JMatPro

PRACTICAL SOFTWARE FOR MATERIALS PROPERTIES

JMatPro® is a powerful software which calculates a wide range of materials properties and is particularly aimed at multicomponent alloys used in industrial practice. **JMatPro®** modules are based on the material types shown here.

- Al alloys
- Fe alloys
- Ni alloys
- Mg alloys
- Ti alloys
- Co alloys
- Cu alloys
- Zr alloys
- Solder alloys

What can JMatPro® do?

Stable and metastable phase equilibria
- Temperature / concentration stepping
- Isopleths

Solidification calculations
- Scheil-Gulliver solidification
- Modified Scheil-Gulliver solidification to include back-diffusion
- Thermo-physical and physical properties during solidification

Mechanical properties
- Strength and hardness
- Flow stress curves
- Creep and rupture life/strength
- Conversion between strength and hardness
- Forming limit diagrams
- Processing maps

Data export to 3rd party packages for
- Casting simulation
- Forming simulation
- Welding simulation
- Heat treatment simulation
- Additive manufacturing

Phase transformations
- TTT/CCT/TTA diagrams
- Microstructure evolution and properties during heating, cooling and isothermal holding
- Precipitation kinetics

Other diffusion-controlled transformations
- Homogenisation
- Carburisation
- Coarsening
- Martensite tempering in steels

### Thermo-physical and physical properties
- specific heat and enthalpy
- density and thermal expansion coefficient
- thermal conductivity
- electrical conductivity/resistivity
- liquid viscosity/diffusivity
- Poisson's ratio
- Young's/bulk/shear moduli
- Magnetic permeability

These properties are calculated for the whole temperature range including in the liquid phase. When relevant, properties are given for each phase.

Who is JMatPro® for?

JMatPro® has been designed so that it can be used by any engineer or scientist that requires knowledge of materials properties and behaviour as part of their daily work and is used by many academic and industrial R&D institutions worldwide. We take great care in the following points:

- extensive validation of the models to ensure sound predictions of the properties
- fast and robust calculations
- ease of use due to an intuitive user interface (no training required)
- extensive online help facility
- powerful data management interface to browse through calculated properties
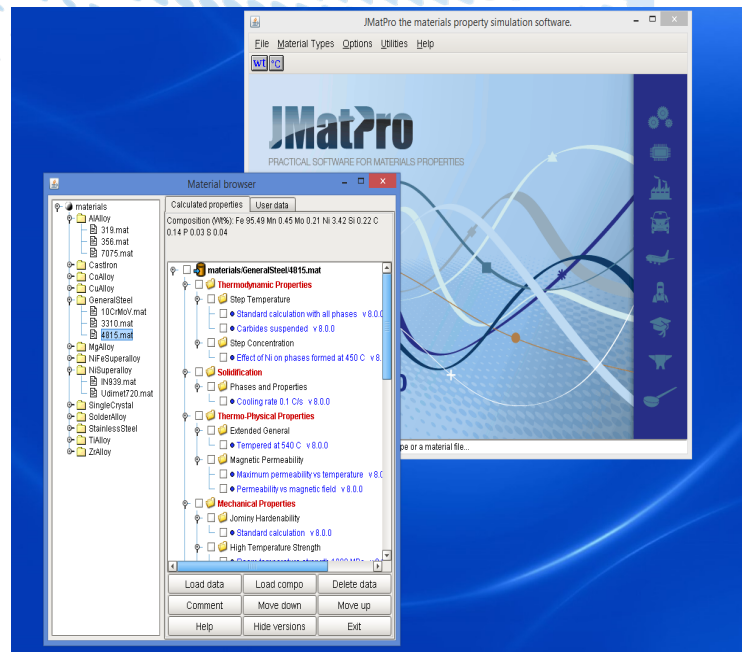
JMatPro

PRACTICAL SOFTWARE FOR MATERIALS PROPERTIES

> **"We don't develop new alloys and property data can be found in the literature or handbooks. Why would we still need JMatPro®?"**

