73rd World Foundry Congress
"Creative Foundry"

23rd–27th September 2018, Kraków, Poland

Congress Programme

Scientific and Technical Sessions

Exhibition 'Creative Foundry', Congress Center Krakow

International Fair of Technologies for Foundry, Kielce

Work Visits

City Tours

Post Congress Tours

Social Events

Polish Foundrymen's Association

World Foundry Organization

Contents

Invitation

Tadeusz Franaszek
President of
The Polish Foundrymen's Association

Dear Delegates!

The year 2018 is a very special year for our Association. It deserves such distinction because on 23rd–27th September the 73rd World Foundry Congress will be held in Krakow. The organization of the Congress, by decision of the statutory authorities of the World Foundry Organization (WFO), was entrusted to the Polish Foundrymen's Association (STOP). We will have the pleasure to welcome more than 700 Representatives of foundry industry from over 40 countries from all over the world, including around 100 Young Researchers.

In the year 2018 we also celebrate the 80th anniversary of the first World Foundry Congress organized in Poland by our Association, it was the fourteenth one in the history of World Foundry Congresses. The Congress took place on September 8th–17th, 1938 in Warsaw and Krakow.

In 1965, on September 12th–17th, the Polish Foundrymen's Association was the organizer of the second World Foundry Congress in Poland, Warsaw, which was the 32nd World Foundry Congress, and in 1991, on September 15th–19th, in Krakow – the 58th World Foundry Congress.

This year's Congress is thus the fourth World Foundry Congress organized in Poland.

Another reason why the year 2018 is so important for our country and the Association is the fact that this year we celebrate the 100th anniversary of regaining independence by Poland.

At this point, one should mention the huge role of Polish founders, who in the industrial consolidation of engineers saw the opportunity for development of foundries and industry of a country devastated by long years of war. At the basis of this awareness lays a number of experiences gained in the years of captivity.

Preceding the first World War, very active, freedom and uprising movements in Poland have scattered Polish engineers around Europe and the world. Many of them found asylum in France, which supported the movements of organizing and associating engineers. Here the first contact of Polish founders with the idea of creating an International Committee of Technical Foundry Societies (CIATF), which was co-operated by Polish engineers. Before the official organization of the founders began to work, the Polish founders participated in the organization of the first Foundry Congress in 1923 in France (Paris), and later in 1926 in the USA (Detroit).

CIATF was established in 1927, and its founding members are foundry engineering associations from: Belgium, France, Great Britain, Italy, the Netherlands, Czechoslovakia, the United States and Poland, on behalf of which the official representative was Kazimierz Gierdziejewski. This organization, well-re-

nown in the global foundry industry, has been active for over 90 years. From year 2004 of the World Foundry Organization (WFO). This facts are not acknowledged or respected by many forming foundry organizations, for example in Europe from the time of its unification in the form of the European Union.

As part of this organization, the Polish Foundrymen's Association works very actively through a large group of Polish engineers, practitioners and scientists, STOP members, among whom ought to be mentioned: colleagues Kazimierz Gierdziejewski, Jerzy Buzek, Plon Januszewicz, Jura Piszak, Wacław Sakwa, Józef Szczepan Suchy and many other STOP members who take active part in WFO thematic committees, organizing trainings, congresses and technical forums in Poland, who appear in scientific and technical journals and foundry publications, those who help with organization of the annual National Foundry Days, Forum of Directors of Polish foundries, international foundry conferences, promotion of the Polish foundry industry during fairs and exhibitions and in cooperation with economic authorities.

All these activities constitute the "mission" of functioning of the WFO and all national engineering Foundry Societies, which are members of this organization. There are currently over 30 such Organizations all over the world.

Our Association has been operating in the structures of the World Foundry Organization for over 80 years, respecting and recognizing this "mission".

By organizing the 73rd World Foundry Congress our Association counts that participation in it will be a great positive intellectual experience for Congress participants and will remain in our memory for many years, giving arguments for positive assessment of organizing skills of Poles, their respect for guests and friends and commitment to implementation of entrusted tasks.

We allow ourselves to make such an assessment based on an unprecedented number of over 205 papers and more than 155 poster presentations. They contain a comprehensive and innovative material, presenting the rich achievements of international and domestic achievements in both science and foundry practice. These contributions will surely be an inspiration for many solutions and projects that, if implemented, will give the foundry industry a new opportunity to effectively compete on global markets.

Invitation

Laszlo Mark Fenyes
President of World Foundry Organization

Dear Delegates,

It is a great honour for me as president of the WFO to welcome you to the 73rd World Foundry congress in the beautiful city of Krakow.

I know that in association with the Polish Foundryman's society and the organising committee a lot of hard work and effort has been put in to make sure that the technical papers, networking and social function of the congress will be of the highest order, and with over 800 delegates registered will prove to be one of our most popular events.

Our industry is going through a profound change as electrification and 3D printing start to impact on the automotive sector. With knowledge comes power, and venues like this congress will give technical information and allow networking to take place so that informed decisions can be made and rather than looking at these shifts as threats, rather view them as opportunities.

The WFO was formed over 90- years ago and remains the uniting body that services the member associations in over 30 countries and represents over 90% of the total tonnage cast in our industry.

In recent times the focus of the WFO executive has been to improve communications between the WFO and its member associations through various means including the use of social media.

The annual report which the WFO publishes gives a useful and accurate guide to the state of the industry by country, and this combined with the six working groups and alternating bi annual congress and technical forum allows the opportunity for gleaning information and networking.

One further step has been taken this year, and the WFO has organised 'The World Foundry Summit' which is due to be held in Rome from the 8,9th. This forum is aimed at CEO's and senior managers and is designed to give an overview of trends in our industry from high level speakers covering Automotive, powered generation, aerospace etc. This is just one more example of how the WFO is helping to bring our industry together and to maintain our status of being the reference point for the global Metal casting industry.

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The 73rd World Foundry Congress
"Creative Foundry"
23–27 September 2018, Kraków, Poland

Invitation

Józef Szczepan Suchy
Chairman of the Organisational Committee of the 73rd WFC

Dear Delegates,

Twenty seven years ago, Krakow was the host for foundry-men from all over the world. These years were especially important for Poland. Changes in political system and economy occurred. This was also a great challenge for people connected with the industry, also the foundry industry. Presently, the Polish foundry practice is the important industry sector of a great potential, open for investments and having a strong scientific and educational background. This, for sure, influenced the interests in the 73rd World Foundry Congress. We are very pleased that the participation in this event – one of the most important for our profession – is declared by persons from 42 countries. This interest is also confirmed by the record number of scientific and technical publications and - which is especially important – by the number of papers submitted for the session of young scientists and engineers.

The Congress organisers contributed a lot of effort to provide the congress participants – apart from numerous lecture and poster sessions and exhibitions – with the possibility of seeing the beauty of our country and Krakow. We also ensured – for the Authors of these interesting papers – the possibility of having them published in known scientific journals of international circulation, regardless of the Congress presentation and conference proceedings.

I would like to express my warm thanks to the Scientific Committee, to the team of the Organising Committee, especially to the Secretariat of the Congress main organiser, it means the Polish Foundry-men's Technical Association, efficiently supported by the Management and Secretariat of WFO. I would like to thank all institutions and persons, who were engaged in preparations of this great event, especially sponsors without which it would not be possible to ensure the proper standard.

The fact that entrusting to Poland the organisation of the 73rd WFC is of a great meaning is proofed by the honourable patronage of the President of the Republic of Poland as well as by the Government, City of Krakow and the whole technological environment.

We are hoping that our efforts will create an excellent atmosphere for expert meetings and discussions. Let it be also an occasion to discover our country and to make friends with Poland and with working here colleagues from the foundry sector.

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General information

KRAKOW

Krakow is one of the oldest cities in Poland, named City of Kings, and the main tourist destination in Europe. To this day it remains the most important Polish city and a cultural centre of Poland and Central Europe. Krakow is situated in southern Poland on both banks of the Vistula River and has a very rich history. It was a residence of Polish kings and the capital for five centuries. The city boasts hundreds of historical buildings, from medieval churches to Art Nouveau edifices and includes ¼ of Poland's museum resources. The key points of interest are the Market Square (the largest medieval square in Europe), the Wawel Castle, St. Mary's Church, Barbican, the Cloth Hall, the old Jewish district of Kazimierz and many more. Thanks to the extraordinary accumulation of cultural wealth, the city was registered on the UNESCO World Heritage List and today competes with some of the most beautiful European cities.
Krakow is also one of the leading centres of science and education in Poland with over 20 institutions of higher education and universities.
Now Krakow is a modern metropolis but it still has a magical atmosphere which makes the visit an unforgettable experience.





CONGRESS VENUE: ICE KRAKOW CONGRESS CENTRE

ICE Krakow Congress Centre is a modern world class building designed to host various types of congress, conferences, exhibitions etc. The centre offers 36000 m^2 of conference space including an Auditorium ready to host over 2000 people and two smaller ones for 600 and 300 people and multifunctional glazed three-floor foyer with a view of the Wawel Castle. ICE Krakow Congress Centre is located in the historical centre of Krakow in the vicinity of the best hotels and tourist attractions.




Programme of the Congress

Sunday 23rd September 2018

8.00 – 22.30 Creative Foundry Exhibition (Installation)
11.00 – 19.00 Congress Registration – ICE Congress Center
13.00 – 15.00 City Tour I*
15.00 – 17.00 City Tour II*
15.00 – 17.00 VIP City Tour* (special invitation)
18.00 – 20.00 VIP Welcome Reception* (special invitation)
19.00 – 22.30 Welcome Party – ICE Congress Center*

Monday 24th September 2018

8.00 – 17.30 Congress Registration – ICE Congress Center
9.00 – 17.30 Creative Foundry Exhibition
10.00 – 11.30 Opening Ceremony
11.30 – 13.00 Plenary Session
11.30 – 15.45 Accompanying Persons' Programme**
11.30 – 17.30 Poster Display I (14.30 – 15.30 poster authors will be available)
13.00 – 14.30 Lunch
13.00 – 14.00 VIP Lunch – Hilton Garden Inn Hotel (special invitation)
14.00 – 15.30 WFO Executive + Past President Meeting (Hilton Garden Inn Hotel)
14.30 – 17.30 Technical Sessions
14.30 – 16.30 Young Researchers' Seminar I
15.30 – 17.00 Press Conference
19.00 – 00.00 Gala Dinner – Folwark Zalesie** **(departure 18.30)**

* Please don't forget to pick up your congress badge and materials before attending any part of the Congress programme
** Meeting point at the ICE Congress Centre (in front of the main entrance)





Tuesday 25th September 2018

8.00 – 17.30 Congress Registration - ICE Congress Center
9.00 – 17.30 Creative Foundry Exhibition
8.50 – 13.10 Technical Sessions
9.00 – 17.30 Poster Display II (12.00 – 13.00 poster authors will be available)
10.00 – 13.10 Young Researchers' Seminar II
10.00 – 11.00 WFO Commission Meeting (Metal Matrix Composites)
10.45 – 16.30 Accompanying Persons' Programme**
11.30 – 12.30 WFO Commission Meeting (Training and Professional Development)
12.10 – 13.10 Young Researchers' Poster Session (poster authors will be available)
13.10 – 14.30 Lunch
13.30 – 16.30 CLLEFE Meeting
13.00 – 14.30 VIP Lunch – Hilton Garden Inn Hotel (special invitation)
14.30 – 16.30 WFO Executive (optional)
14.30 – 17.30 Technical Sessions
17.30 – 23.30 Creative Foundry Exhibition (Dismantling)
19.00 – 22.30 Cocktail Party – AGH University of Science and Technology** **(departure 18.30)**

Wednesday 26th September 2018

8.00 – 17.00 Visit to the METAL Fair in Kielce**
11.00 – 12.00 WFO General Assembly (The METAL Fair, Kielce)
11.00 – 13.30 Visit to the METAL Fair Exhibition
13.30 – 15.00 Lunch (The METAL Fair, Kielce)
19.00 – 00.30 Closing Ceremony + Foundrymen's Night – Stara Zajezdnia Kraków by DeSilva** **(departure 18.30)**

Thursday 27th September 2018

8.00 – 18.00 Work Visits
Please confirm schedules of each tour at the registration desk

Friday 28th September 2018

8.00 – 11.30 Departure of Post Congress Tours




Program Kongresu

23. września 2018 (niedziela)

8.00 – 22.30 Wystawa Kreatywne Odlewnictwo (montaż)
11.00 – 19.00 Rejestracja – Centrum Kongresowe ICE
13.00 – 15.00 City Tour I*
15.00 – 17.00 City Tour II*
15.00 – 17.00 VIP City Tour* (za zaproszeniem)
18.00 – 20.00 VIP Welcome Reception* (za zaproszeniem)
19.00 – 22.30 Welcome Party – ICE Congress Center *

24. września 2018 (poniedziałek)

8.00 – 17.30 Rejestracja – ICE Congress Center
9.00 – 17.30 Wystawa "Kreatywne Odlewnictwo"
10.00 – 11.30 Ceremonia Otwarcia Kongresu
11.30 – 13.00 Sesja Plenarna
11.30 – 15.45 Program dla Osób Towarzyszących**
11.30 – 17.30 Wystawa Posterowa I (14.30 – 15.30 dostępność autorów posterów)
13.00 – 14.30 Lunch
13.00 – 14.00 VIP Lunch – Hotel Hilton Garden Inn (za zaproszeniem)
14.00 – 15.30 Zebranie WFO Executive + Past Presidents – Hotel Hilton Garden Inn
14.30 – 17.30 Sesje Techniczne
14.30 – 16.30 Young Researchers' Seminar I
15.30 – 17.00 Konferencja Prasowa
19.00 – 00.00 Bankiet – Folwark Zalesie** **(wyjazd 18.30)**

* Prosimy o zarejestrowanie się, odebranie identyfikatorów, materiałów kongresowych przed wzięciem udziału w wydarzeniu w ramach Kongresuach

** Punkt spotkań Centrum Kongresowe ICE (wejście główne





25. września 2018 (wtorek)

8.00 – 17.30 Rejestracja - ICE Congress Center
9.00 – 17.30 Wystawa "Kreatywne Odlewnictwo"
8.50 – 13.10 Sesje Techniczne
9.00 – 17.30 Wystawa Posterowa II (12.00 – 13.00 dostępność autorów posterów)
10.00 – 13.10 Young Researchers' Seminar II
10.00 – 11.00 Zebranie Komisji WFO (Metal Matrix Composites)
10.45 – 16.30 Program dla Osób Towarzyszących**
11.30 – 12.30 Zebranie Komisji WFO (Training and Professional Development)
12.10 – 13.10 Sesja Posterowa Young Researchers
13.10 – 14.30 Lunch
13.30 – 16.30 Zebranie CLLEFE
13.00 – 14.30 VIP Lunch – Hotel Hilton Garden Inn (za zaproszeniem)
14.30 – 16.30 Zebranie WFO Executive (opcjonalnie)
14.30 – 17.30 Sesje Techniczne
17.30 – 23.30 Wystawa "Kreatywne Odlewnictwo"(demontaż)
19.00 – 22.30 Cocktail Party – AGH** **(wyjazd 18.30)**

26. września 2018 (środa)

8.00 – 17.00 Wyjazd na Targi METAL, Kielce
11.00 – 12.00 Walne Zebranie WFO (Targi Kielce, Kielce)
11.00 – 13.30 Zwiedzanie wystawy targowej
13.30 – 15.00 Lunch (Targi Kielce, Kielce)
19.00 – 00.30 Ceremonia Zamknięcia + Foundrymen's Night – Stara Zajezdnia Kraków by DeSilva** **(wyjazd 18.30)**

27. września 2018 (czwartek)

