

PRELIMINARY PROGRAM

CIMAC  
CONGRESS 23

BUSAN, JUNE 12-16, 2023

# Meeting the Future of Combustion Engines

## 30th CIMAC WORLD CONGRESS

Combustion Engine Technology for Ship Propulsion | Power Generation | Rail Traction





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# Join us in Busan!

Usually every three years, the CIMAC World Congress and the accompanying exhibition is held in one of our member countries. But due to COVID-19, the congress had to be postponed from 2022 to 2023. It will now be held from June 12 to 16 in Busan.

The Congress is a unique opportunity to keep up to date with what is happening in the internal combustion engine industry and along the value chain, to talk to other professionals from all over the world, to stay in dialogue and to discuss the topics that interest us most or that are particularly pressing on our minds and to the industry.

South Korea will host the 30th edition of the Congress since the founding of the association back in 1951. This proud tradition proves how important and how indispensable this global meeting is. South Korea is hosting the CIMAC Congress for the first time. This choice has been wisely made. The country and its important shipbuilding industry have asserted themselves on the world market and have continuously occupied a leading position for a long time. We are very pleased to be hosted in Busan with its outstanding port: Its depth and low tidal differences have helped Busan become the largest container handling port in the country and the fifth largest in the world.

The 2023 Congress is taking place under special auspices. Our industry is facing enormous, perhaps historically unique challenges, so a holistic professional exchange along the value chain about the state of the art is imperative. A central focus of this year's Congress will lie on identifying the best and realistic ways for the industry to quickly reduce emissions, on addressing greenhouse gas emission targets, on the onset of digitalization in shipping, on developing alternative fuels, and on bringing more clarity to the discussion about future fuels in the industry - all in all challenges that require collaboration within the industry and beyond more than ever before. We look forward to your contribution and to seeing you at the 2023 CIMAC Congress in Busan, where the Congress will provide a perfect opportunity to meet manufacturers, component suppliers, shipyards, research professionals, contractors, customers, and colleagues from across the industry around the world.

Presentations, flanked by the exhibition, poster sessions and the traditional technical tour, will highlight the latest product and technology developments and the value they bring to customers. Strong focus will lie on scientific research that will form the basis for the next generation of technology solutions, and the needs of markets to ensure a sustainable, environmentally friendly and economically viable future will be addressed. In addition, the Congress with its outstanding program including new formats such as pecha kucha presentations will provide a unique opportunity to do business and build lasting networks. Panel discussions and keynote presentations will challenge us to broaden our perspectives.

Once again – Welcome!



**Marko Dekena**  
Vice-President Technical Program



**Jonas Åkerman**  
Vice-President Technical Program

# Welcome to Busan!

We are looking forward welcoming you to Busan, and we hope you will enjoy this wonderful city. Korea is an extremely modern country, but at the same time committed to its traditions. This is particularly evident in Busan, the country's second largest city.

The combination of old and new can be found here at every turn. Outstanding meeting facilities such as the BEXCO Convention Center, where the CIMAC Congress will be held, are just minutes from sandy beaches and historic mountain trails. Huge temple complexes that have endured for millennia are located amidst some of Asia's tallest residential skyscrapers. The city's natural features and rich history have enabled Busan to develop into a first-rate tourist city and established it as a hotspot for international conventions. Add to this the pleasant climate: Busan has four distinct seasons, but it is never too hot nor too cold.

We promise, there is a lot to see and do in Busan - be sure to check out the optional tours in the program and take advantage of what the city has to offer.

**On behalf of the National Member Association of Korea – KOFCE (Korea Federation of Combustion Engines), we hope you enjoy your visit to Busan!**

**Kwang heon Ahn**  
Congress President

**Ji Hyoub Cha**  
NMA Korea Secretary General

## CONGRESS OVERVIEW

Day	Time	Activities
Sunday June 11, 2023	14:00 – 18:00	Congress Information Desk
	14:00 – 18:00	Speakers' Preparation (Room TBD)
Monday June 12, 2023	<b>10:00 – 11:30</b>	<b>Opening Ceremony</b>
	10:00 – 17:40	Exhibition & Poster Sessions
	12:00 – 18:00	Speakers' Preparation (Room TBD)
	12:40 – 13:40	Lunch
	<b>13:40 – 15:00</b>	<b>Technical Sessions</b>
	15:10 – 15:40	Pecha Kucha Presentations
	15:40 – 16:00	Coffee Break
	<b>16:00 – 17:40</b>	<b>Technical Sessions</b>
	<b>18:30</b>	<b>Welcome Reception at Paradise Hotel Busan</b>
Tuesday June 13, 2023	08:00 – 18:00	Speakers' Preparation (Room TBD)
	09:00 – 17:40	Exhibition & Poster Sessions
	09:00 – 10:40	Technical Sessions
	10:40 – 11:20	Coffee Break
	<b>11:20 – 12:40</b>	<b>Technical Sessions</b>
	12:40 – 13:40	Lunch
	<b>13:40 – 15:00</b>	<b>Technical Sessions</b>
	15:10 – 15:40	Pecha Kucha Presentations
	15:40 – 16:00	Coffee Break
	<b>16:00 – 17:40</b>	<b>PANEL Digitalization</b>
	<b>16:00 – 17:40</b>	<b>Technical Sessions</b>
<b>18:30</b>	<b>Accelleron Evening</b>	
Wednesday June 14, 2023	08:00 – 18:00	Speakers' Preparation (Room TBD)
	09:00 – 17:40	Exhibition & Poster Sessions
	<b>09:00 – 10:40</b>	<b>Technical Sessions</b>
	10:40 – 11:20	Coffee Break
	<b>11:20 – 12:40</b>	<b>Technical Sessions</b>
	12:40 – 13:40	Lunch
	<b>13:40 – 14:30</b>	<b>COLLIN TRUST Keynote</b>
	<b>14:30 – 15:30</b>	<b>PANEL Defossilization</b>
15:40 – 16:00	Coffee Break	
<b>16:00 – 17:40</b>	<b>Technical Sessions</b>	
Thursday June 15, 2023	08:00 – 16:00	Speakers' Preparation (Room TBD)
	09:00 – 17:00	Exhibition & Poster Sessions
	<b>09:00 – 10:40</b>	<b>Technical Sessions</b>
	10:40 – 11:20	Coffee Break
	<b>11:20 – 12:40</b>	<b>Technical Sessions</b>
	12:40 – 13:40	Lunch
	<b>13:40 – 15:20</b>	<b>Technical Sessions</b>
	15:20 – 16:00	Coffee Break
<b>16:00 – 17:30</b>	<b>FINAL PANEL</b>	
<b>18:30</b>	<b>Gala Dinner at Busan Hilton Hotel</b>	
Friday June 16, 2023	<b>09:00 – 16:00</b>	<b>Technical Tours (Half day/Full day)</b>

Optional Tours  
June 12 - 15, 2023

Each day poster sessions take place. A broad spectrum of new technologies, optimization measures for existing technologies and the latest research is represented. The exact program will be published by CIMAC later.

Note: Congress Information Desk will be open from Monday to Thursday from 08:00 - 18:00.

## TOPICS AND SESSIONS

- Digitalization and Connectivity**
  - Leveraging Vessel Connectivity
  - Process Optimization and Predictive Maintenance
- System Integration and Hybridization**
  - Ship Hybrid Propulsion
  - Hybrid System Engineering
- Electrification and Fuel Cells Development**
  - Marine Fuel Cell Applications
  - Energy Systems and Fuel Cells
- Controls, Automation, Measurement & Monitoring**
  - Controls and Sensing
  - Monitoring and Fault Diagnostics
- Emission Reduction Technologies - Exhaust Gas Aftertreatment Solutions**
  - Scrubbers
  - Particle Filtration
  - SCR Technology
  - GHG Reduction (ammonia combustion & slip reduction)
- Emission Reduction Technologies - Engine Measures & Combustion Development**
  - GHG Reduction (H2 combustion & transition outlook)
  - PM/BC Reduction
  - Engine Measures
- Fuels - Conventional Fuels**
  - Test methodologies to predict fuel performance
  - Fuel development
- Fuels - Alternative & New Fuels**
  - Energy System Integration
  - Storage, Supply and Handling
  - Biofuels
  - Development aspects for using ammonia as a fuel
- Lubricants**
  - Zero-carbon Fuel Lubricants
  - Gas Engine Lubricants
- New Engine Developments – Diesel**
  - 2-Stroke Engines
  - 4-Stroke Diesel Engines (1)
  - 4-Stroke Diesel Engines (2)
- New Engine Developments - Gas**
  - New Gas Engine Development
  - New Gas Engine Technology
- New Engine Developments - Dual Fuel**
  - 2-Stroke Session
  - 4-Stroke Session
- New Engine Developments - Alternative Fuels & other New Engine Concepts**
  - Methanol Engine Technology
  - Hydrogen and Ammonia Engine Technology
  - Alternative Fuel Concepts & Platforms
- Engine Component Developments - Fuel Injection & Gas Admission**
  - "LIQUID" or Conventional Diesel
  - "GAS" or Alternative/New Fuels
- Engine Component Developments – Components**
  - Advanced Component Integration
  - Auxiliary Equipment Systems
- Engine Component Developments - Tribology**
  - Bearings
  - Piston, Rings & Liner
- Engine Component Developments - Turbochargers & Air/Exhaust Management**
  - Next Generation Turbochargers & Intake Systems
  - Air-/Exhaust Management for Alternative Fuels
- Basic Research & Advanced Engineering - New Concepts**
  - Basic Research & Advanced Engineering - New Concepts
- Basic Research & Advanced Engineering - Simulation Technologies**
  - Engine Thermodynamics 1
  - Engine Thermodynamics 2
  - Engine System Thermodynamics & Visualization
- Basic Research & Advanced Engineering - Mechanics, Materials Research**
  - Mechanics and Materials
- Basic Research & Advanced Engineering - Visualizations**
  - Future Fuel Spray and Combustion

# Monday - June 12, 2023

13:40 – 15:00

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
<p><b>2</b> System Integration and Hybridization</p> <p>2-1 Ship Hybrid Propulsion</p>	<p><b>6</b> Emission Reduction Technologies -Engine Measures &amp; Combustion Development</p> <p>6-2 Greenhouse Gas Reduction</p>	<p><b>5</b> Emission Reduction Technologies -Exhaust Gas Aftertreatment Solution</p> <p>5-3 SCR-Technology</p>	<p><b>11</b> New Engine Developments - Gas</p> <p>11-1 New Gas Engine Development</p>
<p><b>419</b> Suggestions on Amendments of IMO's EEDI: Calculating EEDI Using Engine Operational Power Congbiao Sui, Harbin Engineering University</p> <p><b>090</b> Z-PELLER electrification and optimization for decarbonization Yota Harada, IHI POWER SYSTEMS Co., Ltd.</p> <p><b>328</b> Development of a Free-Running Model Test Methodology for Evaluation of a Full-Scale Ship Propulsion OLEKSIY BONDARENKO, National Maritime Research Institute of Japan</p> <p><b>651</b> Optimization of Complex Energy Systems as an Enabler for Sustainable Shipping Solutions Bernhard Thaler, Large Engines Competence Center Graz</p>	<p><b>084</b> Combustion characteristics of low flash point fuels and ammonia in the internal combustion engine Youngmin Woo, Korea Institute of Energy Research</p> <p><b>072</b> Greenhouse Gas Reduction Through Hydrogen Fumigation on a 1MW Tier 2 Caterpillar 3512 Diesel Engine Christopher Stoos, Southwest Research Institute</p> <p><b>291</b> Prechamber Combustion: Enabling the Competitive Carbon-Neutral ICE Emmanuella Sotiropoulou, Prometheus Applied Technologies</p> <p><b>192</b> Preliminary study on China's ship power to meet the challenge of carbon emission reduction Dongming Zhang, Shanghai marine diesel engine research institute</p> <p><b>652</b> Greenhouse Gas Emissions Reduction on High-Speed Large Engines Gareth Estebanez, AVL List GmbH</p>	<p><b>119</b> Emission Reduction Technologies - Exhaust Gas After-treatment Solutions Jungju Lee, Hyundai Heavy Industries</p> <p><b>243</b> Development and Application of an Intelligent SCR System combining Engine and SCR Control Panagiotis Kyrtatos, Vir2sense GmbH</p> <p><b>320</b> research of marine selective catalytic reduction control strategy based on model predictive control Zhao Hui, Harbin Engineering University</p> <p><b>380</b> A study on deterioration mechanism of SCR catalyst during bypass operation for marine diesel engine KEN KAWABE, YANMAR HOLDINGS CO., LTD.</p>	<p><b>017</b> Further NOx-thermal efficiency trade-off improvement with lean pre-chamber Yoshinori Kaji, DAIHATSU DIESEL MFG.CO.,LTD.</p> <p><b>091</b> Development of Low Speed Four Stroke Gas Engine Satoru Higashikawa, The Hanshin Diesel Works, Ltd.</p> <p><b>415</b> Development of the next Generation Gas Engine with Increased Efficiency and Reduced Emissions Francisco Lopez Gutierrez, Innio Jenbacher GmbH</p> <p><b>448</b> Siemens Energy's new E-Series lean-burn gas engine – First field experiences Iñaki Iruretagoyena, SIEMENS ENERGY</p>
12:40 - 13:40	Lunch		

