

# eec Module Descriptions

Leverage the convenience of the cloud-based platform to quickly and easily perform complex engineering calculations that are aligned with the latest industry codes and standards.

With over 40 tools at your fingertips, the Equity Engineering Cloud (eec) platform helps you make effective and informed decisions to keep your industrial assets operating safely and reliably. The cloud-based tools guide you through the data input requirements for complex engineering analysis, resulting in practical calculations of fitness-for-service (FFS), fatigue analysis, and many other design or in-service evaluations.

## WEBTOOL

## DESCRIPTION



### Abaqus FEA Model Data Mapper

Maps imperfections, thinning/thickening, or abnormally high/low temperature areas across a geometrical body to be read back into Abaqus.



### API 1102 Buried Pipeline Crossings

Designs crossings for steel pipelines located beneath railroads and highways in accordance with API 1102.



### ASME B16.5 Pipe Flanges

Calculates the pressure-temperature rating for a standard flange manufactured in accordance with ASME B16.5 or B16.47.



### B31G Plus

Calculates the MAOP (MAWP) and the remaining life of a pipeline or piping system with a Local Thin Area (B31G, RSTRENG).



### Boiler Tubes

Calculates the boiler tube thickness and MAWP in accordance with ASME B&PV Code, Section I.



### Branch

Performs piping branch reinforcement calculations in accordance with ASME B31.1, B31.3, B31.4, and B31.8.



### Burst Pressure

Calculates the burst pressure or a thickness that will result in a given burst pressure for a cylinder and a sphere based on the analysis procedure developed by Svensson.



### Charpy Data Analysis

Fits Charpy impact test data to the hyperbolic tangent function.



### CP Design Offshore

Uses the DNV-RP-B401 method to determine necessary cathodic protection design parameters for satisfying life, current output, and anode weight requirements.



### CP Design Onshore

Uses the NACE CP3 method to determine necessary cathodic design parameters for satisfying life and current output requirements.



### FAST2: Nozzle Stress Analysis

Analyzes stresses of cylindrical and spherical vessel to-nozzle intersections.



### Fatigue Damage

Estimates the cumulative fatigue damage for a user-specified stress-strain history.



### Fatigue Data Analysis

Fits strain-controlled, constant-amplitude, cyclic fatigue data to the most popular strain-life, stress-life, and cyclic stress-strain models currently available.



### Fatigue Data Explorer

Extracts test data from a fatigue database based upon the extensive material library of Baumel and Seeger.



### Fluid Explorer

Predicts the thermodynamic and transport properties of a multi-component fluid mixture based upon the properties of its distinct molecular components using a cubic equation of state method.



### HotTap Welding

Assesses the suitability of hot tap welding procedures by evaluating risk of burn-through and cold cracking.



### Hydrogen Bake-Out

Calculates the time required for a hydrogen bake-out operation at a user-specified temperature to ensure that the remaining hydrogen concentration in the vessel wall is no greater than a user-specified maximum value.



### Insulation Thickness

Calculates the insulation thickness of a cylindrical or spherical component based on one of the following criteria: Economic Thickness, Personnel Protection, Energy Conservation, or Condensation Control.



### Lot Centered Analysis

Fits creep test data to the Omega creep model of API 579-1/ASME FFS-1, Part 10.



### Material Explorer

Provides access to an extensive material database for materials typically used in the construction of pressure vessels, piping, and tankage.



### Nozzle

Calculates nozzle reinforcement and nozzle-weld strength requirements for nozzles located in ASME Section I and ASME Section VIII, Division 1 and 2 pressure vessels subject to internal or external pressure.



### Part 3 – Brittle Fracture

Provides guidelines for evaluating the resistance to brittle fracture of carbon steel and low-alloy steel assets.



### Part 4 and 5 – Thinning

Provides procedures for pressurized components subject to general/local metal loss resulting from corrosion, erosion, or both corrosion and erosion.



### Part 6 – Pitting

Provides assessment procedures to evaluate pitting damage in pressurized components.



### Part 7 – Hydrogen Damage

Provides assessment procedures to evaluate hydrogen blisters, HIC, and/or SOHIC damage in pressurized components.



### Part 8 – Shell Distortion

Provides assessment procedures for pressurized components with geometric irregularities, such as weld misalignments and shell distortion.



### Part 9 – Crack-Like Flaws

Provides assessment procedures for evaluating crack-like flaws in pressurized components.



### Part 10 – Creep

Provides assessment procedures to evaluate pressurized components operating in the creep range.



### Part 11 – Fire Damage

Provides assessment procedures for evaluating pressure vessels, piping, and tanks subjected to flame impingement and the radiant heat of fire.



### Part 12 – Dents/Gouges

Provides assessment procedures for dents, gouges, and dent-gouge combinations in pressurized components.



### Part 13 – Laminations

Provides assessment procedures for laminations (planes within the steel plate across which there is no metallic bond, typically created during the steel making process) in pressurized components.



### Part 14 – Fatigue Damage

Provides assessment procedures for evaluating fatigue damage in components subject to cyclic operation below the creep range that do not contain crack-like flaws, HIC, stepwise indications, and/or SOHIC.



### Pipe Pressure-Thickness

Calculates piping thickness, MAWP (MAOP), and MDMT for straight pipe, elbows, and miter bends in accordance with ASME B31.1, B31.3, B31.4, and B31.8 Piping Codes.



### Pipe Span Pressure-Thickness

Calculates the required thickness or MAWP (MAOP) of a pipe span such that a user-specified maximum deflection and slope are not exceeded.



### Plausible Profiles

A tool that implements the Plausible Profiles method to evaluate thinning damage.



### PTC 19.3 Thermowell Analysis

Establishes a mechanical design standard for reliable service of tapered, straight, and stepped-shank thermowells in a broad range of applications.



### Rainflow Cycle Counting

Performs rainflow cycle counting per ASTM E1049-85.



### Reactor Shutdown

Calculates the hydrogen concentration in a cylindrical or spherical vessel wall given the steady state operating conditions and specified shutdown conditions.



### Shell Pressure-Thickness

Calculates pressure vessel thickness, MAWP, and MDMT for cylindrical shells, conical shells, spheres, elliptical heads, torispherical heads, and elbows in accordance with the ASME B&PV Code, Section VIII, Divisions 1 and 2.



### SIMFLEX-IV

Offers a static and dynamic pipe stress and flexibility analysis program designed for evaluating pipe stress caused by various loads.



### Smooth Bar Fatigue Life

Predicts the probability of fatigue failure for smooth bar specimens under known or relatively constant operating conditions.



### Stored Energy

Calculates the total volume and total stored energy of a piping system (that may consist of multimer pipe sections with varying diameters or be a single pipe of uniform geometry) that has undergone a pneumatic test.



### Tank Settlement

Calculates the effects of bottom settlement in aboveground storage tanks per Annex B of API 653.



### Tank Shell Thickness

Evaluates aboveground storage tanks considering sustained loading. Only the tank shell courses are included in the evaluation.



### TBREAK

Determines the transient pressures and flow rates in the shellside system of a heat exchanger due to the rupture of one or more tubes.



### Welded Joint Fatigue Life

Predicts the probability of fatigue failure for welded joint specimens under known or relatively constant operating conditions.



### WRC 107/537 – Stresses at Attachments

Used to compute stress intensities due to external forces and moments at nozzle attachments to spherical and cylindrical shells.



### WRC 562 – MAT

Calculates the Minimum Allowable Temperature (MAT) for a given material and thickness based on resistance to brittle fracture, based on fracture mechanics approach described in WRC Bulletin 562.