

Practical Distillation Technology



KISTER BOOKS
& SEMINARS

Presenter: Henry Kister

29 to 31 January 2024

Graceland Hotel, Secunda

Register before 30 November 2023

OVERVIEW

This down-to-earth course given by world-renowned distillation expert Henry Kister gives comprehensive coverage of distillation technology, with particular emphasis on the problems that can occur and how to solve them. It provides an excellent opportunity to develop a working knowledge of key techniques that can promote trouble-free operation and reduce distillation costs.

Application for SAICHe accreditation for 3 CPD Credits with ECSA is in progress.

"Fantastic course with a very knowledgeable and passionate presenter, covering a wide range of useful topics. Good content, with course schedule tailored to people interests with good use of examples to enhance understanding."

J Walton, Mitsubishi Chemical, UK

Henry was excellent and used case-based learning effectively to demonstrate fundamental principles. The content was extremely informative and well presented. Henry's tireless energy in presenting the core material, and his willingness to answer any questions on distillation no matter how complex made this course exceptional."

S Hayton, Worley, UK

LEARNING OUTCOMES

By the end of the course, you will understand:

- how to troubleshoot a distillation column and determine what may cause poor performance
- how to evaluate existing column performance and develop new designs
- how to avoid common causes of capacity bottlenecks, tray damage, downcomer sealing problems, packed tower distributor malfunctions and many other operating difficulties
- how to de-bottleneck a column to improve capacity and/or separation
- how to control and operate a distillation column
- how to validate your tower simulation.

Who will benefit most? Engineering and supervisory personnel who are involved in Operating, Troubleshooting, De-bottlenecking, and Designing and starting up of distillation processes

PRESENTER



TRAINER

Henry Kister, FIChemE

Fluor

Henry, 'the tower doctor', is a globally recognised specialist with a vast background in all phases of distillation, including operation, troubleshooting, controls, design, start-up, and research.

At Fluor he designs, revamps and advises on distillation processes, equipment and controls for the chemical, petrochemical and oil industries. He is also extensively involved in field consulting, start-up and troubleshooting assignments and in developing Fluor's in-house distillation technology.

He is the author of three textbooks - *Distillation Operation* and *Distillation Design* (McGraw-Hill Inc., 1990 and 1992) and *Distillation Troubleshooting* (Wiley Interscience 2006) - as well as the Distillation Equipment chapter in Perry's Handbook (2008, 2018), and over 150 technical articles. He has presented this *Practical Distillation Technology* course over 550 times.

COURSE CONTENT (subject to minor changes)

Avoiding Fractionation Pitfalls Vapour-liquid equilibrium (VLE): key concepts and simulation traps. Should we believe the simulation? Issues with close-boilers and non-idealities: why some heavy components go up while the simulation thinks they go down. VLE data: to trust or not to trust? Multi-component distillation: composition profiles, side-draws, accumulation, and cycling problems. What you need to watch out for.

Troubleshooting Distillation Simulations Does your simulation reflect the real world? How poor simulation leads to incorrect problem diagnosis. What validation checks are needed? How far should we go? Temperature profiles: application for simulation validation and for identifying a second liquid phase. Sensitivity analysis and graphics for simulation troubleshooting: useful hints.

Tray Hydraulics & Limits Visualization of vapour-liquid dispersions on trays, flooding, entrainment, weeping, dumping. Flood mechanisms: jet (entrainment), system limit, downcomer backup, downcomer choke. Which one limits your tower capacity? Common tray types: sieve, moving valve, fixed valve, sheds: pros and cons. Which works well in fouling applications? Small holes, valves: benefits and traps. Flood: what causes it, what affects it, and how predicted. Tray efficiency: are simulation predictions reliable? Can it be enhanced by tray modification?

Troubleshooting Tray Towers Flooding and foaming symptoms: high dP's, reduced bottoms, others. Which can be trusted? Liquid and vapour sensitivity field tests: identifying the correct flood mechanism. Tricks that will get you more information out of dP measurements. Gamma scans: application for diagnosing flood, missing and damaged trays, foaming, and downcomer flooding. How to combine gamma scans with process checks to get the most out of the scans: the four keys to success. Do gamma scans ever lie? How to keep them truthful.

Troubleshooting Packed Towers Visualization of normal and flooded packing operation. Rules of thumb for flood pressure drop and packing efficiency. Simulation hydraulic calculations: to trust or not to trust? Which packings and distributors do better in fouling environments? Grid gamma scanning for detecting maldistribution, damage, distributor malfunction, distributor and collector overflow. Distributor overflow: DEATH for packed beds. Some do's and don'ts for distributors. Can poor distributor feeding bottleneck towers? Circumferential surface temperature surveys: how to conduct, what to avoid, and the hidden secrets they reveal.

De-Bottlenecking State-of-the-art trays & packings: strengths and weaknesses. Factors that favour trays and factors that favour packings. The pressure drop bonanza: why packings win in non-fouling vacuum services and in compressor suction. Pitfalls unique to structured packings: high pressure application, oxidation, shutdown fires. High-capacity trays (e.g. Superfrac, VG Plus, MD): principles, tricks, and traps. Do they really give 30% more capacity than conventionals?

Distillation Control Assembling control loops into an overall scheme: what works, which is better, what causes instability, and what impairs efficiency. The 3 most common causes of control assembly failure: no material balance control, fighting between temperature controllers, and level control on a small stream. Tips for avoiding problems. Can controls affect revamp success? Best temperature control location: is there a reliable method for finding? How can a temperature controller be fooled? Reboiler, condenser, and pressure controls: which loops work and which misbehave. How dead pockets in vapour overhead lines interfere with controls. Understanding hot vapour bypasses: why some work while others don't. Control systems that did not work.

