustment of the endogas flowrate and dewpoint, maintaining uniform pressure at evacuation.

Solo Swiss manufactures advanced industrial furnaces for the heat treatment of metals, used in a variety of heat treatment processes: carburizing, hardening, tempering, annealing, austempering, nitriding, brazing, carbonitriding, sintering, nitrocarburizing, oxinitriding, quenching. Solo Swiss offers two types of furnaces:

- Profitherm type batch furnaces: This unique, multifunctional arrangement of bell-type furnace and multiple quench tanks, allows a direct & rapid transfer of the load from the furnace(s) to the quench tank(s). The modular design enables easy expansions and allows all types of atmospheres and quench media.
- Continuous furnaces: Featuring protective or treatment atmospheres with gas cooling or quenching in liquids. All Solo Swiss furnaces are equipped with alloy muffles to provide precision heat treatment and feature quick quenching. Solo Swiss furnaces are well suited for the treatment of the small complex metallic parts requiring an enhanced heat treatment and reduced distortion. Parts include springs, clips, fasteners, coins, needles, hooks, ball bearings, parts for the aeronautics, cutlery, watch-making industry, micro mechanic, as well as long parts for which the bell furnace is most suitable.

Solo Swiss SA
www.solo.swiss
Hall 4.1 / Booth E-028

Buehler is proud to offer the full lab solution - from sectioning, mounting, grinding, polishing, and analysis to hardness testing all designed and manufactured by Buehler to ensure the highest quality and reliability.

EcoMet™ 30 Grinder Polisher
IsoMet™ High Speed Precision Cutter
**Vacuum sensors** for heat treatment applications

Thyracont Vacuum Instruments has developed and manufactured high-quality vacuum measurement and control instruments for the whole measuring range from rough to ultra-high vacuum since 1970. Its product range consists of robust transducers (Analogline), intelligent gauges (Smartline), handheld compact vacuum meters (VDB) and more.

Heat treatment applications claim for a high level of durability, reliability and resistance especially in pre-vacuum. Be it piezo, Pirani, capacitance, cold cathode (inverted magnetron) or hot cathode (Bayard-Alpert) gauges, Thyracont products use and combine the most refined sensor technologies and measurement principles in such a way that they meet the most demanding vacuum measurement standards.

Analogline vacuum transducers are for the range of 1,400 to $1 \times 10^{-4}$ mbar and known for their high robustness, which has been verified in various challenging process industry applications. Furthermore, their precision as well as temperature (up to 160 °C) and overpressure stability (up to 16 bar) make them the most suitable gauges for your heat treatment process.

The Smartline transducers cover the range of 1,200 to $5 \times 10^{-10}$ mbar and can adapt themselves to individual requirements. Scaling the output signal to the required characteristics for example, makes the exchange of existing gauges easily possible and renders further programming efforts unnecessary. The transducers are optionally available with an integrated display for comfortable appliance control on-site. A customer-friendly spare part concept with calibrated sensor heads enables users to exchange sensor heads themselves in a fast and easy way, reducing maintenance times and costs to an optimum. Further highlights which qualify Smartline transducers for heat treatment processes are their robustness against dust, against high temperatures (160 °C without detaching electronics) and their high overpressure limits of up to 16 bar.

VDB compact vacuum meters measure absolute pressure in the range of 1,600 – $5 \times 10^{-4}$ mbar and can be used with a power supply for long-term measurements or with a battery for mobile use. VDB gauges are perfectly suited to ease and improve maintenance, service and quality management in different vacuum applications. They have a data logger function which can save 2,000 measurements internally. Thyracont also offers a tailor-made vacuum measurement software, VacuGraphTM, for all of its active gauges. Individual gauge parameter settings are made in no time and with least effort. It is the ideal tool to visualize, analyze and manage process data of your heat treatment application.