# Monday - June 12, 2023

16:00 – 17:40

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
<p><b>21</b> Basic Research &amp; Advanced Engineering - Visualizations</p> <p>21-4 Future Fuel Spray and Combustion</p>	<p><b>8</b> Fuels - Alternative &amp; New Fuels</p> <p>8-2 Development aspects for using ammonia as a fuel</p>	<p><b>5</b> Emission Reduction Technologies -Exhaust Gas Aftertreatment Solutions</p> <p>5-1 Scrubbers + CCS</p>	<p><b>11</b> New Engine Developments - Gas</p> <p>11-2 New Gas Engine Technology</p>
<p><b>006</b> Mixture Formation Analysis for Diesel, n-Dodecane, RME, and HVO in Large-Scale Injector Nozzles Hamidreza Fajri, Institute of Engineering Thermodynamics, Friedrich-Alexander-University Erlangen-Nuremberg (FAU)</p> <p><b>050</b> Diagnosis of High-pressure Hydrogen Jet Flame Evolution with a Variation in Ignition Location Ho Lung Yip, The University of New South Wales</p> <p><b>362</b> Characterization of future fuels using an optically accessible rapid compression machine Clemens Gößnitzer, LEC GmbH</p> <p><b>416</b> Optical experiments on ammonia combustion in spark-ignition engines with enhanced turbulence Jiaying Pan, Tianjin University</p> <p><b>620</b> Pollutant formation of diesel-piloted ammonia sprays in a rapid compression expansion machine Valentin Scharl, Technical University of Munich, Chair of Thermodynamics</p>	<p><b>113</b> Development of premixed ammonia combustion strategy with minimum emissions for marine diesel engines Yoichi Niki, National Institute of Maritime, Port and Aviation Technology</p> <p><b>236</b> The effect of injection strategy on combustion and emissions of ammonia Marine engine Yue Wu, Harbin Engineering University</p> <p><b>257</b> Effects of Ammonia Ratios on Efficiency and Emissions of Diesel Pilot-ignited Ammonia Engine Shouying Jin, Tianjin University</p> <p><b>420</b> Effects of Fuel Ratio and Injection Strategy on Ammonia -Diesel Engine Zunhua Zhang, Wuhan University of Technology</p> <p><b>348</b> Preparing for future demands - the CSSC Global 2-stroke Test Center Sebastian Hensel, Winterthur Gas &amp; Diesel</p>	<p><b>463</b> Investigations on combined scrubbing &amp; particle filtration technologies for maritime applications Uwe Etzien, University of Rostock - Chair of Piston Machines and Internal Combustion Engines</p> <p><b>537</b> Dynamic simulation of a closed loop wet scrubber system Benny Mestemaker, Royal IHC</p> <p><b>555</b> Reducing particle emissions from marine engines – fuel choices and technology pathways Kati Lehtoranta, VTT Technical Research Centre of Finland</p> <p><b>545</b> The bench test research of Hige-based Marine exhaust gas cleaning system Shien Tu, Shanghai Marine Diesel Engine Research Institution</p> <p><b>379</b> Experimental study on the performance of an impinging scrubber Wenbo Zhang, China Shipbuilding Power Engineering Institute Co., Ltd</p>	<p><b>082</b> Influence of blend ratio on turbocharging &amp; combustion in HS gas eng. applications with CH4/H2 blend Raphael Ryser, Turbo Systems Switzerland Ltd.</p> <p><b>114</b> Combustion Process Optimization for Wood Gas in a Gas Engine of a Combined Heat and Power Plant Jure Galović, Institute of Powertrains and Automotive Technology, Vienna University of Technology</p> <p><b>289</b> Progress of gas engines toward GHG reduction and carbon neutral fuel utilization Timothy Callahan, Southwest Research Institute</p> <p><b>407</b> Optical experiments on abnormal combustion behaviors in port-injected hydrogen engines Jiaying Pan, Tianjin University</p> <p><b>573</b> Consideration of Combustion Improvements of Lean-burn Gas Engine with Pre-combustion Chamber Elsayed Abdelhameed, Kyushu University</p>
15:40 – 16:00	Coffee Break		

# Tuesday - June 13, 2023

09:00 – 10:40

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
<p><b>1</b> <b>Digitalization and Connectivity</b></p> <p>1-2 Process Optimization and Predictive Maintenance</p> <p><b>069</b> Enhancement of Large Engine Technology Through Machine Learning Constantin Kiesling, LEC GmbH</p> <p><b>112</b> PERFORMANCE EVALUATION OF DIESEL GENERATOR SETS IN SHIPS Serafeim Katsikas, METIS Cyberspace technology</p> <p><b>138</b> Towards the digital engine: benefits and integration of the OMT Intelligent Injection System Marco Coppo, OMT SpA</p> <p><b>570</b> WiDE – an example on how digitalization creates value for ship operators Luca Sala, Winterthur Gas &amp; Diesel</p> <p><b>600</b> Adaptive Operating Condition Fault Diagnosis of Marine Diesel Engine based on Transfer Learning Jia Hu, Wuhan university of technology</p>	<p><b>13</b> <b>New Engine Developments - Alternative Fuels &amp; other New Engine Concepts</b></p> <p>13.2 New Concepts 2 - Hydrogen and Ammonia Engine</p> <p><b>203</b> ABC completes the upgrade of its DZ-engines into hydrogen dual fuel and spark ignition Luc Mattheeuws, Anglo Belgian Corporation NV</p> <p><b>231</b> Safe and efficient engine operation with Ammonia Kaj Portin, Wärtsilä</p> <p><b>606</b> Widening the operation limits of a SI engine running on neat ammonia Mads Carsten Jespersen, Technical University of Denmark</p> <p><b>667</b> Decarbonization of high-power systems: ammonia-hydrogen and ammonia-diesel combustion in HS engines Nicole Wermuth, LEC GmbH</p> <p><b>589</b> Developing the MAN B&amp;W dual fuel ammonia engine Stefan Mayer, MAN Energy Solutions</p>	<p><b>5</b> <b>Emission Reduction Technologies -Exhaust Gas Aftertreatment Solutions</b></p> <p>5-2 Particle Filtration</p> <p><b>549</b> DPF+SCR ultra low emission solution for medium speed diesel engines Dominik Gschwend, Hug Engineering</p> <p><b>288</b> Caught between diesel and the deep blue sea - exhaust aftertreatment systems for a greener future David Phillips, Eminox Limited</p> <p><b>477</b> Particulate removal from deep sea shipping by dry scrubbing technology and GHG Impact Martin Koller, ANDRITZ AG</p> <p><b>182</b> Effects of Membrane filtration on the emission load of EGCS water from various fuels Dennis Fischer, BOLL &amp; KIRCH Filterbau GmbH</p> <p><b>637</b> Simulation based layout of a highly efficient aftertreatment system for a large diesel engine Georg Kaufmann, AVL List GmbH</p>	<p><b>12</b> <b>New Engine Developments - Dual Fuel</b></p> <p>12.2 4-stroke dual fuel engines</p> <p><b>146</b> MAN ES 49/60DF - Maximum performance from the modular system Ingo Wilke, MAN Energy Solutions</p> <p><b>292</b> Development of Marine Dual Fuel Engine (EY26DF) Nobuyuki Higa, YANMAR POWER TECHNOLOGY CO., LTD.</p> <p><b>602</b> Analysis of combustion cycle-to-cycle variation in an optical single cylinder dual-fuel engine Alexander Lauterkorn, Brunel University London</p> <p><b>660</b> Combustion and emission characteristics of biogas-diesel RCCI in a large bore marine engine Jeyoung Kim, University of Vaasa</p>

10:40 – 11:20 Coffee Break

# Tuesday - June 13, 2023

11:20 – 12:40

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
<p><b>2</b> <b>System Integration and Hybridization</b></p> <p>2-2 Hybrid System Engineering</p> <p><b>293</b> Research on energy management strategy and simulation of hybrid power system for ocean-going ships Rongpei Zhang, China Shipbuilding Power Engineering Institute Co., Ltd.</p> <p><b>413</b> Investigation on Matching Design and Strategy Optimization of Ship Hybrid Power System Zunhua Zhang, Wuhan University of Technology</p> <p><b>421</b> Power Management Strategy of Hybrid Power System for Inland Ship Based on Reinforcement Learning Zunhua Zhang, Wuhan University of Technology</p> <p><b>529</b> WinGD Hybrid Control System: The holistic approach for maximising energy efficiency in shipping. Maciej Bendyk, Winterthur Gas &amp; Diesel</p>	<p><b>8</b> <b>Fuels - Alternative &amp; New Fuels</b></p> <p>8-2 Storage supply and handling</p> <p><b>562</b> Impact of alternative fuels on ship design - A shipbuilders perspective Erik-Jan Boonen, DAMEN</p> <p><b>154</b> A Study on the Conceptual Design of a Fuel Supply System for Ammonia Fueled Propulsion Ships Eunyoung Park, Korea Research Institute of Ships&amp;Ocean Engineering(KRISO)</p> <p><b>410</b> Alfa Laval MeOH fuel supply system: the evolution from a prototype to an integrated connected system Davide Rossin, Alfa Laval SpA</p> <p><b>390</b> Filtration Technologies for Future Fuels Joern Grottepass, Boll &amp; Kirch Filterbau GmbH</p>	<p><b>6</b> <b>Emission Reduction Technologies -Engine Measures &amp; Combustion Development</b></p> <p>6-2 PM/BC Reduction</p> <p><b>124</b> Development of Black Carbon Zero System for Marine Diesel Engines Minoru Tsuda, National Fisheries University</p> <p><b>002</b> COOLED SPRAY COMBUSTION FOR PARTICULATE MATTER REDUCTION IN A LARGE-BORE SINGLE-CYLINDER ENGINE Adam Klingbeil, Wabtec Corporation</p> <p><b>393</b> Development of Caterpillar C280 Diesel engine for Very Low smoke and Particulate Emissions John Gladden, Caterpillar, Inc.</p> <p><b>310</b> Influence of post-injection strategy on physiochemical characteristics of diesel particulate matter Xu Lyu, Tianjin University</p>	<p><b>12</b> <b>New Engine Developments - Dual Fuel</b></p> <p>12.1 2-stroke dual fuel engines</p> <p><b>083</b> ME-GA: Development of the MAN Low-Pressure Dual-Fuel Two-Stroke Engine Johan Hult, MAN Energy Solutions</p> <p><b>100</b> Significant Performance Improvements by using a low-pressure EGR System for the new X-DF2.0 Fridolin Unfug, Winterthur Gas &amp; Diesel</p> <p><b>187</b> Service experience on first series of large bore ME-GI engines for mega-container ships Stig Baungaard Jakobsen, MAN Energy Solutions</p> <p><b>514</b> WinGD X92DF engine service experience Konrad Räss, Winterthur Gas &amp; Diesel</p>

