DVS GERMAN WELDING SOCIETY

# LÖT 2019

12th International Conference on Brazing,
High Temperature Brazing and Diffusion Bonding

May 21 – 23, 2019
Eurogress Aachen, Aachen/Germany

www.dvs-ev.de/LOET2019

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Programme is subject to change without notice.

# LÖT 2019

## 12th International Conference on Brazing, High Temperature Brazing and Diffusion Bonding

From May 21 to 23, 2019 the 12th International Conference on Brazing, High Temperature Brazing and Diffusion Bonding represents once again one of the world-wide leading conferences in this field. The conference brings together the professional world of joining technology in Aachen.

The technical development is still progressing faster and faster. Innovative products are manufactured from most modern materials, which are subjected to extreme conditions both during the manufacturing and in operational applications. Therefore, a crucial role is given to the joining technique. Particularly the brazing technique offers a multiplicity of interesting solutions to the manufacturer to join different kinds of materials and products.

Even for the application of these joining processes a special level of knowledge is necessary, which results from the application-oriented information exchange of practice and science and mediates the newest realisations.

For this purpose the International Conference on Brazing, High Temperature Brazing and Diffusion Bonding will be held for the twelfth time and will offer a basis on which

- the transfer of scientific findings to operational practice can be elaborated,
- the production process can be optimised with regard to technical and economic aspects,
- new materials methods and production methods can be presented, and
- the professional contact between users and researchers can be established or intensified.

It is a great pleasure for us inviting all specialists and interested experts to LÖT 2019 to inform about latest developments and trends and additionally to compare the latest findings in international dialogues.

Already today we know: LÖT 2019 will be a conference highlight in this year.

We would be pleased to see you in Aachen.

**Dr.-Ing. Roland Boecking**
General Manager DVS

**Prof. Dr.-Ing. Kirsten Bobzin**
Conference Chairman

# Meetings

**May 20, 2019**

| | |
|---|---|
| **17:00 – 18:00** | **Programmkommission LÖT 2019**<br>Raum Tagungs-Treff |
| **17:30 – 19:00** | **Mitgliederversammlung der Fachgesellschaft Löten**<br>Raum Tagungs-Treff |

**May 23, 2019**

| | |
|---|---|
| **14:30 – 17:30** | **IIW Commission XVII**<br>**"Brazing, soldering and diffusion joining"**<br>Conference room |

**May 24, 2019**

| | |
|---|---|
| **09:00 – 15:30** | **IIW Commission XVII**<br>**"Brazing, soldering and diffusion joining"**<br>RWTH Aachen University, Surface Engineering Institute |

# Sponsors of the LÖT 2019

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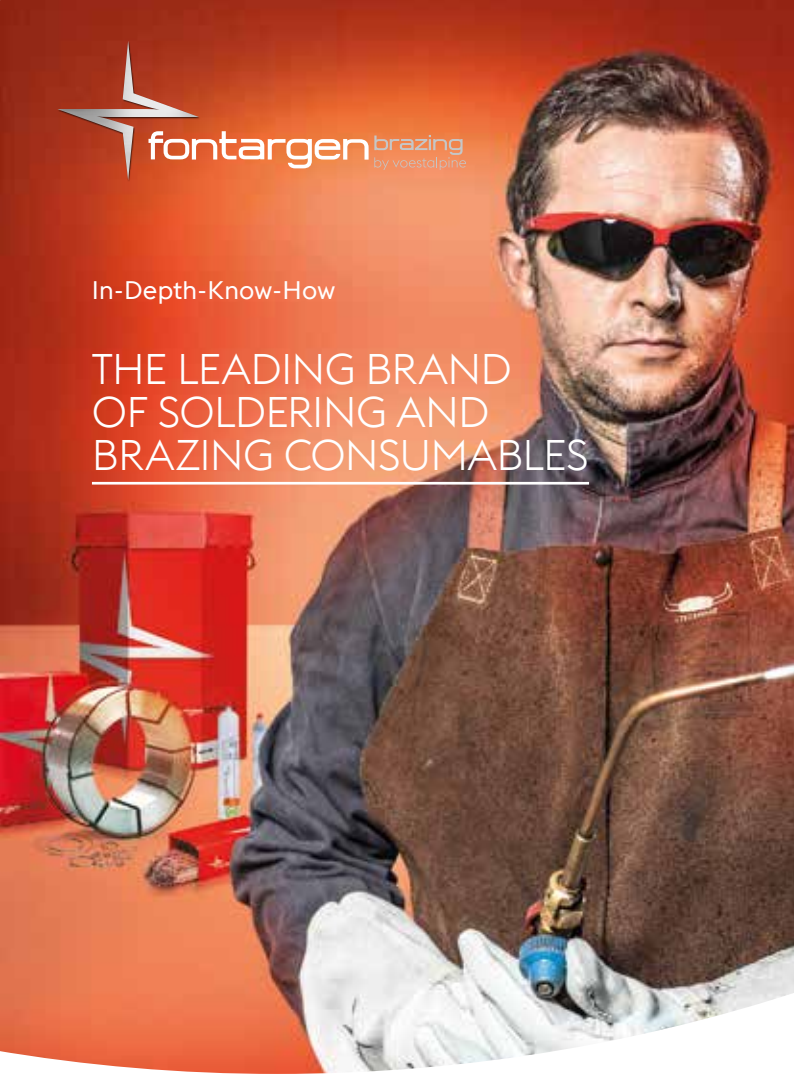
In-Depth-Know-How

