

## **HEAT EXCHANGER FOULING AND CLEANING – 2019**

June 2 – 7, 2019, Józefów (Warsaw), Poland

### **PREFACE**

The decreasing price of oil and the increasing cost of energy and CO<sub>2</sub> emissions force engineers to continuously face the challenges of designing highly effective equipment, developing innovative enhancements for heat transfer, and reducing equipment size, mass and cost. In addition numerous studies have shown that heat exchanger fouling may lead to 1 – 2.5% of global CO<sub>2</sub> emissions. Furthermore, cost penalties associated with heat exchanger fouling are estimated to be roughly 0.25% of the gross domestic product (GDP) for industrialized countries. The high costs associated with fouling have facilitated the urgency in solving this complex problem.

These challenges are compounded by the need to always pay attention to the fouling propensity of the heat transfer equipment. In order to compensate for the diminished performance of fouled heat exchangers and to reduce down-time for cleaning, the heat transfer area is often oversized by up to 200%, which by itself may increase the severity of the fouling problem. Fouling and corrosion, being the major engineering challenge in heat exchanger design and operation, cost the industry billions of dollars each year in lost production, higher energy requirements, additional maintenance cost. Continued research is critical. Whether the work relates to compact heat transfer equipment, surface modifications for reduced deposition, cleaning of equipment or predictive maintenance for optimized operation, it is important that the related R&D community, academic or industrial, is provided a platform to facilitate innovative thinking and to explore new theoretical and practical approaches.

Since 1995, international conferences on heat exchanger fouling and cleaning have been organized by Hans Müller-Steinhagen, Paul Watkinson, and Reza Malayeri in bi-yearly intervals. In 2017, it was my honor to take over the chair of this series and together with a team of colleagues and the Scientific Committee be responsible to organize the 12<sup>th</sup> and 13<sup>th</sup> conference of this series. These meetings provide a unique opportunity for experts from industry, academia and government research centers from around the world to present their latest research findings and technological developments in the areas of fouling mitigation and cleaning technologies. The meetings consist of overview presentations, technical papers, poster sessions, and panel discussions. Following the highly successful meetings in San Luis Obispo, USA (1995), Lucca, Italy (1997), Banff, Canada (1999), Davos, Switzerland (2001), Santa Fé, USA (2003), Kloster Irsee, Germany (2005), Tomar, Portugal (2007), Schladming, Austria (2009), Crete Island, Greece (2011), Budapest, Hungary (2013), Enfield (Dublin), Ireland (2015), Aranjuez, Spain (2017), the 13<sup>th</sup> conference in this series was held in Józefów, Poland (2019).

The following papers have been presented and recommended for publication in the conference e-proceedings after a careful revision process. The proceedings cover many aspects of heat exchanger fouling along with innovative state-of-the-art fouling mitigation and cleaning strategies. The editors wish to thank everyone who contributed to the conference and the post-conference e-proceedings, i.e.

- all the authors and participants who invested substantial efforts to produce high-quality papers and to attend the conference;
- the session chairpersons, who ensured the presenters were introduced and encouraged productive discussions;
- the scientific committee and technical reviewers who helped to improve the quality of these papers even more by providing valuable and helpful comments;
- the team who worked behind the scenes to organize and run the conference and proceedings;
- the conference sponsors; and
- the previous team of Conference Chairmen and Co-Chairmen for keeping the conference going for all these years and for entrusting us to continue this successful arrangement into the future.

**Editor**

Hans U. Zettler  
Heat Transfer Research, Inc. (USA)