Database name: TCS Al-based alloys Database
Database acronym: TCAL
Database version: 1.0
Database owner: Thermo-Calc Software AB
Database segment: Aluminium based alloys

Brief description
TCAL1 contains all the important Al-based alloy phases within a 26-element framework. TCAL1 can be used for a wide range of compositions from pure Al to very complex commercial alloys. TCAL1 can be used also with other software from Thermo-Calc Software such as the TC-Programming Interfaces and DICTRA.

Applications
Al-based alloys design and engineering.

Included Elements (26)

Ag	Al	B	C	Ca	Cr	Cu	Fe	Ge	H	Hf	K	La
Li	Mg	Mn	Na	Ni	Sc	Si	Sn	Sr	Ti	V	Zn	Zr

Included Phases (Selection)

AL10CU10FE	AL20CU3MN3FE7	AL62CU25FE13	ALNI2SI	GRAPHITE
AL10FE3NI	AL24MN5ZN	Al6Ni3Si	BCC_B2#1 (disordered)	HCP_A3
AL10FEMN2	AL28CU13MN3FE3	AL71FE19SI10	BCC_B2#2 (ordered)	LAVES_C14
AL11MN3CU5	AL28MN7CU4	AL71FE5NI24	C1 (Mg2Si etc)	LAVES_C15
AL11MN3ZN2	AL2FE3SI4	Al7CU2M	D011	LAVES_C36
AL13FE2MN2	AL2MN2SI3	AL7CU4NI	D022, BCT_D022	LIQUID
AL13FE4	AL2MNSI3	AL8FEMNSI2	D023	Q_PHASE
AL13NI38ZN49	AL3CU2MG9SI7	Al9FE2SI2 (AL5FESI)	D13	S_PHASE
AL15SI2M4	AL3MN4SI2	AL9FE5SI6	DIAMOND_A4	SIC
AL16FEMN3	AL3MNSI2	AL9FENI	FCC_L12#1 (austenite/γ)	T_PHASE
AL18FE2MG7SI10	Al45M7	AL9MN2ZN	FCC_L12#2 (γ')	THETA (Al2Cu etc.)
AL18MG3MN2	AL5CU2MN3	ALMN2CU3	FCC_L12#3 (Carbide)	V_PHASE
AL1MN1SI1	AL5MN6SI7	ALNI16SI9	GAS	

Only the phases of interest for Al-base alloys are defined by default. The complete descriptions for most of the binary and many ternary systems is available using the BINARY and TERNARY modules (or by manually defining the missing phases before reading data from the database). Please note that only a selection of phases are shown in the table above. **In total there are 349 different solution phases and intermetallic compounds.**

Assessed Systems
Most of the binary systems in this database have been assessed (149 binary systems) and can be calculated with the BINARY Module in Thermo-Calc. TCAL1 also contains many assessed ternary systems, all 56 ternaries in the Al-Cu-Fe-Mg-Mn-Ni-Si-Zn system, which can be calculated with the TERNARY Module in Thermo-Calc. Many of the quaternary systems including Al have also been assessed.

Limits
As in the spirit of the CALPHAD method, predictions can be made for multicomponent systems by extrapolation into multicomponent space of data critically evaluated and assessed based on binary, ternary and in some cases higher order systems. However, critical calculations must always be verified by equilibrium experimental data; it is the user's responsibility to verify the calculations but Thermo-Calc Software AB 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