European Conference on Heat Treatment 2015 & 22nd IFHTSE Congress
Heat Treatment and Surface Engineering
From tradition to innovation

Final Programme & Exhibition Catalogue

Organised by Associazione Italiana di Metallurgia

In cooperation with
# TIME TABLE

## Tuesday, 19 May 2015

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## Wednesday, 20 May 2015

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<td>ROOM A Quenching media and process</td>
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## Thursday, 21 May 2015

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<td>ROOM A Stainless steels Applications</td>
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<td>12.50</td>
<td>ROOM A Announcement of the 23th IFHTEC Congress and European Conference on Heat Treatment 2016</td>
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The long-standing co-operation between AIM - Associazione Italiana di Metallurgia - and the IFHTSE – International Federation for Heat Treatment and Surface Engineering - has already led to the joint organisation of significant events, such as the Congresses held in Florence in 1982 and in 1998 and the Congress on automotive applications organised in Riva del Garda in 2005. Now, the combined efforts will be focused on the organisation of a Conference dealing with tradition and innovation in heat treatment and surface engineering.

The Conference joins the European Conference on Heat Treatment 2015 and the 22nd IFHTSE Congress.

The Conference brings together managers, engineers and researchers from heat treatment shops, tool makers and users, suppliers of heat treatment and surface engineering plant and equipment, as well as material scientists, creating a unique exchange opportunity at an international level among the numerous experts involved in the heat treatment and surface engineering route.
International Steering Committee
Federica Bassani - AIM, Italy
Sylvain Batbedat - A3TS, France
Pierre Bruchet - A3TS, France
Gérard Crevoiserat - SVW/ATT, Switzerland
Stefan Hock - IFHTSE, Italy
Bruno Hribernik - ASMET, Austria
Patrick Jacquot - IFHTSE, France
Xu Kewei - IFHTSE, China
Zoltán Kolozsváry - IFHTSE, Romania
Ottavio Lecis - AIM, Italy
Klaus Löser - AWT, Germany
Carlo Mapelli - AIM, Italy
Reinhold Schneider - IFHTSE, Austria
Pavel Stolar - ATZK, Czech Republic
Bernard Vandewiele - VWT, Belgium and the Netherlands
Robert Wood - IFHTSE, United Kingdom

International Scientific & Programme Committee
Herwig Altena - Aichelin Holding GmbH, Austria
Paolo Luca Antona - Università di Ferrara, Italy
Antonio Bavaro - Laboratorio Prove Bavaro, Italy
Massimiliano Bestetti - Politecnico di Milano, Italy
Mario Cusolito - Rodacciai, Italy
Sabine Denis - Université Henri de Poincare, Nancy, France
Kiyoshi Funatani - MTI Institute, Japan
G. Marina La Vecchia - Università degli Studi di Brescia, Italy
Nora Lecis - Politecnico di Milano, Italy
Thomas Lübben - IWT Bremen, Germany
Rafael Mesquita - Villares, Brazil
Massimo Pellizzari - Università degli Studi di Trento, Italy
Danilo Petta - Gearchem, Italy
Emilio Ramous - Università degli Studi di Padova, Italy
Vladimir Skorobogatykh - CNIIITMASH, Russia
Paul Stratton - Matscribe, United Kingdom
George Totten - Texas A&M University, USA
Eva Troell - Swerea IVF, Sweden
Valentina Vicario - FOMAS Group, Italy
Hans-Werner Zoch - IWT Bremen, Germany
Tuesday, 19 May 2015

17.00/18.30 Opening of the registration

Wednesday, 20 May 2015

8.00 Registration

ROOM A

OPENING SESSION

9.30 Welcome addresses by:
   Reinhold Schneider, IFHTSE President
   Danilo Petta, AIM Heat Treatment & Metallography Study Group President

9.45 Presentation of IFHTSE-Fellowship to
   Dr. Herwig Altena
   Prof. Arkadii Tikhonov
   Dr. Robert Wood

10.00 Keynote lecture
   Determination of the degree of thermal exposure to the lower head of the Three-Mile Island Unit 2 nuclear reactor using metallography
   G.F. Vander Voort - Struers Inc., Wadsworth, USA

10.45 OPENING OF THE EXHIBITION
   Coffee break

ROOM A

MASSIVE HEAT TREATMENTS: MICROSTRUCTURAL PROPERTIES AND TRANSFORMATIONS
   Chairperson: Mario Cusolito - Rodacciai

11.10 Austempering kinetics of a ductile iron
   M. Pellizzari, C. Menapace, G. Straffelini, M. Cazzolli, M. Dal Molin - Università di Trento, Italy
   F. Vettore, E. Veneri - Zanardi Fonderie, Minerbe, Italy

11.30 The effect of niobium on the microstructure and phase transformation kinetics in low-carbon medium manganese steels
   P. Peißl, R. Schneider, M. Rahofer, L. Samek - University of Applied Sciences Upper Austria, Wels
   E. Arenholz - voestalpine Stahl GmbH, Linz, Austria

11.50 Investigation of phase transformations in steel using fast in-situ x-ray diffraction (iXRD)
   A. Kopp, T. Bernthal, G. Ketzer-Raichle, G. Schneider - Aalen University, Germany
   D. Schmid - DSeTec GmbH & Co. KG, Munich, Germany

12.10 Non-destructive in situ monitoring of the microstructural development in high performance steel components during heat treatment
   O. Bruchwald, W. Frackowiak, W. Reimche, H.J. Maier – Leibniz Universität Hannover, Germany