Thyracont Vacuum Instruments GmbH
www.thyracont-vacuum.com
Hall 4.1 / Booth D-058/E-059

**Mesh** and ready-to-use items for heat treatment

For customers inside the heat treatment industry, the Bavarian company Weisse & Eschrich has developed a special mesh with heat resistance up to 1,150 °C. This mesh enables the manufacturing of accurate and low-warpage charger baskets.

W&E either supplies just this particular mesh or the ready-to-use item for the heat treatment industry or for other concepts inside the business.

Rolls, stripes or ready-to-use baskets are heat-resistant up to 1,150 °C.

Single or double layered, folded or/and welded baskets – W&E produces on modern machines inside a huge storage of meshes (> 6,000 types permanently in stock) and is therefore capable to deliver within 48 h.

Weisse & Eschrich GmbH & Co. KG
www.weisse.de
Hall 4.1 / Booth C-010/D-011
INDEX OF EXHIBITORS

3-Rath Kalibrier- und Messtechnik GmbH
B-060

AICHELIN
Industrial furnace solutions
Aichelin Holding GmbH
Fabrikgasse 3
2340 Mödling
Austria
Tel. +43 2236 23 646 0
Fax +43 2236 22 229
marketing@aichelin.com
www.aichelin.com
D-080/F-081

AICHELIN Service GmbH
Schultheiß-Kohle-Straße 7
71636 Ludwigsburg
Germany
Tel. +49 7141 6437 0
Fax +49 7141 6437 100
info.de@aichelin.com
www.aichelin-service.com
D-080/F-081

Air Liquide Deutschland GmbH
C-039

Air Products GmbH
Hüttenstraße 50
45527 Hattingen
Germany
Tel. +49 2324 6890
Fax +49 2324 689 100
apginfo@airproducts.com
www.airproducts.de
F-079

Aichelin Holding GmbH
Fabrikgasse 3
2340 Mödling
Austria
Tel. +43 2236 23 646 0
Fax +43 2236 22 229
marketing@aichelin.com
www.aichelin.com
D-080/F-081

AICHELIN Ges.m.b.H.
2340 Mödling
Austria
Tel. +43 2246 646 0
Fax +43 2236 22 229
marketing@aichelin.com
www.aichelin.com
D-080/F-081

Air Liquide Deutschland GmbH
C-039

ALD Vacuum Technologies GmbH
Otto-von-Guericke-Platz 1
63457 Hanau
Germany
Tel. +49 6181 307 0
Fax +49 6181 307 3290
info@ald-vt.de
www.ald-vt.de
C-059

Maschinenfabrik ALFING Kessler GmbH
Auguste-Kessler-Straße 20
73433 Aalen
Germany
Tel. +49 7361 501 4485
Fax +49 7361 501 4689
hardening@mafa.alfing.de
www.alfing.de
A-020
### INDEX OF EXHIBITORS