# THE LEADING BRAND OF SOLDERING AND BRAZING CONSUMABLES



As a leading brand of soldering and brazing consumables, Fontargen Brazing offers proven solutions based on 50 years of industrial experience, tried and tested processes and methods. This In-Depth Know-How has made Fontargen Brazing an internationally preferred partner for every soldering and brazing task.

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# Tabletop Exhibition

Concurrent with the 12th International Conference on Brazing, High Temperature Brazing and Diffusion Bonding the following exhibitors are presented:

**Exhibitors**

- AIM MRO HOLDINGS Inc., Miamiville/USA
- Ajax TOCCO Magnethermic GmbH, Hirschhorn/Germany
- EUROMAT GmbH, Baesweiler/Germany
- Fusion Incorporated UK Ltd., Harlow/Great Britain
- GH Inducation Atmospheres, Rochester/USA
- Hauck Heat Treatment B.V., Eindhoven/The Netherlands
- Höganäs GmbH, Düsseldorf/Germany
- iew Induktive Erwärmungsanlagen GmbH, Gumpoldskirchen/Austria
- Innobraze GmbH, Esslingen/Germany
- Ipsen International GmbH, Kleve/Germany
- IVA Schmetz GmbH, Menden/Germany
- Johnson Matthey & Brandenberger AG, Zürich/Switzerland
- Listemann Technology AG, Bendern/Liechtenstein
- LOT-TEK GmbH, Erlangen/Germany
- MAHLER GmbH, Plochingen/Germany
- MAT-TECH B.V., Son/The Netherlands
- Metglas Inc., Conway/USA
- Morgan Advanced Materials plc, Erlangen/Germany
- PVA Industrial Vacuum Systems GmbH, Wettenberg/Germany
- REUTER TECHNOLOGIE GmbH, Alzenau/Germany
- SAXONIA Technical Materials GmbH, Hanau/Germany
- Soudax Equipments, Epone/France
- ULVAC GmbH, Garching/Germany
- VACUUMSCHMELZE GmbH & Co. KG, Hanau/Germany
- VBC Group, Loughborough/Great Britain
- Velox Solutio S.L., Vigo/Spain
- Voestalpine Böhler Welding Fontargen GmbH, Eisenberg/Germany
- Wall Colmonoy Ltd., Swansea/Great Britain
- WigTec Fischereder KG, Wiesbaden/Germany

Status: March 1, 2019

## May 21, 2019 — Saal Brüssel

**Opening**
Session Chairman: K. Bobzin (RWTH Aachen University, Germany)

**09:00** **Opening / Welcome**

**K. Bobzin** (RWTH Aachen University, Germany)
**J. Jerzembeck** (DVS – German Welding Society, Germany)
**H. Schmoor** (Schmoor Brazing, Germany)

**09:20** **Combining atomistics and thermodynamics to control wetting for metal-ceramic joints**
W. D. Kaplan (Technion – Israel Institute of Technology, Israel)

**09:50** **Nanojoining: where the border between brazing and soldering melts**
J. Janczak-Rusch (EMPA, Switzerland)

**High-entropy alloys**
Session Chairmen: A. Shapiro (Titanium Brazing, Inc., United States of America) / U. Reisgen (RWTH Aachen University, Germany)

**10:20** **Brazing of high temperature materials using melting range optimized filler metals based on the high-entropy alloy CoCrCuFeNi**
T. Ulitzka*, W. Tillmann, L. Wojarski, M. Manka (Dortmund University of Technology, Germany)

