PETROSYNC
Synchronize Your Skill and Knowledge

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Shell and Tube Heat Exchangers : Mechanical Design (ASME/TEMA), and Considering Operations & Maintenance

Improve Your Heat Exchanger Performance by Maximizing Your Mechanical Design, Operation and Maintenance Knowledge

07th - 11th September 2026 at Kuala Lumpur, Malaysia

Petrosync Distinguished Instructor
Mandar Mulay

- 20 years hands on experience in design and integrity assessment of Piping Systems, Reactors & Storage Tanks, and Pressure Vessels Codes, Power Boiler, Heat Exchanger.
- Well conversant with the major industry codes & standards such as ASME PCC-2, ASME Sec. I, ASME B 31.1, B31.3 , B31.4 and B31.8, ASME Sec VIII, BS-5500, TEMA, API -650, IS 803, API 579, etc.
- He has conducted Training Courses (ASME Sec I, ASME B 31.3 Piping Codes, ASME Sec. VIII, API 579, ASME PCC-2 Repair practices, and Heat Exchanger Design Operations & Maintenance) in Saudi Arabia, Qatar, Bahrain and UAE for engineers from companies like Saudi Aramco, SABIC group of Companies, Qatar Petroleum, ADNOC, BAPCO, Gulf Petrochemicals

Course Objectives

- Familiarize participants with the concepts and technical terms of the codes
- Know the basic concepts of the codes and their design fundamentals
- Understand salient features and differences between codes and standards
- Know the design of pressure parts and major components
- Understand the problems in exchangers in-service & corrosion related issues
- Learn the maintenance aspects in shell & tube exchangers.
- Get introduced to the repair techniques and considerations.
- Discover the fabrication requirements, assembly and welding requirements.
- NDE and Inspection procedures
- Pressure testing
- General requirements for ASME certification

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Course Overview

This Five-day program offers a proper understanding of the ASME/ TEMA codes and standards, pertaining to mechanical design engineering, maintenance, repair and testing of the shell and tube heat exchangers and it's relevant referred codes. This course emphasizes understanding of 'stated' and 'implied' requirements (i.e. content and intent) of the codes. The participants would be explained in detail the application of these code/ standard rules and mechanical design formulas for different design conditions and services.

ASME Section VIII/ TEMA are very commonly adopted guidelines which are comparatively easier to use, in comparison to BS/ DIN/ other codes and standards.

This course is intended to give the participants the confidence for carrying out design, and maintenance and testing for shell and tube heat exchangers and also will help to carrying out strength calculations and assessment of integrity of existing exchangers. How to adopt code rules for different types of exchangers and with various service conditions will be illustrated with case discussions. Important code stipulation will be reviewed and discussed collectively with participants so as to address the difficulties and ambiguities they might have encountered during their working. This course will also help the design engineers to assess the work of the fabricators/ vendors as regards to drawing and calculation review/ approval.

Over and all the course will make the attendees comfortable with the use of ASME/ TEMA codes and standards and understand the basic concepts with better clarity. This will give the candidates a firm background for further studying in-service codes/ standards such as API-579, ASME PCC-2 or API-510

Specially Designed For

The course is designed for, but not limited to, mechanical design, operations, maintenance, and inspection professionals who are involved in equipment such as pressure vessels, heat exchangers, process columns, etc .

- Design Engineers / Managers
- Mechanical Engineers / Managers
- Maintenance Engineers / Managers
- QAQC Engineers / Managers
- Inspection Engineers / Managers
- Reliability Engineers / Managers

WHY YOU SHOULD ATTEND PETROSYNC'S EVENTS

- To ensure that all objectives of the course matches yours, all PetroSync programs are developed after intensive and extensive research within the industry
- PetroSync programs focus on your immediate working issues to ensure that you are able to apply and deliver immediate results in real work situations
- Application and implementation of industry knowledge and experience are the drivers for our course design, not theoretical academic lectures
- PetroSync training focuses on practical interactive learning tools and techniques including case studies, group discussions, scenarios, simulations, practical exercises and knowledge assessments during the course. Invest a small amount of your time to prepare before attending the course to ensure maximum learning
- PetroSync follows a rigorous selection process to ensure that all expert trainers have first-hand, up-to-date and practical knowledge and are leaders of their respective industrial discipline

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Course Agenda

Day 1 :