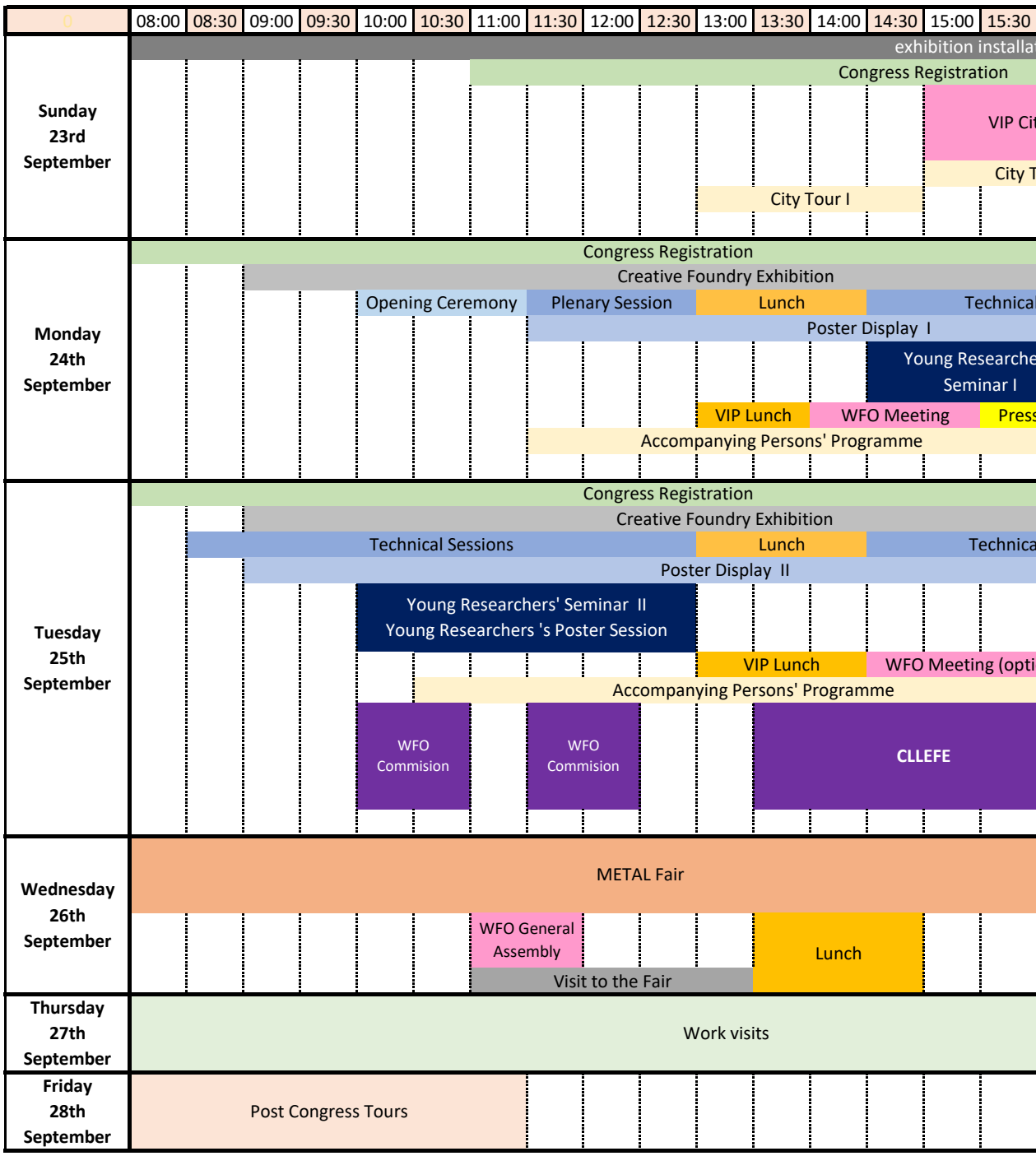
8.00 – 18.00 Wycieczki techniczne**

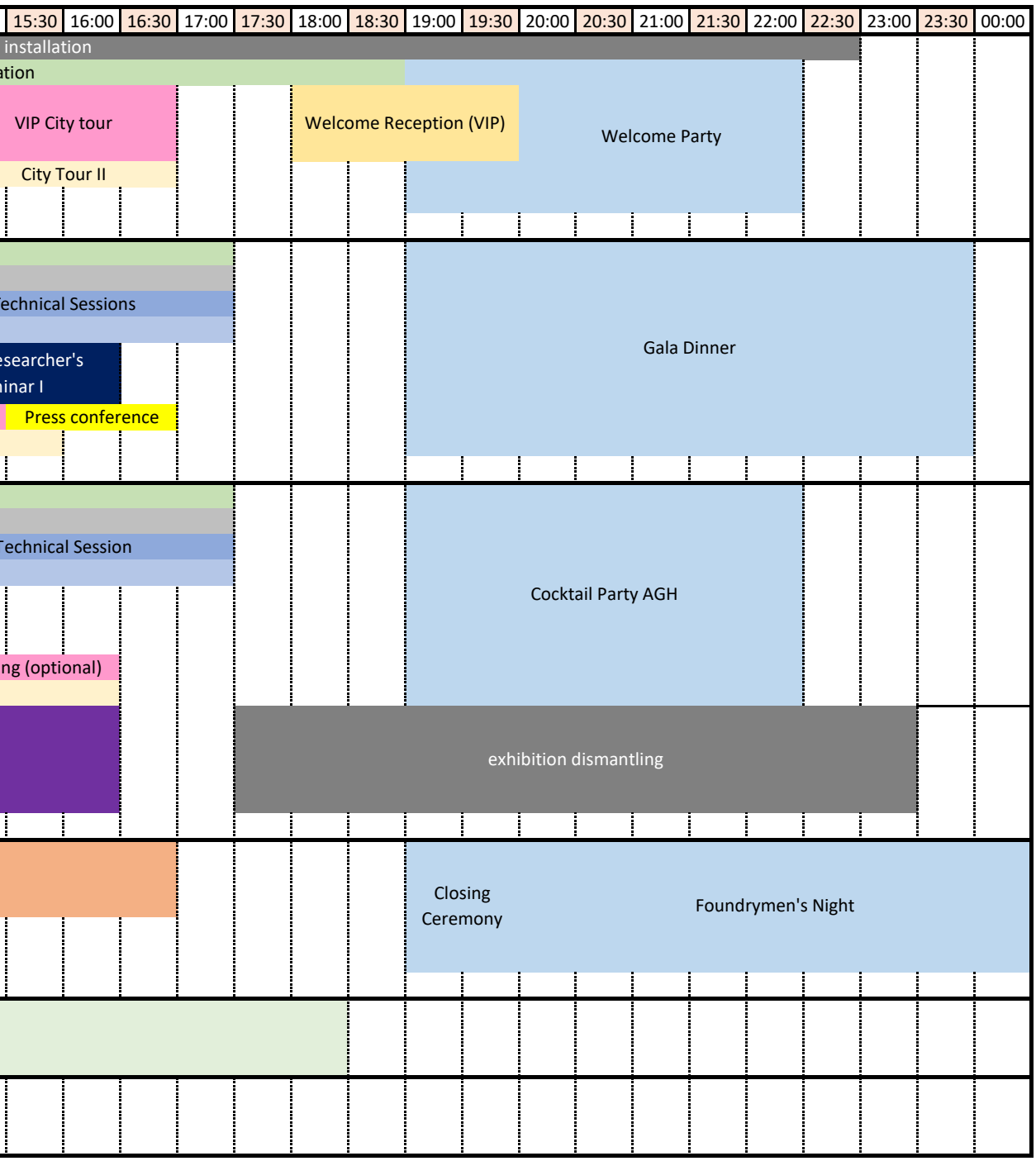
28. września 2018 (piątek)

8.00 – 11.30 Wyjazdy na wycieczki pokongresowe




Programme at Galance

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installation
VIP City tour
City Tour II
Welcome Reception (VIP)
Welcome Party
Gala Dinner
Press conference
Cocktail Party AGH
exhibition dismantling
Closing Ceremony
Foundrymen's Night

Technical Program (Oral and Poster Presentation)

24th September

S1 – Hüttenes-Albertus Hall

PLENARY SESSION

11.30 – 13.00

Development of the electric vehicles market by 2030 in Germany, Europe, US and China
C. Kuhlgatz, Hüttenes-Albertus Chemische Werke GmbH, Germany

Liquid metal engineering for Creative Foundry: from Lab to Fab
N. Sobczak, Foundry Research Institute, Poland

VOX PATRIS – the biggest swinging bell in the world
P. Olszewski, Pracownia Ludwisarska Jana Felczyńskiego, Poland

MATERIALS 1s/Scientific Session

14.30 – 15.50

14.30
Two inoculation methods for refining as-cast grain structure in austenitic 316L steel
S. Lekakh, Missouri University of Science and Technology, USA
14.50
Effect of solidification factors on cast structure and 'A' segregation for an ultra large section strand of a vertical semi-continuous caster of steel
K. Oh, POSCO, South Korea
15.10
Non-metallic inclusions and their influence on the mechanical properties of 18 CrNiMo7-6 steel treated in different crucibles
M. Seleznev, Institute of Materials Engineering, TU Bergakademie Freiberg, Germany
15.30
Improvement of the manufacturing technology of cast steel castings to be used in extreme operating condition
J. Jezierski, Silesian University of Technology, Department of Foundry Engineering, Poland

Coffee break 15.50 – 16.10

MATERIALS 1t/Technical Session

16.10 – 17.30

16.10
Microstrukture and hardness of high vanadium martensitic cast steel for wear resistant applications
J. Głownia, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
16.30
Study on properties of Hyper Duplex Stainless Steel 7A of ASTM A-890 (CD3MWN)
B. Raha, Peekay Steel Castings Private Limited, India
16.50
Microstructure characterization of graded alloy cast iron for flashing/grinding plates used in grinding of ball bearings
P. Bhamawat, Mangalam Steelcast Pvt Ltd., India
17.10
Problems and improvements on the production of large casting with Hi-Si ductile iron
T. Kanno, Kimura Foundry Co., Ltd., R&D, Japan

S2 – Clariant Hall

MATERIALS 2s/Technical Session

14.30 – 15.50

14.30
Microalloying of Al-5%Cu aluminum alloy with nickel aluminides and rare-earth metals
E. Ri, Department of Foundry Engineering and Metal Technology, Pacific National University, Russian Federation
14.50
Interfacial phenomena in Ni alloys-oxides systems of interest for investment casting
F. Valenza, Institute of Condensed Matter Chemistry and Technologies for Energy, National Research Council, Italy
15.10
Grain boundary wetting in the tungsten–nickel alloys
B. Straumal, National University of Science and Technology «MISIS», Russian Federation
15.30
Visual inspection of investment castings made of nickel-based superalloy
P. Rokicki, Rzeszow University of Technology, Research and Development Laboratory for Aerospace Materials, Poland

Coffee break 15.50 – 16.10

MATERIALS 2t/Technical Session

16.10 – 17.30

16.10
Adsorptive nature of gases present on high temperature treated carbonaceous materials
R. Nelson, Superior Graphite, USA
16.30
Cast components in super duplex alloys intercomparison between bench molding and three dimensional printing
Y. Tomita, Kimura Foundry Co., Ltd., Japan
16.50
Additive manufactured hybrid segments for die casting dies equipped with conformal cooling channels
W. Sokołowski, Oskar Frech GmbH Co. KG, Germany
17.10
Manufacturing of corrosive-resistant Cr-Ni steels and Ni-based alloys in vacuum furnaces
A. Zadera, Brno University of Technology, Faculty of Mechanical Engineering, Czech Republic

S3.1 - Poznań International Fair Hall

MATERIALS 3s/Scientific Session

14.30 – 15.50

14.30
Wear properties of milled carbon fiber-reinforced aluminum alloy composites
K. Asano, Kindai University, Faculty of Science and Engineering, Department of Mechanical Engineering, Japan
14.50
Fabrication method of silicon carbide by infiltration of molten Fe-Si alloy through two-step reaction sintering
Y. Hanada, FUJICO Co., Ltd., Japan
15.10
Si-Co and Si-Zr alloys/C-material interfaces: wetting versus infiltration
D. Giuranno, Foundry Research Institute, Poland
15.30
Fabrication of aluminum based functionally graded materials by centrifugal casting and their application of grinding wheels
Y. Watanabe, Department of Physical Science and Engineering, Nagoya Institute of Technology, Japan

Coffee break 15.50 – 16.10

MATERIALS
3t/Technical Session

16.10 – 17.30

16.10
The freedom of creativity: Coatings and additives concepts enabling enhanced construction and casting properties
R. Stötzel, ASK Chemicals GmbH, Germany
16.30
Development of Mg-Al-Sr-Ca system heat resistant alloy for die-casting excellent in castability and recyclability
S. Saikawa, University of Toyama, Japan
16.50
Effect of austenitizing temperature on microstructure and mechanical properties of low-alloyed ausferritic ductile cast iron
M. Sokolnicki, Odlewnie Polskie S.A., Poland
17.10
Automated intelligent coating concept for ferrous foundries
Ch. Genzler, Foseco Europe, The Netherlands

S4.1 Conference room

TECHNOLOGY
1s/Scientific Session

14.30 – 15.50

14.30
Improved ultrasonic degassing of $AlSi_{10}Mg$ alloy and its performance evaluation with the reduced pressure test (RPT) method
H. Galarraga, Fundación Tecnalia R&I, Spain
14.50
Effect of molten metal temperature on mold filling in evaporative pattern casting
T. Maruyama, Kansai University, Department of Chemistry and Material Engineering, Japan
15.10
Effect of aluminum melt treatment by nanosecond electromagnetic pulses on structure and properties of castings
V. Deev, National University of Science and Technology MISIS, Department of Foundry Technology, Russian Federation
15.30
Verification and optimization of investment casting technology for production of cast metal sponges
I. Kroupová, VSB - Technical University of Ostrava, Faculty of Metallurgy and Material Engineering, Czech Republic

Coffee break 15.50 – 16.10

16.10

TECHNOLOGY
1t/Technical Session

16.10 – 17.30

Intelligent manual and automated MicroParticle dry ice cleaning systems for the Foundry-Die Casting Industry
D. Juchmes, Cold Jet BVBA, Belgium
16.30
PUR Cold-Box Systems - Past-Present-Future
P. Gröning, Hüttenes-Albertus Chemische Werke GmbH, Germany
16.50
New induction wireless manufacturing efficient process for energy intensive industries (NIWE)
A. Meléndez, Tecnalia Research & Innovation, Spain
17.10
Optimization and control of modern ladle pouring process
T. Voss, Otto Junker GmbH, Germany

S4.2 Conference room

TECHNOLOGY
2s/Scientific Session

14.30 – 15.50

14.30
20 years of research projects targeted to zero defect manufacturing in diecasting
F. Bonollo, Padova University, Department of Engineering and Management (DTG), Italy
14.50
Complete master of the complex casting in the technology of high pressure die-casting
P. Mrvar, University of Ljubljana, Faculty of Natural Sciences and Engineering, Department of Materials and Metallurgy, Slovenia
15.10
Influence of defects on HPDC strength and effectiveness of gas porosity dispersion by atomized flow
M. Nakagawa, Motorcycle R&D Center, Honda R&D Co., Ltd., Japan
15.30
Research on coatings and infiltration to strengthen ceramic lost cores used in high pressure die casting processes
M. Merchán, Fundación Tecnalia R&I, Spain

Coffee break 15.50 – 16.10

TECHNOLOGY
2t/Technical Session

16.10 – 17.30

16.10
Rapid determination of nodularity index in ductile cast iron production
P. Larrañaga, IK4 AZTERLAN, Spain
16.30
Refractory coatings in centrifugal process: the change from release agent to moulding material
K. Seeger, Hüttenes-Albertus Chemiche Werke GmbH, Germany
16.50
Pro-ecological die-casting foundry
K. Wrzała, Odlewnia SILUM Sp. z o.o., Poland
17.10
New investigation of material-dependent-control of flowability in green sand molding process
J. Bast, TU Bergakademie Freiberg, Faculty of Mechanical Engineering, Germany

S4.3 Conference room

DIGITALIZATION
1s/Scientific Session

14.30 – 15.50

14.30
Use of a mathematical treatment for the prediction of structural zones localization in the continuously cast brass ingots
W. Wołczyński, Polish Academy of Sciences, Institute of Metallurgy and Materials Science, Poland
14.50
Development and application of cast steel numerical simulation system for heat treatment based on InteCAST
J. Zhou, Huazhong University of Science and Technology, State Key Laboratory of Materials Forming and Mould Technology, China

15.10
Application of explicit and implicit smoothed particle hydrodynamics simulation to casting processes
T. Suwa, Fujitsu Ltd., Japan
15.30
Prediction of microstructure of grey cast irons by electrical resistivity measurements
M. Petrič, University of Ljubljana, Faculty of Natural Sciences and Engineering, Department of Materials and Metallurgy, Slovenia

Coffee break 15.50 – 16.10

TECHNOLOGY + DIGITALIZATION 1t/Technical Session

16.10 – 17.30

16.10
"Towards vision zero" in the automotive industry - foundry challenges and opportunities
M. Ata, Continental Teves AG & Co. oHG, Germany
16.30
Seeing through the Cloud of Industry 4.0
M. Lewis, Omega Sinto Foundry Machinery Ltd., United Kingdom
16.50
Data analytics: the next dimension in molding sand control
D. Chowdhary, MPM Infosoft Private Ltd., India
17.10
Industry 4.0 process control and traceability for the foundry industry
D. Gilson, SinterCast AB, Sweden

S4.4 Conference room

ECOLOGY + MANAGEMENT 1s/Scientific Session

14.30 – 15.50

14.30
Increase precision and yield in casting production by simulation of the solidifcation process based on realistic material data evaluated from thermal analysis (using the ATAS MetStar System)
P-E. Persson, Novacast Systems AB, Sweden
14.50
SINFONET: Smart & Innovative Foundry Network
F. Bonollo, Padova University, Department of Engineering and Management (DTG), Italy
15.10
Operational assistance system with direct manipulation of flow rate and falling position of outflow liquid in tilting-ladle-type pouring machine
Y. Sueki, University of Yamanashi, Department of Mechanical Engineering, Japan
15.30
Data mining methods for properties prediction with TDA curves of the hypoeutectic Al-Si alloys
D. Wilk-Kołodziejczyk, Foundry Research Institute, Poland

Coffee break 15.50 – 16.10

ECOLOGY + MANAGEMENT
1t/Technical Session

16.10 – 17.30

16.10

Spent foundry sand valorization in construction sector through the validation of high-performance applications

E. Garitaonandia, IK4-AZTERLAN, Environment and Sustainability, Spain

16.30

New Technology Platform ECOCURE BLUE: Reduction of emissions in foundry processes - First practical experiences

F. Lenzen, ASK Chemicals GmbH, Germany

16.50

Economic solutions for avoiding emissions in foundries

A. Cavotta, Xpuris GmbH, Germany

17.10

Life long education of foundry employees - a step forward

C. Gustavsson, Swerea SWECAST, Sweden

25th September

S1 - Hüttenes-Albertus Hall

MATERIALS 4s/Scientific Session

8.50 – 10.50

8.50
Mechanical and structural characterization of cast iron using synchrotron light
L. Elmquist, Swerea SWECAST, Sweden
9.10
A study of Mg-Cu interreaction in copper-alloyed ADI
M. Górny, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
9.30
The influence of wall thickness on the fatigue limit of V-notched bars made of as-cast or heat treated ductile iron
S. Masaggia, Zanardi Fonderie S.p.A., Italy
9.50
The effect of the substitution of silicon by aluminum on the mechanical properties of gray iron
E. Aguado, IK4-AZTERLAN, Spain
10.10
Microstructure quality assessment of isothermed ductile irons through tensile tests
F. Zanardi, Zanardi Fonderie S.p.A., Italy
10.30
Cast iron "Vari – Morph" (VM) with graphit of several forms – material for castings of special destinations
J. Postuła, Fansuld Cast Iron Foundry , Poland

