

## TCSLD3: TCS Solder Alloy Solutions Database

Database name:	TCS Solder Alloy Solutions Database	Database acronym:	TCSLD
Database owner:	Thermo-Calc Software AB	Database version:	3.2

### Brief Description

TCSLD was developed for thermodynamic calculations of Sn-/Au-/Bi-/Zn-based solder systems (Pb-containing/Pb-free). It can be used with Thermo-Calc and the add-on Diffusion Module (DICTRA) and/or Precipitation Module (TC-PRISMA). TCSLD contains all the important solder alloy phases within a 21-element framework.

### Included Elements (21)

Ag Al Au Bi Ca Cd Co Cu Ga Ge In Mg Mn  
Ni Pb Pd Pt Sb Si Sn Zn

### Included Phases (271)

TCSLD contains 271 different solution phases and intermetallic compounds. A complete list of the phases and their models is given in 'Extended information'. Note that the compounds having the same crystal structure may have been merged into one phase. A selection of phases is shown:

LIQUID	FCC_A1	FCC_L12	BCC_A2	BCT_A5	HCP_A3
HCP_ZN	AGZN_ZETA	ALAU_B31	AL2CU_C16	AL3NI2_D513	AU2BI_C15
AUIN	AU7IN3	AUIN	AUSB2_C2	AUSN4_OS20	AUSN2_OP24
AU10SN_D024	AU5ZN8_GAMMA	AUZN	BIIN_B10	BIIN2_HP6	CO2SI_C23
CU3SN	CU3IN_GAMMA	CU2IN_LT	CU7IN3_DELTA	CU2SB	CU6SN5_LT
IN9NI13	INSB_CF8	INSN_A6	INSN_GAMMA	NI3SN4	NI3SN_D019
NI3SI2	NI5SI2	NIZN_TP2	SBSN_B1_NACL	SB2SN3	SBZN
AUBISN	AU4IN3SN3	AUNI2SN4	CU2IN3SN	CUNI2SN	INNI6SN5
<i>CU6SN5_HT_NIAS (AlCu_D81, AuSn_Delta, BiNi, CoSb_Beta, Co3Sn2, Cu2In_HT, Cu6Sn5_HT, Ni3Sn2, Ge3Ni5_HT, InNi2_HT, Mn(2-x)Sn, NiSb, Ni3Si2_HT, Ni3Sn2, Pb3Pd5_Gamma, PbPt, PdSb, Pd2Sn_HT, PtSn)</i>					
<i>CU5ZN8_GAMMA_D83 (Ag9In4, Ag5Zn8, Al4Cu9, Cu5Zn8, In7Ni3, Ni5Zn8)</i>					
<i>AG3SN_L60_CU3TI (Ag3Sb, Ag3Sn, Au3In, Cu3Sb, Ni3Sb, τ1 in Cu-Ni-Sn)</i>					
<i>AL2AU_C1_CAF2 (Al2Au, Al2Pt, AuIn2, CoSi2, Ga2Pt, In2Pt, Mg2Sn, Mg2Pb, NiSi2, PtSn2)</i>					

### Assessed Systems

139 binary and 72 ternary systems have been assessed. These binaries and ternaries can be calculated in Thermo-Calc with the BINARY and TERNARY modules, respectively.

### 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.