

# Pressure Vessel Re-Rates and R-Stamps

Ensuring safe operations when operating conditions change.

## R-STAMPING OF EXISTING VESSELS

The National Board Inspection Code (NBIC) provides guidance for the in-service inspection, repair, and alteration of pressure-retaining items. The majority of US States and Canadian Provinces require pressure vessels to be Code-stamped, which gives confidence that vessels are designed to operate safely. Subsequent changes to a vessel's operation require an engineering assessment to ensure that the changes will maintain a safe operating margin on all failure modes. Successful re-evaluation of a vessel results in an NBIC R-Stamp.



*Stress Engineering Services is an R-Stamp holder for Vessel Repairs and Alterations, and helps our clients with vessel re-rates, repairs, and evaluations.*

**Vessel Changes:** The most common reasons for R-Stamping vessels are changes in the operating parameters; e.g., the design temperature or pressure often needs to be increased. Additionally, R-Stamp activities can be associated with re-rating based on higher allowable stresses (over the years, some allowable stresses have been increased), enabling operating pressures to be increased.

**Repairs and Alterations:** If a fitness-for-service (FFS) evaluation results in a Recommendation for Remediation, a Repair Plan may be necessary to properly complete the recommendations. Repair Plans are detailed, step-by-step documents for executing the repair and must comply with NBIC NB-23, even if no R-Stamp is being applied. An alteration to a vessel is considered to be a change in the design and requires an R-Stamp.

**R-Stamping of used equipment:** An ASME stamp cannot be applied to used or existing equipment. ASME stamps are for new equipment only; however, application of an R-stamp is similar and ensures that the vessel is designed for safe operation against the relevant failure modes.

**Nameplate detached, damaged, or missing:** If the original nameplate has been detached, a process can be undertaken so that the nameplate can be reattached to the vessel. This requires verification that the nameplate and the vessel match. If the original nameplate has been destroyed or lost, we will execute a process of evaluating the vessel and will obtain an AI concurrence to attach a new R-stamped nameplate to the vessel.

Our **Vessel Certification Service** is aimed at clients requiring evaluation of existing pressure vessels with minimal or no documentation. A well-structured and documented process (including, e.g., inspection of the vessel, material testing, drawing preparation, design calculations, hydrotest or NDE, etc.) can generate vessel records acceptable to a jurisdiction.

## FABRICATING NEW ASME PRESSURE VESSELS

Stress Engineering Services, Inc. is a certified ASME Boiler and Pressure Vessel Code (BPVC) Code Stamp holder. We design, manufacture, and install pressure vessels around the world, and can issue Certificates of Authorization for:

- ASME Section VIII, Division 1 Pressure Vessels (U)
- ASME Section VIII, Division 2 Pressure Vessels (U2)
- ASME Section VIII, Division 3 Pressure Vessels (U3)



Our engineers can design pressure vessels rated and sized for your specific operational requirements. We work with clients throughout all stages of vessel development, from the creation of the User Design Specification (UDS) through the final Manufacturer's Design Report (MDR) that documents the engineering analysis.

- Low or High Pressure Vessels
- Testing Vessels and Chambers
- Low or High Temperature Vessels
- R&D Test Vessels
- Vessels for Processing, Refining, and Manufacturing Processes
- Food Processing Vessels
- Processing/Refining/Manufacturing
- Consumer Products Vessels



## VESSELS IN NEED OF EVALUATION / VESSELS IN DISTRESS

Pressure vessel damage can come in many forms: local corrosion, local thin areas (LTA), general metal loss, cracks or crack-like flaws, pitting, creep, bulging, erosion, and environmental embrittlement to name a few. It is important to note that although significant damage may be present, the vessel may still be safe to operate. The API 579-1/ASME FFS-1 Fitness-for-Service standard is most commonly used to determine if a damaged vessel is suitable for continued operation. We specialize in these types of assessments and can respond quickly.

Acquiring operational and vessel data is essential for developing a good understanding of the strength and condition of the vessel's material. It is also vital to understand the source of the damage so that future damage can be predicted or prevented. At Stress Engineering Services, we regularly evaluate pressure vessels in varying degrees of distress, with conditions including:

- Corrosion Mechanisms (pH, contents, temperatures, etc.)
- Vibration (fluid flow-induced, mechanical, etc.)
- Integrity Operating Windows (IOWs)
- Piping Analysis and Piping Systems Programs
- Structural Engineering



13800 Westfair East Drive • Houston, Texas 77041  
visit us on the web at [www.stress.com](http://www.stress.com)

HOUSTON  
281.955.2900

CINCINNATI  
513.336.6701

CALGARY  
403.256.2527