**10:40** **Development of novel nickel-based brazing alloys, utilising alternative melting point depressants and high entropy alloy concepts**
L. Hardwick*, R. Goodall (University of Sheffield, Great Britain), E. Pickering (University of Manchester, Great Britain), P. Rodgers (VBC Group, Great Britain)

**11:00** **Tabletop Exhibition, Poster Session, Coffee Break**

**Brazing for tool applications**
Session Chairmen: T. Oyama (Morgan Technical Ceramics, United States of America) / H. Schmoor (Schmoor Brazing, Germany)

**11:40** **The effect of nickel-plated surfaces on the microstructure and the strength of vacuum brazed nickel maraging steel**
T. Henning*, W. Tillmann, L. Wojarski, M. Möbus (Dortmund University of Technology, Germany)

**12:00** **Brazing of cemented carbide and steel with Cu-Mn-Ni filler metals**
I. Pashkov*, V. Misnikov (PBSU, Russia), T. Bazlova, V. Bazhenov (MISIS, Russia)

**12:20** **Fundamental study on tempered state of steel influenced by the brazing process parameters for joining of hard metal saw teeth to steel saw blades**
G. Wiehl*, M. Schimpfermann (SAXONIA Technical Materials GmbH, Germany), S. Rassbach, M. Magin (CERATIZIT Luxembourg S.à r.l., Luxembourg), A. Kazuch, M. Marchi, N. Unnasch (Risse + Wilke Kaltband GmbH & Co. KG, Germany)

**12:40** **Improved process control during induction brazing**
J. Hebing*, K. Bobzin, M. Öte, S. Wiesner (RWTH Aachen University, Germany)

**13:00** **Effect of minimizing the thickness of the copper intermediate layer in carbide tipped tools on the shear strength of the brazed joint**
M. Schimpfermann* (SAXONIA Technical Materials GmbH, Germany), M. Magin, S. Rassbach (CERATIZIT Luxembourg S.à r.l., Luxembourg)

**13:20** **Tabletop Exhibition, Poster Session, Lunch Break**

**Brazing for turbine applications**
Session Chairmen: W. Miglietti (Miglietti and Associates, United States of America) / M. Boretius (Listemann Technology AG, Liechtenstein)

**14:20** **Investigations on vacuum furnace brazed dissimilar material compounds of 16Mo3 and INCONEL 625 using nickel based filler materials**
R. Blank*, I. Reinkensmeier (Siemens AG, Germany), T. Uhlig, G. Wagner (Chemnitz University of Technology, Germany)

**14:40** **Brazing process, enabler for lifetime extension of gas turbines**
S. Puidokas, K. Weidemann* (General Electric (Switzerland) GmbH, Switzerland), B. Berme (General Electric, Turkey)

**15:00** **Brazing of SLM generated nickel base material IN 625 to porous sinter metal structures for stationary gas turbines**
I. Reinkensmeier*, S. Purschke, T. Nägel, C. Beck, S. Wanjura (Siemens AG, Germany)

**15:20** **Application of a Ni-based filler metal repair coating by thermal spraying for high pressure turbine blades – A hybrid coating, brazing and aluminising process**
M. Nicolaus*, K. Möhwald, H. Maier (Leibniz University Hannover, Germany)

**15:40** **Influence of superalloy additives on the melting behaviour of green tapes for gas turbine repair brazing**
S. Wiesner, K. Bobzin, M. Öte (RWTH Aachen University, Germany), H. Krappitz, M. Uddin* (Innobraze GmbH, Germany)

**16:00 Tabletop Exhibition, Poster Session, Coffee Break**

**Properties of brazed joints 1**
Session Chairmen: P. Webb (VBC Group, Great Britain) / G. Wagner (Chemnitz University of Technology, Germany)

**16:40 Investigation of interfacial reaction during stainless steel brazing by Ni-base filler with EBSD**
Y. Miyazawa*, K. Kudo, M. Iwata (Tokai University, Japan), Y. Bizen (Hitachi Metals, Ltd., Japan)

**17:00 Investigation on corrosion behaviour of 316L stainless steel brazed joints with a new amorphous nickel-based filler metal**
H. Li*, Y. Li, Z. Li (Beijing University of Technology, P.R. China), J. Senkara (Warsaw University of Technology, Poland), H. Zhuang (Beijing University of Aeronautics and Astronautics, P.R. China)

**17:20 Corrosion fatigue performance of brazed 304L stainless steel joints using gold based brazing alloys**
A. Schmiedt*, M. Manka, W. Tillmann, F. Walther (Dortmund University of Technology, Germany)

**17:40 Improvement of fatigue strength and structural design in heavy steel constructions through arc brazing**
A. Gericke*, F. Wegener (Fraunhofer IGP, Germany), K. Drebenstedt, U. Kuhlmann (Universität Stuttgart, Germany), K. Henkel (Universität Rostock, Germany), R. Glienke (Hochschule Wismar, Germany)

**18:00 Award Presentations**

**18:30 Welcome Reception**

All attendees are invited by DVS to partake in the refreshments.

