

	mc_al Version 2.029	ME-Al Version 1.0	mc_fe Version 2.059	ME-Fe Version 1.0	mc_ni Version 2.033	ME-Ni Version 1.0
<b>Included elements</b>	Al,Cr,Cu,Fe,Mg,Mn,Ni,Si,Ti,Zn,Zr	Al,Cr,Cu,Fe,Li,Mg,Mn,Ni,Sc,Sn,Si,Ti,Zn,Zr	Fe,Al,B,C,Co,Cr,Cu,H,Hf,La,Mn,Mo,N,Nb,Ni,O,P,Pd,S,Si,Ti,V,W,Y	Fe,Al,B,C,Co,Cr,Cu,H,Hf,La,Mn,Mo,N,Nb,Ni,O,P,Pd,S,Si,Ti,V,W,Y	Ni,Al,B,C,Co,Cr,Cu,Fe,Hf,La,Mn,Mo,N,Nb,O,S,Si,Ti,V,W,Y,Zr	Ni,Al,B,C,Co,Cr,Cu,Fe,Hf,La,Mn,Mo,N,Nb,O,Re,Ru,S,Si,Ta,Ti,V,W,Y,Zr
<b>Standard phase descriptions <sup>1)</sup></b>  <small><sup>1)</sup>Typical examples are listed. In case of more comprehensive interest, please contact the database developer</small>	Multi-component liquid, Al-alloy phase  Intermetallic equilibrium precipitates	Multi-component liquid, Al-alloy phase  Intermetallic equilibrium precipitates	Multi-component liquid, Fe-alloy phase  Equilibrium carbides, nitrides, carbo-nitrides  Intermetallic equilibrium precipitates	Multi-component liquid, Fe-alloy phase  Equilibrium carbides, nitrides, carbo-nitrides  Intermetallic equilibrium precipitates	Multi-component liquid, Ni-alloy phase  Intermetallic equilibrium precipitates Ni3Nb-type $\delta$ phase  Ni3Al-type $\gamma'$ phase  Equilibrium carbides, nitrides, carbo-nitrides	Multi-component liquid, Ni-alloy phase  Intermetallic equilibrium precipitates Ni3Nb-type $\delta$ phase  Ni3Al-type $\gamma'$ phase  Equilibrium carbides, nitrides, carbo-nitrides
<b>Special <sup>1)</sup></b>	Descriptions of metastable Mg-Si and Al-Mg-Si precipitates, GP-zones, and Mg-Si co-clusters	Descriptions of metastable Mg-Si and Al-Mg-Si precipitates, GP-zones, and Mg-Si co-clusters.  Descriptions of metastable Al7CuFe precipitate, re-	Description of metastable Cu-Fe bcc-type precipitates  Description of ordered B2-precipitate in PH-steels	Description of metastable Cu-Fe bcc-type precipitates  Description of ordered B2-precipitate in PH-steels  Description of $\delta$ -ferrite of Cu-	Description of metastable Ni3Nb-type $\gamma''$ phase	Description of Ni3(Al,Nb,Ti)-type $\eta$ phase  Description of metastable Ni3Nb-type $\gamma''$ phase  Improved partitioning ratios of elements in $\gamma / \gamma'$ phases

		<p>assessed Al-Cu-Fe phase descriptions.</p> <p>Description of Cu-solubility in Al<sub>13</sub>Fe<sub>4</sub>.</p> <p>Description of Sn-solubility in Mg<sub>2</sub>Si.</p> <p>Description of Cu- and Sc-solubility in Al<sub>3</sub>Zr.</p>	<p>Description of <math>\delta</math>-ferrite of Cu-containing stainless steel</p>	<p>containing stainless steel</p> <p>Description of <math>\gamma'</math> Ni<sub>3</sub>Al-type precipitate in stainless steel</p> <p>Crystal-structurally improved description of M<sub>6</sub>X, including Si-rich <math>\eta</math>-nitride compound</p> <p>Improved descriptions of boride precipitates</p> <p>Assessed Fe-Mn-Al-C peritectic for TRIP steel simulations</p>		<p>Description of topologically close-packed phases (TCP phases)</p>
<b>Applications <sup>1)</sup></b>	<p>Thermodynamic calculations and thermokinetic simulations in AA2xxx to AA7xxx</p>	<p>Thermodynamic calculations and thermokinetic simulations in AA2xxx to AA7xxx, AA7xx with Sc addition, Al-alloys containing lithium.</p>	<p>Thermodynamic calculations and thermokinetic simulations in</p> <p>-) Martensitic 9-12% Cr steel</p>	<p>Thermodynamic calculations and thermokinetic simulations in</p> <p>-) Martensitic 9-12% Cr steel</p>	<p>Thermodynamic calculations and thermokinetic simulations in Ni-base superalloys</p> <p>-) Nimonic</p>	<p>Thermodynamic calculations and thermokinetic simulations in Ni-base superalloys</p> <p>-) Nimonic</p>

