Database name: TCS Sintering/Incineration/Combustion Database
Database acronym: TCES1 **Database version:** 1.1
Database owner: Thermo-Calc Software AB
Database segment: Metals Processing

Brief description
TCES1 is a database for various solid phases and gaseous species.

Applications
Environmental controls in steel and alloy production and metallurgical engineering, environmental-friendly treatments of industrial waste and nuclear waste.

Included Elements

Al	As	Br	C	Ca	Cd	Cl	Cr	Cu	F	Fe	H	Hg	I	K	Mg	Mn
N	Na	Ni	O	P	Pb	S	Sb	Si	Sn	Te	Ti	Zn				

Included Phases
Many types of multicomponent stoichiometric and solution phases are available in the database, such as: gas (gaseous mixture containing about 400 species) and many stoichiometric solids (e.g. metals; carbides, nitrides, silicides, phosphides, borides and other inter-metallic/non-metallic compounds; oxides, hydroxides, silicates, sulfides, sulfates, nitrates, nitrites, phosphates, phosphites, carbonates, borates, halides, etc.). Total amount of different phases is 369.

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, the Ideal Gas Model for gas mixture phase, the Inden Model for magnetic contributions, etc.), which are applicable over a wide temperature-pressure-composition range.

Validation
The present database allows calculations of, for example,

- the effect of variation of ore compositions, sintering temperature, water cooling of the sinter strand at different location, etc., on the concentrations of gaseous species produced along the strand.

- the condensed species formed from the gas phase on cooling and their formation temperatures.

The information provided by the calculations allows process parameters to be adjusted to minimize or eliminate emission of hazardous species and to select suitable filtering operations to maximize removal of both desirable and undesirable species condensing from the gas phase formed during the sintering process.

The database also allows calculations that regard the composition of gas phase forming during incineration and combustion processes, and their respective amounts and temperatures of condensation of species formed on cooling the gas.

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/DOWNLOAD_AREA/References.html