



Guid to American Petroleum Institute (API) 579 Fitness-for-Service

Fitness-For-Service (FFS) evaluations are a set of engineering tools to evaluate flaws or damage to process equipment, and demonstrate the structural integrity of an in-service component. In short, API provides a standardize method to evaluate day to day wear of equipment such as ***storage tanks, pressure vessels, boilers, piping systems, and pipelines.***

Inspections and calculations are used to ensure in service equipment is still within design specifications. Three levels of effort are used under API 579 to evaluate degradation mechanisms:

- **Level 1** is a conservative assessment, assuming the weakest mode of failure exists throughout the equipment. This assessment level is used only on simple shapes under simple loads.
- **Level 2** is less conservative involving more calculations and inspection points. Additional shapes and loads may be evaluated.
- **Level 3** is the most detailed analysis of the components, often using computer modeling (finite element analysis) to more finely tune how a component may fail.

FFS can be used to estimate equipment life by evaluating the following modes of failure:

- Brittle Fracture
- General Metal Loss (large area)
- Localized Metal Loss (small area)
- Pitting Corrosion
- Blisters and Laminations
- Weld Misalignment and Shell Distortions
- Assessment of Crack-Like Flaws
- Equipment Operating in the Creep Regime
- Assessment of Fire Damage

Use FFS at your facility to either evaluate suspect equipment or as predictive/preventative maintenance for budget planning.