



International Institute of Welding

A world of joining experience

IIW COMMISSION II

“ARC WELDING AND FILLER METALS”

Chair: Zhuyao Zhang (United Kingdom)

76TH IIW Annual Assembly MARINA BAY SANDS CONVENTION CENTRE Singapore, July 17-19, 2023

AGENDA

(II-2296r1-2023)

Time schedule for Social Events and Commission II meetings Singapore Time (SGT)

Sunday, July 16	10:30 – 12:30	IIW General Assembly <i>Venue: Orchid Main</i>
	18:00 – 19:30	IIW Opening Ceremony <i>Venue: Orchid Main</i>
Monday, July 17	14:00 – 18:00	Commission II regular meeting (C-II A) <i>Venue: Orchid Main 4205 & 4206</i>
Tuesday, July 18	14:00 – 15:00	Commission II regular meeting (C-II A) <i>Venue: Orchid Main 4205 & 4206</i>
	15:00 – 18:00	Commission II regular meeting (C-II C) <i>Venue: Orchid Main 4205 & 4206</i>
Wednesday, July 19	14:00 – 16:05	Commission II regular meeting (C-II C) <i>Venue: Orchid Main 4205 & 4206</i>
	16:20 – 17:00	Commission II regular meeting (C-II E) <i>Venue: Orchid Main 4205 & 4206</i>
	17:00 – 18:00	Joint Meeting C-II and C-VIII (Health & Safety) <i>Venue: Orchid Main 4205 & 4206</i>

IIW ANTITRUST POLICY

IIW activities are based on a close, voluntary cooperation of its worldwide members with the overall target to improve the knowledge and skills in joining. To maintain these fruitful activities, it is strictly necessary to meet the obligatory terms of antitrust laws during IIW working sessions, meetings and other events. Thus, any commercial oriented discussion (including, but not limited to market shares, prices, turnovers, production quantities, costs, suppliers and/or customers) is strictly banished.

By attending the meeting, you commit to follow the terms of prevailing antitrust laws (relevant antitrust laws can be found at www.iiwelding.org).



International Institute of Welding

A world of joining experience

IIW Commission II 76th Annual Assembly, Singapore 2023

COMMISSION II MEETING General Matters

Chair: Zhuyao Zhang (United Kingdom)

Agenda (II-2296r1-2023)

*Monday, July 17, 2023, 14:00 – 14:25 SGT
Venue: Orchid Main 4205 & 4206*

1. Opening remarks for Day 1

- Chair's Welcome by Z. Zhang
- Highlights of the scheduled meetings by Z. Zhang
- IIW Antitrust policy by Z. Zhang
- **II-2296r1-2023**: Approval of the Agenda C-II 76th Annual Assembly, July 2023 by Z Zhang

2. Tribute to Dr Damian Kotecki

3. Visit of the Editorial Board of "Welding in the World" – Prof. John C. Lippold, Editor

- Facts, Figures and Palms of "Welding in the World" by J. Lippold)
- Explain the roles and importance of Principle Reviewers and Peer Reviewers by J. Lippold

4. Visit of the Secretariate

5. General matters of Commission II

- **II-2249-2022**: Executive Summary of Annual Report 2022, AA Tokyo, Japan by Z Zhang
- Election of Vice-Chair of Commission II by IIW secretary (Appendix 1)



International Institute of Welding

A world of joining experience

IIW Commission II

COMMISSION II-A MEETING

Metallurgy of Weld metals

Chair: Thomas Kannengiesser (Germany)

Agenda

(II-A-432-2023)

Session A: Monday, July 17, 2023, 14:25 – 18:00 SGT

Venue: Orchid Main 4205 & 4206

1. Administrative matters of Sub Commission II-A

(14:25 – 14:30)