**Brazing of light metals and intermetallics**
Session Chairmen: K. Matsu (Tokyo Braze Co., Ltd., Japan) / H. Janssen (Hydro Aluminium Rolled Products GmbH, Germany)

**09:00** **Surface preparation of the coatings for compound casting of Al-steel sheet hybrids**
L. Gerdt*, K. Bobzin, M. Öte, S. Wiesner, A. Bührig-Polaczek, J. Brachmann (RWTH Aachen University, Germany)

**09:20** **Increasing of brazed joint strength of thin sheet metals for arc brazing with different low-melting filler wires**
T. Twiehaus*, U. Reisgen, M. Angerhausen, A. Pipinikas (RWTH Aachen University, Germany)

**09:40** **Joining of TiAl-based alloy by using Ti-Ni-Nb-Zr filler alloy**
Y. Shang, H. Ren, Y. Jing, H. Xiong*, X. Ren, Y. Cheng (Beijing Institute of Aeronautical Materials, P.R. China)

**10:00** **Post-braze deep cooling of titanium brazed joints**
A. Shapiro* (Titanium Brazing, Inc., United States of America)

**10:20** **Tabletop Exhibition, Poster Session, Coffee Break**

**Properties of brazed joints 2**
Session Chairmen: J. E. Indacochea (University of Illionois at Chicago, United States of America) / H. Krappitz (Innobraze GmbH, Germany)

**10:40** **Influence of the process atmosphere on the fatigue behaviour of brazed stainless steel joints before and after corrosive attack**
V. Fedorov*, G. Wagner, T. Uhlig (Chemnitz University of Technology, Germany), A. Langohr, U. Holländer (Leibniz University Hannover, Germany)

**11:00** **Thermal fatigue of steel joints brazed with various NiCrSiB filler metals**
M. Penyaz*, B. Kalin, O. Sevryukov, A. Ivannikov, A. Suchkov, D. Bachurina, E. Abramov (National Research Nuclear University, Russia)

**11:20** **Investigation of residual stresses in high-temperature-brazed hybrid Cr-CrNi-steel joints**
W. Zinn, A. Magnier, T. Niendorf*, B. Scholtes (Universität Kassel, Germany), K. Möhwald, H. Maier, S. Kresnik (Leibniz University Hannover, Germany)

**11:40** **Exploring the stress state of brazed single lap-joints using FEA simulations**
D. Kemmenoe*, S. Baker (Cornell University, United States of America), E. Theisen, W. Coughlan (Metglas Inc., United States of America)

**12:00** **In-situ observation of crack propagation in brazed joints**
T. Uhlig*, G. Wagner (Chemnitz University of Technology, Germany), S. Weis (University of Applied Sciences Zwickau, Germany)

**12:20** **Tabletop Exhibition, Poster Session, Lunch Break**

**Diffusion brazing and bonding**
Session Chairmen: J. Janczak-Rusch (EMPA, Switzerland) / U. Broich (PVA Industrial Vacuum Systems GmbH, Germany)

**13:20** **Understanding solidification kinetics during TLP bonding of an austenitic stainless steel**
S. Guernaoui*, B. Rouat, J. Zollinger, H. Combeau (Institut Jean Lamour, France)

**13:40** **Control of deformation and material issues during diffusion bonding of micro process devices**
T. Gietzelt*, V. Toth, T. Wunsch, R. Dittmeyer (KIT/IMVT, Germany)

**14:00** **Joining of reactive materials using in-line surface treatment and diffusion bonding technology**
S. Habisch*, P. Mayr (Chemnitz University of Technology, Germany)

**14:20** **Development of diffusion bonded large scale parts for highly stressed tool applications**
J. Pfeiffer* (PVA Löt-und Werkstofftechnik GmbH, Germany), F. Gemse, S. Jahn (Günter-Köhler-Institut für Fügetechnik und Werkstoffprüfung GmbH, Germany), V. Frettlöh, U. Hinzpeter (gemeinnützige KIMW Forschungs-GmbH, Germany), D. Günther, U. Staps (FKT Formenbau und Kunststofftechnik GmbH, Germany), U. Broich (PVA Industrial Vacuum Systems GmbH, Germany)

