



# Extended Range

Unparalleled material properties resource for advanced calculations



 Stress-Strain Diagrams

 Formability Curves

 Fatigue Data

 Creep Data

Extended Range offers a unique collection of advanced property data for use in critical design activities

## The Challenge

- Finding material data essential for advanced engineering calculations and computer aided engineering (CAE) and finite element analysis (FEA) simulations
- Obtaining stress-strain curves at various temperatures and at different strain rates
- Comparing fatigue properties of different origins for example American, European and Asian materials

## The Solution

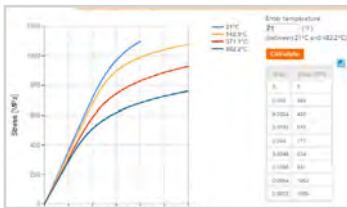
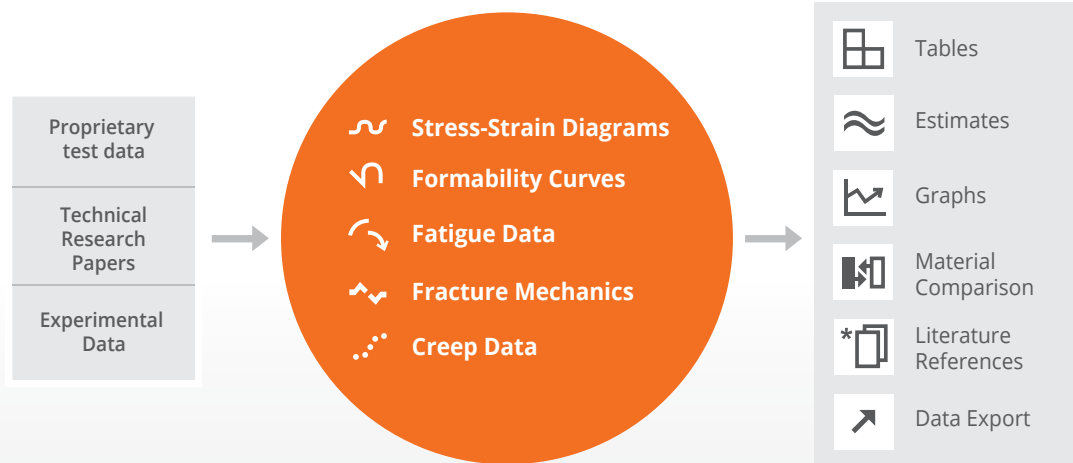
- ✓ Offers a unique collection of advanced property data for use in critical design activities
- ✓ Effortless efficiency in the extremely time consuming task of finding reliable material property information, for advanced calculations
- ✓ Proprietary data acquisition methodology for experimental data from over 3,000 references and documents

## The Benefits

- Avoiding costly and potentially dangerous errors
- Opening new opportunities for more optimized and cost-effective design
- Enhancing accuracy and efficiency throughout the entire process chain

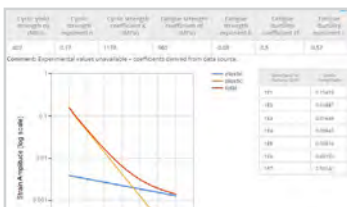


Total Materia's Extended Range dataset provides an unparalleled material properties resource for advanced structural and thermal calculations and analysis including: stress-strain curves, formability diagrams, fatigue data and more.



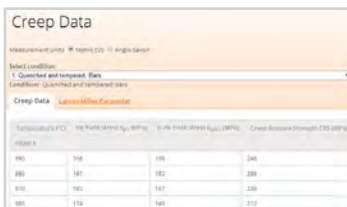
### Thousands of stress-strain curves

Unique collection of more than 150,000 stress-strain curves for calculations in the plastic range covers more than 50,000 materials, with various heat treatments, working temperatures and strain rates, from quasistatic to over 1,000 1/s. Both true and engineering stress curves are given, with a possibility to interpolate curves for user-defined temperatures and strain rates.



### Largest collection of cyclic properties

The largest database of strain-life and stress-life parameters for more than 35,000 materials, e-N and S-N diagrams, for various heat treatments and loading conditions. Monotonic properties are included for reference along with statistical fatigue parameters where applicable.



### Proprietary methodology for properties estimation

Based on Total Materia cross-reference tables and properties of equivalent materials, Extended Range provides estimates for stress-strain curves for additional 90,000 materials and cyclic properties for another 80,000. Although estimates cannot completely replace experimental data, they provide a valuable starting point for further research and calculations.



### More advanced properties for design and simulation

Forming limit and high-strain curves at a range of temperatures, for simulating forging, drawing and other forming operations. Fracture mechanics K<sub>1C</sub>, K<sub>IC</sub>, crack growth and Paris law parameters are presented, with the corresponding graph of crack growth. Creep data including yield stress and creep rupture strength at different temperatures with the calculation of Larsen-Miller parameter and remaining life of the component.