- **II-2269-2023 (II-A-432-2023)**: Approval of the Agenda SC II-A 76th Annual Assembly, Singapore, 17th – 18th July 2023 by Th. Kannengiesser
- Attendance list and apologies
- **II-2273-2023 (II-A-415r2-2023)**: List of documents of SC II-A, July 2023 by Th. Kannengiesser
- **II-2274-2023 (II-A-416r1-2023)**: List of members of SC II-A, July 2023 by Th. Kannengiesser
- **II-2241-2022 (II-A-411-2022)**: Working program of SC II-A by Th. Kannengiesser

2. Hydrogen in Weld Metal

(14:30 -15:30)

- **II-2255-2023 (II-A-418-2023)**: “Investigations on cold cracks in laser-welded thin sheet AHSS joints”, by A. Hopf, M. Klug, K. Durmaz, K. Goth and S. Juettner
- **II-2256-2023 (II-A-419-2023)**: “Effect of delta ferrite on hydrogen embrittlement in GTA weld joint of 316L stainless steel”, by J. Nam, J. Yoo, S. Lee and N. Kang
- **II-2271-2023 (II-A-434-2023)**: “Desorption kinetics and amount of hydrogen trapped in steels”, by S. Sacco and P. F. Mendez

3. The Constitution of Weld Metal

(15:30 – 16:10)

- **II-2257-2023 (II-A-420-2023)**: “Microstructure evaluation of GMAW hot wire process weld metal claddings from Inconel 625 and other Ni alloys”, by C. Judex, M. Zinke and S. Juettner
- **II-2258-2023 (II-A-421-2023)**: “Influence of microalloying on precipitation behavior and notched impact strength of welded high strength structural steels”, by N. Schroeder, M. Rhode and Th. Kannengiesser

COFFEE BREAK – RETURN AT 16:30

(16:30 -17:30)

- **II-2259-2023 (II-A-422-2023)**: “Low-temperature toughness increase for austenitic stainless steel weld metal for cryogenic use”, by H. Maniwa, M. Abe, M. Suzuki, Y. Kitagawa, Y. Hoshino, R. Oda, H. Yamamoto, S.M. Hong and K. Ito



International Institute of Welding

A world of joining experience

- **II-2261-2023 (II-A-424-2023):** “Alloy modification and ultrasonic assisted milling of wear resistant alloys with defined surfaces”, by M. Giese, A. Eissel, D. Schroepfer, K. Treutler, Th. Kannengiesser and V. Wesling
- **II-2267-2023 (II-A-430-2023):** “Modification of electro gas weld metal microstructure in terms of mechanical property specifications in cruise vessel shipbuilding”, by R. Banaschik, O. Braetz, A. Gericke and K.-M. Henkel

4. Metallurgy of Additive Manufactured Components

(17:30 – 18:00)

- **II-2262-2023 (II-A-425-2023):** “Formation mechanism of microstructure inhomogeneity in a martensitic stainless steel during wire arc additive manufacturing”, by Z. Lyu, Y.S. Sato, S. Tokita, Y. Zhao, J. Jia and A. Wu
- **II-2266-2023 (II-A-429-2023):** “Residual stress formation in DED-arc manufactured high strength steel components”, by K. Wandtke, D. Schroepfer, A. Kromm, R. Scharf-Wildenhain, A. Haelsig, Th. Kannengiesser and J. Hensel

*** Closure of Day 1 ***

*** Start of Day 2 ***

COMMISSION II-A MEETING (cont.) Metallurgy of Weld metals

Session B: Tuesday, July 18, 2023, 14:00 – 15:00 SGT

Venue: Orchid Main 4205 & 4206

4. Metallurgy of Additive Manufactured Components (cont)

(14:00 – 14:20)

- **II-2268-2023 (II-A-431-2023):** “Influence of nitrogen-doped shielding gas for welding of medium manganese austenites for cryogenic applications”, by P. Neef, C. Reppin, K. Treutler, A. Gericke, K.-M. Henkel and V. Wesling