12:40 - 13:40 Lunch

# Tuesday - June 13, 2023

13:40 – 15:00

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
0 <b>PANEL - Digitalization</b>	8 <b>Fuels - Alternative &amp; New Fuels</b>	9 <b>Lubricants</b>	7 <b>Fuels - Conventional Fuels</b>
	8-1 Energy System Integration	9-2 Gas engine Lubricants	7-2 Conventional development
	<b>019</b> A comprehensive hydrogen value-chain for a sustainable energy-transition Alexander Rest, MAN Energy Solutions	<b>094</b> Effects of Engine Operating Parameters on Natural Gas Engine Oil Life Fred Girshick, Infineum USA, L.P.	<b>290</b> Microfine Carbon blends as fuel for Marine engines rumman ahmed, Arq ltd
<b>412</b> Power-to-X - From Decentralized e-Fuel Production to the Defossilization of High-Power Applications Philipp Köser, Rolls-Royce Power Systems AG	<b>286</b> Dual fuel engine oil solutions to help enable a lower carbon future john palazzotto, Chevron Oronite	<b>653</b> The influence of Fuel Type and Loads on Particulate Emissions from Marine Diesel Engine ang sun, Harbin Engineering University	<b>653</b> Development of a Surrogate Fuel and Soot Formation Analysis for HFO under Engine-relevant Conditions Xiong Qian, Harbin Engineering University
<b>411</b> The role of gas engines in a future energy market with sustainable fuels Stephan Laiminger, Innio Jenbacher	<b>497</b> LNG, mature solution as a Marine fuel: new generation of lubricants for current and future needs Valerie Doyen, TotalEnergies		
<b>521</b> Methanol as an energy carrier – latest technological advances Michal Wojcieszak, Aalto University	<b>547</b> A China I-Compliant Medium-Speed Marine Diesel Engine Using a Two-Stage Turbocharging System Daniel Peitz, HUG Engineering		
<b>12:40 - 13:40</b>	Lunch		

# Tuesday - June 13, 2023

16:00 – 17:40

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
1 <b>Digitalization and Connectivity</b>	13 <b>New Engine Developments - Alternative Fuels &amp; other New Engine Concepts</b>	6 <b>Emission Reduction Technologies -Engine Measures &amp; Combustion Development</b>	16 <b>Engine Component Developments - Tribology</b>
1-1 Leveraging Vessel Connectivity	13-1 New Concepts 1 - Methanol Engine Technology	6-3 Engine Measures	16-2 Piston, Rings & Liner
<b>148</b> Implementing Fleet Digitalization: Systems, applications and lessons learned. Nikolaos Kyrtatos, Propulsion Analytics	<b>340</b> Experimental Study on the Conversion of Marine Diesel Engine to Methanol Engine Fuel Kan YU, Shanghai Marine Diesel Engine Research Institute	<b>018</b> Analysis and optimisation of combustion process of DF engines using highly fluctuating gas qualities Karsten Schleef, University of Rostock	<b>010</b> Using Analysis of the Ring Pack and Piston to Optimise Oil Consumption of Current and Future Engines Alastair Jay, Ricardo
<b>283</b> An analysis of Marine Cybersecurity Standards and the Secure Development Lifecycle Christopher Sundberg, Woodward, Inc.	<b>535</b> The development and certification of a single fuel high speed marine CI engine on methanol Magnus Svensson, Lund University	<b>433</b> Methane emission reduction technologies for medium-speed dual-fuel engines Hyunchun Park, Hyundai Heavy Industries	<b>013</b> A Study on Improvement of Peeling Resistance of Chromium Ceramic Coating for Large Bore Piston Rings Kunihiro Nishiyama, Riken Corporation
<b>548</b> The Path towards Autonomous Shipping from the Perspective of the Propulsion System Peter Krähenbühl, Winterthur Gas & Diesel	<b>438</b> Methanol combustion concept alternatives for new build and retrofit of 4-stroke medium speed engines Jari Hyvonen, Wärtsilä	<b>065</b> Development of elemental technology for reciprocating engines for the decarbonized society Takeshi Takahashi, IHI Power systems	<b>460</b> Study on the Influence of Oil Injection Strategy of Two-stroke Engine Cylinder on Lubrication Zhang Jiyun, Wuhan University of Technology
<b>330</b> Development of digital solution for FGSS health monitoring and failure diagnosis Hyunho Lee, Hyundai Global Service	<b>523</b> MAN B&W two-stroke methanol-powered engines for small and large container vessels in the A.P Moller Maersk fleet – experience and new development Kjeld Aabo, MAN Energy Solutions	<b>270</b> W31 Next DF, the ultra-low emission gas engine concept Diego Delneri, Wärtsilä	<b>215</b> Novel Findings on Oil Transport Pathways Leading to the Lube Oil Ignition in Industrial Gas Engines Philipp Köser, Rolls-Royce Power Systems AG
<b>674</b> Technological challenges and solutions for the 2030/2050 Chemical Parcel Tanker Jose Gonzalez, Stolt Tankers	<b>655</b> Development of carbon-neutral fuel engine: HiMSEN methanol engine Gwang Hyeon Yu, Hyundai Heavy Industries	<b>183</b> EEXI – Best practices for compliance Fabian Kock, DNV	<b>324</b> Tribology in engine parts design considering the characteristics of operating regime Sung Chan An, Hyundai Heavy Industries
<b>15:40 – 16:00</b>	Coffee Break		

# Wednesday - June 14, 2023

09:00 – 10:40

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
<p><b>13</b> <b>New Engine Developments - Alternative Fuels &amp; other New Engine Concepts</b></p> <p>13-3 Alternative Fuel Concepts &amp; Platforms</p>	<p><b>17</b> <b>Engine Component Developments - Turbochargers &amp; Air/Exhaust Management</b></p> <p>17-1 Next generation Turbocharger &amp; intake systems</p>	<p><b>10</b> <b>New Engine Developments - Diesel</b></p> <p>10.3 4 stroke diesel engines 1</p>	<p><b>19</b> <b>Basic Research &amp; Advanced Engineering - Simulation Technologies</b></p> <p>19-1 Engine Thermodynamics 1</p>
<p><b>049</b> <b>MAN Energy Solutions – Four-Stroke Engine Solutions for Low-Carbon and Carbon Free Fuels</b> Alexander Knafl, MAN Energy Solutions</p> <p><b>144</b> <b>Argon Power Cycle (APC) – The way to zero emission ICEs</b> Karsten Stenzel, WTZ Roßlau gGmbH</p> <p><b>181</b> <b>Defossilized Fuels for Future Non-Road Cargo Transport</b> Martin Muether, FEV Europe GmbH</p> <p><b>080</b> <b>Turbocharging of large engines in decarbonization scenarios: impact for the most likely fuels</b> Raphael Ryser, Turbo Systems Switzerland Ltd.</p> <p><b>105</b> <b>Assessment of combustion concepts and operational limits of net-zero carbon fuels</b> Harald Schlick, AVL List GmbH</p>	<p><b>057</b> <b>Next generation axial turbocharger fit for a carbon neutral world</b> Alexander Mutter, ABB Turbocharging</p> <p><b>043</b> <b>Development of a high flow (TCF) and a high pressure (TCP) radial turbocharger series</b> Lutz Aurahs, MAN-ES</p> <p><b>047</b> <b>A new versatile TC platform for modern HS Diesel engines – From product concept to validation</b> Michael Gisiger, ABB Turbocharging</p> <p><b>042</b> <b>High Cycle Fatigue – Advanced development and design methods for increased robustness</b> Lutz Aurahs, MAN-ES</p> <p><b>531</b> <b>Large Engine Electro-Hydraulic Lost-Motion Intake VVA System</b> John Schwoerer, Jacobs Vehicle Systems</p>	<p><b>015</b> <b>Efficiency &amp; Emissions Improvement Package for 7FDL High-Power, Medium-Spd, Locomotive Diesel Engine</b> Matthew Hart, Wabtec Corporation</p> <p><b>038</b> <b>Performance Prediction and Optimization Methodology based on Meta-model in HiMSEN Engines</b> Jonghwoo Park, Hyundai Heavy Industries</p> <p><b>145</b> <b>MAN ES 175D - The most efficient and most powerful marine high-speed engine in the world</b> Ingo Wilke, MAN Energy Solutions</p> <p><b>162</b> <b>The new CSPI high speed H175 engine series for marine applications</b> Teng Liu, China Shipbuilding Power Engineering Institute Co., Ltd</p> <p><b>109</b> <b>AVL High Efficiency High Speed Large Engine</b> Gareth Estebanez, AVL List GmbH</p>	<p><b>028</b> <b>Empirical Model of Uniflow Scavenging for Long Stroke Marine Low-Speed Diesel Engine</b> Yingyuan Wang, Shanghai Jiao Tong University</p> <p><b>071</b> <b>Evaluation of the predictive capabilities of a 1D dual-fuel combustion model with methanol</b> Jeroen Dierickx, Ghent University</p> <p><b>363</b> <b>Predictive 0D modeling of H2 ignition and combustion processes</b> Gerhard Pirker, LEC GmbH</p> <p><b>426</b> <b>Numerical Study of NH3-Diesel Combustion in a Retrofit for Marine Engines using Detailed Kinetics</b> Lars Seidel, LOGE Deutschland GmbH</p> <p><b>397</b> <b>Open and Close Cycle Modeling of A Large-bore Diesel Engine - Detailed Combustion Analysis</b> Hamed Chehrmonavari, MAPNA Turbine Engineering and Manufacturing Company (TUGA)</p>

10:40 – 11:20 Coffee Break

# Wednesday - June 14, 2023

11:20 – 12:40

Accelleron Hall 2	INNIO Hall 3	OMT Hall 1	Robert Bosch Hall 4
<p><b>4</b> <b>Controls, Automation, Measurement &amp; Monitoring</b></p> <p>4-1 Controls and sensing</p>	<p><b>3</b> <b>Electrification and Fuel Cells Development</b></p> <p>3-2 Energy Systems and Fuel Cells</p>	<p><b>10</b> <b>New Engine Developments - Diesel</b></p> <p>10-3 2 stroke engines</p>	<p><b>19</b> <b>Basic Research &amp; Advanced Engineering - Simulation Technologies</b></p> <p>19-3 Engine Thermodynamics 2</p>
<p><b>102</b> <b>New generation oil mist detection system for prevention of crankcase explosions in large ICE</b> Alexander Levchenko, HEINZMANN GmbH &amp; Co. KG</p> <p><b>110</b> <b>Real time lube oil monitoring, a step further to engine condition monitoring</b> Benoit Perrot, MAN Energy Solutions</p> <p><b>244</b> <b>Selective hydrogen and methane online monitoring in the crankcase of large 4-stroke engines</b> Horst Brünnet, Schaller Automation Industrielle Automationstechnik GmbH &amp; Co. KG</p> <p><b>561</b> <b>Piston ring and liner lubrication, liner stress, and lube oil viscosity measurements</b> Henry Brunskill, pktopk</p>	<p><b>239</b> <b>Review of Wind-Hydrogen Integrated Energy System</b> Hongjie Zhou, Harbin Engineering University</p> <p><b>301</b> <b>High-power power electronic converter for Electrification of ship power system</b> Xuan Yang, Shanghai Marine Diesel Engine Institute</p> <p><b>308</b> <b>Modeling of wind/PV hybrid generation system with LH2-superconducting magnetic energy storage</b> Fan Zhang, Tianjin University</p> <p><b>400</b> <b>Decarbonizing Datacenters with Fuel Cell Solutions in the MW-range</b> Stefan Höttges, Rolls-Royce Solutions GmbH</p>	<p><b>099</b> <b>The latest technological development of J-ENG UE Engine for Zero Emission and Digital Transformation</b> Katsumi IMANAKA, JAPAN ENGINE CORPORATION</p> <p><b>149</b> <b>MAN B&amp;W Two-Stroke Engine Design Update incl. the Newly Developed High-Efficient 10.6 Engine Series</b> Lars Ascanius, MAN Energy Solutions</p> <p><b>464</b> <b>New compact engines from WinGD tailored to the changing needs of modern vessels, applying latest inn</b> Marc Spahni, Winterthur Gas &amp; Diesel</p> <p><b>046</b> <b>LP EGR system for 2-stroke engine</b> Hoick Lee, Hyundai Heavy Industries</p>	<p><b>106</b> <b>Modelling of dual-fuel combustion in a large two-stroke engine using an advanced CFD-chemical model</b> Kar Mun Pang, MAN Energy Solutions</p> <p><b>123</b> <b>Potential of ammonia-diesel dual direct injection in a large two-stroke marine engine: A CFD study</b> Jizhen Zhu, Shanghai Jiao Tong University</p> <p><b>166</b> <b>A mapping approach for efficient CFD simulation of dual fuel marine engine with pre-chamber</b> Ying Ye, Tianjin University</p> <p><b>406</b> <b>A New Combustion Model and its CFD Simulation in an Ammonia/Diesel Dual-Fuel Low-Speed Marine Engine</b> Haifeng Liu, Tianjin University</p>

