Course Fee: US$650

Thermal design methods for kettle reboilers and vaporizers have evolved over the years and some old rules-of-thumb no longer apply. New research results, software advances, and feedback from industry all contribute to improved design practices. The course presents the most up-to-date research in kettle design, provides our current recommendation to use *Xist* to model kettles accurately, and discusses future research and software development to improve predictions. Several example problems illustrate recommended good practices for using *Xist*, interpreting warning messages, improving designs, and troubleshooting cases.

Key Topics
- Shellside boiling methods
- Recirculation
- Liquid level and bundle dryout
- Differences between bundle composition and feed composition
- Kettle sizing
- Entrainment
- Vibration
- Fouling

Suggested Participants
Thermal design engineers and heat exchanger experts

HTRI Software
This course will make use of the following HTRI software: *Xchanger Suite*® component *Xist*®. All training materials are based on the current software version.

Course Credits: 6 hours (PDH/CEU)

Outline

I. Characteristics of Kettles and the Circulation Boiling Model (CBM)
- Pros and cons of kettles
- Handling of heat release curves

II. Kettle-Specific Input Parameters and Thermal-Hydraulic Methods
- Shellside boiling mechanisms and methods
- Two-phase pressure drop methods

III. Entrainment
- Fundamental principles
- *Xist* entrainment methods
- *Xist* kettle sizing and entrainment mitigation

IV. Design Considerations and Challenges
- Fouling and buildup of heavies
- Dry-wall mechanisms
- Tube vibration
- Reboiler checklist