API 579-2 / ASME PTB-14-2023 – 2nd Edition

Fitness-For-Service Example Problems Manual

API/ASME Joint Fitness-For-Service Committee

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FOREWORD

This publication supersedes API 579-2, 1st Edition/ASME FFS-2, which has been redesignated by ASME as ASME PTB-14. It is provided to illustrate the calculations used in the assessment procedures in API 579-1/ASME FFS-1 published in December 2021. 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 NBBI NB 23 (NBIC)). 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 written as an API/ASME PTB technical publication. 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, Two Park Avenue, New York, NY 10016, or SecretaryFFS@asme.org or to the Standards Department, API, 200 Massachusetts Avenue NW, Suite 1100, Washington, DC 20001, standards@api.org.

Items approved as errata to this edition are published on the ASME website 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.

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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, and 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 API 579-1/ASME FFS-1, Part 5.

1.4 References

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