			<ul style="list-style-type: none"> <li>-) Hot-work tool steel</li> <li>-) Microalloyed steel</li> <li>-) PH-steel</li> <li>-) Austenitic stainless steel</li> <li>-) Cu-alloyed steel</li> </ul>	<ul style="list-style-type: none"> <li>-) Hot-work tool steel</li> <li>-) Microalloyed steel</li> <li>-) PH-steel</li> <li>-) Austenitic stainless steel</li> <li>-) Cu-alloyed steel</li> <li>-) TRIP steel</li> </ul>	<ul style="list-style-type: none"> <li>-) Inconel</li> <li>-) Waspaloy</li> <li>-) 1<sup>st</sup> generation single-crystal</li> </ul>	<ul style="list-style-type: none"> <li>-) Inconel</li> <li>-) Waspaloy</li> <li>-) Up to 6<sup>th</sup> generation single-crystal</li> </ul>
<b>Precision</b>	Approx. mean uncertainty range of calc. solidi, liquidi and precipitate solvi: $\pm 30K$	Approx. mean uncertainty range of calc. solidi, liquidi and precipitate solvi: $\pm 30K$	Approx. mean uncertainty range of calc. solidi, liquidi and precipitate solvi: $\pm 30K$	Approx. mean uncertainty range of calc. solidi, liquidi and precipitate solvi: $\pm 30K$	Approx. mean uncertainty range of calc. solidi, liquidi and precipitate solvi: $\pm 20K$	Approx. mean uncertainty range of calc. solidi, liquidi and precipitate solvi: $\pm 20K$
<b>Recommended approx. alloying limitations <sup>2)</sup> for database use (wt.%)</b>  <sup>2)</sup> In case of doubt or special applications with deviating alloying, please contact the database developer	Al>90,Cr<5,Cu<5, Fe<5,Mg<5,Mn<5, Ni<2,Si<10,Ti<2, Zn<5,Zr<2	Al>90,Cr<5,Cu<5,Fe<5 Li<5,Mg<5,Mn<5, Ni<2,Sc<5,Si<10,Sn<2, Ti<2,Zn<5,Zr<2	Al<3,B<0.5,C<1,Co<3 Cr<25,Cu<1,Hf<0.5,La<0.5,Mn<25,Mo<5, N<1,Nb<1,Ni<26, O<0.5,P<0.1,Pd<4, S<0.5,Si<3.5,Ti<0.5, V<0.5,W<3,Y<0.5	Al<10,B<1,C<2,Co<3, Cr<25,Cu<3,Hf<0.5, La<0.5,Mn<25,Mo<5, N<1,Nb<1,Ni<26, O<0.5,P<0.1,Pd<4, S<0.5,Si<5,Ti<0.5, V<0.5,W<3,Y<0.5	Ni>60,Al<10,B<0.5, C<1,Co<20,Cr<20, Cu<0.5,Fe<20,Hf<0.5, La<0.5,Mn<1,Mo<8, N<0.5,Nb<6,O<0.5, S<0.1,Si<2,Ti<4,V<0.5, W<8, Y<0.1,Zr<0.5	Ni>55,Al<15,B<1,C<1, Co<25,Cr<25,Cu<0.5, Fe<20,Hf<1,La<0.5, Mn<1,Mo<10,N<0.5, Nb<6,O<0.5,Re<7, Ru<7,S<0.1,Si<2,Ta<1 0,Ti<5,V<0.5,W<15, Y<0.1,Zr<0.5