JMatPro® is not a database of properties collected from various sources but incorporates physically based materials models that have been extensively validated. Looking for information in the literature or handbooks can be a painful experience because the number of alloys for which information available is limited. The information may also be incomplete in that not all properties have been measured. Moreover, information from various sources may be inconsistent due to the differences in alloys' composition, microstructural status and testing conditions. As each alloy has a specified composition range, variations within this range may result in a big difference in the alloy's properties. **JMatPro®** offers consistent and reliable modelling of these properties, over a range of conditions all available from just one easy-to-use source.
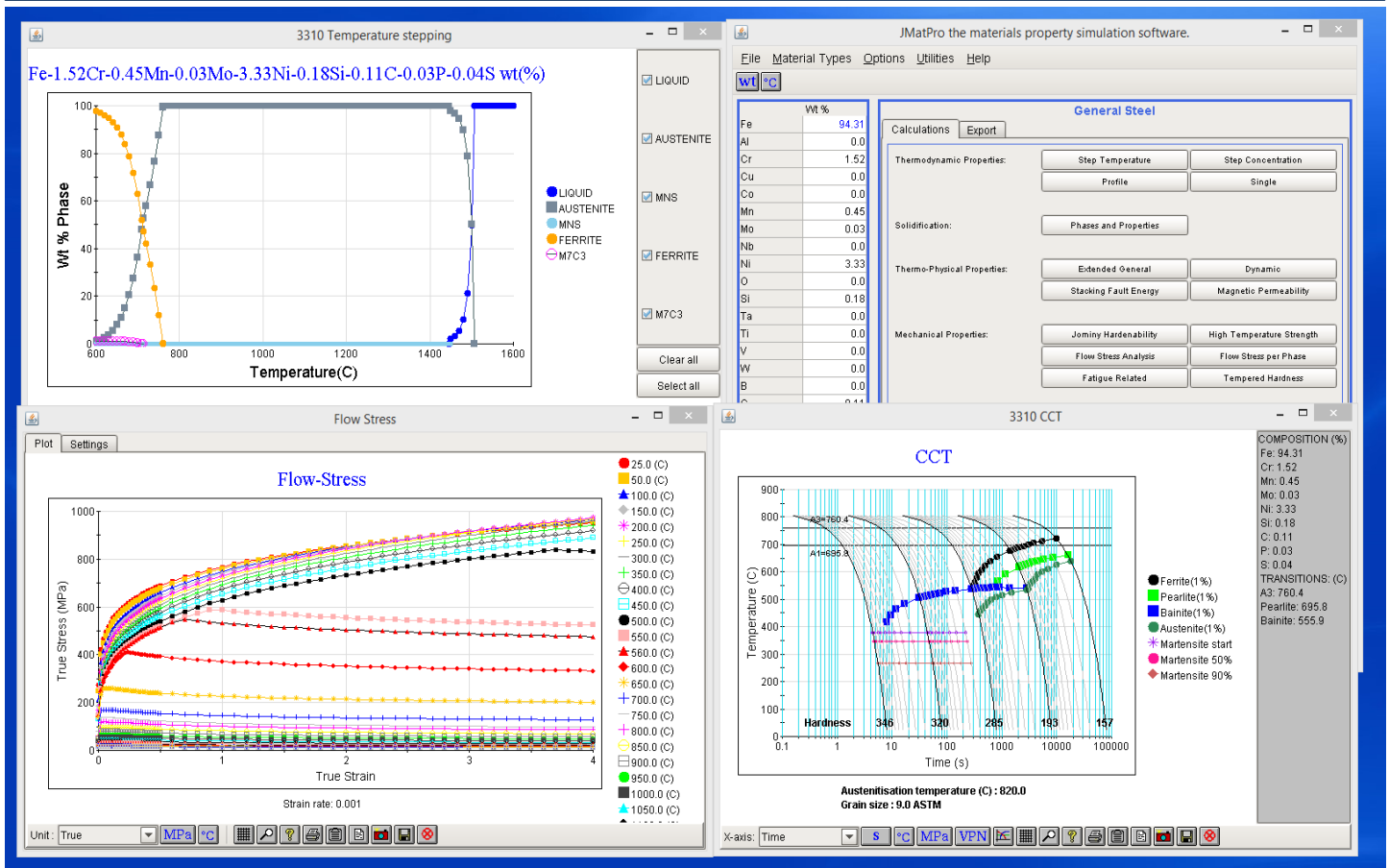
JMatPro® API

This allows you to incorporate some of the **JMatPro®** functionality into your own applications. We provide the basic building blocks for you to **automate** and develop tasks within your own models and to **integrate** them into your own software. We provide calculation modules for:

- Stable and metastable phase equilibria
- Physical and thermophysical properties
- Solidification phases and properties
- Mechanical properties: strength/hardness/flow-stress curves
- TTT/CCT diagrams and cooling properties for steels