12.30 Investigation of martensite formation in Fe based alloys during heating from boiling nitrogen temperature
   M. Villa, T.L. Christiansen, M.F. Hansen, M.A.J. Somers - Technical University of Denmark, Lyngby, Denmark

12.50 Lunch
Wednesday, 20 May 2015

**ROOM A**

**9.30 OPENING SESSION**

**10.00** Keynote Lecture

**10.45 OPENING OF THE EXHIBITION**

Coffee break

**ROOM B**

**TOOL STEELS**

Chairperson: **Donato Firrao** - Politecnico di Torino

**11.10 Effect of deep cryogenic treatment on the properties of AISI M2 steel**

R. Sola, G. Poli, S. Defanti, P. Veronesi - Università di Modena e Reggio Emilia, Italy

G. Parigi - Stav, Barberino del Mugello, Italy

**11.30 Heat treatment of die casting aluminum dies: bainite or martensite which is the best vs. toughness?**

A. Magnacca - Bodycote, Italy

B. Stauder - Bodycote, France

**11.50 Diversifying the heat treatment possibilities of the high thermal conductivity tool steels for new technological perspectives of the material forming processes**

I. Valls - Rovalma S.A., Rubí, Spain

**12.10 Influence of deep cryogenic treatment routes on the mechanical behaviour of a Cr-Mo-V- hot work tool steel**

L.A. Alava, G. Artola, M. Muro - IK4-Azterlan, Durango, Spain

**12.30 Effectiveness of deep cryogenic treatment in improving properties of tool steel**

B. Podgornik, V. Leskovšek - Institute of Metals and Technology, Ljubljana, Slovenia

B. Zajec - Hidria Rotomatika d.o.o., Spodnja Idrija, Slovenia

S. Jacobson - Uppsala University, Uppsala, Sweden

**12.50 Lunch**
Wednesday, 20 May 2015

ROOM A

MASSIVE HEAT TREATMENTS: RELATIONSHIP BETWEEN PROCESS AND FINAL PROPERTIES
Chairperson: Massimo Pellizzari - Università di Trento

14.10 Dry austempering heat treatment process: Interactions between process parameters, microstructural and mechanical properties
E. Dabrock, F. Sarfert - Robert Bosch GmbH, Renningen, Germany
L. Hagymasi, T. Krug - Robert Bosch GmbH, Stuttgart, Germany
E. Kerscher - University of Kaiserslautern, Germany

14.30 The microstructure and properties of direct quenched martensite subjected to both ultra slow coil tempering and conventional tempering cycles
A. Saastamoinen, D. Porter - University of Oulu, Finland
P. Suikkanen – SSAB Europe Oy, Finland

14.50 Comparative impact behavior of O1 steel under quenching and tempering and austempering
L. de C. F. Canale, J.E. Nucci, L.L.M. Albano - University of São Paulo, São Carlos, Brazil
J. Vatavuk - Universidade Presbiteriana Mackenzie, São Paulo, Brazil
G.E. Totten - Portland State University, USA

15.30 coffee break

NITRIDING AND NITROCARBURIZING – APPLICATION AND COMBINED PROCESSES
Chairperson: Hans-Werner Zoch - Stiftung Institut für Werkstofftechnik

15.50 Development of austenite-martensite and ferrite-austenite duplex microstructure upon nitriding Fe-Mn alloys
S.R. Meka, A. Chauhan - Max Planck Institute for Intelligent Systems, Stuttgart, Germany
T. Steiner - Max Planck Institute for Intelligent Systems, Stuttgart, Germany and Robert Bosch GmbH, Stuttgart, Germany
E.J. Mittemeijer - Max Planck Institute for Intelligent Systems, Stuttgart, Germany and University of Stuttgart, Germany

16.10 Tribological performance of nitrocarburising: influence of the compound layer and interests of post-treatments
P-F. Cardey - CETIM, St.Etienne, France

16.30 Future trends in low temperature thermochemical treatment of stainless steel
T.L. Christiansen, K.V. Dahl, M.A.J. Somers - Technical University of Denmark, Kongens Lyngby, Denmark

16.50 Keys to low pressure nitriding
M. Devienne - Fours Industriels BMI, St. Quentin Fallavier, France

17.10 Influence of plastic deformation on low temperature surface hardening of austenitic and precipitation hardening stainless steels by gaseous nitriding
F. Bottoli, G. Winther, T.L. Christiansen, M.A.J. Somers - Technical University of Denmark, Lyngby

17.30 END of the first day
Wednesday, 20 May 2015

ROOM B

QUENCHING AND HEAT TRANSFER
Chairperson: Marina La Vecchia - Università di Brescia

14.10 The DANIELI QST heat treatment: cooling characterization and microstructural evolution through the thickness of heavy products
N. Sartori, G. Luvarà - Danieli Research Center, Buttrio, Italy
F. Forno - Danieli Morgårdshammar, Udine, Italy

14.30 Cooling rates analysis for steel pipes industrial quenching processes
M. Bentivegni, T. Benard, T. Taisne, C. Zonco – Vallourec Research Center, France

14.50 Dependence of the local heat transfer coefficient on temperature and surface roughness in quenching steel parts in high efficiency quenching oil
K. Moch, S. Dietrich, V. Schulze - Karlsruhe Institute of Technology (KIT), Germany

15.10 Design of quenching units for heat treatment of tubes
M. Chabicovsky, J. Horsky, M. Raudensky, M. Hnizdil, P. Kotrbacek - Brno University of Technology, Czech Republic