12:40 - 13:40 Lunch

# Wednesday - June 14, 2023

16:00 – 17:40

Accelleron Hall 2      OMT Hall 1      Robert Bosch Hall 4      INNIO Hall 3

<b>18</b> <b>Basic Research &amp; Advanced Engineering - New Concepts</b>	<b>10</b> <b>New Engine Developments - Diesel</b>	<b>16</b> <b>Engine Component Developments - Tribology</b>	<b>17</b> <b>Engine Component Developments - Turbochargers &amp; Air/ Exhaust Management</b>
18-1 New Concepts	10-3 4 stroke diesel engines 2	16-3 bearings	Air-/ Exhaust Management for alternative fuels

## 103

**Progress and prospect of combustion studies on low- and zero-carbon fuels**  
Koji Takasaki, Kyushu University

## 396

**Initial investigations into ammonia combustion at conditions relevant for marine engines**  
Kai Herrmann, University of Applied Sciences and Arts Northwestern Switzerland (FHNW)

## 495

**A numerical study on head-on quenching for hydrogen/ air mixture at high pressure conditions**  
Hasan CELIK, Aalto University

## 337

**Mechanism study of asymmetric jets formation in turbulent-jet-ignition high-efficiency engine**  
Yanzhao An, Tianjin University

## 143

**Kawasaki hybrid propulsion system using pure gas engine and lithium ion battery**  
Yosuke Nonaka, Kawasaki Heavy Industries Ltd.

## 058

**A new modular medium speed engine family**  
Koen Christianen, Anglo Belgian Corporation

## 381

**Upgrade of 27 bore engine and emission compliance with GB15097**  
Finn Fjeldhoej, MAN Energy Solutions - Holeby

## 395

**Introducing a new medium speed engine CS27**  
Yang Tao, Shanghai Marine Diesel Engine Research Institute

## 451

**The Development of the Wabtec High Speed Diesel Engine**  
Michael Mendoza, Wabtec

## 177

**Performance development and experiment of a high power twostage sequential turbocharge diesel engine**  
Zhong Jie, Shanghai Marine diesel engine researchment

## 009

**DPLE – Digital Product Lifecycle Engineering for Hydrodynamic Bearings**  
Falk Nickel, Miba Bearing

## 025

**Bearing testing and validation to optimize bearing design for different engine applications**  
ZHIFENG ZHANG, Miba Precision Components (China) Co., Ltd.

## 075

**Diagnosis of Abnormal Lubrication Conditions to Prevent Seizure of Crosshead Bearings**  
Tatsumi Kitahara, Kyushu University

## 234

**Study on mechanical characteristics of main bearing of high power marine diesel engine based on flex**  
Chen Guangku, Harbin Engineering University

## 295

**A new real-time condition monitoring method for engine bearings**  
Motohiko Koshima, Daido Metal Co., Ltd

## 068

**Alternative fuels and their consequences for exhaust gas turbocharging**  
Steffen Käseberg, Kompressorenbau Bannewitz GmbH

## 096

**Status of MET turbochargers for alternative fuels to reduce GHG emissions**  
Yushi Ono, Mitsubishi Heavy Industries

## 121

**Future Fuels and Drive Concepts - A Challenge for Turbocharging on the Way to Net Zero Emission**  
Johannes Dr. Kech, Rolls-Royce Power Systems AG

## 437

**Unconventional Turbocharger Application for Large Engines**  
Christoph Häge, ABB Turbocharging

## 194

**Analysis of Gaseous Emission and SFOC Characteristic with SAC Coolant Temp. for Two-Stroke Engine**  
Sanghoon Kim, Korean Register

# Thursday - June 15, 2023

09:00 – 10:40

Accelleron Hall 2      INNIO Hall 3      OMT Hall 1      Robert Bosch Hall 4

<b>19</b> <b>Basic Research &amp; Advanced Engineering - Simulation Technologies</b>	<b>5</b> <b>Emission Reduction Technologies -Exhaust Gas Aftertreatment Solutions</b>	<b>8</b> <b>Fuels - Alternative &amp; New Fuels</b>	<b>15</b> <b>Engine Component Developments - Components</b>
19-4 Engine Systems Thermodynamics &	5-4 GHG Reduction - Ammonia Combustion & slup reduction	8-3 Bio Fuels	15-2 Auxiliary Equipment Systems

## 428

**A Study of the Fluid Flow Characteristics of Fuel Injection System for Large Diesel Engine**  
Binyamin Binyamin, Hyundai Heavy Industries

## 565

**Computational modeling of a 1:10 and 1:1 scale large-bore marine two-stroke engine**  
Charles Finney, Oak Ridge National Laboratory

## 221

**Effect of SO2 on absorbents for Onboard Carbon Dioxide Capture**  
Jianjun Ren, Harbin Engineering University

## 511

**Use and benefits of advanced simulation tools for the development of exhaust aftertreatment systems**  
Christian Lieber, Hug Engineering

## 313

**Experimental visualization of gas-liquid two-phase flow in a real-size piston model**  
BING LIANG, Harbin Engineering University

## 101

**Fundamental study of the effect of stratified NH3 injection system for nitrogen compounds reduction**  
Hiromichi Oba, Japan Engine Corporation

## 556

**Ammonia as fuel – emissions and emission control**  
Jan Torrkulla, Wärtsilä

## 274

**From LNG to CCUS, how the methane pathway can be a shortcut to the decarbonation of large containers**  
Philippe RENAUD, CMA Ships

## 440

**Ammonia as a fuel – a role for catalytic components.**  
Joseph McCarney, Johnson Matthey

## 141

**MAN Energy Solutions – Technologies to reduce methane slip of dual fuel engines**  
Mathias Moser, MAN Energy Solutions

## 133

**All you need to know about Biodiesel Fuel oil blends (VLSFOs) quality as a marine fuel**  
Sara Rezaee, Viswa Group

## 369

**Reduction of CO2 emissions in shipping through use of drop-in fuel components from bio-based waste**  
Fanny Langschwager, Rostock University

## 039

**Investigation of bio-fuel on engine performance, emission, and durability from Himsen Diesel Engine**  
Jinyoung Ko, Hyundai Heavy Industries

## 544

**Ignition and combustion characteristics of fast pyrolysis bio-oil for engine application**  
Yu Wang, Eindhoven University of Technology

## 373

**Exhaust measurements comparison of a marine engine burning different blend of Bio Wastes**  
Philippe RENAUD, CMA Ships

## 016

**Smarter sealing for a safer tomorrow – Obtaining information of a gasket with novel technology**  
Jaakko Niukkala, TT Gaskets

## 064

**Development of Valve train system with Hydraulic Lash Adjuster(HLA) for Large engines**  
Hiroyuki Katayama, DAIHATSU DIESEL MFG.CO.,LTD.

## 208

**The effect of increasing Peak Firing Pressure on the reliability of cylinder head of diesel engine**  
ZOU HAO, Dalian CRRC Diesel Engine Co.,Ltd

## 279

**Innovative lube oil filtration concept for combustion engines**  
Claus Beiersdorfer, Boll & Kirch Filterbau GmbH

## 489

**The reliability design of tribological system meeting for the future clean engine**  
Yihu Tang, SMDERI

15:40 – 16:00

Coffee Break

10:40 – 11:20

Coffee Break

# Thursday - June 15, 2023

11:20 – 12:40

Accelleron Hall 2      INNIO Hall 3      OMT Hall 1      Robert Bosch Hall 4

<b>4</b> Controls, Automation, Measurement & Monitoring	<b>3</b> Electrification and Fuel Cells Development	<b>7</b> Fuels - Conventional Fuels	<b>14</b> Engine Component Developments - Fuel Injection & Gas Admission
4-2 Monitoring and Fault Diagnostics	3-1 Marine Fuel Cell Application	7-2 Test methodologies to predict fuel performance	14-2 "GAS" or alternative new fuels

## 004

**Significant Aftertreatment Cost Reduction with High Precise AFR Control for Gaseous Fueled Engines**  
Yi Han, Woodward,inc.

## 147

**Combustion Control based on Low Cost Vibration Sensors for Variable Fuel Otto Engines**  
Klaus Schmid, AVAT Automation GmbH

## 534

**Use of Machine Learning for Anomaly and Failure Detection in Marine Large-Bore 2-Stroke Engines**  
Martin Brutsche, Winterthur Gas & Diesel

## 627

**Condition Based Monitoring for Large Bore Medium Speed Engines using a Digital Twin, ML and Big Data**  
Rik De Graeve, ABC

## 085

**Fuel cells for future marine propulsion systems**  
Josef Macherhammer, AVL List GmbH

## 118

**Simulation-Driven Development of PEM Fuel Cell Systems for Maritime Applications**  
Victoria Damerow, Freudenberg Fuel Cell e-Power Systems GmbH

## 366

**TCO comparison between fuel cells and Diesel engines - example of PEMFC APU for large vessel**  
Henry Dodson, Ricardo

## 454

**Road to zero global warming from high powered merchant marine propulsion systems**  
Dominik Schneiter, Winterthur Gas & Diesel

## 008

**Demonstrating Significant Fuel Consumption and Emissions Savings with Combustion Improver Additives**  
Adrian Bourdeaux, Infineum UK Ltd

## 014

**The Alfa Laval spin-test: A method to help fuel users predict sludge issues at the separator**  
Dewi Ballard, Infineum UK Ltd

## 131

**Long term storage stability issues of very low sulfur fuels, a major problem for shipowner**  
Sara Rezaee, Viswa Group

## 669

**Presence of Organic Chlorides in Bunker Fuel**  
Sara Rezaee, Viswa Group

## 055

**Fuel injection and admission systems for liquid and gaseous bio- and e-based fuels for large engines**  
Christoph Kendlbacher, Robert Bosch Powertrain Solutions, Large Engines

## 088

**Low pressure (SOGAV) gas admission of H2 and NH3**  
Rick Boom, Woodward

## 104

**Methanol port fuel injection for medium speed application: injector development and engine design**  
Arianna Sorrentino, Heinzmann GmbH & Co. KG

## 128

**Development & Simulation of "HP Gas-and/or hydrogen-DI-Injectors" for combustion engines**  
Erich Vogt, DUAP AG

12:40 - 13:40

Lunch

# Thursday - June 15, 2023

13:40 – 15:20

Accelleron Hall 2      INNIO Hall 3      OMT Hall 1      Robert Bosch Hall 4

<b>15</b> Engine Component Developments - Components	<b>9</b> Lubricants	<b>14</b> Engine Component Developments - Fuel Injection & Gas Admission	<b>20</b> Basic Research & Advanced Engineering - Mechanics, Materials Research
15-3 Advanced Component integration	9-2 Zero carbon fuel lubricants	14-1 "LIQUID" or conventional diesel	20-3 mechanics and materials

## 023

**Joint development of the bearing system for AVL 's new High speed engine platform**  
Gunther Hager, Miba Gleitlager Austria GmbH

## 245

**Powertrain innovation – Development Speed vs. Reliability?**  
Andreas Thalhammer, Geislinger GmbH

## 378

**Improvement technologies for efficiency and through field operation in Mitsubishi gas engines**  
KAZUHIRO KAWAI, MITSUBISHI HEAVY INDUSTRIES ENGINE & TURBOCHARGER

## 560

**Experimental Study on Multi-objective Optimization of a Marine Diesel Engine Cooling System**  
Bo Zhang, Naval University of Engineering

## 616

**CIMAC WG4 - Crankshaft Rules - Multiaxial Fatigue Assessment of Crankshafts**  
John Dowell, Wabtec Corp

## 066

**Lubricants Enabling Shipping's Alternate Fuels and Journey to Decarbonisation**  
Lawrie Peck, Lubrizol

## 126

**Ammonia as an alternative Marine fuel-Assessing the impact on lubricants and lubrication reliability**  
Maria Rappo, TotalEnergies

