

# FITNESS-FOR-SERVICE ASSESSMENT

## 2-Day Training Course: Maintain & Prolong the Life of Your Pressurised Plant & Equipment

This course will help engineers develop a complete method for analysing, evaluating and monitoring the operation, design & maintenance of pressurised equipment.

Learn how to apply the Fitness-For-Service standard API 579-1/ASME FFS-1 2017 through the understanding of material behaviour, non-destructive testing and importance of operating condition.

21-22 May 2019 • Perth | 19-20 June 2019 • Melbourne | 23-24 October 2019 • Brisbane



### Our Expert Course Instructor



#### Annette Karstensen

Annette is a PhD & Chartered Engineer with more than 23 years experience in structural integrity assessments & the application of API579-1/ASME FFS-1 2017 to assess fitness-for-service in industrial plant.

### Key Learning Objectives

- ▶ Review the sections of API 579-1/ASME FFS-1 2017 used for assessing brittle fracture, crack-like defects, corrosion and creep
- ▶ Understand and apply background information on FFS assessment
- ▶ Analyse, evaluate and monitor pressurised equipment for continued operation
- ▶ Discuss damage mechanisms and the importance of identification
- ▶ Solve example problems on the practical application of the techniques incorporated in API 579-1/ASME FFS-1 2017
- ▶ Understand the relationship between API 579-1/ASME FFS-1 2017 and other FFS standards
- ▶ Appreciate the remaining life assessment, remediation, and methods to extend the life of damaged equipment

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## ABOUT THE COURSE

Fitness-For-Service (FFS) assessment is a multi-disciplinary quantitative engineering approach to determine whether equipment is suitable for continued operation.

The pressurised structure or component of interest may contain flaws or other damage, or may be subjected to more severe operating conditions than anticipated by the original design.

The outcome of a FFS assessment is a decision to run the component as is, alter it, repair it, or replace it. A remaining life assessment may be performed as part of a FFS evaluation in order to determine how long the asset can be operated safely or to define appropriate inspection intervals.

This course provides training on the application of API 579-1/ASME FFS-1, a standard jointly published by the American Petroleum Institute (API) and the American Society for Mechanical Engineers (ASME).

Example problems will be worked through to provide participants with a detailed understanding of the various FFS calculations.

## WHO WILL BENEFIT

This is a technical course. It will benefit engineers and engineering management engaged in the operation, design, analysis, and maintenance of pressurised plant or equipment in industry. Job titles include: plant, mechanical, civil, structural, reliability and project engineers. Metallurgists and maintenance employees who design or operate pressurised plant or equipment that may develop cracks in service or at the time of manufacture will also benefit.

## WHAT OUR CLIENTS SAY

*"Broad and in-depth knowledge of subject and use of relevant examples."*

Senior Mechanical Engineer, **Newcrest Mining**

*"Her experience in the field of study and ability to reference actual examples and studies."*

Lead Mechanical Engineer, **QGC**

## EXPERT COURSE INSTRUCTOR



### Annette Karstensen

Annette is a Chartered Engineer and a fracture mechanics expert with more than 20 years' experience in structural integrity assessments and the application of API579-1/ASME FFS-1 to assess Fitness-For-Service in industrial plants. These assessments

cover engineering components related to power, petrochemical and other engineering plants.

Her main line of work involves the application of assessment procedures to calculate maximum tolerable flaw sizes and/or time-to-failure under cyclic load or high temperature exposure. Assessments are also typically carried out in connection with fitness-for-service investigations involving corrosion, fracture, creep and/or fatigue.

Annette has an in-depth knowledge of assessments, particularly related to welds, using BS7910 "Guide on methods for assessing the acceptability of flaws in metallic structures". Annette is also familiar with other assessment procedures such as API579, R5/R6 and with pressure vessel design codes (PD5500 and ASME). Annette is extensively involved in making recommendations for mechanical testing programmes such as fracture toughness testing and measurement of welding residual stresses.

Annette has extensive experience in finite element stress analysis (FEA) and has analysed a large range of both linear and non-linear components (plasticity, thermal and contact). FEA in structural integrity is typically carried out to determine stress intensity factor solutions and/or applied stresses for input into the engineering critical assessment. She has also extensive experience in performing corrosion assessments using FEA and has published several papers on the subject.

A recent selection of major projects Annette has been involved in includes:

- Life assessments considering creep and fatigue crack growth in power plant components
- Fitness-For-Service assessments of pressure vessels in petrochemical plants
- Structural integrity assessments of cyclic loaded components in low cycle fatigue
- Integrity assessments of penstock in a hydro power plant
- Examination of cracking in a generator rotor from hydro-electrical power plants

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## 2-Day Intensive Course Outline

This course examines step by step and in detail the contents of the API/ASME standard. The sessions are not necessarily equal in length. The main focus will be on some of the more commonly used sections in API579.