15.30 coffee break

QUENCHING MEDIA AND PROCESS
Chairperson: Danilo Petta - Gearchem

15.50 An examination of the ASTM D 6482 (Tensi Method) for evaluating polymer quenchants
D.S. MacKenzie - Houghton International, Valley Forge PA, USA

16.10 Control of polymer quenchants for increased life time and optimized maintenance
E. Troell, H. Kristoffersen, A. Stormvinter - Swerea IVF, Mölndal, Sweden

16.30 Influence of oil and polymer quenching on distortion of thin walled bearing rings
T. Wolfrath - Fuchs Schmierstoffe GmbH, Mannheim, Germany
T. Lübben, F. Frerichs - IWT, Bremen, Germany

16.50 Stabilization of vegetable oil-based quenchants to thermal-oxidative degradation: experimental strategy and effect of oxidation on quenching performance
E.C.A. Simêncio, R.L. Simencio Otero, L.C.F. Canale - Universidade de São Paulo, São Carlos, Brasil
G.E. Totten - Portland State University, USA

17.10 Substitution of quenching oils by waterbased polymer quenchants in the forging and steel industry
T. Beitz - Petrofer Chemie, Hildesheim, Germany
A. Vitali - Petrofer Italia, Castel Mella, Italy

17.30 END of the first day
Thursday, 21 May 2015

ROOM A

MASSIVE HEAT TREATMENTS OF SPECIAL COMPONENTS
Chairperson: Reinhold Schneider - University of Applied Sciences Upper Austria

9.00 Macro- and microscopic properties of gradient ultra-high-strength seamless steel tubes produced by dedicated thermo-mechanical treatments
G. Winter, J. Klarner - voestalpine Tubulars GmbH & Co KG, Kindberg, Austria
B. Buchmayr, J. Keckes - University of Leoben, Austria

9.20 Process windows for shell hardening of unalloyed steel cylinders due to high speed quenching
Th. Lübben, F. Frerichs - Stiftung Institut für Werkstofftechnik (IWT), Bremen, Germany

9.40 Deep cryogenic treatment and its influence on structure, mechanical properties and in-service life of high speed steel
A. Ciski, T. Babul, J. Jelenkowski - Institute of Precision Mechanics, Warsaw, Poland

10.00 Simulation of heat treatment of a mold for HPDC: cooling in gas or salt to get the best performance?
A. Magistrelli, D. Mattavelli - TTN, Italy
P. Martelli, L. Valente - Ecotre Valente, Italy

10.20 Effect of thermomechanical treatment on the graphitization of hypoeutectoid steel with high silicon content
H.J. Lee - POSCO, Pohang, South Korea

10.40 coffee break

QUALITY AND ACCREDITATION
Chairperson: Bernard Vandewiele - BVDW Consultancy VOF

11.10 Accreditation NADCAP
E. Gianotti, A. Leone - Trattamenti Termici Ferioli & Gianotti, Caselette, Italy

11.30 Failure analysis of a high speed steel blanking mould machined by EDM
S. Roggero, D. Franchi - Trattamenti Termici Ferioli & Gianotti, Caselette, Italy
D. Firrao - Politecnico di Torino, Italy

11.50 Strategies to optimise the mill and heat performance of a steel plant
J. Hinton, A. Harvey - Primetals Technologies Ltd., Sheffield, United Kingdom

12.10 Carbonitriding “high nitrogen” - from concept to industrialisation – part II – furnace design and simulation
A. Fleurentin - Metallo Corner, Paris, France
K-M. Winter - Process-Electronic GmbH, Heiningen, Germany

12.30 Retained austenite and residual stress: non destructive analysis by using X-Ray, ASTM 975-03 and UNI EN 15305
L. Seralessandri, A. Torboli - GNR, Agrate Conturbia, Italy

12.50 Lunch
Thursday, 21 May 2015

ROOM B

INDUSTRIAL HEAT TREATMENT EQUIPMENT AND PROCESS INNOVATION
Chairperson: Marco Farinet - Trafitec

9.00 Process technology and plant design for bainite hardening
H. Altena - Aichelin Holding GmbH, Mödling, Austria
K. Buchner - Aichelin GesmbH, Mödling, Austria

9.20 Lowering Exhaust gas losses and emissions with newly developed recuperative and regenerative burners
J.G. Wuenning - WS Waerme prozesstechnik GmbH, Renningen, Germany

9.40 Distorsions point of view: process, fixtures and equipment
V. Esteve - ECM Technologies, Grenoble, France

10.00 Advanced hot-zone and cooling gas stream design in vacuum furnaces for automotive applications
B. Zieger, R. Stein - SCHMETZ GmbH, Menden, Germany

10.40 coffee break

INDUSTRIAL HEAT TREATMENT EQUIPMENT AND PROCESS INNOVATION
Chairperson: Herwig Altena - Aichelin Holding GmbH

11.10 Improvements on induction fixture hardening
W. Goy, J. Kern - EMA Indutec GmbH, Meckesheim, Germany

11.30 Vacuum heat treatment systems for modern production strategies
K. Löser, V. Heuer - ALD Vacuum Technologies GmbH, Hanau, Germany

11.50 Outstanding case hardening of Pyrowear® alloy S3 with LPC
M. Korecki, M. Bazel, M. Sut - SECO/WARWICK, Poland
E. Wołowiec-Korecka - Lodz University of Technical, Poland