## 386

**Lubrication needs for hydrogen fueled gas engine power plants**  
Dr. Winfried Koch, ExxonMobil

## 423

**Marine engines lubrication within a broad fuel landscape & impact on exhaust aftertreatment systems**  
Luc Verbeeke, Chevron

## 467

**The Role of Marine Lubricants in Lowering the Carbon Intensity of Maritime Transport**  
Shenghua Li, Chevron Oronite

## 063

**Injection rate control strategy with Bosch Smart CR Injector for optimized injection performance**  
Christoph Kendlbacher, Robert Bosch Powertrain Solutions, Large Engines

## 120

**PtX fuels for combustion engines: flexible injection concepts for all applications**  
Clemens Senghaas, Woodward L'Orange GmbH

## 139

**Powering a greener future: the OMT injector enables high-pressure injection of ammonia and methanol**  
Marco Coppo, OMT SpA

## 439

**Steps towards online detection and optimization of eFuel engine operation**  
Fabian Pinkert, FVTR GmbH

## 574

**Development of a retrofit fuel flexible platform for future fuels**  
Sangram Nanda, Wärtsilä

## 136

**A study of the lubrication state of diesel cylinder liner-piston ring using acoustic emission**  
Shi Zhaoyu, Harbin Engineering University

## 352

**Effect of Plastic Deformation Behavior of Cylinder Liner Surface on Friction and Wear Process**  
Zhangbaofeng Zhang, Harbin Engineering University

## 436

**Impact of hydrogen on iron- and nickel-based valve spindle materials**  
Oliver Lehmann, Märkisches Werk

## 446

**Hydrodynamic bearings with relevant friction reduction**  
Thomas Kottke, Rolls-Royce Power Systems AG

## 392

**Thermal Cyclic Creep Simulation on Valve Seat Sealing of Marine Diesel Engine Cylinder Head**  
Huabing Zhang, Shanghai Jiao Tong University

15:20 – 16:00

Coffee Break

# OPTIONAL TOURS JUNE 12 - 15, 2023

TOUR DATES: JUNE 12 - 15, 2023

## Explore Busan!

Busan as a large port city, is also known for beaches, mountains and temples. Busy Haeundae Beach has a Sea Life Centre and a place for traditional games like tug-of-war. Gwangalli Beach, on the other hand, offers many bars and a view of the modern Gwangandaegyo Bridge. Beomeosa Buddhist Temple, built in 678 AD, is located at the foot of Geumjeong Mountain with its hiking trails. There is a lot to explore in Busan!

### Schedule

	Monday, 12 June 2023	Tuesday, 13 June 2023	Wednesday, 14 June 2023	Thursday, 15 June 2023	
MORNING					<b>BUSAN Seashore Temple Tour</b> 09.00 - 14.00
AFTERNOON	<b>BUSAN Highlights</b> 12.00 - 16.00	<b>Busan Yeongdo Island</b> 09.00 - 16.00	<b>GYEONGJU Shilla Dynasty</b> 09.00 - 17.00	<b>BUSAN Ancient Wall Hiking Trail</b> 09.00 - 16.00	

CIMAC Congress will provide a get-together meeting room with information about the city, sightseeing tours and excursions with daily tips. You will get the chance to connect with others, to explore together Busan and its surroundings.

### Information to Participants

- The tours are only open for CIMAC participants and their partner.
- English speaking tour guide.
- Light lunch for full day tours.
- Minimum number of participants per tour: 10 persons.
- Limited availability per tour, early booking is recommended.

### Level of Activity

- **Easy** - Relaxed pace for classic sightseeing
- **Moderate** - Full day of sightseeing, requiring standing and walking for longer time (natural or historical sites)
- **Active** - Tour with main active element, such as hiking or biking. Walking over uneven and mountainous terrain, biking with moderate elevations. The participant should be physically fit and comfortable to walk 5-10 km. Adequate preparation according to specified instruction per tour required: suitable shoes, clothing, sunscreen, snacks and drinks.



# OPTIONAL TOURS JUNE 12 - 15, 2023

MONDAY JUNE 12 - 15, 2023

## BUSAN HIGHLIGHTS (Half-a-Day / Activity Level: Easy)

**Price: \$ 80 per person**

### Description

The Jagalchi Fishmarket is one of the largest markets of its kind, selling a dazzling array of fish, often alive. Here you can taste the famous Korean sashimi. Nearby you can visit the Kukjae Market, where you can shop for souvenirs, glasses (very cheap in Korea!) and clothing. The Gamcheon village is located on the hillside of the town of Busan. It used to be a shelter for refugees during the Korean War, however, due to its picturesque location, it attracted a lot of artists and Gamcheon became the center of arts and culture in Busan.

Inclusive: Private bus / English Guide / Admission fees

### Program

- 12:00 Departure BEXCO
- 13:00 Gamcheon Cultural Village
- 14:00 Jakalchi Fishmarket / Kukjae Market / BIFF Square
- 15:00 Yongdusan Park & Busan Tower and return via Diamond Bridge
- 16:00 Arrive at BEXCO, end of tour

TUESDAY 13 JUNE 2023

## BUSAN YEONGDO ISLAND (Full Day / Activity Level: Moderate)

**Price: \$ 100 per person**

### Description

Yeongdo Island has kept its original atmosphere, nature, and culture, despite the rapid developments in Busan. Taejongdae and Oryukdo offers spectacular views of rock formations and sea, the White Village is a perfect spot to enjoy a breathtaking view. At the Korea National Maritime Museum, you can learn about the maritime history of Korea in which Busan played a vital role due to its geographical location.

Inclusive: Private bus / English Guide / Admission fees / Lunch

### Program

- 09:00 Departure BEXCO
- 09:45 Via Busan Harbor Bridge to Yeongdo Island
- 12:00 Korea National Maritime Museum
- 14:00 Taejongdae National Park / White Yeoul Village
- 15:00 Via Diamond Bridge to Oryukdo Sky Walk
- 16:00 Arrive at BEXCO, end of tour

## OPTIONAL TOURS JUNE 12 - 15, 2023

WEDNESDAY 14 JUNE 2023

### GYEONGJU SHILLA DYNASTY (Full Day / Activity Level: Moderate)

**Price: \$ 130 per person**

#### Description

Excursion out of Busan to visit Gyeongju, the ancient capital of Shilla now known as the “open-air museum” for being home of several Unesco Heritage sites of Korea.

The royal tombs at the Tumuli Park date back to the Shilla Dynasty (600-900 AD). Artifacts found in the graves show a remarkable technological and cultural achievements. The Cheomseongdae is the oldest existing astronomical observatory in Asia. The 362 stones used to build the Cheomseongdae represent the 362 days in the lunar calendar. The Anapji Pond is an artificial pond constructed for the royal family for leisure and study.

Inclusive: Private bus / English Guide / Admission fees / Lunch

#### Program

- 09:00 Departure BEXCO
- 10:30 Tumuli Park & Grave of General Kim Yusin  
Walk to Cheomseongdae Astronomical Observatory & Anapji Royal Pond
- 12:00 Gyeongju National Museum
- 13:00 Lunch & Free time in Hwangnamdong District / Hwangnidan-Gil  
Traditional village tour with rooftop cafés, restaurants, and tiny shops
- 15:00 Woljeong Bridge
- 17:00 Arrive at BEXCO, end of tour.



Pictures: ©Korea Tourism Organization

## OPTIONAL TOURS JUNE 12 - 15, 2023

THURSDAY 15 JUNE 2023

### Option 1: BUSAN ANCIENT WALL HIKING TRAIL (Full Day / Activity Level: Active)

**Price: \$ 80 per person**

#### Description

The century old Geumjeongsan Defense Wall stretches over several mountain ridges along the city of Busan. From the natural spring of Heoshimjeong one can take a cable car to the Defense Wall and make a wonderful hike for several hours along this wall. On the way stops can be made at the South-, East- and North Gate. The city view is spectacular. The hike ends at the Beomeosa Temple.

**Preparation:** Good physical condition required, good quality hiking shoes (highest point approximately 800 meters), sporty clothing, sun cream, 3-4 bottles of water and energy snacks. Lunch boxes are prepared by the guide. In case of rain or other adverse weather conditions, the tour will be cancelled or postponed.

**Inclusive:** Private bus / English Guide / Admission fees / Lunch package

#### Program

- 09:00 Departure BEXCO
- 10:00 Cable Car at the Geumjeong Park
- 10:30 Hiking via East Gate to the North Gate (highest point 800 meter)  
Descending to the Beomeosa Temple
- 14:30 Arrival at the Beomeosa Temple  
Free time at Beomeosa Temple
- 16:00 Arrive at BEXCO, end of tour

### Option 2 BUSAN SEASHORE TEMPLE TOUR (Half Day Morning Tour / Activity Level: Easy)

**Price: \$ 80 per person**

#### Description

The Haedong Yonggungsa Temple dates back to 1376 during the Goryeo Dynasty. While most temples are tucked away high in the mountains, this temple was built along the shoreline. An enormous Buddha Statue on top of the temple complex is overlooking the amazing coastline. A special site at the temple are the 108 stairs and stone lanterns lining the rocky landscape. After going down the 108 steps one can enjoy the calming sounds of waves, and view the majestic sunrise.

**Inclusive:** Private bus / English Guide / Admission fees

#### Program

- 09:00 Departure BEXCO
- 09:30 Dalmaji-gil Road
- 11:00 Haedong Yonggungsa Temple
- 14:00 Arrive at BEXCO, end of tour

## MAIN SPONSORS

### Platinum Sponsor

We thank our Platinum Sponsor of the 30th CIMAC World Congress for the extraordinary support!



#### Accelleron

Turbo Systems Switzerland Ltd  
5401 Baden, Switzerland

Accelleron is a global leader in turbocharging technologies and optimization solutions for 0.5 to 80+ MW engines, helping to provide sustainable, efficient and reliable power to the marine, energy, rail, and off-highway sectors. Through its innovative product offerings and research leadership, the company accelerates the decarbonization of the industries it operates in. Accelleron has an installed base of approximately 180,000 turbochargers and a network of more than 100 service stations across 50 countries worldwide.

### Gold Sponsors

We thank all the Gold Sponsors of the 30th CIMAC World Congress for their extraordinary support!



#### MTU Friedrichshafen

88045 Friedrichshafen, Germany



#### WEICHAI

128424 Singapore, Singapore

### Silver Sponsors

We thank all the Silver Sponsors of the 30th CIMAC World Congress for their support!



#### OFFICINE MECCANICHE TORINO

10098 Rivoli, Italy

## SPONSORS

### Bronze Sponsors

We thank all the Bronze Sponsors of the 30th CIMAC World Congress for their support!



**Castrol**  
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Great Britain



**Hyundai Heavy Industries,  
Engine & Machinery Division**  
44032 Ulsan, South Korea



**INNIO Jenbacher**  
6200 Jenbach,  
Austria



**Lubmarine**  
Total Energies Lubrifiants  
92029 Nanterre, France

### Premium Sponsors

We thank all the Premium Sponsors of the 30th CIMAC World Congress for their support!



**AVL List**  
8020 Graz, Austria



**Infineum**  
OX14 3BD Abingdon,  
Great Britain



**Robert Bosch**  
16923 Yongin-City  
Kyunggi-Do, Korea



**LEC**  
8010 Graz, Austria



**Boll & Kirch Filterbau**  
50170 Kerpen,  
Germany



**NICO Precision**  
949-6603 Niigata,  
Japan



**Caterpillar**  
24159 Kiel,  
Germany



**PBST** A brand of  
MAN Energy Solutions SE  
86153 Augsburg Germany



**Daihatsu Diesel**  
524-0035 Moriyama city  
Shiga Pref., Japan



**Winterthur Gas & Diesel**  
8401 Winterthur,  
Switzerland



**Geislinger**  
5300 Hallwang,  
Austria



**Woodward**  
70435 Stuttgart,  
Germany



**IHI Power Systems**  
101-0021 Tokyo,  
Japan



**Yanmar**  
660-8585 Amagasaki,  
Japan

# MEDIA PARTNERS

We thank all Media Partners for helping us making CIMAC 2023 once more a successful event.