Coffee break 10.50 – 11.10

TECHNOLOGY 3t/Technical Session

11.10 – 13.10

11.10
Hybrid patternless forming method and equipment of multi-material sand mold
Z. Shan, China Academy of Machinery Science & Technology Group Co., Ltd., China
11.30
Combining mold milling and 3D sand printing to optimize casting design
L. Dunlay, , University of Northern Iowa, Metal Casting Center, United States
11.50
New & reclaimed chromite vs alumino-silicate refractory sand advantages and drawbacks
P. Diaz, Imerys Aluminates, France
12.10
Shrinkage defect elimination supported by thermal analysis application for ductile iron knuckle production
P. Rodriguez, EDERTEK Technology Center of Fagor Ederlan Group, Spain
12.30
Optimum design of foam residue traps to manufacture large-sized castings for full mold casting
Y. Takagi, Mie University, Department of Mechanical Engineering, Graduate School of Engineering, Japan
12.50
Evaluating a ceramic resin coated sand for aluminum and iron castings
S. Ramrattan, Western Michigan University, USA

Lunch break 13.10 – 14.30

MATERIALS
7s/Scientific Session

14.30 – 15.50

14.30
Time-resolved and in-situ 2D / 3D imaging of solidification in ductile cast iron
H. Yasuda, Kyoto University, Department of Materials Science and Engineering, Japan
14.50
Fatigue behavior on heavy section ductile iron casting manufactured in grade EN-GJS-500-14
M. A. Altuna, Grupo WEC, Spain
15.10
Solidification characteristics of silicon alloyed ductile cast irons
I. Riposan, POLITEHNICA University of Bucharest, Materials Science and Engineering Faculty, Romania
15.30
Influence of shrinkage porosity on fracture under tensile stress in ductile cast iron
J. Massone, National University of Mar del Plata, INTEMA-CONICET, Metallurgy Division, Argentina

Coffee break 15.50 – 16.10

MATERIALS
5t/Technical Sessions

16.10 – 17.30

16.10
Investigation and characterization of inclusions in aluminium cast alloys for automotive industry
O. Ozaydin, Cevher Wheels, Research & Development Department, Turkey
16.30
New materials in mould making are required to meet the new challenges in die casting
T. Hoehn, Weldstone GmbH, Germany
16.50
Challenges in gravity sand casting of ZE41 Mg alloy
D. Dispinar, Istanbul University, Faculty of Engineering, Turkey
17.10
Acticote CG range of coatings to reduce graphite degeneration at the surface zone of compacted graphite iron castings
U. Nwaogu, Foseco Nederland BV, The Netherlands

S2 – Clariant Hall

MATERIALS
5s/Scientific Session

8.50 – 10.50

8.50
Main directions of recent works on AlZn based alloys for foundry engineering
W. Krajewski, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
9.10
Effect of single and double solution treatment on second phase dissolution of an Al-8.5Si-1.5Cu-0.4Mg alloy with different initial cooling rates
E. Ochoa de Zabalegui, Edertek Technology Center of FAGOR EDERLAN Group, Spain
9.30
Study of AlSi7MgCu alloy with improved properties in as-cast state
Z. Brodarac, University of Zagreb, Faculty of Metallurgy, Croatia
9.50
Strengthening of Al-casting alloys by quasicrystalline precipitates
F. Zupanič, University of Maribor, Faculty of Mechanical Engineering, Slovenia
10.10
Morphological evolution of semisolid Mg-Al-La-Ca magnesium alloy produced by mechanical stirring process (MSP)
S. Bartex, Federal University of Rio Grande do Sul, Metallurgical Department, Brazil

10.30
The study on tensile stength of AlSi21CuNiMg silumin in the final stage of solidification and the initial stage of self-cooling
R. Romankiewicz, University of Zielona Góra, Faculty of Mechanical Engineering, Poland

Coffee break 10.50 – 11.10

MATERIALS 4t/Technical Session

11.10 – 13.10

11.10
Effect of alloying element on the mechanical properties of high silicon ferritic ductile cast iron
K. Park, Namyang Metals Co., Korea
11.30
Use of dilatometry to evaluate the high temperature characteristics of silica in chromite sand
J. Thiel, University of Northern Iowa, Metal Casting Center, University of Northern Iowa, United States
11.50
Nanokarb: engineered carbon additive for green sand ferrous foundries
V. Gurunath, Institue of Indian Foundrymen, India
12.10
Oxide ceramic and refractory materials for metallurgical processes and industries
F. Pantsialeyenka, The John Paul II Catholic University of Lublin, Faculty of Law and Social Sciences, Institute of Environmental Engineering, Poland
12.30
Feeding technology
J. Kmetsch, Foseco Europe, Germany
12.50
Abrasive wear characterictics of multi component white cast iron
K. Shimizu, Muroran Institute of Technology, College of Design and Manufacturing Technology, Japan

Lunch break 13.10 – 14.30

MATERIALS 8s/Scientific Session

14.30 – 15.50

14.30
Preliminar mechanical properties and microstructures obtained after casting a modified Al-Zn-Mg wrought alloy
R. Hidalgo, Mondragon University, Spain
14.50
Application of differential scanning calorimetry (DSC) for evaluation of aluminium alloys billets homogenization parameters
G. Włoch, AGH University of Science and Technology, Faculty of Non-Ferrous Metals, Poland
15.10
Effect of modification on the thermal analysis of grain refining in A319 Al-Si-Cu alloys
W. Khalifa, Cairo University, Faculty of Engineering, Egypt
15.30
Novel method of thermal conductivity measurement using Stefan-Boltzmann law
P. Wieliczko, Foundry Research Institute, Poland

Coffee break 15.50 – 16.10

MATERIALS 6t/Technical Session

16.10 – 17.30

16.10
Directional solidification casting technology of heavy-duty gas turbine blade with LMC process
L. Xiaofu, Shenyang Research Institute of Foundry, New Technology R&D Center, China
16.30
Local composite reinforcement type TiC/FeCr fabricated in situ in blade casting
Ł. Szymański, Innerco Ltd., Poland

16.50
Triad - a modern technology of non-cement concrete in cast iron foundry
B. Cygan, Silesian University of Technology, Department of Foundry Engineering, Poland
17.10
Enhancing the permeability and properties of ceramic shell in investment casting process using ABS powder and needle coke
D. Karunakar, Shenyang Research Institute of Foundry, Department of Mechanical and Industrial Engineering, Shenyang Research Institute of Foundry, India

S3.1 - Poznań International Fair Hall

MATERIALS 6s/Scientific Session

8.50 – 10.50

8.50
Conventional and hybrid gasars: light-weight materials with pressure-temperature managed porosity
J. Sobczak, Foundry Research Institute, Poland
9.10
Wettability improvement of woven fabric for aluminium casting reinforcement
S. Cruz, Eurecat, Spain
9.30
General concept of cast metal matrix composites design
E. Prusov, Vladimir State University named after Alexander and Nikolay Stoletovs, Department of Functional and Constructional Materials Technology, Russian Federation
9.50
Microstructure effects of Y_2O_3 addition to A356 alloy
S. El-Hadad, Central Metallurgical Research and Development Institute, Egypt
10.10
Nanomultilayers for joining applications
J. Janczak-Rusch, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland
10.30
Liquid-phase bonding of carbon/carbon and porous carbon for structural and thermal management applications
R. Asthana, University Of Wisconsin-Stout, Engineering & Technology, USA

Coffee break 10.50 – 11.10

TECHNOLOGY 4t/Technical Session

11.10 – 13.10

11.10
Environmental and application method improvements - an R&D approach
A. Burrows, Hüttenes-Albertus UK Ltd, United Kingdom
11.30
Evaluation of Green Sand Premixes for Emission Characteristics
V. LaFay, S&T, IMERYS Metalcastings, USA
11.50
Cordis® Process – the next generation
K. Löechte, Hüttenes-Albertus Chemische Werke GmbH
12.10
Using of 3D printed permanent patterns for mass production of castings on "green sand" molding lines
M. Horacek, Brno University of Technology, Faculty of Mechanical Engineering, Czech Republic
12.30
Effect of curing parameters on selected technological properties of the moulding sand with inorganic cordis binder used for ablation casting of aluminium alloys
A. Grabarczyk, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
12.50
Perspective on use of green sand additives as essential contaminants
D. Chowdhary, MPM Private Limited, India

Lunch break 13.10 – 14.30

MATERIALS 9s/Scientific Session

14.30 – 15.50

14.30
Effect of nickle content on microstructural evolution in austempered solution strengthened ferritic ductile cast iron
T. Tokunaga, Kyushu Institute of Technology, Japan
14.50
Shrinkage porosity formation in cast iron components
A. Diószegi, Jönköping University, Sweden
15.10
Influence of heat treatment on the microstructure and corrosion resistance of austempered ductile iron
H. Krawiec, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
15.30
The inoculation effect of aluminum addition on selected high-chrome cast iron properties
A. Szczęsny, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

Coffee break 15.50 – 16.10

S3.2 Conference room

MATERIALS 12s/Scientific Session

14.30 – 15.50

14.30
Influence of powder additives in two component environmentally friendly inorganic binder systems on strength behavior
M. Conev, Technical University of Košice, Faculty of Materials, Metallurgy and Recycling, , Slovakia
14.50
Preparation of magnesium borate fibers by electrospinning
E. Storti, TU Bergakademie Freiberg, Institute of Ceramic, Glass and Construction Materials, , Germany
15.10
Ceramic filters with coatings based on nano-materials or calcium aluminates with carbon for steel melt filtration
E. Storti, TU Bergakademie Freiberg, Institute of Ceramic, Glass and Construction Materials, Germany
15.30
Mechanical behaviour of nodular cast irons after prolonged high temperature exposure
A. Morri, University of Bologna, Department of Industrial Engineering, Italy

Coffee break 15.50 – 16.10

MATERIALS 13s/Scientific Session

16.10 – 17.30

16.10
Feasibility of us foundry supply chain consumables for three dimensional sand printing
S. Giese, University of Northern Iowa, Metal Casting Center, USA
16.30
The decreasing microstructure degradation of fiber base feeder sleeve with various refractory coatings
H. Kahraman, Cukurova Kimya Endustrisi A.S., Turkey
16.50
Effects of manganese content and cooling rate on fatigue in limit heavy sectional spheroidal graphite cast iron
N. Shiraki, Tokyo City University, Faculty of Engineering, Japan
17.10
Role of chemical composition on secondary cementite morphology in alloyed cast seels
J. Krawczyk, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

S4.1 Conference room

TECHNOLOGY 3s/Scientific Session

8.50 – 10.50

8.50
Determination of critical cooling rate for minimization of porosity in the large aluminum casting
I. Cho, ICT Manufacturing Group, Korea Institute of Industrial Technology, South Korea
9.10
ADI -the material revolution and its applications at CMRDI
A. Nofal, Central Metallurgical R&D Institute CMRDI, Foundry Technology Department, Egypt
9.30
Electromagnetic method for control the solidification of Al 99.99
M. Pokusová, Slovak University of Technology in Bratislava, Faculty of Mechanical Engineering, Slovakia
9.50
Metallography for cast Al-alloys using FIB-SEM
T. Bončina, University of Maribor, Faculty of Mechanical Engineering, Slovenia
10.10
Effect of intensive cooling of alloy AlSi7Mg with alloy additions on the microstructure and mechanical properties
B. Pisarek, Lódź University of Technology, Department of Materials Engineering and Production Systems, Poland
10.30
Evaluation of the effect of ultrasonic degassing on components produced by high pressure die casting
M. da Silva, Eurecat, Centre Tecnólogic de Catalunya, Spain

Coffee break 10.50 – 11.10

TECHNOLOGY 5t/Technical Session

11.10 – 13.10

11.10
Heat recovery from compressed air station – foundry Volkswagen Poznań
T. Kamiński, Volkswagen Poznań Sp. z o. o., Poland
11.30
Fata Aluminum inorganic sand regeneration process
P. Bocca, Fata Aluminum, Italy
11.50
Development of molten metal transport support system with an overhead crane
A. Kaneshige, National Institute of Technology, Mechanical Engineering Department, Toyota College, Japan
12.10
LAC, S.R.O. - Producer of furnaces and dryers
P. Szekiełda, LAC, s.r.o., Czech Republic
12.30
Hybrid resins: a great advantage for quality, ecology and costs
A. Mazzon, F.lli Mazzon S.p.A., Italy
12.50
The optimisation of the flowability of sand mixtures to produce high density and defect-free inorganically bonded sand cores
V. Haanappel, FOSECO Europe, The Netherlands

Lunch break 13.10 – 14.30

MATERIALS
10s/Scientific Session

14.30 – 15.50

14.30
Grain size prediction model in aluminium castings manufactured by low pressure technology
A. Fernàndez-Calvo, IK4-AZTERLAN, Spain
14.50
Ambient temperature influence on the properties of the moulding sand with the alkaline-phenolic binder
A. Bul, Pioma-Odlewnia Sp. z o.o., Poland
15.10
Deformation behavior of pure copper castings with as-cast surfaces for electrical parts
I. Goto, Akita University, Graduate School of Engineering Science, Japan
15.30
Optimization of the die casting process of thick-wall bush made of compound aluminum bronze
D. Kołakowski, Lódź University of Technology, Department of Materials Engineering and Production Systems, Poland

Coffee break 15.50 – 16.10

TECHNOLOGY
8t /Technical Session

16.10 – 17.30

16.10
Ten years of industrial experience with low-emission additives for molding sand
T. Engelhardt, Clariant Produkte GmbH, Germany
16.30
Microstructural characterization of Fe/tic composite zones produced in situ using glassy carbon
M. Gajewska, Academic Centre for Materials and Nanotechnology, AGH University of Science and Technology, Poland
16.50
Flexible manufacturing through in-house conversion of shell core making machine to cold box process making machine with easy reversibility
D. A Pratap Singh, Maruti Suzuki India Ltd, India
17.10
A strategy road map towards world class safety through innovative proactive and unique daily routine activities to achieve zero injury in Indian Foundry Industry
D. A. Pratap Singh, Maruti Suzuki India Ltd, India

S4.2 Conference room

TECHNOLOGY
4s/Scientific Session

8.50 – 10.50

8.50
Influence of Mn and Cr on intermetallic sludge formation in Fe containing secondary AlSi9Cu3 alloy with aim of reducing Fe level by filtration
B. Dietrich, TU Bergakademie Freiberg, Foundry-Institute, Germany
9.10
Influence of filter surface chemistry on the filtration of aluminum melt
C. Voigt, TU Bergakademie Freiberg, Institute of Ceramic, Glass and Construction Materials, Germany
9.30
Wettability measurement of AlSi$_7$Mg on Al$_2$O$_3$, MgAl$_2$O$_4$, 3Al$_2$O$_3$·2SiO$_2$ and TiO$_2$ at 730°C
C. Voigt, TU Bergakademie Freiberg, Institute of Ceramic, Glass and Construction Materials, Germany
9.50
Interaction of AlSi$_7$Mg with oxidic filter materials
B. Fankhänel, TU Bergakademie Freiberg, Institute for Nonferrous Metallurgy and Purest Materials, Germany

10.10
Heteroepitaxial growth of passivating layers on rutile in contact with molten aluminium and molten A356 aluminium alloy
A. Salomon, TU Bergakademie Freiberg, Institute of Materials Science, Germany
10.30
Numerical simulation of steel melt filtration
C. Demuth, TU Bergakademie Freiberg, Institute of Thermal Engineering, Germany

Coffee break 10.50 – 11.10

TECHNOLOGY 6t/Technical Session

11.10 – 12.50

11.10
Benefits of using ProCast simulation software to solve casting defects in Odlewnie Polskie S.A.
V. Kolda, Mecas ESI, Czech Republic
11.30
Experiences with helix atline computer tomography(CT) and VGinLine at Volkswagen Foundry Hanover
F. Hansen, Volkswagen Foundry Hanover, Germany
11.50
Wireless measurement of mold temperature during centrifugal casting and heat transfer analysis
N. Iwata, JFE Steel Corporation, Japan
12.10
Absorption-Biochemical Units (ABChU) for ventilating air purification in foundry
Y. Shapavalau, Gazoochistka Engineering LLC, Republic of Belarus
12.30
The shipbuilding industry in the Polish economy as an important element of the development of a modern machinery industry, including foundry
M. Bączkowski, Stocznia Szczecińska Sp. z o.o, Poland

Lunch break 13.10 – 14.30

TECHNOLOGY 5s/Scientific Session

14.30 – 15.50

14.30
Determination of gray cast iron age strengthening by non-destructive methods: effect of alloying elements
A. Vaucheret, ECAM Lyon, France
14.50
Geometric form of gating system elements and its influence on the initial filling phase
R. Dojka, Silesian University of Technology, Department of Foundry Engineering, Poland
15.10
Influence of T6 heat treatment on secondary AlSi9Cu3(Fe) alloy produced by semi-solid seed process
A. Fabrizi, University of Padova, Department of Management and Engineering, Italy
15.30
Development of a squeeze semisolid high pressure die casting process for magnesium structural parts
I. Vicario, Tecnalia Research & Innovation, Spain