- Importance of Heat Transfer
- Categories of heat exchangers such as Plate type/ Double pipe/ Cooling towers/ Air cooled exchangers
- Modes of heat transfer such as conduction/ convection/ radiation
- Introduction to Fluid Flow, velocities and Pressure Loss
- Applicability of relevant codes under ASME/ TEMA/ API
- Introduction and considerations in Thermal Design
- Material selection criteria from ASME Section-II

Day 2 :

- Heat Exchanger Terminology as per TEMA/ ASME
- Types such as Fixed/ Floating/ U tubesheet and applications
- Shell-And-Tube Heat Exchanger parts and detailed function
- Mechanical design & thickness calculations as per ASME-VIII (Internal/ External pressure) for shells/ bonnets/ tubes
- Minimum thickness criteria from TEMA
- Tube Layouts and Number of Tubes in specified Shell Diameter (for ease of maintenance)
- Exercise on (basic) thermal design of the exchanger

Day 3 :

- Thickness calculation for Tubesheet (Bending/ Shear) from TEMA.
- Minimum requirement criteria for baffles/ tie-rods/ tubes/ flanges/ impingement plates/ etc.
- Baffles clearance and spacing with consideration to flow induced vibrations
- Tube Layouts and Number of Tubes in specified Shell Diameter (for ease of maintenance)
- TEMA Standard References.
- General introduction to API Standard for Petroleum and Natural Gas Industries
- Case Study/ exercise on design using TEMA criteria

IN-HOUSE SOLUTIONS

SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact us on +65 3159 0800 or email general@petrosync.com

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Day 4 :

- Inspection considerations (Radiography/ Ultrasonic/etc.)
- Heat Exchanger Hydrostatic test/ Pneumatic test
- General reference from ASME Section-V and ASME Section-IX
- Corrosion and Fouling in Heat Exchangers
- Maintenance and Cleaning Methods
- Preventive & Corrective Maintenance
- Effects of tube failure/ bad design on operation of the exchanger
- Concept of MAWP

Day 5 :

- Repair minimum requirement criteria from ASME PCC-2
- Retubing/ tube pulling/ plugging (friction/ mechanical plugs) of tubes
- Case study from ASME PCC-2 philosophy
- Final heat exchanger selection based on
  - Type of Duty
  - Operating Limitation
  - Materials of Construction
  - Safety and Reliability
  - Design Methods
  - Inspection of new Heat Exchangers during fabrication
  - Dimensions and Weight
  - Cost
  - Delivery
- Review of a real life typical fabrication assembly drawing/ calculations/ specification data sheet
- Discussions and queries
- Final Exam (if required)

(Detailed Thermal Design and HTRI, are not part of this course)

(The main codes of discussion will be ASME VIII-1/ TEMA only. All other codes/ standards mentioned, will be generally referred, as required, to understand the concepts clearly.)

HYBRID TRAINING SOLUTIONS

FOCUS TRAINING • REDUCE COST • ENHANCED RESULTS

Over the years, there has been a growing demand for hybrid training programs. It is an excellant option to maximize your training dollar for your specific training needs. We make it possible to run a training program that is customized totally to your training needs at a fraction of an in-house budget!

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Mandar Mulay has about 20 years hands on experience in design and integrity assessment of Piping Systems, Reactors & Storage Tanks, and Pressure Vessels, Power Boiler, Heat Exchanger. He is well conversant with the major industry codes & standards such as ASME Sec. 1, ASME B 31.1, B31.3 , B31.4 and B31.8, ASME Sec VIII, ASME PCC-2, BS-5500, TEMA, API -650, IS 803, API 579 etc.

Major projects closely associated with, in his professional career so far are, Qatar Chemicals, Shell, Castrol India, Reliance Industries, Cargill Foods USA, etc.

His proficiency in Piping Systems, Reactors & Storage Tanks, and Pressure Vessels, Power Boiler, Heat Exchanger enables him to trace the similarities and differences of these codes. He also actively involved as Instructor for programs on the subjects of API/ASME/TEMA codes, Integrity Assessment, Fitness for Service, etc.

Along with his career in Engineering and Design Department in a multinational company at a very senior post for the last 20 years, he is also visiting faculty to a well known Engineering College in India for their P.G. Courses in Piping Design and Engineering.

