PSE for SPEED

Webinar Series 2021: Fast, efficient & reliable problem solution

A series of six webinars on different topics related to process and product engineering has been organized by PSE for SPEED. The series will consist of the following webinars: 1) 3-days workshop on sustainable chemical (and biochemical) process design; 2) a 4-hours workshop on pure component and mixture properties estimation; 3) a 3 hours workshop on refrigerant design; 4) a 3 hours workshop on different aspects of chemical substitution; 5) a 4 hours workshop on general computer aided chemical product design; 6) a 4 hours workshop on computer aided modelling. See the table below for the date and time (in CET) for the webinars.

Program for Webinar 3: Refrigerant design, selection, verification

The objective of this workshop is to give the participants a view on various aspects related to refrigerants. The refrigerants are chemical compounds having thermodynamic properties that are especially suited for refrigeration systems. Refrigeration systems are an essential process in industry and home applications as they perform cooling or maintain room temperature at a desired value. A cycle of refrigeration consists of heat exchange (evaporation and condensation), compression and expansion with a refrigerant flowing through the units within the cycle. The selection and design of refrigerants can be formulated as computer-aided molecular and/or mixture design, while, test and verification of a candidate refrigerant requires simulation and optimization of the refrigeration cycle operation. From an environmental point of view, selection of the appropriate refrigerant is important because they may impact the environment negatively due to their GWP and ODP values. From an energy point of view, less efficient refrigeration cycle will require more energy and thereby contribute to indirect emission of carbon dioxide. This webinar will have 3 lectures and a problem solution session with ProREFD, a special software developed for refrigerant selection, design and verification. Prof Sahinidis is the guest speaker in this webinar and his lecture will cover optimization approaches for refrigerant design.

Course Organization

The Webinars are being organized by the PSE for SPEED office in Bangkok, Thailand. All confirmed registered participants will be sent a link to join the Webinars. The time indicated for each lecture includes Q&A after the lecture. The problem solution lectures will include step by step demonstration of selected problem solutions. There will be Q&A at the end of all lectures and also at the end of the problem sessions. Selected recorded presentations will also be available to subscribers to the PSE for SPEED YouTube channel and Webinar participants will be able to download copies of the presentation slides from the link:
https://www.pseforspeed.com/webinar-lecture-and-recorded-video/

Please direct all your questions to the PSE for SPEED in Bangkok to Ms. Orakotch Padungwatanaroj (P.orakotch@gmail.com).

Webinar 3: Refrigerant design, selection, verification (16 August)
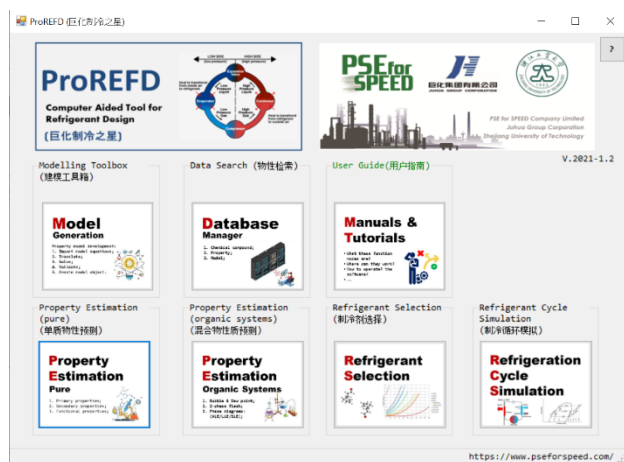
- **Modelling Toolbox (MoT)** - In-house equations solvers (algebraic equations, ordinary differential equations, PDAES and optimizers) for model development and application.
- **Database Manager** - Search and retrieval engines for the refrigerant properties (pure and measured VLE and azeotropic data for binary mixtures).
- **Property Estimation (Pure)** - Pure properties prediction tool consists of 60 different pure component properties and numerous models.
- **Property Estimation (Mixture)** – Mixture properties prediction tool for refrigerants.
- **Refrigerant Selection** – Tool for tailor-made design, replacement and optimization of refrigerants for applications based on desired properties.
- **Refrigerant Cycle Simulation** – Tool for simulation of refrigeration cycles plus operation analysis through thermodynamic diagrams and parametric sensitivity.

Lecture	Time (CET)*	Topic	Speaker
1	**13:00 – 14:00**	Introduction to refrigerant design, selection & verification: Models, methods, & solution approaches	Rafiqul Gani
2	**14:00 – 15:00**	Optimization approaches to refrigerant design	Prof Nikolaos Sahinidis (guest speaker)
3	**15:00 – 16:00**	Case studies and introduction to ProREFD	Rafiqul Gani
4	**16:00 – 17:00**	Problem solution using ProREFD (database, property estimation, refrigerant selection and/or substitution, refrigeration cycle simulation) plus Q&A	Anjan Tula; Nichakorn Kuprasertwong, Siriporn Jalernsuk

*The change in time (start time is now 13:00 CET)

Next PSE for SPEED Webinar on Chemical Substitution (25 August, starting at 13:00 CET)