

Case Studies: High-Temperature Test Equipment

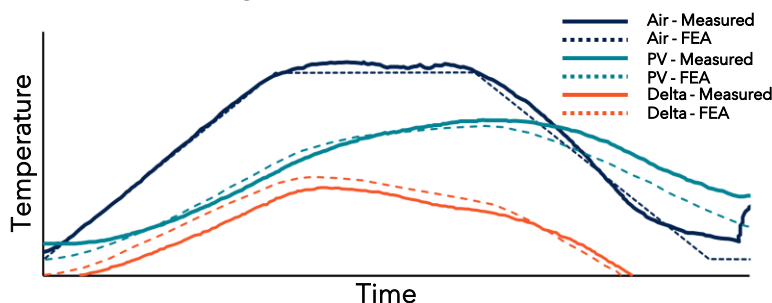
Frewer provides design & analysis for high-temperature & pressure test equipment. This includes pipework, custom vessels & complex geometries such as combustors or internal air systems.



High-Temperature Design

Frewer approaches design for extreme environments from concept through detail with a system-level approach. We address the most demanding requirements such as high-temperature & pressure induced loads, accounting for whole rig factors such as thermal expansion, sealing configuration, pipework restraint and machine operability. This way, equipment has the performance to complete its mission, whilst being practical to use day-to-day.

We design for PE(S)R/PED and relevant boiler & pressure vessel codes where necessary, to ensure novel equipment is safe, legal & compliant with design-by-formula, or rapidly iterating detailed analysis. Turnkey projects also include full mechanical design of support structures, pipework, provision for instrumentation & management of interfaces.



Accurate Thermal Modelling

Accurate stress analysis & life prediction is essential for pressure vessels which spend their lives being pressure/temperature cycled. With non-linear transient FEA, we can predict the impact loading cycles will have on pressure equipment. Furthermore, where transient heating/cooling effects impact performance, heat transfer coefficient estimation with CFD can be used to predict conjugate heat transfer between the vessel & its contents. This combined approach can be highly accurate, as shown in the graph above illustrating experimental vs Frewer FEA predictions of a real vessel wall temperature.