5. Weld Metal Cracking

No document

6. Development and behaviour of filler metals for HSS

(14:20 – 14:55)

- **II-2263-2023 (II-A-426-2023):** “Stresses in repair welding of high-strength steels – Part 1: restraint and cold cracking risk”, by D. Schroepfer, J. Witte, A. Kromm and Th. Kannengiesser
- **II-2264-2023 (II-A-427-2023):** “Stresses in repair welding of high-strength steels – Part 2: heat control and stress optimization”, by D. Schroepfer, J. Witte, A. Kromm and Th. Kannengiesser

7. Working program 2023/24 of SC II-A

(14:55 – 15:00)

- **II-2270-2023 (II-A-433-2023):** “Working program 2023/24 of SC-II-A”, by Th. Kannengiesser

8. Date and venue of next SC II-A meetings and any other business.

- 2024 Intermediate meeting: March 2024, Incheon, Korea (proposed)



International Institute of Welding

A world of joining experience

IIW Commission II

COMMISSION II-C MEETING Testing and Measurement of Welds

Chair: Carolin Fink (United States)

Agenda

(II-C-637-2023)

Session A: Tuesday, July 18th 2023, 15:00 -18:00 SGT

Venue: Orchid Main 4205 & 4206

1. Opening remarks

2. Administrative matters of Sub Commission II-C

(15:00 – 15:10)

- **II-2272-2023 (II-C-637-2023)**: Approval of the Agenda SC II-C by C.Fink
- Attendance list and apologies
- **II-2273-2023 (II-C-638-2023)**: List of members of SC II-C, June 2023 by C. Fink
- **II-2274-2023 (II-C-639-2023)**: List of documents of SC II-C, June 2023 by C. Fink
- **II-2244-2022 (II-C-618-2022)**: Working Program of SC II-C for 2022-2023 by Z. Zhang

2. Testing of austenitic and duplex stainless steel weld metals

(15:10 – 15:50)

- **II-2278-2023 (II-C-630-2023)**: “Stress Relaxation Cracking Susceptibility Evaluation in 347H Stainless Steel Welds”, by Z. Yu, T. Pickle, Y. Hong, J. Vidal, C. Augustine
- **II-2282-2023 (II-C-634-2023)**: “Effect Of Ferrite Number, Heat Input and Coating Type On Cryogenic Toughness Of SMAW and Austenitic Stainless Steel Weld Metals”, by R. Raut, D. Giri, S. Chakravarty, N. Thigale

COFFEE BREAK – RETURN AT 16:20

3. Testing of weld metal for microstructure, mechanical properties, cold cracking, hot cracking and microfissuring

(16:20 – 18:00)

- **II-2275-2023 (II-C-623-2023)**: “Investigations of the hot cracking behaviour of dissimilar weld metal made of high Mn Steels and classic car body steels”, by F. Urban, C. Judex, M. Zinke, S. Jüttner
- **II-2280-2023 (II-C-632-2023)**: “Increasing the Significance of Vareststraint Tests through Improved Crack Evaluation”, by A. Kromm, M. Thomas, T. Kannengiesser, P. Liepold, J. Gibmeier
- **II-2279-2023 (II-C-631-2023)**: “Enhanced crack detection method using convolutional neural networks for Vareststraint type tests”, by P. Liepold, A. Kromm, Th. Kannengiesser
- **II-2281-2023 (II-C-633-2023)**: “Low silicate welding consumable development”, by A.U.C. Thilagam, T. Dittrich, G. Goldenbagen, T. Hurley, B. Narayanan, N. Sridharan



International Institute of Welding

A world of joining experience

- **II-2292-2023 (II-C-641-2023)**: “Local mechanical properties of TIG dissimilar metal welded High Entropy Alloy with austenitic steel AISI 304” by T. Richter, K. Erxleben, M. Rhode and D. Schroeppfer

*** Closure of Day 2 ***

*** Start of Day 3 ***

COMMISSION II-C MEETING (cont.)