Coffee break 15.50 – 16.10

TECHNOLOGY 9t/Technical Session

16.10 – 17.30

16.10
Modern green sand moulding for everyone
P. Larsen, DISA Industries, Denmark
16.30
Profiling the quality of bentonite clay with dilatometry
J. Thiel, Metal Casting Center, University of Northern Iowa, USA
16.50
The green sand foundry of tomorrow
P. Larsen, DISA Industries, Denmark

17.10
Focus on development of quality high pressure die casting process
M. Rosso, Politecnico Di Torino, Department of Applied Science And Technology, , Italy

S4.3 Conference room

DIGITALIZATION 2s/Scientific Session

8.50 – 10.50

8.50
Lightweight die casting tools - a promising option for enhancing the high pressure die casting process
S. Müeller, Technische Universitaet Braunschweig, Institute of Joining and Welding, Germany
9.10
Pouring process control based on high-speed image analysis of liquid flow
R. Tasaki, Toyohashi University of Technology, Department of Mechanical Engineering, Japan
9.30
Development of numerical model for core gas generation by the reaction with binder in sand cores and transport in molten metal
S. Kim, AnyCasting Software, Co. Ltd., South Korea
9.50
Development of in situ fabrication process of clad materials by using tandem twin-roll casting
S. Kumai, Tokyo Institute of Technology, Department of Materials Science and Engineering, Japan
10.10
Modeling and computation of casting process by particle method
M. Kazama, Fujitsu Ltd., Japan
10.30
Intelligent data analytics for foundry industry 4.0
M. Perzyk, Warsaw University of Technology, Faculty of Production Engineering, Poland

Coffee break 10.50 – 11.10

TECHNOLOGY 7t/Technical Session

11.10 – 13.10

11.10
Control volume simulation of the tilt casting process
D. Molnar, University of Miskolc, Hungary
11.30
Casting simulation: an aid to green manufacturing
A. Bhat, SoftCAST Technologies Pvt Ltd, India
11.50
Optimization of heavy steel casting manufacturing technology
R. Dojka, Odlewnia Staliwa Łabędy, Poland
12.10
Modern permanent lining concepts for CC tundishes – theory and practice
P. Mirecki, Pasek Europe, Poland
12.30
Automatic bottom pouring of iron alloys
O. Schmitz, Pour-Tech AB, Sweden
12.50
Ductile iron and compacted graphite iron treatment with hybrid magnesium cored wire process
O. Bahuon, Foundry products, Affival sas, France

Lunch break 13.10 – 14.30

TECHNOLOGY + DIGITALIZATION 6s/Scientific Session

14.30 – 15.50

14.30
Concept of the Smart Foundry platform integrating Industry 4.0 technologies
P. Malinowski, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

14.50
Digital transformation to Foundry 4.0
N. Gramegna, EnginSoft S.p.A., Manufacturing Business Unit, Italy
15.10
Photography of atomized flow and LES-VOF simulation of die interior flow behavior under high-pressure die-casting
E. Koya, Honda R&D Co., Ltd., Motorcycle R&D Center, Japan
15.30
Effects of green sand particle size distribution on squeeze compacting behavior analyzed by discrete element method
Y. Maeda, Daido University, Department of Mechanical Engineering, Japan

Coffee break 15.50 – 16.10

ECOLOGY + MANAGEMENT 3t/Technical Session

16.10 – 17.30

16.10
Introducing Industry 4.0 in a die casting foundry
B. Dybowski, NEMAK POLAND Sp. z o.o., Poland
16.30
Partnership of industry and knowledge center for a sustainable foundry industry
L. Sechi, Clariant SE, France
16.50
Experimental and simulation studies of cores making process with blowing methods
R. Dańko, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
17.10
Simulation driven design for castings with effective control of manufacturing constraints
K. Afsardis, Altair, Grrece

S4.4 Conference room

ECOLOGY + MANAGEMENT 2s/Scientific Session

8.50 – 10.50

8.50
From waste foundry sand to a new biodegraded raw material, an ecological solution for foundries
P. Caballero, Tecnalia Research & Innovation, Spain
9.10
Recycling of dispersed metal wastes in rotary furnaces – a method of creating a new source of raw materials for foundry
S. Rovin, UE "Technolit", Belarus
9.30
Correlation of thermal analysis to binder emissions
S. Giese, University of Northern Iowa, USA
9.50
Innovation in knowledge transfer from academia to the foundry industry - an advanced case
J. Svidró, Jönköping University School of Engineering, Department of Materials and Manufacturing Sweden
10.10
Determination of content of phenol in foundry resins by pyrolysis gas chromatography-mass spectrometry method
S. Żymankowska-Kumon, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
10.30
Thermal stability of a resin binder used in moulding sand technology
A. Roczniak, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

Coffee break 10.50 – 11.10

ECOLOGY + MANAGEMENT 2t/Technical Session

11.10 – 13.10

11.10
Process performance and environmental impact of the $CaO-Al_2O_3$ slag system as alternative to calcium carbide for desulfurization of nodular cast iron
R. Lencina, Kerneos Aluminate Technologies, France
11.30
Increase of output - retrofits - modifications
F. Schaefer, Heinrich Wagner Sinto Maschinenfabrik GmbH, Germany
11.50
Database of materials for the evaluation of the impact of harmful substances in metallurgical processes
A. Bydałek, University of Zielona Góra, Faculty of Mechanical Engineering, Poland
12.10
Comparison of the properties of the alkaline-phenolic binders for the moulding sand for the steel castings
R. Kania, Pioma-Odlewnia Sp. z o.o., Poland
12.30
Automation of sand cores production – Foundry Volkswagen Poznań
T. Kamiński, Volkswagen Poznań Sp. z o. o., Poland
12.50
The application of Resource and Process Consumption Accounting (RPCA/RCA) in a foundry entity
M. Latallo-Anulewicz, Foundry Research Institute, Poland

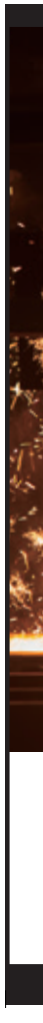
Lunch break 13.10 – 14.30

MATERIALS 11s/ Scientific Session

14.30 – 15.50

14.30
Nondestructive evaluation of ductile cast iron matrix via casting surface by electromagnetic method
N. Horikawa, National Institute of Technology, Asahikawa College, Japan
14.50
Use of high intensity X-ray analysis as tool to create new, fundamental models for phase transformations and residual stress in ductile cast iron
N. Tiedje, Technical University of Denmark, Mechanical Engineering, Denmark
15.10
Research and analysis of the foundry coatings influence on the mould filling process
Y. Nikolaichyk, Belarusian National Technical University, Foundry Department, Belarus
15.30
Influence of investment casting parameters on creep resistance of Ni-based superalloy
Ł. Rakoczy, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

Coffee break 15.50 – 16.10



TECHNOLOGY
10t/Technical Sessiona

16.10 – 17.30

16.10
Use of supplier quality index for assessing providers quality in aluminium castings
D. Dispinar, Istanbul University, Faculty of Engineering, Metallurgical and Meterials Department Turkey

16.30
Development of additive manufacturing sand molding system aimed for mass production application
T. Okane, National Institute of Advanced Industrial Science and Technology, (AIST), Japan

16.50
Optimization and automation of chemical control of alloys in Smart Foundry 4.0
A. Montenegro, Amv Soluciones, R&D&I, , Spain

17.10
Investigation of the efficiency of grain refiners on the hot tearing in Al8Si3Cu
M. Uludag, Metallurgical and Materials, Bursa Technical University, Turkey

24th September
11.30 – 17.30
(14.30 – 15.30 poster authors will be available)

Hall, 2nd floor

POSTER DISPLAY I

SCIENTIFIC

21 – On quantitative metallography vacuum casted Ni-based superalloy used in aero jet engine construction – turbine blades SEM structure analysis after various working hours
J. Belan, University of Žilina, Department of Material Engineering, Slovakia

22 – Quality assessment of Al castings produced in sand moulds using image and CT analysis
L. Kuchariková, University of Žilina, Department of Materials Engineering, Slovakia

23 – Mechanical and fatigue properties of nodular cast irons
A. Vaško, Department of Materials Engineering, University of Žilina, Faculty of Mechanical Engineering, Slovakia

28 – Increasing productive efficiency of casting of ferrous and non-ferrous alloys
M. Sadokha, JSC BELNIILIT, Republic of Belarus

55 – Effect of composition and microstructure on the fatigue life of quaternary SnZnAgCu lead-free alloy
K. Pietrzak, Institute of Precision Mechanics, Poland

76 – The modified low-cycle fatigue test as a quick and economic criterion of the quality of ductile iron after normalizing annealing
M. Maj, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

84 – Effect of melt pouring temperature and composition of primary coating of shell mould on tensile deformation behavior of IN713C superalloy
Ł. Rakoczy, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

99 – Studies of accelerated microwave drying of ceramic moulds
P. Just, Lodz University of Technology, Department of Materials Engineering and Production Systems, Poland

100 – Effect of trace elements on microstructure and material properties of an aluminium alloy
T. Pabel, Austrian Foundry Research Institute, Austria

107 – Prediction of chunky graphite on the base of numerical simulation and experimental data
B. Bauer, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Croatia

113 – Effect of micro-scale gas bubbles on steel filtration: a numerical study
A. Asad, Technische Universität Bergakademie Freiberg, Institute of Mechanic and Fluid Dynamics, Germany

114 – 3-Dimensional imaging of spheroidal graphite by ultra-high voltage electron microscopy
H. Maeda, Ryukoku Unversity, Faculty of Science & Technology, Japan
R. Cygan, Rzeszow University of Technology, Poland

152 – Influence of printed ceramic filters on temperature field distribution during investment casting of thin-walled Ni-based superalloys
M. Antosz, Rzeszow University of Technology, Poland

168 – The effect of Sr and impurities interaction on the Al-7%Si-0.3%Mg alloys
T. Fukuhara, Shoko. Co., Ltd., Japan

175 – An investigation on microstructural and mechanical properties of ceramic moulds applied in the investment casting of critical parts of aircraft engines
M. Ksiazek, Foundry Research Institute, Complex of Research Laboratories, Poland

178 – Influence of thermo-physical properties of moulding sands on the solidification time of ductile cast iron
A. Brusilová, Slovak University of Technology in Bratislava, Faculty of Mechanical Engineering, Slovakia

179 – Conductive stirring problems of steel in continuous casting process
A. Schrek, Slovak University of Technology in Bratislava, Faculty of Mechanical Engineering, Slovakia

180 – The application of X-ray computed tomography to study the quality of ceramic moulds in precision foundry
A. Tchórz, Foundry Research Institute, Poland

187 – Revealing of microstructural features in Haynes® 282® superalloy subjected to various heat treatments
A. Polkowska, Foundry Research Institute, Poland

204 – Physico-chemical, structural and derivatographic studies of bentonite clays from national deposits
J. Kamińska, Foundry Research Institute, Poland

208 – Determination of the charge materials range in a multistage charge burden optimisation for the foundry furnaces
K. Schmalenberg, Odlewnie Polskie S.A., Poland

225 – Amplitude dependence of internal damping of magnesium alloys before and after plastic deformation
M. Uhríčik, University of Žilina, Department of Materials Engineering, Slovakia

229 – Influence of mischmetal on impact toughness and morphology of G20Mn5 cast steel fractures
J. Kasińska, Kielce University of Technology , Poland

233 – Technology of alloy layers on surface of castings
T. Wróbel, Silesian University of Technology, Department of Foundry Engineering, Poland

234 – Strength properties of ceramic moulds containing waste moulding sand after initial reclamation as a substitute for base sand
M. Angrecki, Foundry Research Institute, Poland

243 – Lead-free casting brasses. Analysis of microstructure and properties combined with the casting technology
J. Kozana, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

245 – Influence of structural discontinuities on the fatigue life of aluminium alloys of 4XXO series
J. Zych, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

251 – Investigations of the influence zone of chills - on the casting of the plate made of AlSi7Mg alloy, after the heat treatment T6
M. Piękoś, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

265 – Microstructure and tribological properties of Co-Cr alloys used for metal elements in prosthetic technique
J. Augustyn-Nadzieja, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

271 – Optymalization of mould preheating process to reduce formation of gases during investment casting of Ni-based alloys
M. Grudzień, Foundry Research Institute, Poland

273 – Characterization of primary microstructure of thin-walled Ni-based superalloy casting
M. Grudzień, Foundry Research Institute, Poland

274 – Structure and mechanical properties of austempered grey iron (AGI)
K. Jaśkowiec, Foundry Research Institute, Poland

275 – Determining the effect of austempering temperature on the morphology of ausferrite in ADI using computer image analysis and X-ray diffractometry
K. Jaśkowiec, Foundry Research Institute, Poland

276 – Use of the ATND method to assessment of EN AC-AlSi9Mg alloy hardness moulded in metal moulds
J. Pezda, University of Bielsko-Biała, Department of Production Engineering and Automation, Poland

288 – Effect of increased temperature on dimensional and shape accuracy of castings produced from the EN AC-AlSi11 alloy by pressure die casting process
A. Jarco, University of Bielsko-Biała, Department of Production Engineering and Automation, Poland

289 – Application of patterns fabricated by the FDM technique (Fused Deposition Modeling) in precision casting
T. Pacyniak, Lodz University of Technology, Department of Materials Engineering and Production Systems, Poland

297 – Mechanical properties of phenolic urethanic sand after thermal regeneration at 930°C
T. Nascimento, Federal Institute Education Science Technology of Rio Grande do Sul, Brazil

303 – Analysis of computer simulation data application for steel casting desing in order to reduce its weight
P. Żak, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

306 – Grain boundary wetting phenomena in the Nd-Feb-based commercial alloys
B. Straumal, National University of Science and Technology «MISIS», Russian Federation

315 – AZ91 magnesium based nanocomposites obtaned using thixomolding technology
Ł. Rogal, Polish Academy of Sciences, Institute of Metallurgy and Materials Science, Poland

318 – Dammage micromechanism in spheroidal cast iron as affected by graphite/matrix interface interactions
M. Warmuzek, Foundry Research Institute, Poland

322 – The role of aluminium in the cast iron spheroidizing process
M. Soiński, The Jacob of Paradies University, The Department of Technology, Poland

334 – The effect of Sr modification and Ti grain refinement on the mechanical properties of A356
M. Uludağ, Bursa Technical University, Metallurgical and Materials Engineering, Turkey

339 – Reconstruction of the casting technology of prehistoric bronze ornaments worked with the lost-wax technique on the bases of metal science analyses, computer modelling and model alloys
Z. Kwak, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

340 – Study of (%TiO_2)/ [%Ti] partition coefficient in cupola furnace
M. Castro-Román, Cinvestav Unidad Saltillo, Department of Metallurgical Engineering, Mexico

346 – Influence of carbon on the formation of microstructure and mechanical properties of Co-Cr-Mo and Co-Cr-W-Mo cast alloys
J. Augustyn-Nadzieja, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

349 – Influence of the low Ti addition on gray cast iron properties produced with increased steel scrap in the charge
P. Futas, Slovak University of Technology in Bratislava, Slovakia

350 – Cupola furnace slag - its origin, properties and utilization
A. Pribulova, Technical University in Kosice, Faculty of Materials, Metallurgy and Recycling, Slovakia

367 – Preparation, properties and applications of the novel polymer binders BioCo
B. Grabowska, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

25th September
9.00 – 17.30
(12.00 – 13.00 poster authors will be available)

Hall, 2nd floor

POSTER DISPLAY II

150 – Characterization of composite ceramic materials used during investment casting of aircraft engines components
R. Cygan, Rzeszow University of Technology, Poland

151 – Influence of the selected superalloy and ceramic crucible on the melting and melt-pouring process during the investment casting of the aircraft components
R. Cygan, Rzeszow University of Technology, Poland

183 – Effect of temperature on the structure and magnetic properties of zinc ferrite nanoparticles
A. Kmita, AGH University of Science and Technology , Academic Centre for Materials and Nanotechnology, Poland

184 – Influence of the heating rate on the thermal decomposition kinetics of the chemical cured binder
A. Kmita, AGH University of Science and Technology , Academic Centre for Materials and Nanotechnology, Poland

237 – Environmentally friendly foundry molding and core sands
K. Major-Gabryś, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

311 – Numerical and experimental studies on the cooling conditions of cast aluminium semi-finished product for forging process
M. Szucki, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

351 - The wear mechanism of mill beaters for coal grinding made-up from high manganese cast steel
J. Krawczyk, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

357 – Influencing crystallization of austenitic manganese steel by modification with complex alloying elements
Š. Eperješi, Technical University of Kosice, Slovakia

359 – Determination of transformation temperatures and solidification sequence of the Mg-Al-La-Ca alloy
V. De Barcellos, Federal University of Rio Grande do Sul, Brazil

361 – Investigations of the thickness of protective coatings deposited on moulds and cores
Ł. Jamrozowicz, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

363 – Effect of CaSiAl modification on the microstructure and mechanical properties of low-carbon microalloyed cast steel with 0.04% Nb and 0.07% V
B. Kalandyk, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

365 – Analisis of rapid drying process by set on fire of alcohol-based protective coatings applied on sand cores and moulds
J. Kolczyk-Tylka, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

369 – Influence of the master alloy Ti-Fe on the microstructure and selected properties of copper and copper alloys
M. Piękoś, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

370 – Investigations of the titanium influence on the structure and selected properties of tin bronzes
J. Kozana, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

389 – Application of selected artificial intelligence methods in the system predicting the microstructure of compacted graphite iron
B. Mrzygłód, AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Poland