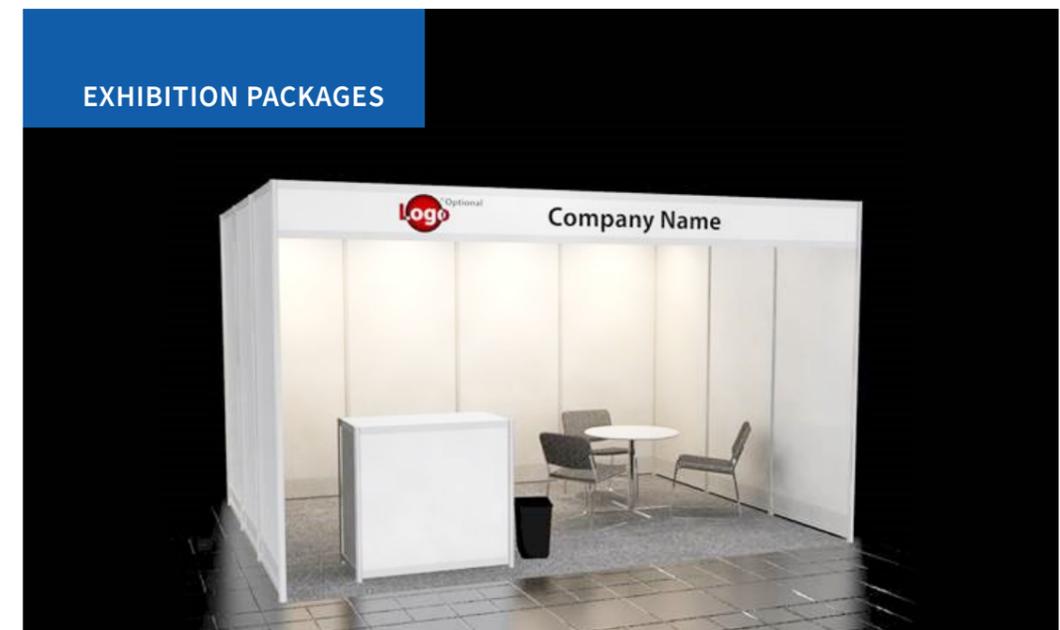
# ACCOMPANYING EXHIBITION

## Present your Company

We are pleased to inform you about the excellent opportunity to present your company at the accompanying exhibition of the 30th CIMAC World Congress, which will be held in the BEXCO Convention Centre, Busan, South Korea. The exhibition takes place from **12 until 15 June 2023**.

For the application forms please visit [www.cimaccongress.com](http://www.cimaccongress.com)

For any questions regarding the exhibition, please contact [Ms. Sybille Lang](mailto:Ms.Sybille.Lang)  
CIMAC Project Team



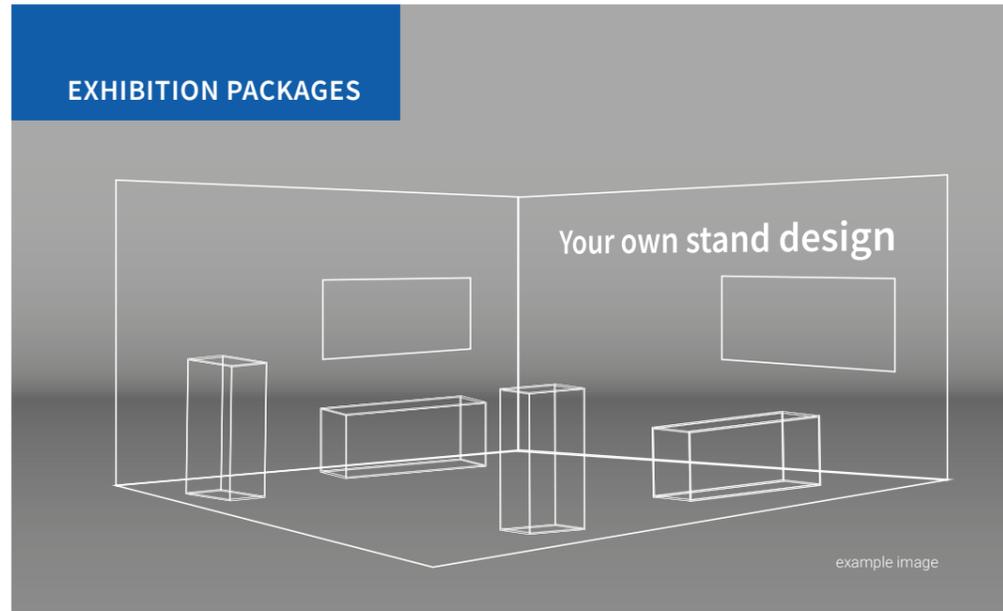
### Stand Type a) - Package (min. 9 sqm)

- Provision of stand space
- Stand construction, uniform design
- Uniform floor covering
- 1 table, 3 chairs, 1 lockable sideboard, 1 waste paper basket
- Fascia board incl. company name and booth-number
- 1 power outlet, approx. 2 kW (220V)
- General stand lighting
- Daily basic stand cleaning, excl. exhibits
- Catalogue entry (CIMAC Congress publication)
- Support service by HMC prior to the event and during the show
- 2 exhibitor badges, for each additional 9 sqm you will receive 1 extra badge

**EUR 425.00 /sqm incl. stand construction (excl. tax)**

### Exhibitor Badges

The exhibitor badges are for use of the stand staff only and do not entitle to take part in the conference.



## EXHIBITION PACKAGES

### Stand Type b) – Required exhibition raw space excl. stand construction (min. 54 sqm)

- Provision of stand space
- Daily basic stand cleaning, excl. exhibits
- Catalogue entry (CIMAC Congress publication)
- Support service by HMC prior to the event and during the show
- 4 exhibitor badges, for each additional 9 sqm you will receive 1 extra badge

**EUR 275.00 /sqm excl. stand construction (excl. tax)**

#### Exhibitor Badges

The exhibitor badges are for use of the stand staff only and do not entitle to take part in the conference.

Exhibitors	Booth Number
Accelleron	70
AVAT Automation GmbH Tübingen	6
AVL List GmbH Graz	58
BOLL & KIRCH Filterbau GmbH Kerpen	47
C.C.JENSEN A/S - Filter - Svendborg	39
Chevron Oronite Company LLC San Ramon, CA	30
Dr. E. Horn GmbH & Co. KG Gärtringen	5
DUAP AG Herzogenbuchsee	6
Federal-Mogul Burscheid GmbH Burscheid	25
FEV Europe GmbH Aachen	2
Ganser CRS AG Elsau	16
Geislinger GmbH Hallwang	75
Heinzmann GmbH & Co. KG Schönau	17
HYDAC International GmbH Sulzbach	51
IMES GmbH Kaufbeuren	14
Infineum UK Ltd. Abingdon, Oxfordshire	12
KS Kolbenschmidt GmbH Neckarsulm	11
Märkisches Werk GmbH Halver	10
Miba Bearing Group - Miba Gleitlager Austria GmbH Laakirchen	34
Mitsubishi Heavy Industries Marine Machinery & Equipment Co. Ltd. Nagasaki	44

# HALL LAYOUT

## Convention Hall 3F - Grand Ballroom - General Hall Layout

More information on: <https://www.bexco.co.kr/eng/Main.do>

You can find the latest floor plan at: <https://www.hamburg-messe.de/aussteller>





## Busan

Busan is Korea's representative tourist city with over 3 million foreign visitors a year. From the Haeundae Beach to the beautiful natural environment, visitors can enjoy all four seasons. It provides a variety of marine tour programs, shopping experiences and other cultural activities. These have all combined to make Busan a world class tourist city for lodging and relaxation.

**Population:** 3.429 million

**Languages Spoken:** Korean is the national and official language in Busan. The language is drastically different from western languages. In addition to the native language, most people below 40 years of age speak English frequently. One of the most prominent minority languages in South Korea is Chinese, which is spoken by over 1.2 million residents.

**Climate:** Busan is characterized by the oceanic climate with warm summers and mild winters. In winter temperatures can drop below the freezing point at night. Rainy season is from April until September. Busan has a cooler version of a humid subtropical climate. Extremely high or low temperatures are rare. Busan and the nearby area have the least amount of snow compared to other regions of Korea due to its location.

**Time Zone:** Busan is in the Korean Standard Time Zone.

**Money:** The Korean currency is Korean Won (KRW). \$ 1 = KRW 1350. Upon your arrival at the airport in Korea you can exchange cash money to Korean won at any bank at Incheon Airport – or debit card out of the ATM. You can use your debit card if it shows the Cirrus- or Maestro-logo. Credit cards (VISA or MasterCard) are widely used.

**Electricity:** Korea has an electric voltage capacity of 220 volts. Adapters are necessary in case of variation to the European standard 2-pin plugs.

**Phone & Internet:** Wifi is widely available. If you want to have continuous access without using roaming, you can either rent a phone, sim card or Pocket Wifi. These items are for rental and can be picked up upon arrival at the Incheon Airport & Gimpo Airport.

For more information about Busan please visit: [Busan Tourism](#)

## Traveling to Busan

### Travel preparation

Please be aware that you have to register online for K-ETA (Korea Travel Authorization) <https://www.k-eta.go.kr/portal/apply/index.do> before travelling to Korea! You must complete your K-ETA application at least 24 hours prior to boarding your flight.

### Accessibility

South Korea is extremely well-connected by land, air and sea, with a high density of airports, train/subway stations and bus terminals all over the country. Almost all stations are meticulously clean and safe, the schedules frequent and punctual, and rates reasonable. For subway, bus and taxi, the most convenient is to purchase a T-Money Card at one of the numerous convenient stores.

### Domestic transportation

■ **Domestic flights:** South-Korea has a convenient network of domestic airport that cover the entire country. The main domestic destinations are Seoul, Busan, Daegu, Gwangju and Jeju Island.

■ **Train:** South Korea is conveniently connected by high speed train between all major cities on the mainland: Seoul, Daejeon, Daegu, Gwangju, Yeosu, Busan. Commuter trains ('Mugunghwa) still run and stop at smaller towns and villages. Payment by purchase of separate tickets.

■ **Subway:** One of the best in the world and by far the most convenient way to transfer within the city. Seoul, Busan, Daegu and Gwangju offers state-of-the-art modern subway, with clear signage in Chinese, English and Japanese. The subway lines cross city borders and connect suburbs and nearby towns. Payment by T-Money card or purchase of separate tickets.

■ **Taxi:** Uber is not the common taxi service, instead the Koreans use Kakao Taxi. The app is easy to download and convenient to use. Alternatively, the hotel staff can help you reserve a taxi, or you can stop a taxi on the road. Payment by T-Money card, credit card or cash.

■ **Car rental:** Koreans drive on the right side. Driving in the big cities of Seoul and Busan is comparable with driving in Rome or Paris, so caution is advised. Car-rentals can be arranged in South Korea.





# Acce/eron

your partner in the decarbonization journey.

## bexco

**Busan the city of international conventions - the perfect place for any event!**

Korea is one of the most advanced nations in the world, yet it is also a country steeped in historically rich tradition. In Busan, this combination of the old and the new abounds at every turn. Firstclass convention facilities sit minutes from sandy beaches and historic mountain trails. Serene, thousand-year old temple sites are nestled among some of the tallest residential skyscrapers in Asia.

