

# Fitness-For-Service Example Problem Manual

API 579-2/ASME FFS-2 2009

AUGUST 11, 2009



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# API 579-2/ASME FFS-2 2009 Fitness-For-Service Example Problem Manual

## FOREWORD

The publication of the standard API 579-1/ASME FFS-1 *Fitness-For-Service*, in July 2007 provides a compendium of consensus methods for reliable assessment of the structural integrity of industrial equipment containing identified flaws or damage. API 579-1/ASME FFS-1 was written to be used in conjunction with industry's existing codes for pressure vessels, piping and aboveground storage tanks (e.g. API 510, API 570, API 653, and NB-23). The standardized Fitness-For-Service assessment procedures presented in API 579-1/ASME FFS-1 provide technically sound consensus approaches that ensure the safety of plant personnel and the public while aging equipment continues to operate and can be used to optimize maintenance and operation practices, maintain availability and enhance the long-term economic performance of plant equipment.

This publication is provided to illustrate the calculations used in the assessment procedures in API 579-1/ASME FFS-1 published in July, 2007.

This publication is written as a standard. Its words *shall* and *must* indicate explicit requirements that are essential for an assessment procedure to be correct. The word *should* indicates recommendations that are good practice but not essential. The word *may* indicates recommendations that are optional.

The API/ASME Joint Fitness-For-Service Committee intends to continuously improve this publication as changes are made to API 579-1/ASME FFS-1. All users are encouraged to inform the committee if they discover areas in which these procedures should be corrected, revised or expanded. Suggestions should be submitted to the Secretary, API/ASME Fitness-For-Service Joint Committee, The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016, or [SecretaryFFS@asme.org](mailto:SecretaryFFS@asme.org).

Items approved as errata to this edition are published on the ASME Web site under Committee Pages at <http://cstools.asme.org>. Under Committee Pages, expand Board on Pressure Technology Codes & Standards and select ASME/API Joint Committee on Fitness-For-Service. The errata are posted under Publication Information.

This publication is under the jurisdiction of the ASME Board on Pressure Technology Codes and Standards and the API Committee on Refinery Equipment and is the direct responsibility of the API/ASME Fitness-For-Service Joint Committee. The American National Standards Institute approved API 579-2/ASME FFS-2 2009 Fitness-For-Service Example Problem Manual on August 11, 2009.

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## PART 1

### INTRODUCTION

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#### 1.1 Introduction

Fitness-For-Service (*FFS*) assessments in API 579-1/ASME FFS-1 *Fitness-For-Service* are engineering evaluations that are performed to demonstrate the structural integrity of an in-service component that may contain a flaw or damage or that may be operating under specific conditions that could produce a failure. API 579-1/ASME FFS-1 provides guidance for conducting *FFS* assessments using methodologies specifically prepared for pressurized equipment. The guidelines provided in this standard may be used to make run-repair-replace decisions to help determine if pressurized equipment containing flaws that have been identified by inspection can continue to operate safely for some period of time. These *FFS* assessments of API 579-1/ASME FFS-1 are currently recognized and referenced by the API Codes and Standards (510, 570, & 653), and by NB-23 as suitable means for evaluating the structural integrity of pressure vessels, piping systems and storage tanks where inspection has revealed degradation and flaws in the equipment or where operating conditions suggest that a risk of failure may be present.

#### 1.2 Scope

Example problems illustrating the use and calculations required for Fitness-For-Service Assessments described in API 579-1/ASME FFS-1 are provided in this document. Example problems are provided for all calculation procedures in both SI and US Customary units.

#### 1.3 Organization and Use

An introduction to the example problems in this document is described in Part 2 of this Standard. The remaining Parts of this document contain the example problems. The Parts in this document coincide with the Parts in API 579-1/ASME FFS-1. For example, example problems illustrating calculations for local thin areas are provided in Part 5 of this document. This coincides with the assessment procedures for local thin areas contained in Part 5 of API 579-1/ASME FFS-1.

#### 1.4 References

API 579-1/ASME FFS-1 *Fitness For Service*.