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Stand Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbeitsgemeinschaft Wärmebehandlung und Werkstofftechnik e.V.</td>
<td>C-120</td>
</tr>
<tr>
<td>Ariane Group (Airbus Safran Launchers)</td>
<td>E-108</td>
</tr>
<tr>
<td>ATM GmbH</td>
<td>C-002</td>
</tr>
<tr>
<td>Avion Europe GmbH &amp; Co. KG</td>
<td>F-029</td>
</tr>
<tr>
<td>bAKA Handling Solutions GmbH</td>
<td>A-108/B-109</td>
</tr>
<tr>
<td>BAQ GmbH</td>
<td>A-110</td>
</tr>
<tr>
<td>Bax Engineering GmbH</td>
<td>A-031</td>
</tr>
<tr>
<td>Belec Spektrometrie Opto Elektronik GmbH</td>
<td>A-070</td>
</tr>
<tr>
<td>Berghütten GmbH</td>
<td>E-118</td>
</tr>
<tr>
<td>BMI Fours Industriels</td>
<td>A-080/C-089</td>
</tr>
<tr>
<td>Bodycote Wärmebehandlung GmbH</td>
<td>F-036</td>
</tr>
<tr>
<td>BOSIO d.o.o.</td>
<td></td>
</tr>
<tr>
<td>BOSIO d.o.o. Bukovzalak 109 3000 Celje Slovenia <a href="mailto:info@bosio.si">info@bosio.si</a> <a href="http://www.bosio.si">www.bosio.si</a></td>
<td></td>
</tr>
<tr>
<td>Bon Group</td>
<td></td>
</tr>
<tr>
<td>Expertise in heat treatment</td>
<td></td>
</tr>
<tr>
<td>BURGDORF GmbH &amp; Co. KG &amp; OSMIROL GmbH</td>
<td></td>
</tr>
<tr>
<td>Birkenwaldstraße 94 70191 Stuttgart Germany Tel. +49 711 257 78 0 Fax 49 711</td>
<td></td>
</tr>
<tr>
<td>Buehler – ITW Test &amp; Measurement GmbH</td>
<td></td>
</tr>
<tr>
<td>Boschstraße 10 73734 Esslingen am Neckar Germany Tel. +49 711 490 4690 0</td>
<td></td>
</tr>
<tr>
<td>Bührkert GmbH &amp; Co. KG</td>
<td></td>
</tr>
<tr>
<td>Christian-Bührkert-Straße 13-17 74653 Ingelfingen Germany +49 7940 10 0</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td></td>
</tr>
<tr>
<td>Dr.-Ing. K. Busch GmbH</td>
<td>F-053</td>
</tr>
<tr>
<td>CastService GmbH</td>
<td></td>
</tr>
<tr>
<td>Nordsternpark 22a 52134 Herzogenrath Germany Tel. +49 2406 989927 8 Fax 49</td>
<td></td>
</tr>
<tr>
<td>CASTService GmbH</td>
<td></td>
</tr>
<tr>
<td>CASTService GmbH</td>
<td></td>
</tr>
<tr>
<td>Nordsternpark 22a 52134 Herzogenrath Germany Tel. +49 2406 989927 8 Fax 49</td>
<td></td>
</tr>
<tr>
<td>Cieffe Thermal Systems S.R.L.</td>
<td></td>
</tr>
<tr>
<td>Viale dell'Industria, 7 31014 Colle Umberto Italy Tel. +49 0438 4341 Fax</td>
<td></td>
</tr>
<tr>
<td>Cobes GmbH</td>
<td>D-119</td>
</tr>
</tbody>
</table>
INDEX OF EXHIBITORS

Codere S.A.
Route de Miécourt 12
2942 Alle
Switzerland
Tel. +41 32 465 10 10
Fax +41 32 465 10 11
info@codere.ch
www.codere.ch
F-056

Honeywell
THE POWER OF CONNECTED

Honeywell Thermal Solutions
Elster GmbH
Strotheweg 1
49504 Lotte-Büren
Germany
Tel. +49 541 1214 0
Fax +49 541 1214 370
Hts.emea@honeywell.com
www.prozesswaerme.net/companies/honeywell-thermal-solutions
F-034

F & E Technologiebroker Bremen GmbH
C-120/F-121

FAI FTC S.p.A.
F-010

Fertigungsgerätebau Steinbach GmbH & Co. KG
A-019

Fluke Process Instruments GmbH
A-060/B-061

Fraunhofer-Institut für Werkstoff- und Strahltechnik
E-002

Courth Edelstahl-Apparatebau GmbH
C-041

Codere S.A.
Route de Miécourt 12
2942 Alle
Switzerland
Tel. +41 32 465 10 10
Fax +41 32 465 10 11
info@codere.ch
www.codere.ch
F-056

