MAESTRO CONSULTANTS

HEAT EXCHANGERS

COURSE OUTLINE 2020

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TRAINING TITLE

HEAT EXCHANGERS

VENUE

Dubai, UAE

DURATION

5 Days

DATES

31 May - 04 June 2020

PRICE

US$4,000 per attendee including training material/handouts, morning/afternoon coffee breaks and Lunch buffet daily.

TRAINING INTRODUCTION

Heat exchanger is an important and expensive item of equipment that is used almost in every industry (oil and petrochemical, sugar, food, pharmaceutical and power industry).

A better understanding of the basic principles of heat transfer and fluid flow and their application to the design and operation of heat exchangers that you gain from this course will enable you to improve their efficiency and extend their life. You understand how to use the applicable API, TEMA and ASME recommended practices, standards and codes for heat exchangers. This will enable you to communicate with the designers, manufacturers and bidders of heat exchangers. You will understand how to avoid fouling, corrosion and failure and leak problems by your design. You will also be able to survey and troubleshoot heat exchangers and assist in performing inspection, cleaning, and maintenance. You will be exposed to recent development and future trend in heat exchangers.

TRAINING OBJECTIVES

- To learn the classification, (API,TEMA,...) and selection procedure for heat exchangers.
- To review the thermal and mechanical design of heat exchangers.
- To learn the installation, operation and maintenance procedure for heat exchanger.

- To acquire information that will enable decisions to be made on the repair and refurbishment of aging equipment as well as repair vs. replacement options.
- To learn techniques of failure elimination and appropriate maintenance and troubleshooting procedures.
- To delineate/determine the factors that lead to overall economically advantageous decisions.

TRAINING AUDIENCE

Project engineers, process engineers and plant engineers in the oil, chemical, sugar, power, and other industries who requires a wider and deeper appreciation of heat exchangers design, performance and operation. The detailed review of thermal and mechanical design is particularly useful to plant and maintenance engineers as well as to those generally knowledge able in the subject, but who require a refresher or update.

Codes and standards are useful for project engineer to help him communicate with manufacturers, designers and bidders of heat exchangers. Troubleshooting procedures are important for process engineers.

COURSE OUTLINE

Following topics will be covered in 5 days

Day 1

HEATEXCHANGERS CLASSIFICATION APPLICATION, CODE AND STANDARDS

Classification according to construction (tubular, plate, finned, enhanced)

Classification according to service (cooler, heater, condenser, re boiler, etc..)

Construction, applications, range and limitations and sizes

Code and standards (TEMA,API,...)

TEMA nomenclature: rear end head types, shell types , front end typ

TEMA standards: shell size, tube size, baffle, selection of materials, component

design, nozzle loadings, supports, lifting features, high pressure, low temperature, specials designs

DAY II

HEAT TRANSFER FUNDAMENTALS AND THERMAL DESIGN

Heat transfer mechanisms: conduction and convection as related to heat exchangers

Temperature difference in heat exchanger

Overall heat transfer coefficient

Heat transfer coefficient and pressure drop for single phase and multiphase

(evaporation and condensation)

Resistances to fouling

DAY III

MECHANICAL DESIGN OF H.E

Mechanical design: shells, channels and heads, tube sheets, bundles, tubes-tube sheet attachment

Design strategy, design algorithm

Heat exchanger:

– Selection procedure

– Specification sheet

– Bid evaluation

DAY IV

Storage, Installation, Operation, Maintenance

Storage

Installation procedure

Operation

startup

shutdown

Maintenance

Cleaning

Repair

– Plug

– Sleeving

– Expansion

Replacement

– Re tubing

– Re bundling

– Replacement (new unit)

DAY V

Troubleshooting

- Heat exchangers' problem

– Fouling: causes, mechanisms, design considerations and exchanger selection, remedies, cleaning

– Leakage: Location (tube sheet, tube failure), causes (differential thermal expansion, flow-induced vibration),

– Corrosion: Type, causes, material of construction, fabrication

– Vibration: causes (velocity), design procedure to avoid vibration including baffle selection, rod baffles, impingement baffles

- Past incidents failure.
- Examples of common problems encountered in heat exchangers (low rate, un-controlled outlet temperature, failure of tubes near the inlet nozzles)

TRAINING CERTIFICATE

MAESTRO CONSULTANTS Certificate of Completion for delegates who attend and complete the training course

METHODOLOGY

Our courses are highly interactive, typically taking a case study approach that we have found to be an effective method of fostering discussions and transferring knowledge. Participants will learn by active participation during the program through the use of individual exercises, questionnaires, team exercises, training videos and discussions of "real life" issues in their organizations. The material has been designed to enable delegates to apply all of the material with immediate effect back in the workplace.