Testing and Measurement of Welds

Session B: Wednesday, July 19th 2023, 14:00 – 16:05 SGT

Venue: Orchid Main 4205 & 4206

3. Testing of weld metal for microstructure, mechanical properties, cold cracking, hot cracking and microfissuring (cont.)

(14:00 – 15:00)

- **II-2284-2023 (II-C-636-2023)**: “Effect of Mo content on the mechanical properties and deformation behavior of Ni-30Cr weld metal”, by X. Guo, K. Xu, Ch. Wei, Y. L. Jiang, Y. Han
- **II-2293-2023 (II-C-642-2023)**: “Hydrogen assisted cracking in a thick-walled SAW joint for offshore applications” by M. Rhode , A. Kromm, T. Mente, D. Czeskleba and Th. Kannengiesser
- **II-2295-2023 (II-C-644-2023)**: “Creation of technologies for the production of welding fluxes with a low content of harmful impurities”, by Igor Goncharov and Anna Duchenko

4. Corrosion testing of weld metal

No document

5. Procedures for weld metal chemical analysis and weld metal sample preparation – Comparison of analysis methods

No document

6. Testing of high-strength weld metals

No document

7. Testing of creep and heat resistant weld metal

(15:00 – 16:00)

- **II-2277-2023 (II-C-628-2023)**: “Welding procedure development and effect of PWHT on the microstructure and properties of the matching weld metal and joint of the MARBN alloy”, by S. Roberts, J. Wildgoose, M. Jepson, W. Philpott, Z. Zhang, D. Allen
- **II-2283-2023 (II-C-635-2023)**: “Effect Of Chemical Composition and PWHT Cycles On Microstructures And Mechanical Properties Of P91 Weld Metal”, by D. Giri, R. Raut, S. Chakravarty, N. Thigale
- **II-2294-2023 (II-C-643-2023)**: “Investigation of the influence of PWHT heating rate and global stress conditions on the stress relief cracking mechanism of CrMoV-steel SAW joints” by D. Czeskleba, M. Rhode and Th. Kannengiesser

8. Testing of non-ferrous weld metal

No document



International Institute of Welding

A world of joining experience

**9. Working program 2023/2024 of Sub Commission II-C
(16:00 – 16:05)**

- **II-2285-2023 (II-C-640-2023):** Working Program of SC II-C for 2023-2024 by C. Fink

10. Date and venue of next C-II-C meetings, other matters

- 2024 Intermediate meeting: March 2024, Incheon, Korea (proposed)

COFFEE BREAK – RETURN AT 16:20



International Institute of Welding

A world of joining experience

IIW Commission II

COMMISSION II-E MEETING

Standardization

Chair: David Fink (United States) (Acting: Zhuyao Zhang, United Kingdom)

Agenda

(II-E-836-2023)

Wednesday, July 19th 2023, 16:20 – 17:00, SGT

Venue: Orchid Main 4205 & 4206

1. Opening remarks and administrative matters of Sub Commission II-C

- **II-2287-2023 (II-E-836-2023):** Approval of Agenda for Subcommission II-E by D. Fink
- **II-2288-2023 (II-E-837-2023):** List of documents of Subcommission II-E by D. Fink
- **II-2286-2023 (II-E-835-2023):** Minutes of SC II-E meeting at AA July 2022 by D. Fink

2. Update of Standards for Welding Consumables in Review

- **II-2289-2023 (II-E-838-2023):** 2023 Update on Standards for Welding Consumables under Review
- **Update on Standards for Systematic Review in 2023**
 - **ISO 2401:2018**, *Welding consumables — Covered electrodes — Determination of the efficiency, metal recovery and deposition coefficient*
 - **ISO 24373:2018**, *Welding consumables — Solid wires and rods for fusion welding of copper and copper alloys — Classification*
 - **ISO 18275:2018**, *Welding consumables — Covered electrodes for manual metal arc welding of high-strength steels — Classification*
- **IIW standards**
 - **ISO 3690:2018**, *Welding and allied processes — Determination of hydrogen content in arc weld metal*
 - **ISO 8249:2018**, *Welding — Determination of Ferrite Number (FN) in austenitic and duplex ferritic-austenitic Cr-Ni stainless steel weld metals*