Cronite Klefisch GmbH
C-019

Cronite Klefisch GmbH
C-019

DAM Härteotechnik GmbH
A-061

Demig Prozessautomatisierung GmbH
C-058/D-059

Deutsche Edelstahlwerke Service GmbH
D-091/D-099

Dorstener Drahtwerke H.W. Brune & Co. GmbH
A-069

S. Dunkes GmbH
F-032

Durferrit GmbH
D-040/E-049

ECM Technologies
F-039

Edevis GmbH
Newcomer

EFD Induction GmbH
D-070

Eltro GmbH
C-060

Ema Indutec GmbH
Petersbergstraße 9
74009 Meckesheim
Germany
Tel.: +49 6226 7880
Fax: +49 6226 788 100
sales@ema-indutec.de
www.ema-indutec.com
D-080

Emco-Test Deutschland GmbH
F-071

Esi Prüftechnik GmbH
D-079

Fuchs Schmierstoffe GmbH
F-060

Galdabini SPA
E-100

Gebrüder Hammer GmbH
C-021

Gefran
GEFRAN Deutschland GmbH
Philipp-Reis-Straße 9a
63500 Seligenstadt
Germany
Tel.: +49 61 82 809 0
Fax: +49 61 82 809 222
vertrieb@gefran.de
www.gefran.de
E-099

E-Therm Germany GmbH
Boschstraße 16
47533 Kleve
Germany
Tel. +49 2821 8944890
Fax 2821 8933899
info@e-therm.gmbh
www.e-therm.gmbh
A-010

GH-Induction Deutschland Indukt.-Erw.-Anlagen GmbH
Hainbrunner Straße 10
69434 Hirschlhorn / Neckar
Germany
Tel. +49 6272 9216 0
+49 6272 9216 26
Gh.info@gh-induction.de
www.gh-induction.de
F-038
Gießtechnik Bremer GmbH
F-066

GKN Sinter Metals Engineering GmbH
Newcomer

G.N.R. S.r.l.
A-107

Graphite Materials GmbH
A-021

GTD Graphit Technologie GmbH
Raiffeisenstraße 1
35428 Langgöns
Germany
Tel. +49 6403 9514 0
Fax +49 6403 9514 25
info@gtd-graphit.de
www.gtd-graphit.de
B-090/C-099

Günther GmbH
F-101

Gwk Gesellschaft Wärme Kältetechnik mbH
C-038/D-39

Carl Hansen Verlag GmbH & Co. KG
C-118

Heess GmbH & Co. KG
C-028/D-029

Hein-Lehmann GmbH
E-098

HONEYWELL
THE POWER OF CONNECTED

Honeywell Thermal Solutions
Elster GmbH
Strotheweg 1
49504 Lotte-Büren
Germany
Tel. +49 541 1214 0
Fax +49 541 1214 370
Hts.emea@honeywell.com
www.prozesswaerme.net/companies/honeywell-thermal-solutions
F-034

HSH Härtereitechnik GmbH
F-031

HSL Härtereizubehör GmbH
A-091

ibg Prüfcomputer GmbH
E-019

IBS Industrie-Brenner-Systeme GmbH
Deister Straße 100 a
58091 Hagen
Germany
Tel. +49 2331 34840 0
Fax +49 2331 34840 29
info@ibs-brenner.de
www.ibs-brenner.de
A-065

IHI Machinery & Furnace Co., Ltd.
F-019

IHT Industrieverband Härteotechnik
C-051

IHTS GmbH
A-009

Inductoheat Europe GmbH
Ostweg 5
73262 Reichenbach/Fils
Germany
Tel. +49 7153 504 0
Fax +49 7153 504 340
info@inductoheat.eu
www.inductoheat.eu
D-030

Industrieofen- & Härterei-zubehör GmbH Unna
Viktoriastraße 12
59425 Unna
Germany
Tel.: +49 2303 25252 0
Fax: +49 2503 25252 20
info@ihu.de
www.ihu.de
A-030
### INDEX OF EXHIBITORS