**BEXCO - Busan Exhibition Convention Centre**

Convention Hall  
55 APEC-ro  
U-dong  
Haeundae-gu  
Busan  
South Korea

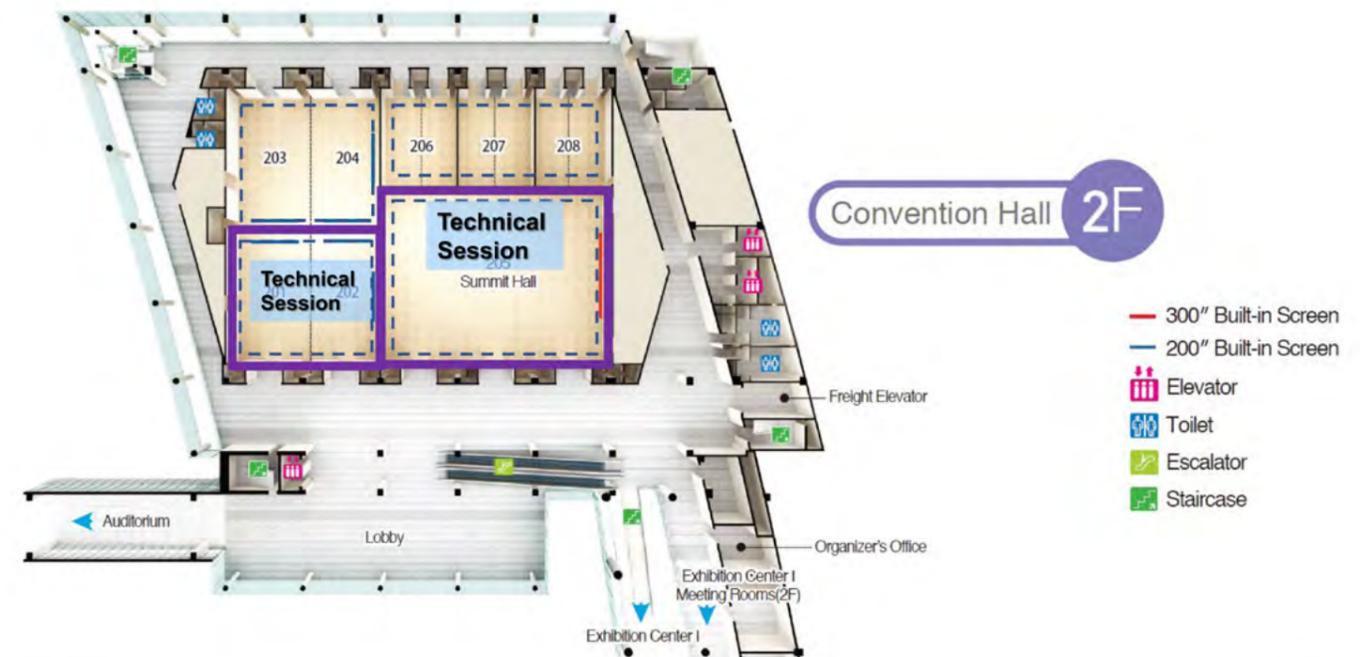
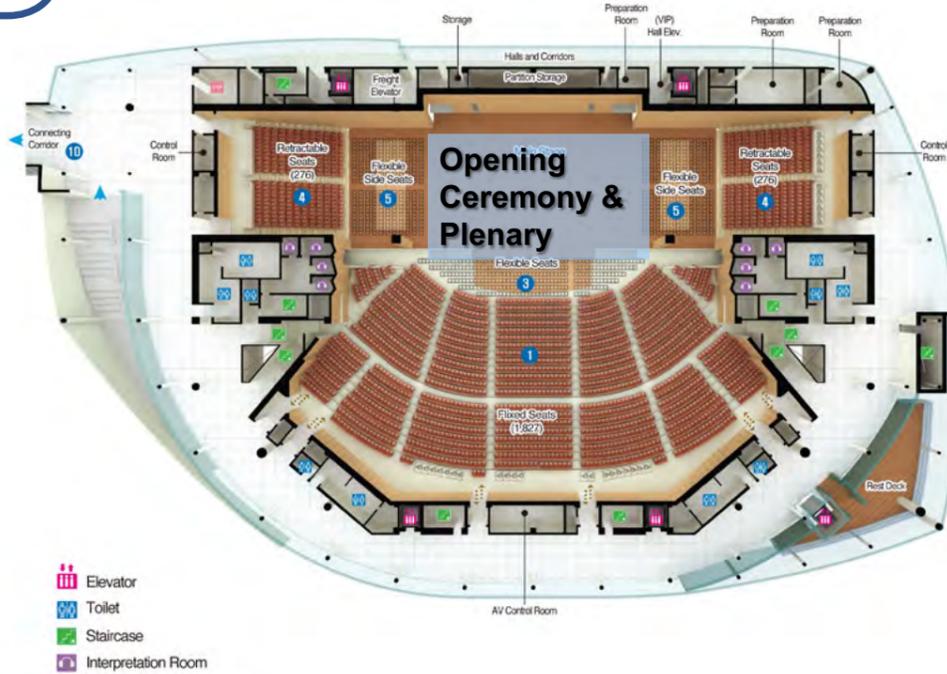
[www.bexco.co.kr](http://www.bexco.co.kr)



# FLOOR PLANS

# FLOOR PLANS

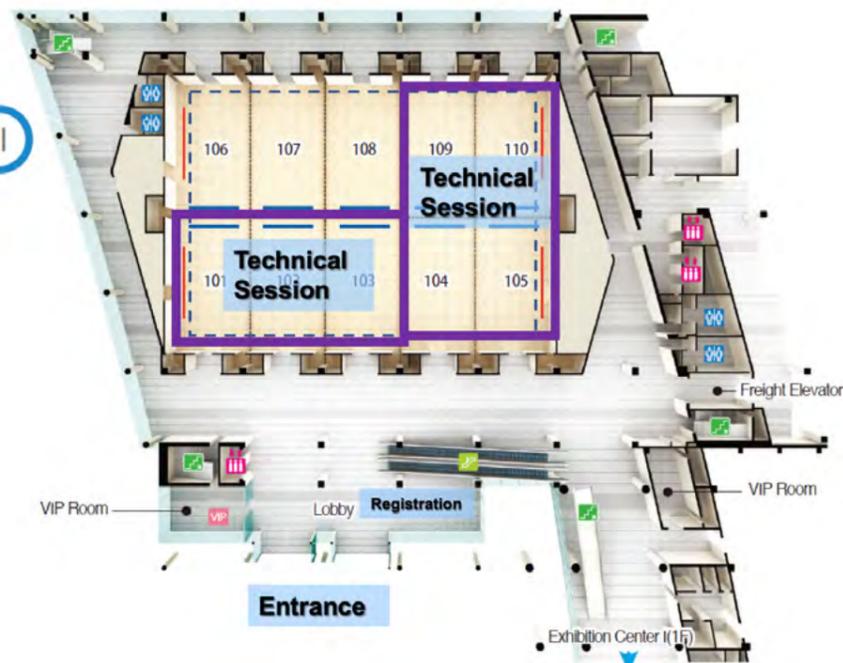
Auditorium



1

1

1F Convention Hall



# ACCOMMODATION

## Selected hotels for CIMAC participants

Hotel offers:

- **Special rates** for CIMAC participants on the following website: [hotel bookings](#)
- **Close vicinity to BEXCO**, 1 to 10 min away by car.
- **Special Cancellation Policy:** in case the CIMAC Congress is cancelled your room reservation is 100% refundable.
- All rates inclusive of all taxes & breakfast
- Additional week-end charges may apply
- Rates in USD are subject to currency fluctuations and may be adjusted over time.
- Payment via international bank transfer.
- Cancellation policy according to [General Terms & Conditions KR H&E for CIMAC Congress 2022](#).



Contact



KR Hospitality & Events (KR H&E) is the official travel agent for CIMAC Congress 2023 in Busan

**Mr. Don Roelofs**

Info & Bookings via [don@krhospitality.co](mailto:don@krhospitality.co)

# ACCOMMODATION

## 1 CENTUM PREMIER HOTEL 4 \*



The finest business hotel within walking distance from BEXCO, and only 10 minutes drive to the famous Haeundae Beach. Located in a quiet area in the evening, and with an excellent restaurant inside the hotel. The hotel provides clean and cozy guest rooms and various facilities to ensure the best service and satisfaction for all guests.

Info & booking: <https://zurl.co/dNHP>

Room Type	Occupancy	Room size	Rate per room per night
Superior Double	Single	20 m <sup>2</sup>	\$ 112
	Double		\$ 126
Superior Twin	Double	20 m <sup>2</sup>	\$ 124
Deluxe Double	Single	22 m <sup>2</sup>	\$ 122
	Double		\$ 136
Deluxe Twin	Double	27 m <sup>2</sup>	\$ 135

## 2 RAMADA ENCORE BY WYNDHAM Busan Haeundae 4 \*



RAMADA ENCORE BY WYNDHAM Haeundae has been opened in 2017 and is 500 meters away from the famous Haeundae Beach. In the direct vicinity of the hotel, you will find a large variety of restaurants, bars and shops, while still enjoying the tranquility inside the hotel. It only takes 10 minutes by subway to reach BEXCO.

Info & bookings: <https://zurl.co/sr6Y>

Room Type	Occupancy	Room size	Rate per room per night
Superior Double	Single	19.7 m <sup>2</sup>	\$ 122
	Double		\$ 139
Deluxe Twin	Single	23 m <sup>2</sup>	\$ 122
	Double		\$ 139
Corner Suite Double	Single	38 m <sup>2</sup>	\$ 177
	Double		\$ 194
Corner Suite Twin	Single	35 m <sup>2</sup>	\$ 177
	Double		\$ 194

# ACCOMMODATION

3

## THE WESTIN JOSUN Busan 5 \*



The Westin Josun Busan offers luxury along the famous Haeundae Beach with true 5-star service. It definitely has one of the best city- and sea views of Busan. It is 15 minutes drive to BEXO Convention Center.

Info & booking: <https://zurl.co/9wJJ>

Room Type	Occupancy	Room size	Rate per room per night
Deluxe Park Twin	Single	29.7m <sup>2</sup>	\$ 287
	Double		\$ 320
Deluxe Beach Double	Single	29.7m <sup>2</sup>	\$ 321
	Double		\$ 363
Deluxe Beach Twin	Single	29.7m <sup>2</sup>	\$ 321
	Double		\$ 363
Executive Park Double	Single	29.7m <sup>2</sup>	\$ 289
	Double		\$ 331
Executive Park Twin	Single	29.7m <sup>2</sup>	\$ 289
	Double		\$ 331
Executive Beach Double	Single	29.7m <sup>2</sup>	\$ 331
	Double		\$ 373
Executive Beach Twin	Single	29.7m <sup>2</sup>	\$ 331
	Double		\$ 373
Suite Executive Grand (Double)	Double	44.5m <sup>2</sup>	\$ 636

4

## PARK HYATT HOTEL Busan 5 \*



At Park Hyatt Busan, guests will discover the traditional values of courtesy, care, comfort, and luxury with the discreet, residential, and sophisticated style of Park Hyatt. Whether guests are visiting the hotel for an important meeting or a relaxing weekend away, Park Hyatt Busan offers an array of services that are sure to make stays memorable. It is 9 minutes drive to BEXO Convention Center.

Info & bookings: <https://zurl.co/6DoC>

Room Type	Occupancy	Room size	Rate per room per night
King Bed	Single	42-47m <sup>2</sup>	\$ 309
	Double		\$ 350
King Deluxe	Single	47-49m <sup>2</sup>	\$ 345
	Double		\$ 386
Twin Deluxe	Single	48-49m <sup>2</sup>	\$ 345
	Double		\$ 386
King Ocean View	Single	41m <sup>2</sup>	\$ 405
	Double		\$ 446
Twin Ocean View	Single	41m <sup>2</sup>	\$ 405
	Double		\$ 446
Park Executive Marina Suite	Single	67m <sup>2</sup>	\$ 525
	Double		\$ 566

# REGISTRATION

## Opening Hours Information Desk

Sunday June 11	14:00 – 18:00
Monday June 12	08:00 – 18:00
Tuesday June 13	08:00 – 18:00
Wednesday June 14	08:00 – 18:00
Thursday June 15	08:00 – 18:00

## Ticket shop

You can register for the 30th CIMAC World Congress online by using the ticket shop. Please follow the link: [Ticket shop](#)

## Registration Fees\*

	Euro / €	USD / \$	Korean WON / ₩
CIMAC Members	1,950	2,010	2,788,500
Non-Members	2,300	2,370	3,289,000
Speakers	1,750	1,805	2,502,500
Students	On invitation only		
Accompanying Persons	350	365	500,500
One-Day Ticket	950	980	1,358,500
Exhibition Ticket per Day	50	55	72,000
Gala Dinner only	250	260	357,500

\*Not subject to Korean VAT.

**The prices in Euro are binding.** Dollar and Korean won prices may vary and are for orientation only.

The Congress fee for **CIMAC members, non-members and speakers** includes participation in the technical program, admission to the exhibition, the Opening Ceremony, the Welcome Reception, the Accelleron Evening, and the Gala Dinner. Additional Congress components, such as the accompanying program (optional tours, technical tours) must be booked and paid separately. The Congress documents (program, Congress bag, participant badge) as well as catering during breaks are included in the Congress fees.