Apart from being visiting faculty, He has also conducted several Training Courses (ASME Sec. 1, ASME Sec. VIII, ASME B 31.3 Piping Codes , API 579 FFS code, ASME PCC-2 Repair practices, and Heat Exchanger design Operation & Maintenance) in Saudi Arabia, Qatar, Bahrain and UAE for engineers from companies like Saudi Aramco , SABIC group of Companies, Qatar Petroleum, ADNOC, BAPCO, DEWA, Gulf Petrochemicals etc. He has already conducted many times the training courses in API 579, where the participants rated him “Excellent” for these courses.

PROGRAM SCHEDULE

08:00	Registration (Day1)
08:10 – 10:00	Session I
10:00 – 10:15	1st Tea Break
10:15 – 12:30	Session II
12:30 – 13:30	Lunch Break
13:30 – 15:00	Session III
15:00 – 15:15	2nd Tea Break
15:15 – 16:00	Session IV
16:00	End of Day

*Schedule may vary for each training

INVESTMENT PACKAGES

Shell & Tube Heat Exchangers SCHEDULE	LOCATION	PRICE
☐ 07th - 11th September 2026	Kuala Lumpur, Malaysia	USD 3,450

** All prices are subject to change without notice and are not guaranteed, except that prices for an order that have been accepted by PetroSync is not subject to change after acceptance*

** Price is nett excluding Withholding Tax if any and will be quoted separately. Please send us the withholding tax payment receipt.*

DELEGATE DETAILS

1st Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

2nd Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

3rd Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

4th Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

**Please fill all the details including mobile number. This help us to contact participant if they are late in class or if there is any urgent update (through whatsapp/call)*

INVOICE DETAILS

Attention Invoice to: _____

Direct Line Number: _____ Fax: _____

Company: _____ Industry : _____

Address: _____ Postcode: _____

Country: _____ Email: _____

Please note:

- Indicate if you have already registered by Phone ☐ Fax ☐ Email ☐ Web ☐
- If you have not received an acknowledgement before the training, please call us to confirm your booking.

PAYMENT METHODS

☐ **By Credit Card**

☐ **By Direct Transfer : Please quote invoice number(s) on remittance advice**

PetroSync Global Pte Ltd Bank details:
Account Name : PetroSync Global Pte Ltd
Bank Name : DBS Bank Ltd
Bank Code : 7171 • Bank Swift Code : DBSSSGSGXXX • Branch code : 288
Account No : 0288-002682-01-6-022 (USD)
Bank Address : 12 Marina Boulevard, Level 3. Marina Bay Financial Centre Tower 3. Singapore 018982

All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

PROGRAMME CONSULTANT

Name : Cay Aagen
Email : registration@petrosync.com
Phone : +65 3159 0800

TERMS AND CONDITIONS

DISCLAIMER

Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics or location (classroom / Virtual). As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or alterations will be updated on our web page as soon as possible.

DATA PROTECTION

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want us to share your information with other reputable companies, please tick this box ☐

CANCELLATION POLICY

Delegates who cancel after the training is officially confirmed run by email, are liable to pay the full course fee and no refunds will be granted. You may substitute delegates at any time as long as reasonable advance notice is given to Petrosync.

In the event that PetroSync cancels or postpones an In the event that PetroSync cancels or postpones or change the trainer or change the training location (classroom / virtual) of an event for any reason and that the delegate is unable or unwilling to attend in on the rescheduled date, you will receive a credit voucher for 100% of the contract fee paid. You may use this credit voucher for another PetroSync to be mutually agreed with PetroSync, which must occur within a year from the date of postponement.

PetroSync is not responsible for any loss or damage as a result of the cancellation policy. PetroSync will assume no liability whatsoever in the event this event is cancelled, rescheduled or postponed due to any Act of God, fire, act of government or state, war, civil commotion, insurrection, embargo, industrial action, or any other reason beyond management control.

CERTIFICATE OF ATTENDANCE

80% attendance is required for PetroSync's Certificate of Attendance.

DETAILS

Please accept our apologies for mail or email that is incorrectly addressed.
Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

Find us on Social Media:

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CHARGES & FEE(s)

- For Payment by Direct TelegraphicTransfer, client has to bear both local and oversea bank charges.

- For credit card payment, there is additional 4% credit card processsing fee.

COURSE CONFIRMATION

I agree to PetroSync's payment terms and cancellation policy.

Signature : _____
Date : _____

PAYMENT TERMS : Payment is due in full at the time of registration. Full payment is mandatory for event attendance.