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Company Name</th>
<th>Address</th>
<th>Country</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-030</td>
<td>Industriefen- &amp; Härtereizubehör Unna GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-059</td>
<td>Industriefenbau Aue GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-098/B-099</td>
<td>Intermetall Produkte AG</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-038</td>
<td>Ipsen International GmbH</td>
<td>Flutstraße 78</td>
<td>Germany</td>
<td>+49 2821 804 0</td>
<td></td>
<td><a href="mailto:Sales@ipsen.de">Sales@ipsen.de</a></td>
<td><a href="http://www.ipsen.de">www.ipsen.de</a></td>
</tr>
<tr>
<td>E-031</td>
<td>ITG Induktionsanlagen GmbH</td>
<td>Neckarsteinacher Straße 88</td>
<td>Germany</td>
<td>+49 6272 9203 0</td>
<td>+49 6272 9203 10</td>
<td><a href="mailto:vertrieb@itg-induktion.de">vertrieb@itg-induktion.de</a></td>
<td><a href="http://www.itg-induktion.de">www.itg-induktion.de</a></td>
</tr>
<tr>
<td>C-061</td>
<td>Isserstedt Prüfmaschinen GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-060</td>
<td>Leybold GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-039</td>
<td>Kanthal ZN der Sandvik Materials Technology Deutschland GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-071</td>
<td>Karberg &amp; Hennemann GmbH &amp; Co. KG</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-018</td>
<td>Keller HCW GmbH</td>
<td>Infrared Temperature Solutions (IST)</td>
<td>Germany</td>
<td>+49 5451 85 0</td>
<td>+49 5451 85 412</td>
<td><a href="mailto:info@keller-its.de">info@keller-its.de</a></td>
<td><a href="http://www.keller-its.de">www.keller-its.de</a></td>
</tr>
<tr>
<td>F-091</td>
<td>Linn High Therm GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-020/D-021</td>
<td>Friedrich Lohmann GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-078</td>
<td>Kerfa GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-069</td>
<td>Kohnle Wärmebehandlungsanlagen GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-078</td>
<td>Kureha GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-068</td>
<td>Laserline GmbH</td>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INDEX OF EXHIBITORS

MAE Maschinen- und Apparatebau Götzen GmbH
A-010
Magnetische Prüfanlagen GmbH
F-099
MAHLER GmbH
A-080/C-089
Maptec landau GmbH
F-032
MESA Electronic GmbH
C-030/D031
Mesa Industrie-Elektronik
A-052/A-058

Nabertherm GmbH
C-116
NewSonic GmbH
A-103
Nippon Carbon Co. Ltd.
F-064
Nippon Kornmeyer Carbon Group GmbH
F-064
Nippon Techno Carbon Co. Ltd.
F-064
Artur Nolzen Industrieofen GmbH & Co. KG
A-025

Noxmat GmbH
Ringstraße 7
09569 Oederan
Germany
Tel. +49 37292 6503 0
Fax +49 37292 6503 29
info@noxmat.com
www.noxmat.com
D-080/D-088

Osaka Tel Ve Telbant San. Tic. Ltd. Sti.
A-095
OSA-tec Service GmbH
D-078
OSK-Kiefer GmbH
A-067
Padelttherm GmbH
A-067
Panjin Tiangong Precision Casting Co., Ltd.
A-099
Parsimonia GmbH
F-119
Petrofer Chemie H. R. Fischer GmbH & Co. KG
C-018/D-019
INDEX OF EXHIBITORS

W. Pilling Kesselfabrik GmbH & Co. Kommanditgesellschaft
D-020

PhoenixTM GmbH
Am Rehmer Eck 22
32547 Bad Oeynhausen
Germany
Tel. +49 5731 300 28 0
Fax +49 5731 300 28 14
info@phoenixtm.de
www.phoenixtm.de
F-061/F-069