12.10 FEM-Supported development of single-shot hardening process for crank and camshafts
A. Ulferts, F. Andrä - Inductoheat Europe GmbH, Reichenbach, Germany
V. Rudnev, C. Russel - Inductoheat Inc., Madison Heights, USA

12.30 High quality material for high temperature applications. Improvement of parts through the use of Sepcarb
F. Guichard - Herakles Safran Groupe, Le Haillan, France

12.50 Lunch
Thursday, 21 May 2015

ROOM A

STAINLESS STEELS
Chairperson: Valentina Vicario - Fomas Group

14.00 Post weld heat treatment of martensitic stainless steel
M. Pellizzari, C. Menapace - Università di Trento, Italy
N. Sartori, G. Luvarà - Danieli Officine Meccaniche Research Centre, Buttrio, Italy
G. Carnelutti - Danieli Service, Buttrio, Italy

14.20 Effect of ingot dimension on anisotropic behavior of a forged 17-4 PH steel used to produce steam turbine blades for power generation plants
A. Lanzutti, L. Fedrizzi - Università di Udine, Italy
G. Lucacci - C Blade, Maniago, Italy

14.40 Microstructural characterization and layer stability of low-temperature carburized AISI 304L and AISI 904L austenitic stainless steel
G. Maistro, L. Nyborg, Y. Cao - Chalmers University of Technology, Gothenburg, Sweden
S. Vezzù - Veneto Nanotech, Venice, Italy

15.00 Microstructural and phase ratio evolution of super duplex stainless steels during isothermal annealing at 1080°C
A.F. Ciuffini, S. Barella, C. Di Cecca, A. Gruttadaria, C. Mapelli, D. Mombelli - Politecnico di Milano, Italy

16.00 coffee break

CARBURIZING PROCESSES AND PROPERTIES
Chairperson: Luigi Cislaghi - T.T.N.

16.20 Thermochemical treatments of alloys 16NiCrMo13 and 23MnCrMo5: the roles of carbon and nitrogen on metallurgical response to carbonitriding
W. Dal Maz Silva, J. Dulcy, T. Belmonte - IJL, Nancy, France

16.40 Effect of Si concentration on the carbon concentration on surface layer after gas carburizing
T. Koyama, M. Kubota, S. Yoshida - Nippon Steel & Sumitomo Metal Corporation, Muroran, Japan

17.00 Formation of fine and coarse grain layer by atmosphere control in case-hardening steel
T. Ando, T. Morita, K. Inoue - Daido Steel Co. Ltd., Nagoya, Japan

17.20 Carbon potential controlled in direct gas carburizing using hydrocarbon and nitrogen with water vapour
M. Okumiya, J.H. Kong, Y. Tsunekawa, I. Kondo - Toyota Technological Institute, Nagoya, Japan
M. Yamada, S. Simizu, S. Miura - TOHO GAS Co., Ltd., Tokai, Japan

17.40 Keynote lecture
Consistency in different grain size measurement methods
G.F. Vander Voort - Struers Inc., Wadsworth, USA

18.15 END of the second day

19.00 Social event sponsored by TAV
Thursday, 21 May 2015

**ROOM B**

**APPLICATIONS**

Chairperson: **Stefan Hock** - IFHTSE

14.00 The DANIELI Rail Head Hardening Technology “RH2” from laboratory scale to industrial production
U. Saccoman, G. Luvarà, D. Andreatta - Danieli Research Center, Buttrio, Italy
L. Gori - Danieli Morgårdshammar, Italy

14.20 Yield stress evolution in Inconel 718 samples under standard heat treatment process conditions of turbine disks
H. Maderbacher - Montanuniversität Leoben, Austria
B. Oberwinkler - Böhler Schmiedetechnik GmbH & Co KG, Kapfenberg, Austria
A. Fischersworring-Bunk - MTU Aero Engines AG, Munich, Germany

14.40 Improved properties of high strength 18Ni maraging steels for pushbelt CVT applications by optimization of alloy compositions and surface hardening heat treatments
B. Pennings, K. Hatanaka, L. Crebolder - Bosch Transmission Technology B.V., Tilburg, Netherlands

15.00 Alternative heat and surface treatment for drivetrain applications
V. Strobl, R. Noebauer - Ruebig GmbH & Co.KG, Wels, Austria

15.20 In-service and simulated thermal transformation of steels for high temperature applications
P. Aeuerkari, S. Yli-Olli, S. Tuurna - VTT, Espoo, Finland

15.40 Development of novel plasma surface engineering technologies for multi-functional surfaces
K. Lin, L. Tian, X. Li, H. Dong - The University of Birmingham, United Kingdom

16.00 coffee break

**NON FERROUS PROCESSES AND PROPERTIES**

Chairperson: **Lorella Ceschini** - Università di Bologna

16.20 Design optimization of heat treatment support frames for aluminum alloy structural cast parts using virtual experimentation
H-J. Gaspers, J. Thorborg - MAGMA Gießereitechnologie GmbH, Aachen, Germany

16.40 Heat treatment optimization of secondary AlSi10MnMg(Fe) test parts fabricated by vacuum assisted high pressure die casting technology
A.I. Fernández-Calvo, A. Bakedano, E. Barbarias, F. Santos, A. Niklas - IK4-AZTERLAN, Durango, Spain

17.00 Effect of different pretreatment processes on the properties of copper plating on titanium alloy tubing surface
Q. Liu, S-y. Song, G. Wu - China National Petroleum Corporation, Xi’an, China
Y-n. Chen - Chang’an University, Xi’an, China