395 – Analysis of the temperature distribution in the sample during the hot distortion parameter testing
J. Jakubski, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

408 – Biography of bronze. Archaeometallurgical study on the casting technology of the lusatian culture communities in greater Poland. Presesntation of the project
A. Garbacz-Klempka, AGH University of Science and Technology, Faculty of Foudry Engineering, Poland

411 – The use of synthetic slags in Polish foundry Metalodlew in Cracow
M. Balicki, Metalodlew SA, Poland

413 – Design of competitive light-weight composite materials: SiC/$TiSi_2$
D. Giuranno, Foundry Research Institute, Poland

415 – Structure and properties of high nickel austempered ductile iron
A. Kochański, Warsaw University of Technology, Faculty of Production Engineering, Poland

416 – The role of recycled ceramic material obtained from the ceramic layered moulds used in the investment casting
A. Soroczyński, Warsaw University of Technology, Department of Plastic Forming and Foundry Engineering, Poland

417 – Computer simulation of solidification of casting with composite zone based on TiC reinforcement
S. Sobula, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

420 – Quality index of AlSi7Mg0.3 silumin from the perspective of refining methods
A. Garbacz-Klempka , AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

422 – Considerations on the correlation of engineering training with the developments in the field of the creative production of cast parts
V. Soporan, Technical University of Cluj-Napoca, Department of Environmental Engineering and Sustainable Development Entrepreneurship, Romania

423 – Innovation in the production of cast parts in the era of digitalization and tranzition towards circular economy according to the "sharing"-type economic models
V. Soporan, Technical University of Cluj-Napoca, Department of Environmental Engineering and Sustainable Development Entrepreneurship, Romania

426 – Influence of magnesium matrix composition on pressure infiltration of glassy carbon foam
A. Olszówka-Myalska, Silesian University of Technology, Faculty of Materials Science and Engineering, Poland

439 – Prediction of shrinkage porosity in ductile cast iron test castings
J. Hajkowski, Poznan University of Technology, CAD/CAE Material Technology & Foundry Laboratories, Poland

441 – Experimental device for investigation of low vapour pressure liquid metals and their interaction in contact with refractory materials
A. Kudyba, Foundry Research Institute, Poland

444 – Comperative study of interaction of kaolin substrates with liquide Ni and CSMX4 alloy
R. Nowak, Foundry Research Institute, Poland

451- High-temperature interaction of molten conventional grey cast iron and Al_2O_3-ZrO_2 ceramic
L. Drenchev, Institute of Metal Science, Equipment and Technologies with Hydroaerodynamics Centre, Bulgaria

452 – Thermal conductivity of selected vermicular cast iron alloys
M. Homa, Foundry Research Institute, Poland

453 – Simoultanoeus TG-DTA thermal analysis of Si-30B alloy
M. Homa, Foundry Research Institute, Poland

455 – Wettability of two-dimensional MoS_2 layer by liquid tin
G. Bruzda, Foundry Research Institute, Poland

456 – The influence of alloying additions on the interaction between re-melted vermicular graphite cast iron and Al_2O_3 substrate
G. Bruzda, Foundry Research Institute, Poland

459 – The effect of surface condition on wetting of Hastelloy® x by ***Brazer Alloy of Ni-Pd-Cr-B-Si system***
A. Kudyba, Foundry Research Institute, Poland

460 – Improvement of TiC/Fe in situ composite layer formation on the surface of Fe-based castings
Ł. Szymański, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland
A. Pokrovsky, Physicotechnical Institute, National Academy of Sciences, Belarus

TECHNICAL

26 – Effect of magnesium inoculation on the microstructure and mechanical properties of a spheroidal cast iron knuckle: a focus on the steering arm
S. Mavhungu, University of Johannesburg, Metal Casting Technology Station, South Africa

156 – Effect of Nd content on structures and mechanical properties of Mg-Gd alloys cast into sand molds
N. Sunayama, TANIDA Ltd., Japan

167 – The role of recycled ceramic material obtained from the ceramic layered moulds used in the investment casting
A. Soroczyński, Warsaw University of Technology, Department of Plastic Forming and Foundry Engineering, Poland

189 – Ceramic-carbon filters for molten metal filtration
B. Lipowska, Institute of Ceramics and Building Materials, Refractory Materials Division, Poland

221 –Prediction of shrinkage cavities of using casting simulation
H. Mitsuya, Muroran Institute of Technology, Japan

223 – Thermal stress analysis of TiC cast-in insertion multi-component white cast iron
S. Murase, Muroran Institute of Technology, Japan

241 – Influence of quality of charge materials on chemical composition, structure and properties of copper products for electrical application
B. Juszczyk, Institute of Non-Ferrous Metals, Metal Processing Department, Poland

242 – The use of Multivariate Control Charts to assess the quality of aluminum alloys melted in crucible furnaces
M. Brzeziński, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

244 – Technological aspects of producing Certified Reference Material (CRM) for zinc alloys
Ł. Wierzbicki, Institute of Non-Ferrous Metals, Metal Processing Department, Poland

262 – Influence of nickel content on erosive wear and heat treatment conditons behaviour of multi component white cast iron
K. Kusumoto, Muroran Institute of Technology, College of Design and Manufacturing Technology, Japan

366 – Easy-knock out moulding and core sand - the future for metal casting
A. Bobrowski, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

403 – Polish engineer with regard to changes caused by Industry 4.0
K. Liszka, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

445 – The technology of continuous casting of aluminium alloy ingots
B. Augustyn, Institute of Non-Ferrous Metals, Light Metals Division, Poland

Young Researchers' Seminar

Patron of the Young Researchers' Seminar

24th September

S3.2 – Conference Room

ORAL SESSION

14.30 – 16.30

14.30
GUEST LECTURE

Kimura Foundry Co., Ltd. Overview
K. Kimura – President of Kimura Foundry CO., Ltd, JAPAN

YOUNG RESEARCHERS' SESSION – oral presentations

15.00
Oxidation resistant aluminum alloyed simo cast iron for high temperature application
N. Scheidhauer, Technical University Bergakademie Freiberg, Foundry Department, Germany

15.15
Infruence of tellurium addition to spheroidal graphite cast iron on the number of graphite particles
R. Saito, Department of Chemistry and Materials Engineering, Graduate School of Kansai University, Japan

15.30
Influence of solution hardening on microstructure and mechanical properties of Al-2.5Mg-0.7Li alloy
F. Kozina, University of Zagreb, Faculty of Metallurgy, Department for Process Metallurgy, Croatia

15.45
Comparative study of waste foundry sand reclamation techniques
M. Khan, Indian Institute of Technology Bombay, Department of Chemical Engineering, India

16.00
The examination of the modification effect of strontium in AlSi8Cu3foundry alloys
M. Tokár, University of Miskolc, Foundry Institute, Hungary

16.15
Effect of thermal exposure on high temperature mechanical properties of secondary AlSi7Cu3Mg alloys
A. De Mori, University of Padova, Department of Management and Engineering, Italy

25th September

S3.2 – Conference Room

ORAL SESSION

10.00 – 13.10

10.00
GUEST LECTURE

The state of art and foresight of world casting production. The role of the Faculty of Foundry Engineering AGH-UST in educating engineers for casting industry
R. Dańko - Dean of Faculty of Foundry Engineering, University of Science and Technology, POLAND

YOUNG RESEARCHERS' SESSION – oral presentations

10.30

The influence of remelting on the properties of Al-Si9Cu3 alloy with higher iron concent

M. Matejka, University of Žilina, Department of Technological Engineering, Slovakia

10.45

Development of mathematical relationships for calculating of material-dependent-flowability of green moulding sand

D. Abdulamer, IMKF. TU- Bergakademie Freiberg, Germany

11.00

Multi-scale topologically optimized components made by casting and additive manufacturing

K. Jalava, Aalto University, Department of Mechanical Engineering, Finland

11.15

Effect of predeformation and semisolid isothermal treatment time on the globular grains in MRI230 alloy during SIMA process

M. Roberto Bellé, Federal University of Rio Grande do Sul, Metallurgy Department - School of Engineering, Brazil

11.30

Numerical modelling of SHSB metal matrix composite solidification

A. Wojtyla, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

11.45

New possibilities in the thermal analysis of moulding materials

J. Svidró, Jönköping University School of Engineering, Department of Materials and Manufacturing, Sweden

POSTER SESSION

12.00 – 12.45

15 – Technical capabilities for low-temperature waste heat recovery in foundries

T. Ludwig, Technical University Freiberg, Foundry Department, Germany

24 – Steeldesign and activated infiltration of metal-matrix composites for wearing parts

P. Rähmer, TU Bergakademie Freiberg, Foundry Institute, Germany

27 – Oxidation resistant aluminum alloyed simo cast iron for high temperature application

N. Scheidhauer, Technical University Bergakademie Freiberg, Foundry Department, Germany

32 – Design options to increase the service life of cast accessories for thermal and chemical treatment furnaces

A. Bajwoluk, West Pomeranian University of Technology, Faculty of Mechanical Engineering and Mechatronics, Poland

33 – Suppressing the basket deformation process during heat treatment

A. Bajwoluk, West Pomeranian University of Technology, Faculty of Mechanical Engineering and Mechatronics, Poland

35 – Modeling of microstructure in hypoeutectic high chromium cast iron

D. Siekaniec, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

37 – Possibility on estimation of fatigue limit using X-ray CT apparatus in spheroidal graphite cast iron

K. Tanaka, Tokyo City University, Graduate school of Engineering, Japan

45 – A six sigma framework for eliminating defects in sand casting foundries

K. Nyembwe, University of Johanneburg, South Africa

48 – Influence of solution hardening on microstructure and mechanical properties of Al-2.5Mg-0.7Li alloy

F. Kozina, University of Zagreb Faculty of Metallurgy, Department for Process Metallurgy, Croatia

50 – Modification of non-metallic inclusions in steel by application of deoxodizing agents with alkaline metals (calcium and barium)

J. Cerny, COMTES FHT, Czech Republic

53 – A novel measurement method to study the thermal aspects of moulding mixture decomposition

J. Svidró, Jönköping University School of Engineering, Department of Materials and Manufacturing, Sweden

56 – Development of casting genome for automotive piston casting: a study

R. Ozah, North Eastern Regional Institute of Science and Technology, Mechanical Engineering, India

63 – Investigation of the impact of roughness on adhesion forces and filtration efficiency in a water-based model system with ceramic foam filters
D. Hoppach, TU Freiberg, Insitute of Mechanical Process Engineering and Mineral Processing, Germany

77 – New possibilities in the thermal analysis of moulding materials
J. Svidró, Jönköping University School of Engineering, Department of Materials and Manufacturing, Sweden

93 – Comparative study of waste foundry sand reclamation techniques
M. Khan, Indian Institute of Technology Bombay, Chemical Engineering, India

130 – Spaghetti filters – a novel approach for steel melt filtration based on alginate gel-casting
T. Wetzig, TU Bergakademie Freiberg, Institute of Ceramic, Glass and Construction Materials, Germany

132 – Microsegregation in low – alloy cast steels: characterization and homogenization
A.Yaktiti, LaBoMaP, France

136 – Development of mathematical relationships for calculating of material-dependent-flowability of green moulding sand
D. Abdulamer, IMKF. TU- Bergakademie Freiberg, Germany

145 – Thermal reclamation of foundry sands using repurposed sand dryer equipment
T. Sappinen, Aalto University, School of Engineering, Finland

147 – Spinel forming systems (Mg-/Fe-/Mn-Al-O) as functional coating materials on carbon-bonded filters for steel melt filtration
B. Bock, TU Bergakademie Freiberg, Institute of Ceramic, Glass and Construction Materials, Germany

157 – Exchangeable carbon-bonded alumina foam filter systems for the continuous casting of steel – development and testing
T. Wetzig, TU Bergakademie Freiberg, Institute of Ceramics, Glass and Construction Materials, Germany

160 – *Development of new heat – resistant steel to avoid the detrimental Z-phase precipitation at high temperatures*
W. Pasini, Federal University of Rio Grande do Sul, Metallurgy Department - School of Engineering, Brazil

165 – Adaptative product manufacturing technique for foundry industry using IoT technology an industry 4.0 initiative
Y. Pandya, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

169 – Optimal gating system design of steel casting by fruit fly optimization algorithm based on casting simulation technology
W. Tong, Huazhong University of Science and Technology, State Key Laboratory of Materials Processing and Die & Mould Technology, China

170 – The deviation from eutectic composition in boundary layer for eutectic growth: a phase-field study
Z. Tu, Huazhong University of Science and Technology, State Key Laboratory of Materials Processing and Die & Mould Technology, China

173 – Effect of cooling rate on constituent particle formation in high-speed twin-roll cast Al-Mn based alloy strips
R. Song, Tokyo Institute of Technology, Department of Metallurgy and Ceramics Science, Japan

176 – Optimal gating system design of steel casting by fruit fly optimization algorithm based on casting simulation technology
T. Wang, Huazhong University of Science and Technology, State Key Laboratory of Materials Processing and Die &Mould Technology, China

185 – Casting EMPS (ERP\MES\PDM\SCADA) integrated system architecture and its application in aeronautic titanium alloy foundry enterprise
J. Zhou, Huazhong University of Science & Technology, State Key Laboratory of Materials Processing and Die & Mould Technology, China

190 – Suppressing of ultra-high temperature wetting between molten Si and SiC by using h-BN spray coatings
W. Polkowski, Foundry Research Institute, Poland

196 – Indicator of the efficient protection against the humidity W_{SO}, as a new parameter characterising protective coatings
N. Kaźnica, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

198 – Application of 3D printing to produce an investment casting model of hip-joint endoprosthesis
M. Skorupska, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

200 – Bayesian inference based optimization of process parameters for chemically bonded molding system
H. Khandelwal, MPM Infosoft Pvt. Ltd., India

201 – Numerical modelling of SHSB metal matrix composite solidification
A. Wojtyla, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

207 – The influence of remelting on the properties of AlSi9Cu3 alloy with higher iron content

M. Matejka, University of Žilina, Department of Technological Engineering, Slovakia

212 – Coupled methods of thermal analysis in the study of materials used in the foundry industry

A. Roczniak, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

215 – Study of damping properties of composite materials on a metallic matrix

M. Poręba, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

216 – Tribological properties of composite materials on the metallic matrix

B. Gospodarczyk, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

217 – Gating system design optimization for investment casted part

M. Bruna, University of Źilina, Department of Technological Engineering, Slovakia

219 – Dynamic measurement and FEM analysis of restraint force from mold on gray cast iron castings and contraction of castings during cooling in green sand mold

M. Kaneko, Waseda University, Modern mechanical engineering, Japan

239 – Development of a method for measuring the ejector forces in the die casting process

S. Krischke, TU Braunschweig, Institute of Joining and Welding, High-Pressure Die Casting, Germany

250 – Deformations in chemically bonded moulding sands

A. Grabarczyk, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

254 – Austempering in Zamak bath: influence of austempering time on the properties of ductile cast iron

W. M. Pasini, Federal University of Rio Grande do Sul, Metallurgy Department - School of Engineering, Brazil

260 – Teaching-and-playback approach based on pouring flow rate in tilting-ladle-type pouring machine

T. Yajima, University of Yamanashi, Department of Mechanical Engineering, Japan

266 – Optimization of the runner shape considering the molten metal flow of product in die casting

T. Okuno, Mie University, Faculty of Engineering, Department of Mechanical Engineering, Japan

267 – Influence of AlP in solidification sequence of Al -10%Si-0.3%Mg

Y. Zhao, University of Toyama, Graduate School of Science and Engineering for Education, Japan

268 – Effect of AlP in solidification sequence of Al-6%Mg -3%Si

A. Osugi, University of Toyama, Graduate School of Science and Engineering for Research, Japan

269 – Influence of P content in eutectic crystallization of Al-10%Si-0.8%Mg

H. Kazuta, University of Toyama, Graduate School of Science and Engineering for Education, Japan

278 – Infruence of tellurium addition to spheroidal graphite cast iron on the number of graphite particles

R. Saito, Graduate School of Kansai University, Department of Chemistry and Materials Engineering, Japan

282 – Multi-scale topologically optimized components made by casting and additive manufacturing

K. Jalava, Aalto University, Department of Mechanical Engineering, Finland

286 – Influence of Ti and RE on primary crystallization and wear resistance of chromium cast iron

M. Dojka, Silesian University of Technology, Department of Foundry Engineering, Poland

290 – Rate of metal additive for filler of the liquid ceramic mold in the manufacturing of single crystal nickel-based superalloys

K. Gancarczyk, Rzeszow University of Technology, Department of Materials Science, Poland

294 – Product design and manufacturing in foundry industry using augmented virtual reality technology

Y. Pandya, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

295 – Study of viscosity of water- and alcohol-based protective coatings

E. Wildhirt, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

298 – Corrosion resistance of Ti30Nb alloy in Hank's solution

J. Ryba, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

299 – Magnesium alloys for biomedical applications of implants

A. Fijołek, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

300 – Modeling of the kinetics of carbonitrides precipitation process in HSLA steels using cellular automata method
P. Marynowski, AGH University of Science and Technology, Poland

301 – Grain refinement of Al-2%Cu alloy using by vibrating mold
Y. Yoshitake, National Institute of Technology, Support Center of Education and Research, Kurume College, Japan

310 – Settling effect of Ti on melt quality and mechanical properties in 356 cast alloy
Ö. Gürsoy, Istanbul University, Faculty of Engineering, Turkey

317 – Hot tearing tendency and tensile property change of Ni and Cu added A356 casting alloys
K. Yildirim, Giesserei Institut RWTH, Germany