4. Matrix of Filler Metal Classification Standards

- **II-2290-2023 (II-E-839-2023):** “Matrix of Filler Metal Classifications”.

5. Working program of Subcommission II-E

- **II-2291-2023 (II-E-840-2023):** Working Program of SC II-E for 2023-2024 by D. Fink

6. Date and venue of next meeting

- 2024 Intermediate meeting: March 2024, Incheon, Korea (proposed)

7. Closing CII-Annual Assembly Meetings

- Résumé of the Commission II Annual Assembly 2023 meetings by Z. Zhang
- Acknowledgments to the organizers by Z. Zhang



International Institute of Welding

A world of joining experience

IIW Commissions II, VIII JOINT MEETING

Chair C-II: Zhuyao Zhang (United Kingdom)

Chair C-VIII: David Werba (USA)

Agenda

(II-2296r1-2023 / VIII-2358-2023)

Wednesday, July 19th 2023, 17:00 – 18:00 SGT

Venue: Orchid Main 4205 & 4206

1. Welcome and opening remarks

- Welcome and general information about the meetings by the Chairs of C-VIII: David Werba and C-II: Zhuyao Zhang
- **II-2296r1-2023 / VIII-2358-2023:** Review and approval of the agenda
- IIW Antitrust policy by Z. Zhang / D Werba

2. Summary of C-VIII 2023 Annual Assembly presentations: David Werba

3. Welding fume

3.1. EU Survery

- 3.1.1. The European Union has started a series of actions to discuss the possibility of having fumes from welding and allied processes (“welding + fumes”) listed as carcinogenic in the CMRD Directive (Directive 2004/37/EC - carcinogens, mutagens or reprotoxic substances at work). The IIW believes that this possible inclusion requires in-depth evaluation as it may significantly impact the welding business, not only regionally but also globally. As such, IIW developed the herewith attached statement. In agreement EWF (European Welding Federation) and EWA (European Welding Association) IIW is requesting that these three organisations are recognised as a source of expertise to advise the Statutory bodies and assist them in the evaluation.
- 3.1.2. IIW Statement on the possible inclusion of “welding+ fumes” in Annex 1 of the CMRD
<http://iiwelding.org/media/upload/link/63/iiw-statement-welding-fumes-in-cmrd.pdf>
- 3.1.3. ECHA Scoping Study - Report for evaluation welding fumes+ under CMRD
[TCC-618-23 report for IIW TC-VIII.pdf](http://iiwelding.org/media/upload/link/63/tcc-618-23-report-for-iiw-tc-viii.pdf)
- 3.1.4. Summary of the Minutes & Presentation - Meeting with DG Employment of the European Commission – April 12, 2023
- 3.1.5. Minutes of the on-line meeting with Working Party on Chemicals (WPC) - May 17, 2023
- 3.1.6. Next steps

4. Closure of the joint meeting



International Institute of Welding
A world of joining experience

Appendix I:

Candidate for the Vice-Chair of Commission II

Dr. Susanne Baumgartner



Dr. Susanne Baumgartner studied Mechanical Engineering and Economics at Graz University of Technology where she specialised in Materials Science and Welding. In 2005 she joined the R&D department of voestalpine Böhler Welding Austria where she holds the position of Senior Expert in Creep Resistant Materials and Welding Consumables.

Dr. Baumgartner has been involved in IIW Commission II and IX since 2013. Currently she additionally serves as IIW Director (2022-2025).