**ROOM A**

17.40 Keynote lecture
Consistency in different grain size measurement methods
G.F. Vander Voort - Struers Inc., Wadsworth, USA

18.15 END of the second day

19.00 **Social event** sponsored by TAV VACUUM TURNFACES
Friday, 22 May 2015

**ROOM A**

**NITRIDING AND NITROCARBURIZING – APPLICATION AND COMBINED PROCESSES**

Chairperson: **Emilio Ramous** - Università di Padova

9.00 **Gaseous nitriding of micro-alloyed steel sheets**
E. Leunis, L. Moli Sanchez - ArcelorMittal Global R&D Gent, OCAS NV, Zelzate, Belgium

9.20 **Fluidized bed nitriding in chemically active powders of HS 6-5-2 steel**
K. Lankiewicz, A. Ciski, T. Babul - Institute of Precision Mechanics, Warsaw, Poland
J. Nižňanská - COMTEST FHT a.s., Dobráň, Czech Republic

9.40 **Numerical model of the ferritic nitrocarburizing of plain carbon steels**
M. Manivannan, V. Stoilov, D.O. Northwood - University of Windsor, Canada

10.00 **Acceleration of nitriding process by usage of catalytic properties of oxide films**
L. Petrova, V. Aleksandrov, A. Malakhov - Moscow Automobile and Road Construction State Technical University (MADI), Russia

10.20 **coffee break**

**COATINGS PROCESSES AND APPLICATIONS**

Chairperson: **Silvia Roggero** - Trattamenti Termici Ferioli & Gianotti

10.50 **Electron beam liquid phase surface treatments – facilitating the use of PVD hard coatings as surface protection for cast irons**
A. Buchwalder, A. Jung - TU Bergakademie Freiberg, Germany
R. Zenker - TU Bergakademie Freiberg, Germany and Zenker-Consult, Germany
M. Steudtner, M. Engelmann - Techno-Coat Oberflächentechnik GmbH, Germany
F. Gleißner, R. Schwab - Schönheider Guss GmbH, Germany

11.10 **Laser surface texturing of PVD coatings applied to sheet forming dies for stainless steel**
M. Calandri, D. Ugues - Politecnico di Torino, Italy
M. Lorusso - IIT, Torino, Italy
A.G. Demir, N.F. Lecis, B. Previtali - Politecnico di Milano, Italy

11.30 **DEBACOAT project: Development of high-performance extrusion barrels with innovative gradient coatings**
J.N. Lemke, L. Roveri, N. Lecis, S. Zarini, B. Previtali, M. Vedani - Politecnico di Milano, Italy
O. Stejskal - Bernex Bimetallic Sro, Modrice, Czech Republic
F. Kubisch, M. Pfennig, F. Brueckner, S. Nowotny - Fraunhofer Institute Material and Beam Technology IWS, Dresden, Germany
J. Leunda, C. Soriano, C. Sanz - IK4 – TEKNIKER Polo tecnológico de Eibar, Gipuzkoa, Spain
B. Bouaïf, D. Schbieb - nt - Neue Technologie Systemlösungen GmbH, Osterode am Harz, Germany
C. Andrianopoli - Cogne Acciai Speciali, Italy
X. Garmendia - GNC Läser, Gipuzkoa, Spain

11.50 **Characterization of TiAlBN/TiAlN/TiN multilayer coatings prepared by pulsed d.c plasma-enhanced chemical vapor deposition**
K. Kawata, Y. Sekiya, T. Kidachi - Oriental Engineering Co., Ltd., Kawagoe-city, Japan

12.30 **Closing Ceremony and announcement of the Tom Bell Young Author Award winner, sponsored by Linde Group.**

12.50 **Announcement of the 23th IFHTSE Congress and of the European Conference on Heat Treatment 2016**

13.05 **End of the Conference**
Friday, 22 May 2015

**ROOM B**

**COATINGS PROPERTIES AND CHARACTERIZATION**

Chairperson: Daniele Ugues - Politecnico di Torino

9.00 Electron beam hardening of PVD-coated steels - improved load-supporting capacity for Ti₁₋ₓAlₓN layers
G. Grumbt, H. Biermann - TU Bergakademie Freiberg, Germany
R. Zenker - TU Bergakademie Freiberg, Germany and Zenker-Consult, Mittweida, Germany
K. Weigel, K. Bewilogua, G. Bräuer - Fraunhofer IST, Braunschweig, Germany

9.20 Effect of electron beam remelting to microstructure and phase modification of HVOF and CGDS CoNiCrAlY coatings
P. Gavendová, I. Dlouhý, J. Čížek, J. Čupera, P. Hanusová - Brno University of Technology, Czech Republic

9.40 The effect of AlN/Ti interlayers on the mechanical and tribological behaviour of DLC coatings
M. Patru, D. Cristea, I. Ghiuta, D. Munteanu - Transilvania University of Brasov, Romania

10.00 Tribological behaviours of wear-resistant coatings on 304 stainless steel fabricated by cathodic plasma electrolytic oxidation at ambient and high temperature
X. Jin, W. Xue, J. Wu, R. Liu, B. Wang, J. Du, X. Wu - Beijing Normal University, China

10.20 coffee break

**INDUSTRIAL HEAT TREATMENT PROCESS AND SIMULATION**

Chairperson: Vincenzo Tosetto - Inductotherm Group Italy

10.50 Numerical FEM simulation of induction hardening process: a multiphysical approach
M. Spezzapria, M. Forzan, F. Dughiero - Università di Padova, Italy

