

**June 1 – Manufacturing duplex stainless steels**

12:30	Welcome from KCI Publishing, explanation of technical matters <b>Introduction to Duplex World by Conference Chairman Mr Bruce Cowe, TOTAL S.E.</b>
13:00	<b>Meeting the challenges of producing duplex stainless steels</b> <i>Moderator: Prof. Thomas Ladwein, Aalen University</i>  "Duplex stainless steels are different, not difficult". A thorough understanding of their metallurgy as well as using the appropriate software tools and manufacturing utilities assures a flawless production and high-quality products. <ul style="list-style-type: none"> <li>• Production optimisation due to real-time information of profile and surface defects on rolling products. Johann Peters, LAP GmbH</li> <li>• Cause analysis of strip breakage of 2205 duplex stainless steel during hot annealing and pickling. Leilei Zhou, Baosteel</li> <li>• Heat resistant high alloy furnace rolls for the manufacture of duplex stainless steels. Dr Shankar Venkataraman, Schmidt + Clemens</li> </ul>
14:25	Five minute break
14:30	<b>Processing for optimal properties</b> <i>Moderator: Dr Willem Van Haften, Shell Global Solutions International</i>  This session brings together experts in the field of manufacturing (super) duplex steel. Processing parameters and the underlying metallurgical mechanisms to obtain optimal mechanical and corrosion properties will be discussed. <ul style="list-style-type: none"> <li>• The effects of reduction magnitude and different hot-working processes on the microstructure, mechanical properties and pitting corrosion resistance of SAN- MAC SAF 2205. Munir Al-Saadi, AB Sandvik Materials Technology</li> <li>• Influence of thermal ageing on the mechanical and corrosion properties of the Super Duplex 1.4410 (UR™2507). Sarata Cissé, Industeel R&amp;D, France</li> <li>• Effect of different cooling methods and heat treatments on the toughness of thick wall extruded duplex stainless steel tubes. Pilar Esteban, Tubacex Group</li> <li>• Hardness conversion of duplex and super duplex stainless steel between the Rockwell and Vickers scales. Yong Joo Kim, Webco Industries</li> </ul>
15:55	Five minute break
16:00	<b>Ferrite measurements: Historical techniques with new possibilities!</b> <i>Moderator: Jan Jonsson, Outokumpu</i>  An overview of old and completely new methods for ferrite measurement methods will be given, with some relevant examples of applications. <ul style="list-style-type: none"> <li>• Heat-affected zone ferrite content control of a new duplex stainless steel grade with enhanced weldability. Sandra Le Manchet, Industeel – ArcelorMittal</li> <li>• Considerations for measuring ferrite content in Duplex Stainless Steels with image analyses, IA. Jan Jonsson, Outokumpu.</li> </ul>
17:00	<b>Closing remarks by Conference Chairman Bruce Cowe, TOTAL S.E.</b>