Reckmann GmbH
A-109

Reinhardt GmbH
A-118/B-119

Remix S. A.
E-090

Rohde Schutzgasöfen GmbH
D-028/E-029

Rohmann GmbH
D-061

Rössler Oberflächentechnik GmbH
Newcomer

Rothstein Metallfördergurte GmbH & Co. KG
D-010

Rübigerm GmbH & Co. KG
C-070

Runkel GmbH & Co. KG
C-031

AICHELIN Ges.m.b.H.
Business unit SAFED
Fabriksgasse 3
2340 Mödling
Austria
Tel. +43 2236 23646 0
Fax +43 2236 22229
marketing@aichelin.com
www.aichelin.com
D-080

Sajjan Precision Castings
B-108/C-109

SAFT Shanghai Advanced Materials Technology Co., Ltd.
C-080/D-089

Schick Technik GmbH
D-038

Schneider Electric Systems Germany
GmbH >Eurotherm<
E-070/E-078

K. Schräder Nachf.
F-030

Schunk Carbon Technology
D-018

Schütz + Licht Prüftechnik GmbH
A-002

SCR SA
A-100/B-101

SECO/WARWICK
www.secowarwick.com

SECO/WARWICK
Sobieskiego 8
66-200 Świebodzin
Poland
Tel. +48 683820 500
Fax +48 683820 555
Info-poland@secowarwick.com
www.secowarwick.com
E-060

Process-Electronic GmbH
Dünauweg 30
73092 Heiningen
Germany
Tel. +49 7161 94888 0
Fax +49 7161 43046
info@process-electronic.com
www.group-upc.com
A-040