**14:40** **Reaction-assisted bonding of Ti6Al4V alloy with Ti/Ni reactive nanostructured multilayers and interdiffusion behaviour simulation employing molecular dynamics modelling**
H. Li*, L. Yang, Y. Ma,J. Yuan, A. Hu (Beijing University of Technology, P.R. China), E. Hodúlóva (Slovak University of Technology, Slovakia)

**15:00** **Tabletop Exhibition, Poster Session, Coffee Break**

## May 22, 2019 — Saal Brüssel

**Brazing of ceramic and glass**
Session Chairmen: H. Li (Beijing University of Technology, P.R. China) / K. Bobzin (RWTH Aachen University, Germany)

**15:40** **Crystallization processes of BaO-CaO-$SiO_2$-glasses as sealing material for the application in SOCs**
S. Groß-Barsnick*, J. Brendt, C. Babelot, G. Natour (Forschungszentrum Jülich GmbH, Germany)

**16:00** **Reactive air brazing of ceramic-steel composites with novel composition of brazing pastes**
K. Wätzig*, J. Schlim (Fraunhofer IKTS, Germany), W. Tillmann, A. Eilers, N. Sievers, M. Manka (Dortmund University of Technology, Germany)

**16:20** **Ceramic joining technology for thermoelectric modules**
A. Rost*, M. Trache, J. Schilm (Fraunhofer IKTS, Germany), D. Zuckermann (Isabellenhütte, Germany)

**16:40** **Brazes for extremely high temperatures**
H. Martin*, S. Roszeitis, B. Matthey, A. Michaelis (Fraunhofer IKTS, Germany), M. Herrmann, M. Graffe, W. Lippmann (Technische Universität Dresden, Germany), M. Schmidt, U. Burkhardt (MPI-CPfS, Germany)

**17:00** **Brazed metal-ceramic components for space applications**
H. Elsener*, L. Jeurgens, T. Burgdorfd, B. Rheingans (EMPA, Switzerland), S. Brüngger, D. Piazza, P. Wurz (University of Bern, Switzerland)

**18:00** **Sightseeing Historic Old Town of Aachen**


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## May 23, 2019 — Saal Brüssel

**Application methods for brazing metals**
Session Chairmen: J. Nowacki (West Pomeranian University of Technology, Poland) / K. Möhwald (Leibniz University Hannover, Germany)

**09:00** **Development and application of thermoplastic-coated particles for joining with powdered brazing alloys**
M. Schmieding*, U. Holländer, F. Weber, K. Möhwald, H. Maier (Leibniz University Hannover, Germany), E. Schmidt (Technische Hochschule Georg Agricola, Germany)

**09:20** **Hybrid friction surfacing – Supporting a friction surfacing process by resistance heating**
D. Köberlin*, J. Zschetzsche, U. Füssel (Technische Universität Dresden, Germany)

**09:40** **In situ chromium carbide formation in carbon modified brazed NiCrP-coatings**
U. Holländer*, H. Maier, K. Möhwald (Leibniz University Hannover, Germany)

**10:00** **Tabletop Exhibition, Poster Session, Coffee Break**

**Development of brazing metals**
Session Chairmen: B. Berme (General Electric, Turkey) / M. Türpe (MAHLE Behr GmbH & Co. KG, Germany)

**10:40** **Estimation of Pb-free brass soldering-ability using in situ observation method**
H. Tajima*, H. Okada, Y. Miyazawa (Tokai University, Japan), H. Tameda (Kitz Metal Works Corporation, Japan)

**11:00** **Influence of tin on the wetting behaviour of aluminum**
A. Schmidt*, K. Bobzin, M. Öte, S. Wiesner (RWTH Aachen University, Germany), J. Mayer, A. Aretz (Central Facility for Electron Microscopy, Germany)

**11:20** **Surface deoxidation mechanisms of stainless steels in vacuum brazing processes**
C. Strauß*, R. Gustus, W. Maus-Friedrichs (Technical University Clausthal, Germany), S. Schöler, U. Holländer, K. Möhwald (Leibniz University Hannover, Germany)

**11:40** **Development of low silver content brazing filler metal**
K. Matsu*, S. Kangdao (Tokyo Braze Co., Ltd., Japan), T. Kishimoto, T. Terui, M. Takahashi (Tanaka Precious Metals, Japan)

**12:00** **Poster Award**

**12:10** **Tabletop Exhibition, Poster Session, Lunch Break**

**Brazing of Ni-/Fe-based materials**
Session Chairmen: H. Xiong (Beijing Institute of Aeronautical Materials, P.R. China) / I. Reinkensmeier (Siemens AG, Germany)