319 – Efficiency of Ti addition in A356 alloy under different holding time
M. Gurtaran, Bursa Technical University, Material Science And Engineering, Turkey

320 – Influence of manufacturing process parameters on the stability of layers printed from ceramic powders using additive technology
A. Kania, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

325 – Effect of thermal exposure on high temperature mechanical properties of secondary AlSi7Cu3Mg alloys
A. De Mori, University of Padova, Department of Management and Engineering, Italy

330 – Increasing the lifetime of die casting molds made of the hot work tool steel H13 by means of a local surface heat treatment with the electron-beam
T. Schuchardt, TU Braunschweig, Institute of Joining and Welding, Germany

332 – Implementation of 3D printing in dentistry to improve the production of dental prosthetics restoration
D. Dulian, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

335 – Numerical simulation of the impact of casting wall thickness and initial mould temperature on the ductile cast iron microstructure
G. Witek, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

336 – Effect of quenching mediums on mechanical properties of Al-Cu alloy
M. Gurtaran, Bursa Technical University, Metallurgical and Materials Engineering, Turkey

337 – Foundry engineering and art. Casting of the bronze statuette inspired by Salvador Dali
B. Chachurska, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

343 – The use of experimental and computer aided methods in reconstruction of casting process of metal artifacts from the bronze age
D. Gruszka, AGH University of Science and Technology, Faculty of Foundry Engineering, Poland

360 – The examination of the modification effect of strontium in AlSi8Cu3 foundry alloy
M. Tokár, University of Miskolc, Foundry Institute, Hungary

362 – Manganese in Compacted Graphite Iron
B. Kurowska, Łódź University of Technology, Department of Materials Engineering and Production Systems, Poland

381 – Influence of evaluated temperature of intercritical treatment on mechanical properties of austempered ductile iron
P. Nawrocki, Warsaw Univeristy of Technology, Faculty of Production Engineering, Poland

383 – Microstrutural and mechanical characterization of high-aluminium zinc alloy modified with 2.0% TiB_2
M. Roberto Bellé, Federal University of Rio Grande do Sul, Metallurgy Department, School of Engineering, Brazil

390 – Effect of Al, Cr and Mo addition on mechanical properties of Nb-Si based alloys
T. Uemura, Kindai University, Faculty of Mechanical Engineering, Japan

406 – Quality index - a way of illustrating diversified properties of a heat-treated Al-Zn-Mg-Cu aluminum alloys depending on homogenization parameters
Z. Kwak, AGH University od Science and Technology, Faculty of Foundry Engineering, Poland

409 – Non-destructive testing methods in the analysis of metal artefacts
A. Sosnowska, AGH University od Science and Technology, Faculty of Management, Poland

419 – Influence of alloy additives and casting parameters on microstructure and mechanical properties of silicon bronzes
D. Witasiak, AGH University od Science and Technology, Faculty of Foundry Engineering, Poland

424 – Vision of the digitalized foundry -with cyper-physical systems to fully automatic cutting process for casting
M. Füglister, University of Applied Science and Arts Northwestern, Institute of Automation, School of Engineering, Switzerland

428 – Effect of predeformation and semisolid isothermal treatment time on the globular grains in MRI230 alloy during SIMA process

M. Roberto Bellé, Federal University of Rio Grande do Sul, Metallurgy Department - School of Engineering, Brazil

443 – Wettability, reactivity and interfaces in Gd/Y_2O_3 system

P. Turalska, Foundry Research Institute, Poland

446 – High-temperature interaction of molten high chromium cast iron with ZrO_2- Al_2O_3 ceramic

M. Kolev, Institute of Metal Science, Equipment and Technologies with Hydroaerodynamics Centre, Bulgaria

447 – Analysis and evaluation of the effect of manganese content on the properties of aluminum alloy EN AC 46000

M. Pasternak, AGH University od Science and Technology, Faculty of Foundry Engineering, Poland

449 – Analysis of the influence of the degree of wear of the pressing piston in cold chamber pressure machines on the quality of aluminium castings

G. Piwowarczyk, AGH University od Science and Technology, Faculty of Foundry Engineering, Poland

458 – The effect of boron content on wetting kinetics in Si-B alloy/h-BN system

W. Polkowski, Foundry Research Institute, Poland

Award ceremony for the
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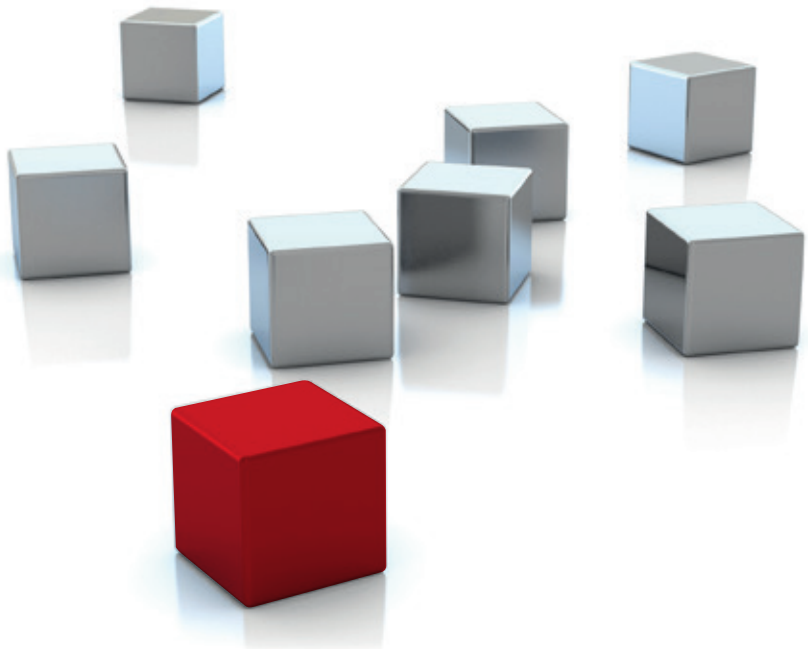

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Exhibition "Creative Foundry"

Exhibition 'Creative Foundry' is organized on September 24-25th in the ICE Kraków Congress Centre to underline the motto of the Congress. The co-organizer of the exhibition is Poznań International Fair. The exhibition presents creative and innovative solutions in foundry engineering technologies, castings, materials, casting productions, instrumentations, machines and foundry devices, as well as in management solutions.

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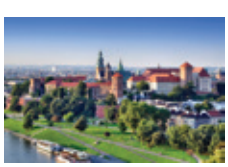

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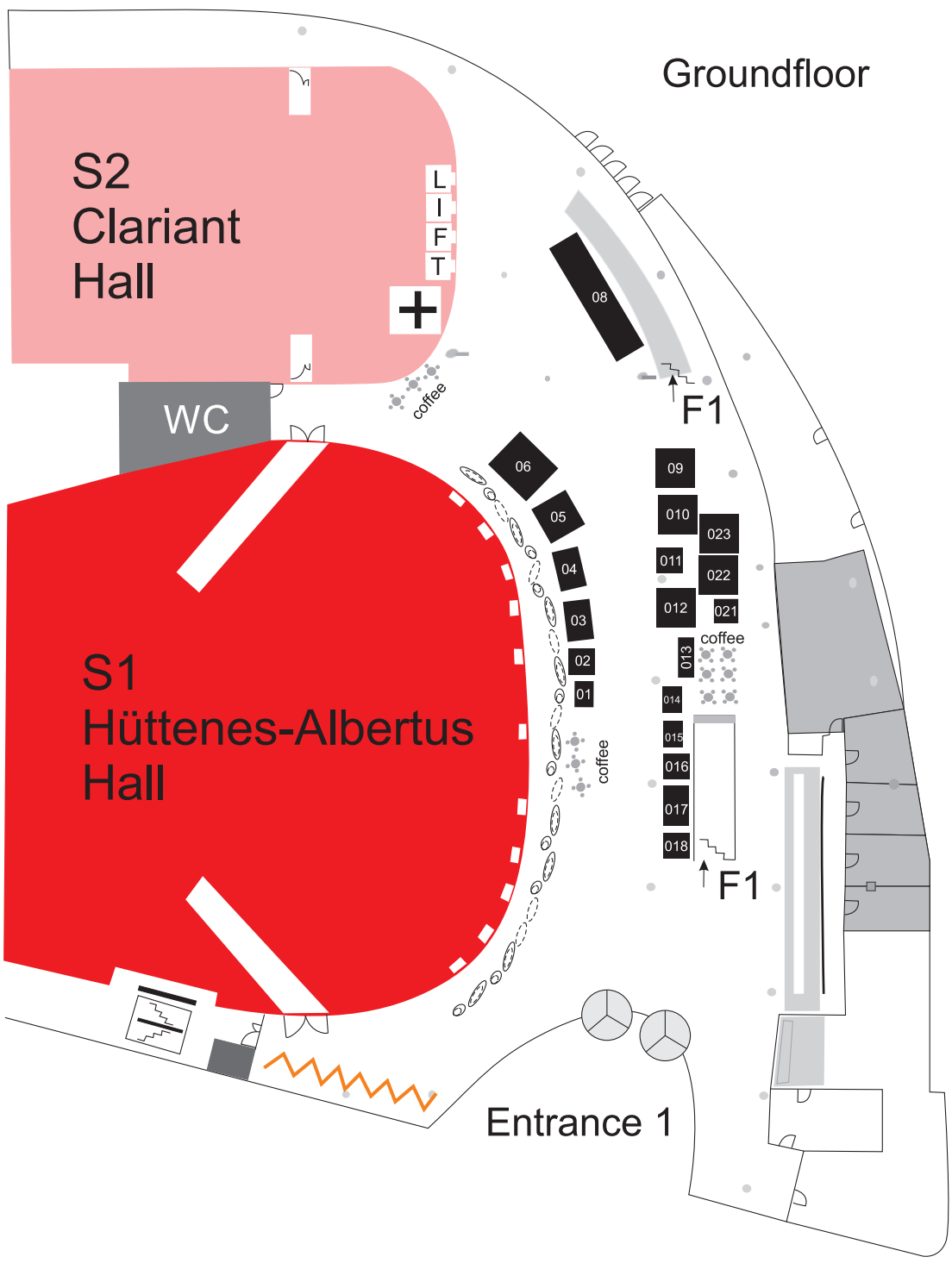
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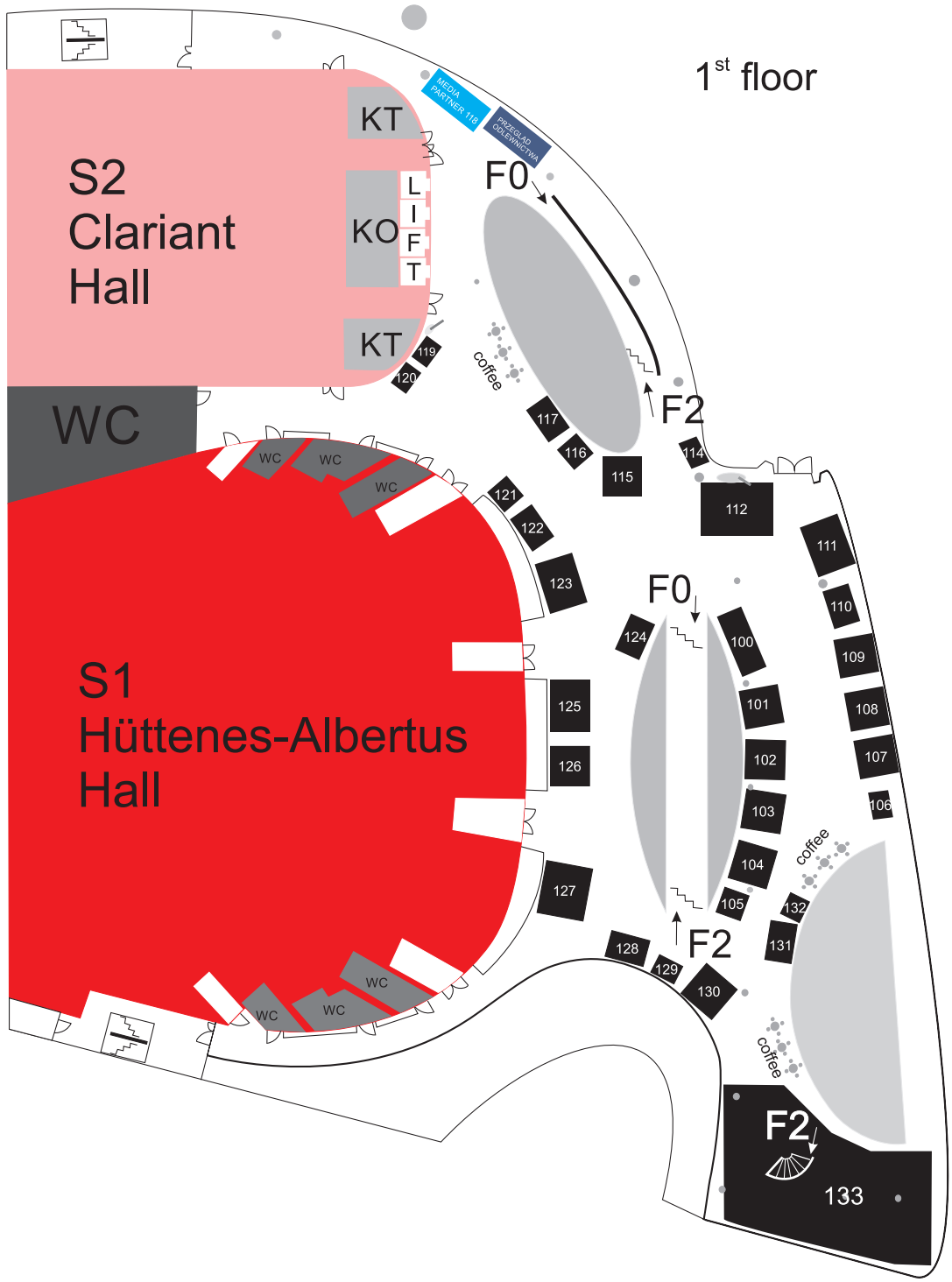
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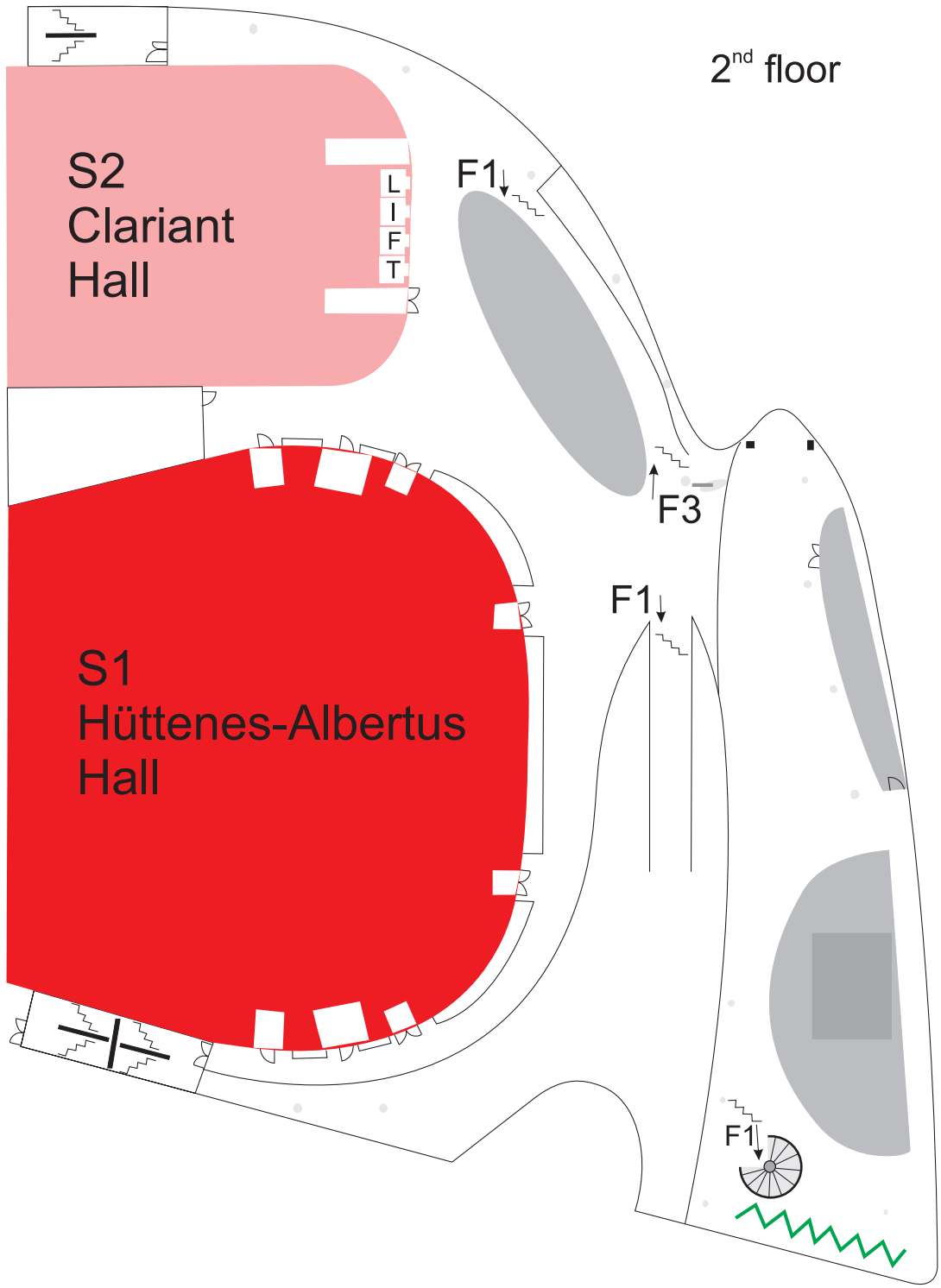
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22. International Fair
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The 73rd World Foundry Congress, Creative Foundry

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22. International Fair of Technologies for Foundry METAL 2018

22nd International Fair of Technologies for Foundry METAL will be an accompanying event of the 73rd WFC. It will present the most important companies from the foundry sector, suppliers of raw materials, machines and components for foundry plants from more than 20 countries. The participants of the Congress will have the opportunity to participate in this event, on the fourth day of the Congress.
September 2018 – Poland becomes the home for global cutting-edge foundry technologies!
The upcoming METAL 2018 is held from 25 to 27 September already promises to be the greatest and grandest ever. 2018's METAL is an integral part of 73rd World Foundry Congress is held in Krakow from 23 to 27 September 2018. On 26 September 2018 the Congress participants will take part in the off-site session held at Targi Kielce's METAL, ALUMINIUM & NonFermet and Recycling Expos.
The METAL expo is one of the world's leading in addition to being Central and Eastern Europe's largest foundry and metal business-sectors' events. For years the expo has brought together participants from around the world – a large group of exhibitors that offer the latest technologies and a whole array of visitors – this is a properly selected target group. The expo guests are business-insiders and representatives of related sectors.

