



Database name: Thermotech TiAl-based Alloys Database
Database acronym: TTTIAL1 **Database version:** 1.0
Database owner: ThermoTech
Database segment: High Al-containing Ti-alloys

Brief description

TTTIAL1 is suitable to be used for prediction of stable and metastable phase equilibria in multicomponent γ -TiAl based alloys.

Applications

TiAl-based alloy design and engineering.

Included Elements

Al B Cr Mn Mo Nb O Si Ta Ti V W Zr

Included Phases

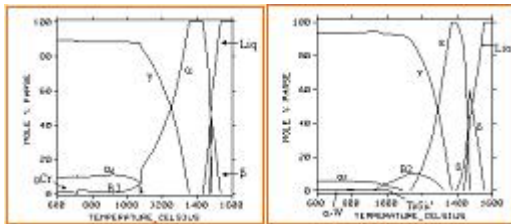
AL2O3	BCC_A2	LIQUID:L	TI3B4	TIB
AL3TI	HCP_A3	SIGMA	TI5SI3	TIB2
B2_BCC	LAVES	TI3AL	TIAL	TIZRSI

Assessed Systems

All phases have been critically assessed and treated by some appropriate thermodynamic models (e.g. the Sublattice Model for solid solutions and liquid mixture phases), which are applicable over a wide temperature-pressure-composition range.

Validation

TTTIAL1 has been developed to be used for the prediction of stable and metastable phase equilibria in multicomponent γ -TiAl based alloys. It represents a new state of the art in modelling techniques and includes features which allow, uniquely, the inclusion of O in the α_2 -Ti₃Al and γ -TiAl phases and the incorporation of new models to allow for the important B2_bcc transformation to be reproduced in multicomponent alloys. It is compatible with TTTI which was designed for conventional Ti alloys, and they will eventually be fully incorporated into a single large and unique database. The database has been constructed using a combination of published information, unique proprietary data and newly developed extrapolation methods, and has been designed for use with γ -TiAl alloys but can, to a certain degree, also be used with super α_2 -Ti₃Al based alloys and this capability will be expanded at a later stage with the incorporation of the orthorhombic "O" phase. The figures below show phase% plots for the alloys Ti-48Al-2Cr-2Nb and Ti-47Al-2Nb-1Mn-0.5W-0.5Mo-0.2Si.

**Limits**

Combinations of several critically-assessed systems can calculate and extrapolate higher-order multicomponent systems. Such extrapolations require experience and understanding and the producer or vendor should be contacted if problems occur. Critical calculations must always be verified by equilibrium experimental data; it is the user's responsibility to verify the calculations but Thermo-Calc Software is interested to know about any significant deviations in order to improve any future release.

Scientific Models & References

See the Thermo-Calc Software reference list available at: <http://www.thermocalc.com/Library.htm>