**12:40** **Manufacturing of Ni-based brazing form parts by means of additive manufacturing**
M. Schmitt*, O. Hendriks (voestalpine Böhler Welding Fontargen GmbH, Germany)

**13:00** **Furnace brazing of inconel 718 with Ni and BNi-2 nanopastes**
A. Hu*, D. Bridges (University of Tennessee Knoxville, United States of America), R. Xu (Rolls-Royce North America, United States of America)

**13:20** **Development of Ni based brazing filler material including Fe and Cu with high corrosion resistance**
T. Sawada* (Sanyo Special Steel Co., Ltd., Japan)

**13:40** **Effect of brazing atmosphere on the corrosion resistance of ferritic stainless steels brazed with Ni and Fe based filler metals**
T. Grøstad*, L. Kjellén (Höganäs AB, Sweden), M. Stroiczek (Höganäs GmbH, Germany)

**14:00** **Microstructure and joint strength properties when brazing with nickel and nickel-iron based amorphous brazing foils**
E. Theisen*, W. Coughlan (Metglas Inc., United States of America), D. Kemmenoe, S. Baker (Cornell University, United States of America)

**14:20** **Closing Remarks**

## Poster Session

Posters 1 to 7 are results from projects of the Industrial Collective Research for SMEs. The core activity of the German Federation of Industrial Research Associations (AiF) is the so called Industrial Collective Research (IGF). Collective research is a mechanism enabling businesses to solve shared problems through shared projects. This kind of pre-competitive research closes the gap between basic research and industrial application. The results are available for everyone interested and the basis for individual adaptations within enterprises.

**01** **Advanced process control during induction brazing by detecting the filler metal state**
J. Hebing*, K. Bobzin, M. Öte, S. Wiesner (RWTH Aachen University, Germany)

**02** **Production and application of thermoplastic-coated braze metal particles for brazing processes with powdered brazing alloys**
M. Schmieding*, U. Holländer, F. Weber, K. Möhwald, H. Maier (Leibniz University Hannover, Germany), E. Schmidt (Technische Hochschule Georg Agricola, Germany)

**03** **Development of copper aluminium composite wires for the in situ formation of CuAl based braze metals during furnace brazing of CrNi steels**
M. Schmieding*, U. Holländer, A. Langohr, K. Möhwald, H. Maier (Leibniz University Hannover, Germany)

**04** **Process monitoring during brazing of large components**
M. Manka, W. Tillmann, L. Wojarski, B. Lehmert* (Dortmund University of Technology, Germany)

**05** **Influence of the process atmosphere on the fatigue behaviour of brazed stainless steel joints before and after corrosive attack**
V. Fedorov*, T. Uhlig, G. Wagner (Chemnitz University of Technology, Germany), A. Langohr, U. Höllander (Leibniz University Hannover, Germany)

**06** **Hybrid friction surfacing – Supporting a friction surfacing process by resistance heating**
D. Köberlin*, J. Zschetzsche, U. Füssel (Technische Universität Dresden, Germany)

**07** **Influence of manufacturing and geometric parameters on the performance of arc-brazed galvanized steel structures t > 3 mm**
P. Andreazza*, R. Banaschik, K.-M. Henkel (Fraunhofer IGP, Germany)

## Poster Session

**08** **High entropy alloys as brazing filler metals**
R. Goodall*, M. Way, L. Hardwick, R. Snell (University of Sheffield, Great Britain), E. Pickering (University of Manchester, Great Britan)

**09** **Kinetic investigations for brazing Zn-surfaced AlSi duplex braze metal coatings with $NH_4Cl$-doped process gases**
A. Langohr*, U. Holländer, K. Möhwald (Leibniz University Hannover, Germany), S. Groß-Bölting (Dortmund University of Technology, Germany)

**10** **Joining sintered NdFeB permanent magnets using two kinds of filler metals: microstructure and mechanical properties**
C. Luo*, Y. Lu, F. Xing, Y. Ruan, X. Qiu (Jilin University, P.R. China)

**11** **The thermal stability of Cu/W nano-multilayers for low-temperature brazing applications**
H. Li*, Z. Xing, Q. Qiao (Beijing University of Technology, P.R. China), B. Lehmert, M. Manka, W. Tillmann (Dortmund University of Technology, Germany)