Metalcasting over the centuries

Exhibition

METALCASTING OVER THE CENTURIES is a unique exhibition which is designed to show how the evolution of metal casting had influenced the life of humanity, what impact it had on attitudes, religions/beliefs or even laws.
The diverse history of this proffesion has been displayed on 28 boards which connect the first steps of shaping metal with the leading and still evoluing noder Art of Metal Casting.

Work Visits

One-day technical excursions will be organised on the last day of the Congress to present the Polish foundry engineering, The participants will be able to visit foundry plants of various production profiles as well as the most important scientific-research foundry centres and universities of technology.

8 technical excursions are planned concerning the issues listed below:

TOUR 1 – METALODLEW SA, Kraków

Metalodlew SA was established in January 1994. Metalodlew SA offers one-off unit casts, short series manually formed in sand forms, made of several dozen types of cast steel (up to 15 Mg), cast iron (up to 25 Mg), non-ferrous metal alloys, with various mixes depending on shape and weight.

Mission: Metalodlew – a recognised and effective producer of one-off unit castings.

Casting process engineering. The engineering of casting processes both for steel and iron castings is aided by CAD 3D type software. The effectiveness of these engineered processes has been verified with the most recent version of the Magmasoft software, which has been equipped with modules for the simulation of pouring, solidification and stress distribution in steel and iron castings, as well as a module for the forecasting of iron casting mechanical properties.

Production of patterns. We have our own pattern shop, where we make patterns of Textolite, wood, foamed polystyrene or resin. Our patterns and customers' patterns are stored within air-conditioned warehouses which are amongst the biggest facilities in Poland.

Steel castings. We are experienced in the production of carbon, low- and high-alloy steel castings, with a unit weight up to 15 Mg and a carbon content of over 0.1%. For steel castings containing less than 0.07% of carbon – we are able to make castings with a unit weight up to 4 Mg. The steel is melted in electric arc furnaces of 8.5 Mg capacity each, and in two-pot induction furnaces of 1 Mg capacity each. In addition we have the option of metal ladle treatment by argon bubbling. Moulds and cores are made of ester hardened alkaline phenol resin bonded sands using continuous mixer-feeders. The heat treatment of castings is performed in three computer controlled furnaces, depending on the material grade and customer requirements. The maximum dimensions of heat treated components are 5.8 x 3.1 x 1.8 m.

Iron castings. We make grey iron castings weighing up to 30 Mg, and S.G. iron castings with a maximum unit weight up to 25Mg.
Iron is melted in a two-pot medium-frequency induction furnace by Otto Junker, with a capacity of each crucible of 12 Mg, and in a grid-frequency induction furnace with a crucible capacity of 2,5 Mg. Moulds and cores are made of furane sands that are based on reclaimed quartz sand by continuous mixer-feeders.

Non-ferrous metals castings. We are experienced in the manufacturing of castings of non-ferrous alloys such as bronze and brass, as well as in the casting of bearing metals. We melt non-ferrous metals in two-pot induction furnaces with capacities of 1 Mg, and 50 and 100 Mg. We also use an electric resistance furnace with a capacity of 200 Mg.

Machining of castings. Depending on customers' requirements, we offer machining – roughing and finishing. Machining Department is equipped with two numerically controlled (CNC) drilling/milling machines, three vertical lathes and a conventional boring machine.

TOUR 2 – ODLEWNIE POLSKIE SA, Starachowice

ODLEWNIE POLSKIE S.A. Foundry in Starachowice is located 160 km from Krakow (in the middle of the Krakow – Warsaw route) – easy access, about 2.5 hours by car.
Starachowice and the Foundry are located on the edge of the Świętokrzyskie Mountains – the oldest mountains in Poland.
The foundry produces around 20,000 tons of castings per year, 80% of which are made from spheroidal cast irons. Casting parts for the machine industry, automotive industry, railways, construction, agricultural machinery, power industry – a typical foundry service. Production of around 900 items a year, for around 100 clients.Technological process based on smelting cast iron in 3 induction furnaces with a capacity of 7 tons each and 2 automatic molding lines with vertical and horizontal division of the mold (LORAMENDI line with variable chamber and Heinrich-Wagner-Sinto line). Typical castings which weight from 1 to 100 kg are made in bentonite moulding sands (green sand technology). 75% of castings require cores – most cores are made in cold-box technology on Laempe machines. Grinding of castings is done using grinding machines and robots. The company has the possibility of mechanical machining of ready castings, priming and painting of castings, and their partial assembly.
Since 2010, the Research and Development Center of Casting Components has been operating in the Company. The company has a high-quality control and measurement facility, including a CT scanner for castings and the ATAS metallurgical control system. The Foundry is the only Polish producer of ADI cast iron castings.
Patterns are made in the house on two CNC machines, including design with the assistance of computer programs with possibility of flow simulation and solidification.

The trip includes:

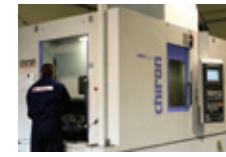
- visit to the Technical Museum in Starachowice with the perfectly preserved Large Furnace from 1899, which initiated the history of the Foundry in Starachowice,
- multimedia presentation of the Odlewnie Polskie Foundry,
- visiting the Foundry,
- picnic in the Foundry perimiter.

Museum of Nature and Technology, Starachowice – is the first museum created in the XXI century in Poland. The facility covers an area of 8 hectares, on which two chronologically successive blast furnace plants are located.
Elder „released in motion" in 1841 and its successor built a few hundred meters away in the 1899 year. They provide a perfect illustration of the technological development of nineteenth-century steel industry, as a whole preserved its terrace and a technological system. Starting from the flyover railway, which was supplied to the premises by the feedstockboxes warehouses, a water towerup to the blast furnace fuel coke, which is the most precious object in the museum. No less valuable and the most intriguing it is one of the world's largest steam engine.




TOUR 3 – Iron Foundry WULKAN SA, Częstochowa

Iron Foundry WULKAN SA specializes in medium and high-volume production of gray iron castings in automatic moulding technology (disamatic).
Castings weighing from 0.01kg to 20kg are produced for the automotive, machine and construction industries. 70% of production goes through further mechanical treatment. The annual production capacity is about 9000 tons of castings.
During the tour participants will have an opportunity to visit the Iron Foundry WULKAN SA along with its two subsidiaries: LAWA and FENIX MACHINES.
LAWA sp. o.o. deals with mechanical processing of castings.
FENIX MACHINES sp. z o.o. manufactures numerically controlled grinding machines. Application of modern CNC grinders in the foundry process ensures accuracy of the shape of the grinded product and high process efficiency. Robotization of grinded castings loading process results in a further increase in its efficiency.



Częstochowa – Jasna Góra Monastery. The monastery on Jasna Gora was founded in 1382 by the Pauline monks who came from Hungary at the invitation of Władysław, Prince of Opole. The monastery has been a place of pilgrimage for hundreds of years and contains an important icon of the Virgin Mary. The Icon of the Virgin and Child is known as the Black Madonna of Czestochowa or the Madonna of Czestochowa, which is widely venerated and attributed to many miracles.

CNC grinding machines created by the foundry

TOUR 4 – METALPOL, Węgierska Górka

METALPOL Węgierska Górka, the oldest foundry in Poland whose beginnings date back to the year 1838, will celebrate its 180th anniversary in 2018. Over the 180 years of its operation, the only thing that has never changed about the plant was its top ranking among the best and most advanced casting plants in this country. The plant first opened as an ironworks smelting iron from the iron ores mined in the area, using charcoal supplied by the nearby forests, and energy provided courtesy of a river flowing close by. At the time, the ironworks became well-known as one of the largest and most sophisticated plants in this part of Europe. In 1938, the foundry welcomed visitors from the 14th World Casting Conference held in Warsaw. The year 2017 saw the launch of a most technologically advanced, and the largest in the world vertical mold partition casting line with an electric drive e-VMM 8 50x650x150–500 mm molding machine made by Spanish LORAMENDI, an Italian BELLOI-ROMAGNOLI sand mix station, a German EIRICH cooler, and a CIME pouring system. The other production line at METALPOL features a BMD horizontal molding line 850x750x2x250 mm capable of making castings weighing from 5 to 100 kg. 95% of METALPOL production is made of ductile cast iron. METALPOL is a supplier to some leading global companies, such as CATERPILLAR, KNORR BREMSE, KUHN, POCLAIN HYDRAULICS, and TOYOTA.

The railway industry represents another major customer for METALPOL, especially for their railway junctions/switch points, parts for cars, engines, as well as railway sleeper components both for domestic and foreign buyers. METALPOL proudly continues their historic traditions as a major supplier of water system fittings not just for the Polish market but a number of foreign customers as well. For more information on METALPOL and the Virtual Museum of the Foundry, please go to http://www.metalpol.com/en

Firma METALPOL WĘGIERSKA GÓRKA Sp. z o.o jako kontynuatorka tradycji XIX wiecznej Huty Żelaza założonej 1838 przez hrabiego Wielpolskiego oraz Fabryki Armatury i Odlewni S.A jest jednym z najstarszych i najbardziej znanych zakładów branży metalurgicznej w Polsce. W tym roku obchodziła swój Jubileusz 180 lecie istnienia.

METALPOL oferuje wyroby spełniające wszystkie wymagania odpowiadające światowym standardom w zakresie jakościowym, zapewnia gwarancję solidności, profesjonalizmu i nowoczesności.

W tym też celu zainwestowała w nową automatyczną linię formierską LORAMENDI VMM 6080D z pionowym podziałem i zmienną komorą formowania, o gabarycie formy (mm) 600x775x150 i wydajności 450 form na godzinę bez rdzeni i 400 form na godzinne z rdzeniami o wadze odlewów 0,5- 30 kg.

Produkowane są na niej szerokiej gamy wyroby z żeliwa sferoidalnego (wg. PN-EN 1563) oraz z szarego (wg.PN-EN 1561) z przeznaczeniem dla przemysłu samochodowego i maszynowego, kolejnictwa, górnictwa, budownictwa oraz robót publicznych.

Firma posiada Certyfikaty Zintegrowanego Systemu Zarządzania: ISO 9001:2008, ISO TS 16946:2009 oraz ISO 14001:2004.

TOUR 5 – Zakład Metalurgiczny WSK Rzeszów Ltd.

Zakład Metalurgiczny „WSK Rzeszow" Ltd. – Company with over 60 years of tradition in foundry branch and machining. Almost 90% of the company's revenue comes from export as its products are being sold to the most demanding world markets in Europe and America.

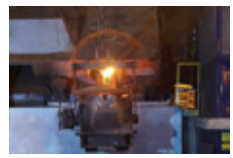
Customers of ZM „WSK Rzeszow" Ltd. are world leaders of:

- automotive industry,
- power transmission and distribution,
- railway industry,
- machine industry,
- tractors and agriculture machines production.

ZM „WSK Rzeszow" Ltd. has Aluminum Foundry, that produces large, medium and small series of aluminum castings weighing from 0.5 to 400 kg. They are casted in sand molds, gravity molds and in low pressure molds. Light alloy castings are supplied to more than 50 customers, which are large and well-known companies in the automotive, machine, electromechanical and energy industries. ZM „WSK Rzeszow" also has a cast iron foundry, which specializes in the production of the most demanding, technologically complicated castings from a wide range of cast irons, including gray cast iron, spheroidal cast iron and silicon-molybdenum cast iron (SiMo). ZM "WSK Rzeszow" also has Machine Shop with Die & Pattern Department equipped with a several dozen CNC machining centers and good equipped own design office and laboratory.

ZM offers wide range of castings and machined components of highest difficulty level and parameters. Products' quality is proved with ISO 9001 and IATF 16949 certificates. In the range of environment management Company is certified with ISO 14001.

Łańcut Castle and Palace Complex. Łańcut Castle is one of the most beautiful aristocratic residences in Podkarpacie in Poland, famous for its excellent interiors and extraordinarily interesting collection of horse-drawn carriages. The castle complex is surrounded by an old and picturesque park filled with pavilions and farm buildings, all part of the former the daily life of the castle.


TOUR 6 – NEMAK, Bielsko-Biała

Nemak Poland domiciled in Bielsko-Biała is the oldest company of the Nemak group. Its origin dates back to the year 1878 when Karol Hess founded a textile factory. In 1932 a number of diecasting machines were purchased. It was the actual starting point of the foundry practice both in our company and throughout Poland.

Nemak Poland has specialized in three types of castings: engine blocks, gearbox casings and coupling boxes, cylinder heads and also structural components.These parts are manufactured according to two technological processes:

- High-pressure diecasting (HPDC process),
- Gravity diecasting (GDC process).

Since the company in Bielsko-Biała joined the Nemak Group, we have developed dynamically.

Both the production output and the number of complex technological projects have grown step by step.

We have been working together successfully with leading automotive manufacturers, for example, in the production of components for the new BMW motor

Nemak Poland is the only company of the Nemak Europe Business Unit that has the experience and expertise for high-pressure diecasting. And this was the reason why the management board decided to establish the product development centre for high-pressure diecasting here.

At present the companies of the Nemak group are supported by the development centre in the technological field as follows:

- Creation of the technical conditions for new projects,
- Project management,
- Design and manufacture of moulds,
- Development of computer simulations for casting processes,
- Design of casting units,
- Supporting other companies during the startup phase of new production lines.



TOUR 7 –

AGH University of Science and Technology, Faculty of Foundry Engineering

The Foundry Research Institute

The Faculty of Foundry Engineering was established in the academic year 1951/1952 by the act of splitting up the Faculty of Metallurgy. In line with the Faculty's profile, there were two specializations: foundry technology, and foundry machines and mechanisation. At present, the Faculty is entitled to confer the academic degrees of Doctor, Senior Doctor (habilitation), and Professor. The Faculty educates specialists in the field of foundry technology, and is the only faculty of this kind and scope of education operating within the structure of the higher education system in Poland and Europe. Modern foundry technology mainly strives for the improvement of casting production quality, reduced consumption of energy and raw materials (lean processes and lean production), improved processes and product economy, and, last but not least, reducing the harmful effect of the foundry industry on the environment. The idea of constructing and operating a waste-free foundry plant is nowadays the main subject of largescale international research projects. Graduates of the Faculty are well prepared to face the challenges of modern industry. They possess skills and capabilities necessary to develop and implement new, advanced technologies, and to undertake management challenges of modern industrial enterprises. Therefore, they are also highly valued in other countries (for example, in Germany, where the demand for foundry specialists is very strong). Students of the Faculty also have a possibility to obtain a double diploma – one of AGH UST, and one of a foreign university. In 2011 – with the help of the Faculty of Metals Engineering and Industrial Computer Science – a new, interdisciplinary field of studies called VIRTOTECHNOLOGY was introduced. Graduates in this discipline will gain knowledge and practical skills with regard to the processing of metals, materials technology, computer science, economics, and ecology. They will demonstrate creative attitude towards issues related to virtualization processes and the professional use of computer tools for the purpose of processing technological problems. In 2016 name of the field of study Virtotechnology has been changed to Computer Aided Process Engineering and name of the field of study Metallurgy has been changed to Enginnering of Foundry Processes. The Faculty maintains permanent contact with foundry enterprises, organises training courses for students, as well offers post-graduate scholarships for those who have successfully completed their studies. Members of the Faculty staff maintain relations with numerous scientific and research centres, universities, research institutes, and industry. A map of the location of foundries and enterprises with which the Faculty of Foundry Engineering has been cooperating covers practically the whole area of Poland.
Among our partners are: Volkswagen Poznań Sp. z o.o., Toyota Motor Manufacturing Poland Sp. z o.o., Georg Fischer AG, Brembo S. p. A., GE Power, University of Cambridge, University of Oxford, Montanuniversität Leoben, Jönköping University, Bergakademie Freiberg and many others.
Tour contents: get acquainted with didactic profile and possibilities of cooperation, visiting research laboratories.