Avoiding Tower Malfunctions What malfunctions should troubleshooters look for and prevent. Points of transition (feeds, draws, tower base): why these are some of the worst tower bottlenecks: how diagnosed and remedied. High tower base levels: how they induce premature flood, even tray/packing damage, and how you can prevent. Instrument issues at the tower base: what to watch out for. Tray/packing damage: pressure surges due to water entering a tower full of hot oil or insoluble organics, other sources of tray damage and ways to avoid. Some commissioning and startup watchouts: blinding and unblinding, reverse flow, steam-water operation, washing, rapid pressuring/depressuring, drawing vacuum, introducing liquid. Chimney trays: do's, don'ts, and how they bottleneck towers. Liquid outlets: choking in sidedraw and rundown lines and how it restricts tower capacity. Why must self-venting flow be assured in the presence of entrained vapour? Siphon formation. Kettle and once through thermosiphon reboilers: why are they common causes of bottlenecks.

Case Studies will be scattered throughout to illustrate the key principles and to distinguish good from bad practices.

VENUE

Graceland Hotel (S:26° 30' 44"; E: 29° 09' 42")

eMbalenhle Road
SECUNDA
Mpumalanga
South Africa

Tel: +27 (0)17 620 1000

Web Site: <https://www.graceland.co.za>



COURSE FEES

The attendance fee (excluding VAT) is set on a sliding scale to give all attendees the “economy of scale” benefit.

The effective attendance fee will be set on the number of confirmed registration received by 30 November 2023:

| Number of attendees | 25 to 35 | 36 to 45 | 46 to 55 | 56 to 65 | 66 to 75 |
|-------------------------|----------|----------|----------|----------|----------|
| Course fee per attendee | R 55 000 | R 50 000 | R 45 000 | R 42 500 | R 40 000 |

The fee includes the presentation, the venue with refreshments and lunch as well as the course material which consists of a high quality course manual, and Kister’s books “Distillation Operation” and “Distillation Troubleshooting” and a copy of section 14 in Perry’s handbook, 9th Edition 2018 “Equipment for Distillation, Gas Absorption, Phase Dispersion and Phase Separation” by Kister et. al. Travel and accommodation for each attendee is NOT included.

Perspective on the fee: The attendance fee to the same course in the UK during October 2023 is the equivalent of R 47 150 for members of IChemE and R 55 200 for non-members (only 13% of the fee is SA based).

Invoices will be issued during December 2023 and full payment is required before the course commences on 29 January 2024 or only upon specific pre-arrangement before the end of February 2024.

REGISTRATION and CONDITIONS

Completed registration forms should be e-mailed to andries@resolvekzn.co.za.

The registration form is attached to this brochure, and can also be downloaded from the Unlock and Align Facilitation (Resolve) website (www.resolvekzn.co.za).

The deadline milestone date for registration is 30 November 2023.

The number of attendees registered by 30 November would a) determine the attendance fee per attendee as set out in the table above, as well as b) the order of training material.

Cancellation after 30 November 2023 would remain obligated for full payment since the attendance fee would be finalised and the course material would already be ordered. A substitute could attend if a registered attendee could no longer do so, and such arrangements should be communicated before the course commences.

The right is reserved to change the presentation date and/or venue in the event of unforeseen circumstances like illness.

HOST

This excellent opportunity for development of Process Engineers is proudly enabled and hosted by Unlock and Align Facilitation (t/a Resolve) established by Andries Burger to offer and share practically oriented Process Engineering and related experience and knowledge.



In collaboration with other professionals (like Henry Kister, Norman Lieberman and Cilliers Kruger) *Resolve* focusses on transfer of experience and Engineering Practices. Refer to www.resolvekzn.co.za for more information.





PRACTIAL DISTILLATION TECHNOLOGY by HENRY KISTER

29 to 31 January 2024 at GRACELAND Hotel in SECUNDA, South Africa



Download from www.resolvekzn.co.za and e-mail complete registration form to andries@resolvekzn.co.za

Find herewith a request for the following reservation for the above training course:

REGISTRAR DETAIL:

Name: [_____] e-mail: [_____] Tel: [_____]

INVOICE DETAIL:

Company Name: [_____] VAT Nr. [_____] Quotation Required? (Yes / No): [_____]

Company Invoice Address: [_____] Order Nr. [_____]

Invoice Contact Name: [_____] Invoice Contact e-mail: [_____] Invoice Contact Tel: [_____]

ATTENDEE DETAILS:

| | Name | Surname | ID Nr | e-mail | SAICHe Nr (Optional) | Dietary Limitations (Optional) |
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Course Fee:

The attendance fee (excluding VAT) is based on registration by 30 November 2023:

| | | | | | |
|-------------------------|----------|----------|----------|----------|----------|
| Number of attendees | 25 to 35 | 36 to 45 | 46 to 55 | 56 to 65 | 66 to 75 |
| Course fee per attendee | R 55 000 | R 50 000 | R 45 000 | R 42 500 | R 40 000 |

Payment: Invoices will be issued during December 2023 for full payment before the course presentation starts, or upon specific pre-arrangement before end February 2024.

Rights Reserved: If you registered and are unable to attend the event you may substitute at any time. Such substitution and name changes must be communicated to [Resolve](http://www.resolvekzn.co.za) by e-mail. **No refund for cancellation after 30 November 2023.** The presentation date/venue could be subject to change at the discretion of the presenter or host in the event of significant unforeseen circumstances.