**12** **Brazing of nonmetallic materials with Ta and Nb by fillers based on Cu-Ni system without pressure application**
T. Sydorenko*, V. Zhuravlev (I. Frantsevich Institute for Problems of Materials Science of NAS of Ukraine, Ukraine)

**13** **Influence of gap clearance on brazing joint strength for Ni and Fe based filler metals for brazing ferritic stainless steels**
T. Grøstad*, L. Kjellén (Höganäs AB, Sweden), M. Stroiczek (Höganäs GmbH, Germany)

**14** **Ultrarapid formation of full $Cu_3Sn$ joints through ultrasonic-assisted die bonding with Sn+Cu composite solder paste for high temperature application.**
H. Ji*, M. Li (Harbin Institute of Technology, P.R. China)

**15** **Direct bonding of $Al_2O_3$ ceramic, Cu and 5056 aluminum alloy with Sn-Zn-Sb type solders**
H. Li*, J. Zhang, W. Qu, H. Zhuang (Beijing University of Technology, P.R. China)

**16** **Low temperature joining of copper with Ag precursors**
S. Hausner*, P. Frenzel, J. Noll, G. Wagner, H. Lang (Chemnitz University of Technology, Germany)

## Poster Session

**17** **Joint interface of diamond produced by using nano-gold ink and vanadium examined by infrared-rays spectroscopic analysis**
M. Hino*, T. Yamazaki (Tokyo Institute of Technology, Japan)

**18** **Scarf joining repair of carbon/carbon composite using Au-Ni-Cr alloy powder**
T. Yamazaki*, M. Fukuda, G. Yamazaki (Tokyo Institute of Technology, Japan)

**19** **Coating technologies for tailored brazing solutions**
J. Janczak-Rusch, T. Burgdorf*, H. Elsener, B. Rheingans, C. Cancellieri, L. Jeurgens (EMPA, Switzerland)

**20** **Study on brazing SiC ceramics and metal Mo with AuPdCoMnNi alloy**
H. Feng*, B. Chen, H. Xiong, W. Li, Y. Cheng (Beijing Institute of Aeronautical Materials, P.R. China)

**21** **Analysis of interfacial microstructure of stainless steel brazed joint using EBSD method**
K. Kudo*, M. Iwata, Y. Miyazawa (Tokai University, Japan), Y. Bizen (Hitachi Kinzoku, Japan)

**22** **Metallurgical analysis at the brazed joint of metallic cultural heritages**
H. Sato*, T. Sasaki, Y. Miyazawa, K. Yamahana (Tokai University, Japan)

**23** **Influence of vibratory action on soldered joint formation**
I. Pashkov*, V. Misnikov (PBSU, Russia), T. Bazlova (MISIS, Russia)

**24** **In situ observation during copper alloy brazing using X-ray system**
H. Okada*, Y. Miyazawa (Tokai University, Japan), F. Kanazaki (Saginomiya seisakusho Incorporated, Japan)

**25** **The effect of molybdenum and vanadium on corrosion behaviour of high chromium nickel brazing alloys**
S. Sivasli*, 0. Sorucu, K. Boz (Sentes-Bir A.S., Turkey)

## Poster Session

**26** **Development of rapidly quenched filler alloys for brazing of ITER and DEMO components**
A. Suchkov*, B. Kalin, O. Sevryukov, D. Bachurina, A. Ivannikov, P. Morokhov, M. Penyaz (National Research Nuclear University MEPhI, Russia)

**27** **Damage zone analysis of Ni-based super alloy brazed joints for high temperature gas turbine applications**
J. Wildofsky*, B. Alexandrov, A. Benatar (Ohio State University, United States of America), R. Xu (Rolls-Royce, United States of America)

**28** **Melting characteristics of selected brazing filler metals by thermal analysis; differential scanning calorimetry (DSC)**
J. Brace*, A. Battenbough, A. Osmanda (Wall Colmonoy Ltd., Great Britain), M. Weinstein, L. Lee, L. Johnson (Wall Colmonoy Corp., United States of America)

**29** **Brazing of stainless steel and C/C composite with active brazing filler metal**
M. Uchibori*, T. Sasaki, Y. Miyazawa (Tokai University, Japan)

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# Information

## Conference Location

Eurogress Aachen
Monheimsallee 48
52062 Aachen
Germany

## Registration

**E-mail or fax**

Send your complete registration form to
DVS – German Welding Society
Conference Department
P.O. Box 10 19 65
40010 Düsseldorf, Germany
P +49 211 1591-302/-303
F +49 211 1591-300
tagungen@dvs-hg.de

**Online**

You can also use the online registration: www.dvs-ev.de/LOET2019
(will be closed by May 14, 2019)

If your registration form has not been received by DVS May 1, 2019, you will pay a late registration fee of EUR 80. This applies also to on-site registration. A registration confirmation/invoice will be sent to you within 10 business days of receiving your registration.