**June 2 – Welding and Additive Manufacturing with Duplex**

12:25	<b>Introduction to Day 2, explanation of technical matters</b>
12:30	<b>Welding duplex stainless steels</b> <i>Moderator: Dr Iris Rommerskirchen, Eisenbau Krämer</i>  The interaction of alloying elements and welding parameters offers a variety of exciting effects on microstructure and weld integrity of Duplex stainless steels. <ul style="list-style-type: none"> <li>• Appropriate welding approach of super duplex 25%Cr seamless pipes for subsea applications: Effect of alloying elements and modus operandi. Dr Lars Schemmann, Salzgitter Mannesmann Forschung GmbH</li> <li>• A parametric study on TIG weldability of cold-rolled Aperam DX2507 super duplex. Jerome Bridel, Aperam</li> <li>• Effect of welding parameters on microstructure of weldments of newly developed duplex stainless steel (UNS S82551). Kenta Yamada, Nippon Steel Corporation</li> <li>• Submerged arc welding of duplex stainless steels with additional cold wire - a comparison of different process variants. Juliane Stützer, Otto-von-Guericke-Universität Magdeburg</li> </ul>
13:55	Five minute break
14:00	<b>Additive manufacturing: better than wrought?</b> <i>Moderator: Kasra Sotoudeh, TWI</i>  Additive manufacturing (AM) processes are rapidly maturing and offer the capability to build a new generation of components with complex designs, enhanced functionality, and rapid repair of existing components previously replaced. These technologies have the potential to change the manufacturing paradigm with rapid production of complex parts locally, using cloud-based design libraries, on-demand. However, with material properties and failure mechanisms rarely considered in detail, this session will discuss the opportunities and drawbacks for AM duplex stainless steel components. Can we consider them to be 'better than wrought' as often advertised? Including: <ul style="list-style-type: none"> <li>• The formation and impact of oxygen-based inclusions in additively manufactured super duplex stainless steel. A.D. Iams and T. A. Palmer, Pennsylvania State University</li> <li>• Application of laser metal deposition for repair of super duplex stainless steel impeller. Dr. Yogi Pardhi, Sulzer Pumps (UK) Ltd</li> <li>• Microstructural &amp; corrosion studies of super duplex produced via additive manufacturing. James Shipley, Quintus Technologies</li> <li>• Microstructure and Mechanical properties of Additively Manufactured Superduplex Stainless Steels. Nikhil Dixit, Sandvik Manufacturing Solutions AB</li> </ul>
15:25	Five minute break
15:30	<b>Welding &amp; special treatments followed by Dr Duplex Q&amp;A</b> <i>Moderators: Raymond Cordewener, Loïc Amadu &amp; Rob Spelt</i>  The workshop is open for all your duplex related questions. We encourage you to bring your questions forward.  The moderators will show short videos about welding and share news about welding processes. They focus on the fact that welding is also a new heat-treatment to the base-material/welding layer below. This has or could have an influence on the micro-structure, phases, ferrite content, mechanical values, hardness and corrosion.
17:00	<b>Closing remarks by Conference Chairman Bruce Cowe, TOTAL S.E.</b>

**June 3 – Duplex Applications**

12:25	<b>Introduction to Day 3, explanation of technical matters</b>
12:30	<b>Past experience and future use of duplex stainless steels in upstream oil and gas; an operator's view</b> <i>Dr Thierry Cassagne, Corrosion and Metallurgy Expert, Exploration Production, TOTAL S.E. France</i>
13:10	Five minute break
13:15	<b>Understanding the limits of duplex stainless steels</b> <i>Moderator: Mark van den Broek, Fluor</i>  This session addresses the reputation of duplex stainless steels in the petrochemical industry. Serious incidents reported in the past decade relating to the incorrect use of the material have resulted in operators avoiding it. However, duplexes can be a reliable and economical choice in many process applications when correctly used within their boundary limits. <ul style="list-style-type: none"> <li>• Specific material degradation mechanisms in petrochemical facilities relating to the use of duplexes. Examples of applications with issues (REACs, reboilers, vacuum condensers etc.), and reliable and economically successful applications of duplexes in the petrochemical industry. Mark van den Broek, Fluor</li> <li>• For heat exchangers in hydrogen and wet sour service, the problem area is the tube to tube-sheet weld. A best practice approach in designing and welding of tube to tube-sheet connections will be provided. Jan-Willem Rensman, Fluor, co-author John Houben, ExxonMobil</li> <li>• Avoiding corrosion in SWRO desalination plants. Roger Francis, Nickel Institute</li> </ul>
14:25	Five minute break
14:30	<b>Duplex applications &amp; success stories</b> <i>Moderator: Barinder Ghai, Sandvik Material Technologies</i>  This session focuses on some key applications relating to lifecycle costing and other advantages of using duplex. The key objective is an open discussion with the audience, listening to their experience and challenges with upgrading to duplex materials. This will be a great opportunity for industry experts to listen, discuss and learn how to save costs by using more duplex. <ul style="list-style-type: none"> <li>• Success with lean duplex castings. Dr Shankar Venkataraman, Schmidt + Clemens GmbH + Co. KG</li> <li>• Longer heat exchanger lifecycles with duplex stainless steels. Angela Philipp, Sandvik Materials Technology Deutschland GmbH</li> <li>• Duplex: The best of both worlds for storage tank construction. Enzo Panella, Gpi</li> <li>• Successful, cost effective, vibration free machining of duplex fabrications. Stephen D. Burrows, Large Prismatic Machines</li> </ul>
15:55	Five minute break
16:00	<b>Market opportunities for duplex stainless steels in applications presently dominated by other materials.</b> <i>Frank Sukjun Yoon, International Stainless Steel Forum (ISSF) Market Development Committee Fellow</i>
16:45	<b>Closing remarks by Conference Chairman Bruce Cowe, TOTAL S.E.</b>

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