The level of detail examined will be dependent of the requirements and experience of the participants.

Most case studies examined throughout the course will be pre-worked to improve productivity and maximise learning transfer through group discussion. However, there will be opportunities for participants to work through a number of limited problems individually and in group work.

Participants are encouraged to bring specific problems of interest to them to discuss during the course, to assist with problem solving and benchmarking against best practices and lessons learnt.

### Assessment of brittle fracture

- Levels 1 and 2
- Case study examination
- Participant questions/problems/discussion

### Assessment of general metal loss

- Level 1, 2, and 3 assessment
- Case study examination
- Participant questions/problems/discussion

### Assessment of local metal loss

- Level 1, 2, and 3 assessment
- Case study examination
- Participant questions/problems/discussion

### Assessment of pitting corrosion

- Level 1, 2, and 3 assessment
- Case study examination
- Participant questions/problems/discussion

### Assessment of crack-like flaws

- Level 1, 2, and 3 assessment
- Case study examination
- Participant questions/problems/group discussion

### Assessment of creep damage

- Level 1, 2, and 3 assessment
- Case study examination
- Participant questions/problems/group discussion



## Would You Like To Run This Course On-Site?

### Informa Corporate Learning: On-site & Customised Training

If you have **8+** interested people, an onsite course can be an ideal solution. Speak with **Anton Long** or **Holly Baldwin** on **+61 (02) 9080 4454** to discuss your customised learning solution, or email [training@informa.com.au](mailto:training@informa.com.au)



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## Easy Ways to Register

**1 Web**  
[www.informa.com.au/serviceassessment](http://www.informa.com.au/serviceassessment)

**2 Telephone**  
+61 (02) 9080 4395

**3 Email**  
[training@informa.com.au](mailto:training@informa.com.au)

## Stay Connected



## Fitness-for-Service Assessment

	Location	Course Dates	Super Early Bird price valid until		Early Bird price valid until		Standard price valid after		4+ Dels Discount	
			PE - 12 Apr 19	ME - 10 May 19	PE - 3 May 19	ME - 31 May 19	PE - 3 May 19	ME - 31 May 19		
P19GE07PE	Perth	21-22 May 19	\$2,595 + \$259.50 GST	<b>\$2,854.50</b>	\$2,795 + \$279.50 GST	<b>\$3,074.50</b>	\$2,895 + \$289.50 GST	<b>\$3,184.50</b>	\$2,236 + \$223.60 GST	<b>\$2,459.60</b>
P19GE07ME	Melbourne	19-20 Jun 19	\$2,595 + \$259.50 GST	<b>\$2,854.50</b>	\$2,795 + \$279.50 GST	<b>\$3,074.50</b>	\$2,895 + \$289.50 GST	<b>\$3,184.50</b>	\$2,236 + \$223.60 GST	<b>\$2,459.60</b>
P19GE07BR	Brisbane	23-24 Oct 19	\$2,595 + \$259.50 GST	<b>\$2,854.50</b>	\$2,795 + \$279.50 GST	<b>\$3,074.50</b>	\$2,895 + \$289.50 GST	<b>\$3,184.50</b>	\$2,236 + \$223.60 GST	<b>\$2,459.60</b>

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### Informa Corporate Learning – On-site & Customised Training

Informa Corporate Learning has a long-standing track record of delivering very successful customised learning solutions achieving real and measurable value for our clients through our senior training consultants.

If you have 8+ interested people, an on-site course can be the ideal solution – giving you the opportunity to customise our course content to your specific training needs, as well as attracting significant savings compared to public course costs.

### Why Choose On-site With Informa Corporate Learning?

- 1. Custom design** – Together, we will identify the best blended learning solution for your culture, your people and your training objectives.
- 2. Quality assured** – We design market-leading training programs, concepts and methodologies, with a 400+ course portfolio. Our rigorously selected 900+ instructor faculty are recognised experts in their field. Quality of their content and delivery methods is assured through continuous monitoring and evolution.
- 3. On-site training** is a cost effective way to train your people and achieve your defined outcomes.

### Our Long Standing Clients Include:

Ambulance Victoria, BHP, Department of Planning, Transport & Infrastructure, SA, Origin Energy, Electricity Generating Authority of Thailand (EGAT), ActewAGL, Ajilon, Arrow Energy, Barrick, Chevron Australia, Coffey International, ConocoPhillips, Dalrymple Bay Coal Terminal, Department of Education, ENI Australia, Fortescue Metals Group, IBM, Jemena, Office of the National Rail Safety Regulator, Pacific National, PT Freeport, Public Transport Authority – WA, QGC – BG Group, Rio Tinto, UBS, Woodside, IP Australia, ANU, Health Purchasing Victoria, Telstra, Queensland Rail, EY, Litmus Group and more...

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