11.10 Process optimization for an energy efficient heat treatment of ADI
E. Hepp, M. Dzusov, W. Schäfer - MAGMA Gießereitechnologie GmbH, Aachen, Germany

11.30 Heat treatment of steels – virtual optimization of microstructures, mechanical properties, stresses and distortions
C. Thomser, J. Thorborg - MAGMA Gießereitechnologie GmbH Aachen, Germany

11.50 FE Simulation and temperature measurements for the induction heating of large billets
M. Magritzer, V. Wieser, P. Markiewicz, S. Zinner - Böhler Edelstahl GmbH & Co KG, Kapfenberg, Austria

12.10 Study on simulation accuracy of quench distortion of tool steel parts
M. Narazaki, M. Kogawara, A. Shirayori - Utsunomiya University, Tochigi, Japan
H. Someya - Onward Giken, Tochigi, Japan
S-Y. Kim, S. Kubota - Yamanaka Eng. Co, Ltd, Chiba, Japan

**ROOM A**

12.30 Closing Ceremony and announcement of the Tom Bell Young Author Award winner, sponsored by Linde Group.

12.50 Announcement of the 23th IFHTSE Congress and of the European Conference on Heat Treatment 2016

13.05 End of the Conference
Batch annealing model for cold rolled coils and its application
C-J. Fang, L-W. Wu - China Steel Corporation, Kaohsiung, Taiwan R.O.C

Cutting tool performance of recycle-type Fe3Al composites evaluated by lath
T. Itoi, T. Sudo - Chiba University, Japan

Surface preparation and PVD coating of broaches
S. Roggero, D. Franchi - Trattamenti Termici Ferioli & Gianotti, Caselette, Italy
C. Galamand - Platit S.A., Grenchen, Switzerland
F. Gianotti - Trattamenti Termici Ferioli & Gianotti, Cascine Vica, Italy
P. Matteis - Politecnico di Torino, Italy

Investigation of friction and wear behaviors of solid expandable casing with different lubricants
S-y. Song, Q. Liu, F. Tian - China National Petroleum Corporation, Xi’an, China

Abrasive impact wear resistance of hardfacings
P. Kulu, A. Surzenkov, R. Tarbe, T. Simson - Tallinn University of Technology, Estonia

RQP1: Heat treatment system survey and quality control
P-F. Cardey - CETIM, St.Etienne, France

Effect of solution time during the T6 heat treatment on microstructure and microhardness of a directionally solidified Al-Si-Cu alloy
T.A. Costa, M. Dias, A. Garcia - University of Campinas, Brazil
L. Gouvea Gomes, O. Lima Rocha - Federal Institute of Education, Belém, Brazil

Valve tests at high pressure and cryogenic conditions
A. Recanati - SIAD, Bergamo, Italy

Electrodeposition of minerals substituted hydroxyapatite coating on high energy electron beam treated surgical grade stainless steel for improved mechanical and biological properties
D. Gopi - Periyar University, Tamilnadu, India
L. Kavitha - Central University of Tamilnadu, India

Metallurgical, mechanical and electrochemical behavior study of the lamellar gray cast iron treated with niobium
M.O. Azzoug, R. Drif, K. Boulgheb, N. Zaourar - University of Science and Technology Houari Boumediene, Algeria
N. Madaoui - Ionized Media Laboratory, Baba Hassene, Algeria

Gasoxinitriding with variable nitriding potential - material and process specific investigations
A. Dalke, H-J. Spies, H. Zimdars, H. Biermann - TU Bergakademie Freiberg IWT, Germany

Punch lifetime in fine-blanking with optimum combination of mechanical properties
R. Veinthal, P. Peetsalu, M. Saarna, F. Sergejev - Tallinn University of Technology, Estonia

Effect of nitriding process on tribological properties of surface engineered steel / aluminum pairs
G. Aktaş, Ş. Polat, Ş. Hakan Atapek - Kocaeli University, Turkey

Multi-surface treatments for enhancement of the tribological properties of hot work tool steels used in AA6080 extrusion
G. Aktaş, Ş. Polat, Ş. Hakan Atapek - Kocaeli University, Turkey
Pulsed electron beam facilities for surface thermotreatment of materials
V. Engelko - Efremov Inst. of Electrophysical apparatus, St.Petersburg, Russia

Behavior of the nitrogen and carbon enriched layer of plasma nitrocarburized 316L austenitic stainless steel on changing pulse frequency and discharge voltage at fixed plasma-off time
A. Barua, I. Lee - Dongeui University, Busan, Korea

Effect of pressurized jet on heat transfer characteristics of staggered-array jets on hot steel plate
S. Sohn, T. Kim, K.H. Do, J. Lee - Korea Institute of Machinery and Materials, Daejeon, Korea

Influence of processing parameters on geometrical features of clad produced by high power diode laser cladding of carbon steel with different powders
S. Zanzarin, A. Molinari - Università di Trento, Italy
S. Bengtsson - Höganäs AB, Höganäs, Sweden

Efficiency-enhancing maintenance of heating systems
D. Mäder - NOXMAT GmbH, Hagen, Germany
O. Schmiel Gamarra, M. Schulze, R. Lohr - NOXMAT GmbH, Oederan, Germany

Numerical method for modelling spray quenching of cylindrical forgings
M. Soltani, A. Pola, G.M. La Vecchia - Università di Brescia, Italy
M. Modigell - Gutech - German University of Technology, Oman

Effect of different heat treatments on the microstructure and the mechanical properties of a 750 gold alloy
L. Pezzato, G. Magnabosco, K. Brunelli, M. Dabalà - Università di Padova, Italy

