

A lot of  
Practical Things,  
Case Studies  
and Exercises!

# API 579 Training - Fitness For Service

Make The Best Decision to Run, Repair or Replace By Learning From The Expert With Many Case Studies !

05<sup>th</sup> - 09<sup>th</sup> August 2024 at Kuala Lumpur, Malaysia | 02<sup>nd</sup> - 06<sup>th</sup> December 2024 at Bandung, Indonesia



## 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 Boilers, 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

- ▶ To familiarize participants with the main concepts and technical terms of degradation mechanisms.
- ▶ To introduce participants to the concepts of FFS.
- ▶ To explain to participants the basic concepts of degradation and FFS.
- ▶ To provide participants with the basic technical and scientific knowledge for carrying out in depth inspection and engineering calculations.
- ▶ To train participants to choose between '3 R's i.e. Re-rate, Repair and Replace.
- ▶ To introduce participants to different ways of evaluations and decision making as regards the repairs alterations and re-ratings
- ▶ Assessment of future remaining life.

## 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 excellent 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!

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

## API 579 Training - Fitness for Service

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### Specially Designed for

Pressure Vessel/ Piping/ Tank design engineers, process engineers, plant operating engineers and managers, Chemical/mechanical engineers who are involved in integrity assessment of Columns, Vessels, tanks, piping etc. Also recommended for the Design engineers, Inspection persons and maintenance engineers involved in Repair, maintenance and trouble shooting of plant equipments in Refining, Petrochemical and Chemical industries. Individual certification of API 510/ 570/ 653 will be an added advantage to the participants.

Each attendee must bring a **Scientific Calculator**.

### Course Overview

Fitness-For-Service (FFS) assessments are quantitative engineering evaluations that are performed to demonstrate the structural integrity of an in-service component that may contain a flaw or damage. This training course is designed to give a detailed discussion of the subject of Fitness For Service concepts (FFS) with emphasis on the basic degradation mechanism and its consequences aspect.

It presents a thorough understanding of how the disciplines of material science, stress analysis, NDT and inspection practices can be applied for assessing the present structural integrity of the component, and deciding its fitness for continued service as well as the projected remaining life. This course covers the analytical methods and their applications are explained with numerous case studies. In order to suit the course to participants with or without a FFS background, the course will be delivered such a way that most of technical terms and both code statements and examples will clarify concepts.

## PROGRAM SCHEDULE

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

*\*Schedule may vary for each training*

### Petrosync Quality

#### Limited Attendees

The course has limited seats to ensure maximum learning and experience for all delegates.

#### Certificate of Attendance

You will receive a Certificate of Attendance bearing the signatures of the Trainer upon successful completion of the course. This certificate is proof of your continuing professional development.

#### Interactive Training

You will be attending training designed to share both the latest knowledge and practical experience through interactive sessions. This will provide you with a deeper and more long-term understanding of your current issues.

#### High Quality Course Materials

Printed course manual will provide you with working materials throughout the course and will be an invaluable source of reference for you and your colleagues afterward. You can follow course progress on your laptop with soft copies provided.

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### Course Agenda

#### Day 1 :

- Introduction to API 579
- Fundamentals of Pressure vessels and piping
- Review of Design formulas
- Calculation of required thickness
- Concept of MAWP
- Scope and limitations of API 579
- Definition of technical terms
- FFS assessment procedures
- Levels of assessment
- Remaining strength factor
- Failure assessment Diagrams
- Reduced permissible MAWP
- Remaining life assessment
- Overview of flaw damage and assessment procedures
- Modes of deterioration and metal loss
- Assessment for Brittle Fracture (Level 1)
- Critical Exposure Temperature (CET)
- Minimum Allowable Temperature (MAT)

#### Day 2 :

- Definition of general metal loss
- Assessment general metal loss
- Required data and measurements
- Procedures for level 1 assessment
- Assessment techniques and acceptance criteria
- Step-by step assessment method
- Calculation of minimum required thickness
- Calculation of average thickness
- Coefficient of variation
- Case studies and exercise on application of API 579 methodology
- Assessment of local metal loss
- Required data and measurements
- Procedure for level 1 assessment

#### Day 3 :

- Brief discussion on Pitting Corrosion
- Step by step assessment method as per Level-1
- Case study and Exercise

- Assessment techniques and acceptance criteria for pitting
- Assessment of Hydrogen damage - Hydrogen Induced Cracking
- Assessment of Hydrogen blisters
- Assessment techniques and acceptance criteria as per Level-1
- Case study and Exercise
- Assessment of Wed Mis-alignments
- Assessment of Shell distortion
- Assessment techniques and criteria as per Level-1

#### Day 4 :

- Assessment of Crack like flaws
- Assessment technique as per Level 1
- Flaw Characterization- single cracks
- Flaw Characterization- multiple cracks
- Step by step assessment method
- Failure assessment curves for crack-like flaws
- Selection of FAD curves.
- Maximum permissible crack dimensions.
- Level-1 Assessment of cracks
- Case study and Exercise on crack analysis as per Level-1
- Assessment of creep damage
- Creep range temperatures for various materials
- Creep curves for various materials
- Case studies on creep damage assessment

#### Day 5 :

- Assessment of fire damage
- Deciding fire zones
- Case studies on fire damage assessment
- Assessment of dents, gouges
- Assessment techniques and acceptance criteria as per Level-1
- Case studies on dents, gouges assessment
- Assessment of Laminations
- Case study on lamination assessment
- Assessment of Fatigue Damage as per Level-1
- Case study on fatigue damage
- Final Review Exam (if required)
- Closing Session.

## 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](mailto:general@petrosync.com)

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### Petrosync Distinguished Instructor

Mandar Mulay

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, and 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 USA, etc. His proficiency in Power Boiler, Tanks, Piping and pressure vessel codes enables him to trace the similarities and differences of these codes.

He is involved in integrity Assessment, Repair practices and remaining life calculations for Pressure Vessels, Storage Tanks and Piping Systems. He has practically implemented the API 579 Fitness for service assessment methods for several In-service assessments of Pressure vessels and Piping.

Mandar Mulay is also actively involved as Instructor for programs on the subjects of ASME Codes for Piping and Pressure vessels, Integrity assessments, 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 Post Graduate courses in Process equipment Design, failure analysis and integrity assessment.

Apart from being visiting faculty, He has also conducted several Training Courses ( ASME Sec. I, ASME Sec. VIII, ASME B 31.3 Piping Codes , API 579 FFS code and 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, 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.

#### 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

## COURSE DETAILS

Title : API 579 - Fitness for Service  
Date : 05<sup>th</sup> - 09<sup>th</sup> August 2024 | 02<sup>nd</sup> - 06<sup>th</sup> December 2024  
Location : Kuala Lumpur, Malaysia | Bandung, Indonesia

## INVESTMENT PACKAGES

Please checklist the package that you are attending!

API 579 - Fitness for Service Schedules	Price
<input type="checkbox"/> 05 <sup>th</sup> - 09 <sup>th</sup> August 2024 at Kuala Lumpur, Malaysia	USD 3,250
<input type="checkbox"/> 02 <sup>nd</sup> - 06 <sup>th</sup> December 2024 at Bandung, Indonesia	USD 3,250

\* 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.

## DELEGATES 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: \_\_\_\_\_

\*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.

## 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.

## 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 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:

 PetroSync Global Pte Ltd

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## CHARGES & FEE(S)

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

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