Prozess-Technik GmbH
F-061/F-069

PVA Industrial Vacuum Systems GmbH
A-027

PVT Plasma und Vakuum Technik GmbH
D-09

QASS GmbH
B-070/D-079

Qness GmbH
C-069

Joseph Raab GmbH & Cie. KG
F-051

RD Technologies
E-058

SAFECHEM Europe GmbH
D-090

Saet S.P.A.
Via Torino 213
10040 Leinì
Italy
Tel. +39 011 9977 999
Fax +39 011 9974 328
info@saetemmedi.com
www.saetemmedi.com
F-041/F-049
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Booth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentenso GmbH</td>
<td>D-069</td>
<td></td>
</tr>
<tr>
<td>SGL Carbon GmbH</td>
<td>E-061</td>
<td></td>
</tr>
<tr>
<td>Shinto Italia S.p.A.</td>
<td>C-100</td>
<td></td>
</tr>
<tr>
<td>Skako Vibration A/S</td>
<td>E-20</td>
<td></td>
</tr>
<tr>
<td>Smart Induction Converter Technologies S.L.</td>
<td></td>
<td>Newcomer</td>
</tr>
<tr>
<td>ELOTERM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMS Elotherm GmbH</td>
<td></td>
<td>In der Flue 2 42897 Remscheid Germany Tel. +49 2191 891 0 Fax +49 2191 891 229 <a href="mailto:info@sms-elotherm.com">info@sms-elotherm.com</a> <a href="http://www.sms-elotherm.com">www.sms-elotherm.com</a> C-040/D-049</td>
</tr>
<tr>
<td>SOLO</td>
<td></td>
<td>Grandes-Vies 25 2900 Porrentruy Switzerland Tel. +41 32 465 96 00 Fax +41 32 465 96 05 <a href="mailto:mail@solo.swiss">mail@solo.swiss</a> <a href="http://www.solo.swiss">www.solo.swiss</a> E-028</td>
</tr>
<tr>
<td>Dr. Sommer Werkstofftechnik GmbH</td>
<td>A-050</td>
<td></td>
</tr>
<tr>
<td>Spectro Analytical Instruments GmbH</td>
<td>A-101</td>
<td></td>
</tr>
<tr>
<td>SSI Super Systems Europe</td>
<td>F-029</td>
<td></td>
</tr>
<tr>
<td>Stange Elektronik GmbH</td>
<td></td>
<td>Stange Elektronik GmbH Gutenbergstraße 3 51645 Gummersbach Germany Tel. +49 2261 9579 0 Fax +49 2261 55212 <a href="mailto:info@stange-elektronik.de">info@stange-elektronik.de</a> <a href="http://www.stange-elektronik.com">www.stange-elektronik.com</a> E-030</td>
</tr>
<tr>
<td>Steremat Induktion GmbH</td>
<td>F-118</td>
<td></td>
</tr>
<tr>
<td>Stresstech GmbH</td>
<td>F-001</td>
<td></td>
</tr>
<tr>
<td>Struers GmbH</td>
<td></td>
<td>Carl-Friedrich-Benz-Straße 5 47877 Willich Germany Tel. +49 2154 486 0 Fax +49 2154 486 222 <a href="mailto:marketing@struers.de">marketing@struers.de</a> <a href="http://www.struers.com">www.struers.com</a> F-089</td>
</tr>
<tr>
<td>Systherms GmbH</td>
<td>B-071</td>
<td></td>
</tr>
<tr>
<td>TAV VACUUM FURNACES SPA</td>
<td>F-040</td>
<td></td>
</tr>
<tr>
<td>TAVENINEERING S.p.A.</td>
<td>E-050</td>
<td></td>
</tr>
<tr>
<td>Thermo-Control Körtevályessy GmbH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermo-Control Körtevályessy GmbH</td>
<td></td>
<td>Grünspechtweg 19 13469 Berlin Germany Tel. +49 30 40 586 940 Fax +49 30 40 586 941 <a href="mailto:info@thermo-control.com">info@thermo-control.com</a> <a href="http://www.thermo-control.com">www.thermo-control.com</a> A-037</td>
</tr>
<tr>
<td>TPC GmbH</td>
<td></td>
<td>Kalteiche-Ring 79 35708 Haiger Germany Tel. +49 2773 71075 30 Fax +49 2773 71075 50 <a href="mailto:info@tpcgmbh.de">info@tpcgmbh.de</a> <a href="http://www.tpcgmbh.de">www.tpcgmbh.de</a> C-090</td>
</tr>
<tr>
<td>TTC Informatik</td>
<td></td>
<td>C-058/D-059</td>
</tr>
<tr>
<td>ULFAC (Shenyang) Co., Ltd.</td>
<td></td>
<td>F-062</td>
</tr>
<tr>
<td>UTTIS</td>
<td></td>
<td>B-079</td>
</tr>
<tr>
<td>VA-Tech GmbH</td>
<td></td>
<td>A-028</td>
</tr>
</tbody>
</table>
INDEX OF EXHIBITORS

Vulkan Verlag
Friedrich-Ebert-Straße 55
45127 Essen
Germany
Tel. +49 201 82002 14
Fax +49 201 82002 40
info@vulkan-verlag.de
www.vulkan-verlag.de
E-079

Weisse & Eschrich GmbH & Co. KG
C-010/D-011

Wickert Maschinenbau GmbH
Wollmesheimer Höhe 2
76929 Landau
Germany
Tel. +49 6341 9343 0
Fax +49 6341 9343 30
info@wickert-presstech.de
www.wickert-presstech.de
C-050/D-051

WS Wärmeprozessechnik GmbH
Dornierstraße 14
71272 Renningen
Germany
Tel. +49 7159 1632 0
Fax +49 7159 2738
ws@flox.com
www.flox.com
A-039

Wienstroth Wärmebehandlungstechnik GmbH
C-029

WMU GmbH
E-021

WPX Faserkeramik GmbH
B-100/C-101

Wuxi Junteng Fanghu Casting Co., Ltd.
E-091

Xinghua Tongbu Casting Co., Ltd.
B-068

Zwick GmbH & Co. KG
B-110/C-119

EFFECTIVE 2018/08/14
THIS INFORMATION IS SUPPLIED WITHOUT LIABILITY.

Visit us at the HK 2018
Vulkan-Verlag
Hall 4.1 / Booth E 079
16 - 18 October 2018
Koelnmesse, Cologne
Germany