The influence of chemical composition and microstructure on the heat treatment cycle and mechanical properties of railway wheels
A. Ghidini - Lucchini RS, Italy
P. Martelli, C. Viscardi - Ecotre Valente, Italy

How to recover oil from washing bath
E. Piana, F. Paradisi - Karberg & Hennemann, Modena, Italy

Effect of thickness and substrate material on the functional and mechanical properties of Wc-Co-Cr coatings
E. Gariboldi, N. Lecis - Politecnico di Milano, Italy
W. Cerri - Flame Spray, Milano, Italy

Gradient Fe-alloy based inlay coatings for extrusion barrels produced by spin casting
J.N. Lemke, L. Rovatti, N. Lecis, M. Vedani - Politecnico di Milano, Italy
O. Stejskal - Bernex Bimetallic Sro, Modrice Czech Republic

DEBACOAT project: Effect of pre-heating temperature on microstructure and wear resistance of a laser cladded Ni-based alloy reinforced with tungsten carbides
L. Rovatti, S. Zarini, R. Casati, B. Previtali, M. Vedani - Politecnico di Milano, Italy

DEBACOAT project: Laser cladding of WC reinforced NiCr alloy on inner walls of extrusion barrels
J. Leunda, C. Soriano, C. Sanz - IK4-TEKNIKER, Gipuzkoa, Spain

DEBACOAT project: Internal laser cladding of barrels with the newly developed Mini\textsubscript{id} cladding head
F. Kubisch, M. Pfennig, F. Brückner, S. Nowotny - Fraunhofer Institute Material and Beam Technology IWS, Dresden, Germany
Technological aspects of the process of steels and cast irons liquid boriding
S.G. Tsikh, V.N. Skorobogatykh - RPA CNITMASH, Moscow, Russia
N.E. Shkliar - BMSTU, Moscow, Russia
P.V. Doudkin – Ltd Termohim, Moscow, Russia

Gas phase deep nitriding of 32CDV13 low alloy steel for aerospace applications
O. Skiba - Université de Lorraine, Nancy, France and Hispano-Suiza, groupe Safran, Colombes, France
J. Dulcy, G. Marcos, T. Czerwiec - Université de Lorraine, Nancy, France
A. Courleux, S. Becquerelle - Hispano-Suiza, groupe Safran, Colombes, France

Development and optimization of an oxynitrocarburizing treatment
D. Caliari, G. Timelli - Università di Padova, Vicenza, Italy
T. Salata, S. Maestri - Alfa Ossidazione, Borgosatollo, Italy

Computer simulation of mechanical properties of quenched and tempered stamping punch
B. Smoljan, D. Iljič, S. Smokvina Hanza - University of Rijeka, Croatia

Microstructure and corrosion behavior of duplex coating fabricated by plasma nitriding and TiN/TiCN pulsed DC PACVD method on K390 MC cold work tool steel
D. Landek, F. Cajner, S. Kovačić, V. Alar, V. Macura - University of Zagreb, Croatia

Wear resistance of TiN/TiCN and TiN/Ti-B-N multilayers coatings fabricated by the pulsed DC PACVD process on K390 MC cold work tool steel
F. Cajner, D. Landek, H. Rafael, J. Jačan, D. Bogdanić - University of Zagreb, Croatia

Liquid Quenchant Database
I. Felde - Óbuda University, Hungary

Effect of deep cryogenic treatment on carbides precipitation kinetics during tempering of the X37CrMoV5-1 hot working tool steel
P. Šuchmann, J. Nižňanská - Comtes FHT, Dobrany, Czech Republic

Hardening of 100CrMnSi6-4 bearing steel after accelerated carbide spheroidisation and long-duration annealing
D. Hauserova, J. Dlouhy, Z. Novy - Comtes FHT, Dobrany, Czech Republic

Bioquenchants based on chemically modified vegetable oil: physical properties and metallurgical behavior
R.L. Simencio Otero, L.C.F. Canale - Universidade de São Paulo, São Carlos, Brasil
G.E. Totten - G.E. Totten & Associates, Seattle, USA

Influence of pack boriding on the wear and corrosion resistance of AISI H13 steel
S. Cristaldo, L.C. Casteletti - University of São Paulo, Brazil
A. Lombardi Neto - UTFPR-LD, Londrina, Brazil
C.A. Picon - EEIS-UNESP, Brazil
G.E. Totten - Portland State University, USA

Boroaustempering thermochemical treatment in nodular cast irons
F. Edson Mariani, L.C. Casteletti - Universidade de São Paulo, Brazil
A. Lombardi Neto - Universidade Tecnológica Federal do Paraná, Brazil
A. Itman Filho - Instituto Federal do Espírito Santo, Brazil
G.E. Totten - Portland State University, USA

Corrosion resistance of pack chromized Fe-Mn-Al-Si-C steel
L.C. Casteletti, G.S. Takeya - Universidade de São Paulo, Brazil
A. Lombardi Neto - UTFPR-LD, Londrina, Brazil
C.A. Picon - EEIS-UNESP, Ilha Solteira, Brazil
G.E. Totten - Portland State University, USA
Austempering and boroaustempering treatments in gray cast iron
G. Bortoluci de Assis, F. Edson Mariani, L.C. Casteletti - Universidade de São Paulo, Brazil
A. Lombardi Neto - Universidade Tecnológica Federal do Paraná, Brazil
G.E. Totten - Portland State University, USA