## Payment

**By bank transfer:**

DVS – German Welding Society
Commerzbank AG, Düsseldorf,
BIC-code: DRESDEFF300
IBAN-code.: DE82 3008 0000 0212 6011 00

Any bank charges which may be incurred will be borne by the attendees. Keyword for credit transfer (please do not forget): LÖT 2019, no. of invoice and name of attendee.

**By credit card:**

MasterCard, Visa, American Express

## Cancellations

All cancellations must be in writing to DVS by May 1, 2019. Cancellations after May 1, 2019 cost EUR 100 for administrative fee. No refunds will be given for cancellations made after May 5, 2019. A substitute can be nominated.

### Registration Desk and Check-In / On-site Registration

Registered attendees should check in and pick up their conference tickets incl. the conference proceedings as soon as possible at the registration desk.
The registration desk will be located in the foyer of the Eurogress Aachen, (P +49 241 9131-538). Opening hours for the registration desk are as follows:

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| Monday, May 20, 2019 | 15:30 – 17:30 |
| Tuesday, May 21, 2019 | 8:00 – 17:00 |
| Wednesday, May 22, 2019 | 8:00 – 17:00 |
| Thursday, May 23, 2019 | 8:00 – 14:00 |

### Registration Fees

See registration form or online www.dvs-ev.de/LOET2019

### Conference Information

The conference will take place as a **discussion event**. The names of the presenting authors are followed by an **asterisk**. The language of the conference is **English**.

### Conference Proceedings

The conference proceedings will be published in advance with all illustrations and tables.

### Poster Session

During the conference a poster session will be held in the Berlin Saal (see pages 16 – 19). The contributions to the poster session will be published in the conference proceedings (volume 353 of the DVS report series). The presenters of the posters will be available for discussion at the times mentioned in the conference programme. In addition, further contacts with the presenters can be arranged.

### Award Presentations

Since 2010 the Erich Lugscheider Award is granted every 3 years at the LÖT conference. With this award distinguished persons in the field of brazing are honoured for rendering outstanding services for the international interconnectedness of brazing and soldering technology and the exchange of knowledge as promoted by Professor Erich Lugscheider.

At the suggestion of the programme committee the DVS – German Welding Society has launched a promotional scheme for one of the best contributions. The successful contribution will be chosen by a neutral prize committee, which will include members of the programme committee.

This year the DVS is giving an award for the best poster at the LÖT 2019. Until Wednesday evening (16:00) all participants are asked to tick the poster presentation they think is the best one on their voting paper (enclosed in your conference documents). The presentation with the best design and realization of the topic will be honoured with an award on Thursday at 12:00.

## List of Attendees

All attendees having registered before May 1, 2019 will be entered into a list of attendees. This list will be distributed free of charge during the conference.

## Aachen – sightseeing tour of the historical city

Wednesday, May 22, 2019, 18:00. Start of the tour from the Eurogress Aachen. All participants will have the chance to take part in the sightseeing tour of the old city of Aachen. Discover Aachen by an interesting walk through the historical centre with its venerable old merchants' houses and winding lanes.
Please indicate your participation on the registration form. **The number of participants is limited**.

## Hotel Reservation

Hotel reservations can be made by filling in the enclosed reservation form and faxing it to the
aachen tourist service e.V.
P.O. Box 10 22 51
52022 Aachen, Germany
P +49 241 18029-50
F +49 241 18029-53
incoming@aachen-tourist.de
or online: www.aachen-congress.de/hotels/loet2019

## Parking Area

There are a lot of parking spaces in the underground car park of the Eurogress.
Charges: max. EUR 12 daily

## Travel Connections

**Train:**
Good connections between Düsseldorf – Aachen and Cologne – Aachen.

**Car:**

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| E 314 | Antwerpen – Hasselt – Heerlen – Aachen |
| E 40 | London – Brüssel – Lüttich – Aachen |
| A 4 | Olpe – Cologne – Aachen |
| A 44/46 | Düsseldorf – Neuss – Aachen |

**Plane:**
Airport Maastricht-Aachen (NL), 41 km – www.maa.nl
Airport Köln/Bonn, 85 km – www.koeln-bonn-airport.de
Airport Düsseldorf, 90 km – www.duesseldorf-international.de

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Photo on the front page:
Vacuum brazed diffusion pump housings
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