The Foundry Research Institute is a leading centre conducting scientific research activities for the foundry industry in Poland under the supervision of the Ministry of Economic Development. The scope of research and development works covers metallurgy and casting technology of cast iron alloys, cast steel, alloys of Al, Mg, Cu, Zn, Ti, Ni; moulding technology; gravity and pressure die casting, and investment casting; the use of lost foam patterns; sand reclamation; high-temperature corrosion tests and studies; high-temperature studies of the liquid state, studies of nanostructured materials, physicochemical and mechanical properties, and casting defects; work in the field of rapid prototyping, 3D scanning, simulation of the casting pouring process, casting solidification and stress distribution. The research activity is facilitated by scientific information; monitoring of the foundry industry; certification of products; publishing, standardisation, and training activities. The strategic directions in the research and development work carried out by the Institute are closely linked with the latest developments in the field of research methodologies using highly specialized and innovative research equipment. The research works are conducted on the basis of advanced feasibility study, on the analysis and assessment of the current state and forecast organizational, technical and technological progress in the area of the Institute activities.

The Foundry Research Institute operates in the area of innovative basic, applied and industrial research. It is also actively involved in advanced development work for companies operating in the foundry industry with the potential of more than 400 foundry plants, mostly based on domestic capital investment. The Foundry Research Institute is actively involved in industry association initiatives, such as e.g. operating since 2000 Polish Foundry Centre (co-sponsored by the Polish Foundrymen's Technical Association, the Foundry Chamber of Commerce and the Faculty of Foundry Engineering of the AGH – University of Science and Technology). Noteworthy is the undisputed and stable international position of the Foundry Research Institute (rich collaboration with such research centres and companies like NASA, ESA, Aérospatiale, Rolls-Royce, Toyota, Lockheed Martin, General Electric, etc., and also with many organizations and scientific societies operating in the country and abroad). Owing to this global involvement and awareness of the Foundry Research Institute in Kraków, Poland was entrusted with the organization of the World Foundry Congress in 2018 – the most prestigious international event of the foundry industry. The Foundry Research Institute is also a reliable partner in numerous scientific and industrial consortia implementing research, development and innovation projects in the EU financial perspective 2014–2020.

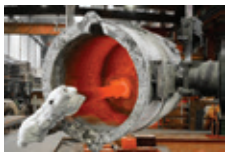


TOUR 8 – VESUVIUS, Skawina

Foseco is a foundry division of Vesuvius Group and a world-renowned name that has become synonymous with reliability, technology and service in the supply of consumable products and associated services to the foundry industry. With the acquisition in 2008 by Vesuvius Group, a global leader in molten metal flow engineering, Foseco has expanded its portfolio by offering a variety of stoppers and nozzles for iron and steel foundries.

On the 27th of September we invite all participants of the WFC to visit our plant in Skawina, only 30 minutes from Krakow. This visit will be a unique opportunity to see the only Vesuvius site worldwide manufacturing VAPEX stoppers and nozzles for steel foundry applications. Second part of the visit will be dedicated to Viso line producing isostatically pressed parts for metal flow control in steel plants. You can register online to join the tour.

We believe that all visitors who will join the tour of the Vesuvius plant in Skawina will benefit from this visit. Therefore, we look forward to hosting you as our guests.



FOSECO

JOIN
OUR TOUR!

TOUR 8

Visit our production of stoppers and nozzles for iron and steel foundries.

27. SEPTEMBER 2018

www.foseco.com.pl

City Tours

KRAKÓW OLD TOWN WALKING TOUR 23rd September 2018

Duration: 2h **Meeting point at the ICE Congress Centre (in front of the main entrance)**

- See all the highlights of the Old Town area that made Cracow so famous,
- Starting with Barbican – the remaining fragments of city fortifications, the masterpiece of medieval military structures built in the 15th century,
- The spectacular Main Market Square with the Renaissance Cloth Hall – a perfect place to buy local souvenirs, the Town Hall Tower and St Mary's Basilica with unique wooden masterpiece of Veit Stoss,
- Don't miss the buildings of Poland's oldest university the Jagiellonian University, where Nicolaus Copernicus studied,
- Wawel Hill that is dominated by the Castle, the defense towers and the Wawel Cathedral which to be the scene of coronations and is the eternal resting place of the kings of Poland.





Social Programme

WELCOME PARTY – 23rd September, 19.00

ul. Marii Konopnickiej 17, 30-302 Kraków

ICE Kraków Congress Centre

The ICE Kraków Congress Centre is a modern world-class building, the business and cultural flagship of the city. Located in the very heart of Kraków, it is a co-nvenient place for the organisation of diverse events.

GALA DINNER – 24th September, 19.00

Grajów 150, 32-020 Wieliczka

Folwark Zalesie

Folwark Zalesie, interesting form of traditional Polish architecture, with 200 year history.

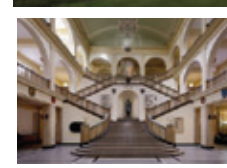
It is only 25 km from city center of Krakow, located on the hill around with forests, fields and meadows, with the wonderful view on Beskidy Mountains, Dobczyński Dam and Tatra Mountains.

COCTAIL PARTY – 25th September, 19.00

Al. Adama Mickiewicza 30, 30-059 Kraków

The Main Building of AGH University of Science and Technology

AGH University of Science and Technology is one of the best and most renowned modern Polish universities. For many years it has been ranked in the top of the list of institutions of higher education. AGH UST is a leading Polish university in modern technologies, and belongs to a group of prestigious international educational centres.



FOUNDRYMEN'S NIGHT + Closing Ceremony of 73WFC – 26th September, 19.00

ul. Św. Wawrzyńca 12, 31-060 Kraków

Stara Zajezdnia Kraków by DeSilva

The renovated building of Stara Zajezdnia (Old Tram Depot) is a unique facility. The hall is an example of wooden framework architecture with brick filling, very rare in Cracow, commonly called the "Prussian wall". The hall front is decorated with a picturesque top bearing a clock with Art Nouveau finish. The Main Hall belongs to an architectural and construction complex, which is under legal protection – entered into the register of monuments in 1985 and the World Cultural and Natural Heritage List UNESCO, and known as a historical monument.

Buses for all of the social events depart at 18.30 from ICE Congress Center

Accompanying Persons' Programme

24th September

8.00–10.00 Registration
10.00–11.30 Opening Ceremony, ICE Congress Centre

11:30–15:45 **KRAKOW SIGHTSEEING TOUR: OLD TOWN, KAZIMIERZ AND NOWA HUTA**
(the route covers most important monuments of three most popular districts)

- Old Town with Main Market Square, Cloth Hall and Wawel Castle,
- Jewish district with synagogues and small restaurants in old style,
- former Jewish ghetto becoming more and more popular thanks to Oskar Schindler's factory or HistoricalMuseum of the City of Krakow,
- Nowa Huta – the socialist-era part of town, founded in 1949, that was home to the Poland's first integrated steelworks,
- lunch.

Schedule:
11:30 Meeting point at the ICE Congress Centre (in front of the main entrance),
11:45 Transfer to the Old Town and tour of the Main Square along with Kraków Cloth Hall and Historical Museum,
13:00 Short route to Wawel Castle and to Kazimierz district,
14:00 Lunch break at the Kaziemierz district,
14:45 Transfer and visit to Nowa Huta and Kraków Ghetto,
15:45 End of the visit

19.00 Gala Dinner

25th September

10:45–16:30 **WIELICZKA SALT MINE VISIT**

- Visit Wieliczka Salt Mine – a world class tourist attraction and UNESCO site – which will definitely be an unforgettable underground experience,
- Over 700-year-old, this monument of history has been created by many generations of Polish miners,
- Wieliczka is also home to the world's largest mining heritage museum, with a collection of unique pieces of mining equipment reflecting the development of mining techniques from the Middle Ages until today,
- lunch at the local restaurant.




Schedule:
10:45 Meeting point at the ICE Congress Centre (in front of the main entrance),
11:00 Transfer to Wieliczka,
11:30 Lunch in Wieliczka,
12:50 Entry to the Salt Mine,
16:00 Exit from the Salt Mine,
16:30 End of the visit.

19.00 **Cocktail Party, The Main Building of AGH University of Science and Technology**

26th September

8.00–17.00 **Visit to the METAL Fair in Kielce (have to be confirmed in registration system),**

19.00 **Foundrymen's Night + Closing Ceremeny, Stara Zajezdnia Kraków by DeSilva.**

Post Congress Tours

Poland is a country of various landscapes – high mountains, wide sandy beaches, clean lakes, beautiful forests and world class monuments. To enable the Congress participants to see the interesting regions of Poland the organisers forecast sightseeing Post-Congress Tours of several days. This last part of the Congress will allow the participants to get to know Poland and its culture. Excursions organised during the 73rd WFC will also adopt a new form, joining leisure with the possibility of visiting foundry plants located on their routes.

3-DAY TOUR KRAKOW – ZAKOPANE – WADOWICE – OŚWIĘCIM 28–30.09.2018

DAY – 1 KRAKOW – KAZIMIERZ JEWISH DISTRICT – TYNIEC ABBEY
DAY – 2 ZAKOPANE
DAY – 3 OŚWIĘCIM – WADOWICE





4-DAY TOUR KRAKOW – CZĘSTOCHOWA – ŁÓDŹ – WARSZAWA 28.09-01.10.2018

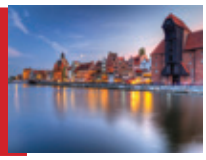
DAY – 1 CZĘSTOCHOWA – ŁÓDŹ
DAY – 2 ŁÓDŹ – ŁOWICZ – WARSZAWA
DAY – 3 WARSAW
DAY – 4 WARSAW





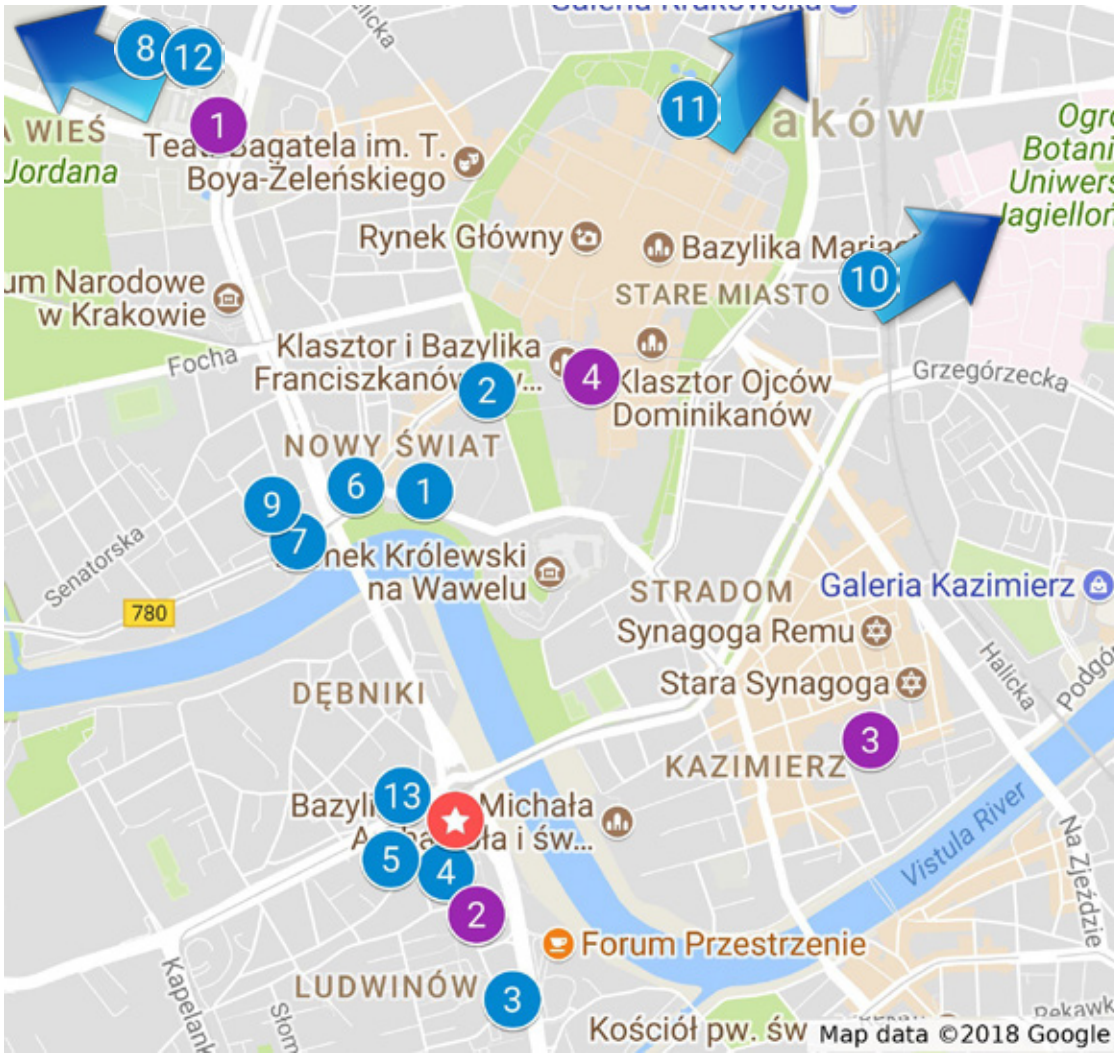
4-DAY TOUR KRAKOW – POZNAŃ – MALBORK – GDAŃSK 28.09-01.10.2018

DAY – 1 KRAKOW – POZNAŃ
DAY – 2 POZNAŃ – MALBORK – GDAŃSK
DAY – 3 TRI CITY
DAY – 4 GDAŃSK





Map of main Congress places



Hotels

1. Sheraton Grand
2. Radisson Blu Hotel
3. Hilton Garden Inn
4. Q Hotel Plus
5. Park Inn by Radisson
6. Hotel Kossak
7. Novotel Centrum
8. Novotel City West
9. Ibis Centrum
10. Vienna House Hotel
11. Ibis Budget
12. Hostel "Olimp"
13. B&B Hotel

Evening events

1. AGH University
2. Meeting point
3. Stara Zajezdnia by D
4. Urząd Miasta/City H

Congress Centre

- ICE Kraków

Notes

Organization

Executive of WFO

President	M. Fenyes (United Kingdom)
Vice President	U. Denizci (Turkey)
Immediate Past President	M.H. Kim (Korea)
Past President	X. Azpiri Gonzalez (Spain)
Traesurer	J.S. Suchy (Poland)

Members:
Y. Lou (China)
D. Dotson (United States of America)
U. Denizci (Turkey)
C. Kuhlgatz (Germany)
S. Panchal (India)
P.M. Cabbanne (France)
T. Torigoe (Japan)

General Secretary	A. Turner (United Kingdom)
Assistant Secretary	L. Postle (United Kingdom)
Media Manager	J. Call (USA)
Administration Secretary	Mr. J. J. Gozalez (Spain)

THE HONORARY PATRONAGE
OF THE PRESIDENT OF THE REPUBLIC OF POLAND
ANDRZEJ DUDA

Honorary Committee of the 73rd World Foundry Congress

Jarosław GOWIN	– Minister of Science and Higher Education
Jacek KRUPA	– The Marshal of the Małopolska Region
Jacek MAJCHROWSKI	– Major of the City of Krakow
Tadeusz SŁOMKA	– Rector of University of Science and Technology (AGH)
Ewa MAŃKIEWICZ-CUDNY	– President of NOT, The Polish Federation of Engineering Associatons
Mark FENYES	– President of World Foundry Organization

Organizational Committee of the 73rd World Foundry Congress

Józef Szczepan SUCHY	– Chairman
Tadeusz FRANASZEK	– President of Polish Foundrymen's Association
Katarzyna LISZKA	– General Secretary of Polish Foundrymen's Association
Andrew TURNER	– General Secretary of World Foundry Organization

Michał BALICKI
Aldona GARBACZ-KLEMPKA
Aleksandra GRABARCZYK
Beata GRABOWSKA
Marcin GÓRNY
Joanna MADEJ
Jerzy Józef SOBCZAK
Michał SZUCKI
Emilia WILDHIRT
Dorota WILK-KOŁODZIEJCZYK
Jerzy ZYCH
Janusz LELITO
Magdalena JASIŃSKA
Magdalena PIETROŃ

Program Committee of the 73rd World Foundry Congress

Tadeusz FRANASZEK	– President of Polish Foundrymen's Association
Józef Szczepan SUCHY	– AGH University of Science and Technology
Rafał DAŃKO	– Dean of Faculty of Foundry Engineering/AGH University of Science and Technology
Jerzy SOBCZAK	– Foundry Research Institute, Krakow
Andrzej MOCHOŃ	– Chairman of the Board/Kielce Trade Fairs
Przemysław TRAWA	– Chairman of the Board/Poznań International Fair

Scientific Committee of the 73rd World Foundry Congress

Prof. Natalia Sobczak – Poland (Chairperson, Guest Editor)
Prof. Rajiv Asthana – USA (Vice-Chairman, Guest Editor)
Prof. Jan Szajnar – Poland (Vice-Chairman, Guest Editor)
Dr. Zdenka Zovko Brodarac – Croatia
Prof. Ludmil Drenchev – Bulgaria
Dr. Patricia Caballero – Spain
Dr. Rafał Cygan – Poland
Dr Donatella Giuranno – Poland/Italy
Prof. Edward Guzik – Poland
Prof. Milan Horacek – Czech Republic
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Polish Foundrymen's Association
Headquarters
Dukatów 8
31-431 Kraków, Poland

Congress Secretariat:

Polish Foundrymen's Association
Zakopiańska 73
30-418 Kraków
Poland
tel./fax: +48 12 52 39 60
e-mail: info@73wfc.com
www.73wfc.com

Head Office:

The World Foundry Organization Ltd
Winton House
Lyonshall
Kington
Herefordshire
HR5 3JP
United Kingdom
tel.: +44 (0) 1544 340332
fax: +44 (0) 1544 340332
www.thewfo.com