Corrosion resistance of pack aluminized Ti-6Al-4V alloy
L.C. Casteletti, G.S. Takeya, G.C. Rego - Universidade de São Paulo, Brazil
A. Lombardi Neto - Universidade Tecnológica Federal do Paraná, Brazil
C.A. Picon - Universidade Estadual Paulista, Brazil
G.E. Totten - Portland State University, USA

Influence of the boronizing treatment on Fe-Mn-Al-Si-C steel
L.C. Casteletti, G.S. Takeya - Universidade de São Paulo, Brazil
A. Lombardi Neto - UTFPR-LD, Londrina, Brazil
C.A. Picon - EEIS-UNESP, Ilha Solteira, Brazil
G.E. Totten - Portland State University, USA

Influence of the boronizing on a precipitation hardened niobium stainless steel
L.C. Casteletti, G.S. Takeya, F. Edson Mariani - Universidade de São Paulo, Brazil
A. Lombardi Neto - Universidade Tecnológica Federal do Paraná, Brazil
G.E. Totten - Portland State University, USA

Towards novel long-lasting S-phase based anti-bacterial coatings
D. Formosa, X. Li, H. Dong - University of Birmingham, United Kingdom

Effect of aluminizing on surface microstructure of an austenitic stainless steel
B. Matijević, V. Alar, I. Kumić - University of Zagreb, Croatia

Spectroscopic ellipsometry investigation of pure, and Al-doped ZnO thin films deposited by radio frequency magnetron sputtering
Y. Li, Z. Chen, S. Li, G. Chang, X. Zhao, K. Xu - Xi’an University, China

POSTERS WILL BE DISPLAYED FOR THE ENTIRE PERIOD OF THE CONFERENCE

POSSIBLE CHANGES TO THE PROGRAMME WILL BE COMMUNICATED DURING THE CONFERENCE.
General Information

Conference Venue
The Conference will be held in Venice Mestre mainland, at NH VENEZIA CONGRESS CENTER - Laguna Palace (Viale Ancona 2, Venezia Mestre, Venice - Italy).

Language
The official language of the Conference will be English. A service of simultaneous translation (English-Italian) will be provided.

Proceedings
The full text of the accepted papers will be published in the CD-Rom proceedings and issued to attendees at registration at the Conference site.

Conference schedule
May 19, 2015: Pre-registration
May 20, 2015: Opening session and opening of the exhibition
May 21, 2015: Sessions - social event
May 22, 2015: Sessions

Registration information
REGISTRATION FEES
All registration fees are revenue stamp included

NON members fee
- Regular participant: 830 €
- Speaker/ Session chairperson: 690 €
- Student*: 350 €

AIM member fees
- Regular participant: 700 €
- Speaker/ Session chairperson: 560 €
- AIM junior members: free
- Accompanying persons: 122 € (VAT included)

Conference Registration fees include admittance to technical sessions, Conference bag with CD-Rom proceedings, coffee breaks, lunches and the social events. For non-members the fee includes AIM Membership for the last three quarters of 2015 and for the year 2016.

* Students will have to provide valid proof of student status. In the Student fee, the social events are not included.

Payment and remittance
- by bank transfer, to the order of Associazione Italiana di Metallurgia - AIM at “Banca Popolare Commercio e Industria (UBI Banca)”, Branch no. 2 - Via Borgogna, 2/4 - 20122 Milano - Italy, account no. 000000022325 - cod. ABI 05048 - CAB 01602 - cin L, IBAN: IT92L0504801602000000002325, swift code BLOPIT22. The transfer order must specify the name of the delegate and the reference "IFHT-SE 2015". A copy of the transfer order must be sent to AIM, together with the Registration Form.
- by credit card online (www.aimnet.it/ht2015.htm);
- by credit card (Visa, Carta Si, Mastercard, American Express and Diners) and by cash at the registration desk in Mestre (not for speakers).
### General Information

**Cancellation and refund policy**
A refund, less 20% deduction for administrative costs, will be issued for written cancellations received by May 4, 2015. For attendees who notify their cancellation after May 4, 2015 or will not attend the conference, a charge of 100% of the conference fee will be withheld and a copy of the proceedings will be sent after the event.

**Insurance**
The Organising Secretariat cannot assume any responsibility for personal accident, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the conference. Participants should therefore take whatever steps they consider necessary as regards insurance.

**Visa Application Form**
If you need and official invitation please send your request to the Organising Secretariat before April 30, 2015 complete with family and first name, Mr/Mrs, birth date, passport number, arrival and departure dates, nationality and fax number of the Italian Embassy for your Country.

**Exhibition**
The Conference will feature an exhibition that will represent many areas of industry with latest equipment, facilities and instruments, products and services in the field of heat treatment and surface engineering. The exhibitor will offer a unique opportunity to promote new products, outline services and highlight key achievements to a highly targeted audience. The exhibition will run from 20 to 22 May. Interested Companies are kindly requested to contact the Conference secretariat (e-mail: marketing@aimnet.it / fax: +39 0276020551).

**Social programme**
In order to give delegates the opportunity to meet informally and enjoy Venice’s atmosphere, AIM organized a Social Event in the evening of May 21, 2015. The Social Event will consist of a boat excursion to Venice Island with a refreshment served at Café Florian in Saint Mark’s Square (piazza San Marco). Announcement of the winner of the Poster Award, sponsored by Linde Group.

The Social Event is sponsored by [TAV Vacuum Furnaces](#).

**Mobile/cell phone**
Mobiles must be kept turned off or in silent mode in all Congress rooms.

**Venice**
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