**Invited Students** (free of charge) have the above-mentioned services also included - except the participation in the Gala Dinner.

The participation fee for **accompanying persons** includes admission to the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, the Accelleron Evening and Gala Dinner, but this ticket does NOT include the technical program.

The participant fee for **One Day tickets** includes: participation in the scientific program, admission to the exhibition. The Congress documents (program, Congress bag, participant badge) as well as catering during breaks are included in the Congress fee, this ticket does NOT include any social program.

The participation fee for **exhibitors and exhibition day-tickets only** include only the admission to the exhibition and does NOT include the scientific program and does NOT include any social program.

## QUICK FACTS

### Accommodation

Informations about selected Hotels in [Busan](#) please see page 37.

### CIMAC

CIMAC is the non-commercial sponsor of the 30th CIMAC World Congress in Busan. For further informations on CIMAC please visit the website at <http://www.cimac.com/>

### Cancellation of Congress Participation

In case of cancellation, provided that VDMA Services has received written notice about it 40 days before the congress, the participation fee will be refunded less a handling fee of € 180. In case of cancellation after this date, no refund will be made.

### CIMAC Membership

If you are uncertain about your membership status or want to apply for a membership, please contact the CIMAC Central Secretariat – [info@cimac.com](mailto:info@cimac.com)

### Congress Catering

Catering stations will be integrated in the exhibition area. During the coffee breaks and lunch break participants will be provided with food and drinks. Enjoy regional and international cuisine!

### Congress Documents

Please bring your mobile ticket ready on your mobile phone or tablet with you or print out your e-ticket legibly on a sheet of paper. Your personal badge is your entrance ticket to all sessions, the exhibition and the social events. Please, remember to wear your badge at the congress and the social events at every time. Congress bags will be provided in the registration area in the Convention Centre.

### Contact for Questions

For questions regarding the technical Program, please contact CIMAC Central Secretariat. For questions regarding the congress, sponsoring and exhibition, please contact the Main and the Co-Organizer of the congress. Contact details see page 43.

### COVID-19

Current COVID-19 regulations will be announced on our website <https://www.cimaccongress.com/> in time before the Congress.

### Cloakroom

Participants may leave their belongings in the designated area.

### Language

The official language of the Congress is English. No translation will be provided.

### Newsletter

For the subscription of the CIMAC Newsletter please fill out the form on CIMAC website: <http://www.cimac.com/publication-press/newsletter-subscription/index.html>

## QUICK FACTS

### Mobile App

A mobile app will be available for downloading in [Google Play](#) and [Apple App Store](#) for all congress participants in early spring time. The app contains the actual technical Program, general informations, floor plans and furthermore.

### Optional Tours

For participating in the optional tours, please visit our hospitality room at the congress. Please see pages 19.

### Registration Fees

Registration Fees for tickets will be announced on our website in January 2023.

### Social Media

Fans and followers will find the CIMAC Congress on [LinkedIn](#) and [Twitter](#).

### Speakers' Preparation Room

All presentations can be checked and delivered to the speaker's preparation room at least 2 hours prior to speaker's session. Presentations being held during a morning session should be checked at the end of the day before. Speakers are kindly requested to follow the instructions of the chairperson and strictly keep to the time of their presentation.

### Technical Program

Admission to all sessions of the technical Program is only possible with a valid congress ticket. The congress ticket for **CIMAC members, non members, speakers and students** includes: congress badge, congress bag, admission to all sessions and the exhibition, coffee breaks and lunches, Opening Ceremony, Welcome Reception, Accelleron Evening, Gala Dinner (except students).

The registration for **accompanying persons** includes: admission to the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, Accelleron Evening, Gala Dinner.

### Technical Tours

Separate registration is required for participation in the technical tours. Registration will be available in the beginning of 2023 on the congress website.

### Ticketshop

Tickets are only sold online via our Ticketshop and only payable via credit card. Print your ticket or bring it along on your mobile device. The ticketshop will be online on our website in January 2023.

### WIFI

Free WIFI is available at Busan Convention Center BEXCO. Login and password will be announced on-site.

## Main Organizer Congress:

### VDMA Services GmbH

a VDMA group company

Lyoner Straße 18  
60528 Frankfurt am Main  
Germany

Contact: Hatice Altintas  
Email: [Hatice.Altintas@vdma.org](mailto:Hatice.Altintas@vdma.org)

Phone: +49 69 6603-1143  
Fax: +49 69 6603-2843  
Email: [Hatice.Altintas@vdma.org](mailto:Hatice.Altintas@vdma.org)  
Web: [www.cimaccongress.com](http://www.cimaccongress.com)  
[www.vdmaservices.de](http://www.vdmaservices.de)

## Non-Commercial Sponsor:

### CIMAC e.V.

Lyoner Strasse 18  
60528 Frankfurt am Main  
Germany

Contact: Marc Schinke

Phone: +49 69 6603 1149  
Fax: +49 69 6603-2149  
Email: [info@cimac.com](mailto:info@cimac.com)  
Web: [www.cimac.com](http://www.cimac.com)



## Co-Organizer Congress:

### CIMAC National Member Association

Korea Federation of Combustion Engines (KOFCE)  
C1-463, Marine Department,  
Korea Maritime and Ocean Univ. 727,  
Taejong-ro, Yeongdo-gu, Busan, Republic of Korea.

Contact: Ph.D. Ji Hyoub, Cha, Secretary General

Phone: +82-51-917-1767  
Fax: +82-51-917-1766  
Web: [www.kofce.or.kr](http://www.kofce.or.kr)

## Co-Organizer Exhibition:

### Hamburg Messe und Congress GmbH

Messeplatz 1  
20357 Hamburg  
Germany

Contact: Sybille Lang

Phone: +49 40 3569-2293  
Fax: +49 40 3569-692293  
Email: [cimac@hamburg-messe.de](mailto:cimac@hamburg-messe.de)  
Web: [www.hamburg-messe.de/aussteller/auslandsveranstaltungen/auslandstermine-details/veranstaltung/cimac-congress-2022-0013](http://www.hamburg-messe.de/aussteller/auslandsveranstaltungen/auslandstermine-details/veranstaltung/cimac-congress-2022-0013)



# ABOUT CIMAC

Originally founded in Paris in 1951, CIMAC has become the **leading global association of the large internal combustion machinery industry**. It is a non-profit association bringing together and representing the large engine industry to regulators and standardizing bodies. In addition to promoting the work of National Member Associations, CIMAC supports information exchange and understanding across the large engine industry including:

- Builders of large diesel, gas and dual-fuel engines
- Users of large engines such as owners and operators of ships, power plants, locomotives etc.
- Systems and component suppliers
- Fuel and lubricant suppliers, including oil companies
- Classification societies and other regulatory bodies
- Academic institutions, consultant engineers, scientists
- System Integrators, shipyards and other service providers

## CIMAC's Vision:

To promote large engine technology power solutions that are efficient, reliable, safe and sustainable and of benefit to society, in pursuit of the transition to a low-carbon future.

## CIMAC's Mission:

To add value to our members' businesses and to society by:

- › Enabling exchange on technological trends and developments among our members, with their users, associated industries along the value chain.
- › Developing and promoting globally harmonized standards and regulations that foster a competitive, safe and sustainable industry.
- › Striving for zero environmental impact of power solutions utilizing large engine technology.
- › Facilitating safe and efficient operation, leveraging digitalization, automation and system integration.
- › Promoting open markets to foster the spread and scalability of innovative large engine technology solutions.

## CIMAC Membership

CIMAC members currently come from **24 countries** across America, Asia and Europe. Membership can take three forms:

- Membership of the official CIMAC National Member Association (NMA) in your country
- Membership in the respective National Member Associations (NMA)
- Corporate Membership for individual companies (in countries where there is no NMA)

Please see page [43](#) for CIMAC contact details.

# ABOUT CIMAC

## CIMAC Strategy Groups & Working Groups: The Consensus Seekers

CIMAC Strategy & Working Groups are the heart of CIMAC. Led by **international specialists** from CIMAC member organisations, they seek solutions to industry-wide technical issues and develop strategies to deal with pressing topics of the industry.

They interface with legislators, standards organisations, and regulators such as the classification societies to develop united CIMAC guidelines, recommendations, or positions, representing the industry on a pre-competitive, pre-legislative basis. They have a distinguished record of issuing guidance and publications on a wide range of crucial subjects relating to the operation of large engines in the maritime industry. Consequently, CIMAC Strategy & Working Group activities encompass the environmental compatibility, efficiency and safety of large engines and their applications.

### The two recently established CIMAC Strategy Groups are:

- Greenhouse Gas Strategy Group
- Digitalization Strategy Group

### CIMAC Working Groups currently cover these vital areas of engine technology and operation:

- |                             |                                  |
|-----------------------------|----------------------------------|
| ▪ Classification            | ▪ Electronics & Software Systems |
| ▪ Crankshaft Rules          | ▪ Gas Engines                    |
| ▪ Exhaust Emissions Control | ▪ Inland Waterway Vessels        |
| ▪ Fuels                     | ▪ System Integration             |
| ▪ Marine Lubricants         | ▪ Propulsion                     |
| ▪ Users                     |                                  |

## CIMAC Events

The CIMAC Congress represents the culmination of all CIMAC activities, being held every three years, each time in a different member country. The Congress is **a unique gathering of key industry decision makers**, including manufacturers of engines, components and sub-systems, engine owners and operators, classification societies, researchers and developers, and representatives from regulatory bodies.

The Congress program centres on the **presentation of technical papers** on engine research & development, application engineering on the original equipment side, and engine operation and maintenance on the end-user side. This is complemented by social programs which promotes friendship and networking within the community.

CIMAC Circles are panel discussions involving CIMAC members debating topical issues. They are hosted at key industry events around the world at least once a year. CIMAC CASCADES promote the advancement of young engineers and their careers. The events enable them to meet with leading industry experts to exchange information, network and present their projects.

CIMAC Tech-Talks and Webinars are new online events with technical presentations & live discussion sessions, chaired by distinguished experts from the industry, offering fresh insights into new and important topics pertaining to the industry today.

# CONGRESS TECHNICAL PROGRAM COMMITTEE

Person	Company	Place
Aabo, Kjeld	MAN Energy Solutions	Copenhagen, Denmark
Aufischer, Rainer	MIBA Gleitlager GmbH	Laakirchen, Austria
Banck, Andreas	Caterpillar Motoren GmbH & Co. KG	Kiel, Germany
Bergmann, Dirk	ABB Turbocharging	Baden, Switzerland
Boletis, Elias	Wärtsilä	Vaasa, Finland
Boom, Rick	Woodward	Amsterdam, Netherlands
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Mingfa, Yao	Tianjin University	Tianjin, China
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Risse, Silvio	Kompressorenbau Bannewitz GmbH (KBB)	Bannewitz, Germany
Rojgaard, Charlotte	Bureau Veritas VeriFuel	Copenhagen, Denmark
Schneider, Dominik	Winterthur Gas & Diesel	Winterthur, Switzerland
Stiesch, Gunnar	MAN Energy Solutions	Augsburg, Germany
Takahashi, Shinsuke	IHI Power Systems	Tokyo, Japan
Takahata, Yasuyuki	Yanmar	Osaka, Japan
Takasaki, Koji	Kyushu University	Fukuoka, Japan
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van der Put, Dieter	FEV GmbH	Aachen, Germany
Venkataraman, Sai	Woodward	Colorado, USA
Vlaskos, Ioannis	Winterthur Gas & Diesel	Winterthur, Switzerland
Weisser, German	Winterthur Gas & Diesel	Winterthur, Switzerland
Wik, Christer	Wärtsilä	Vaasa, Finland
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Finland	Technology Industries of Finland
France	CIMAC France
Germany	AG Großmotoren - CIMAC Deutschland
India	CIMAC India
Japan	JICEF (Japan Internal Combustion Engine Federation)
Republic of Korea	KOFCE (Korea Federation of Combustion Engines)
Netherlands	CIMAC National Members Association Netherlands
Norway	CIMAC NMA Norway
Sweden	Svenska CIMAC-föreningen
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United Kingdom	The UK National Member Association of CIMAC
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