



钢铁之家

www.steels.org.cn

全球钢号百科!

Global Steel Grade Encyclopedia



涵盖的行业或国家与地区类别



国际材料与试验协会

GJB

国家军用标准



动力机械工程师协会

EU

前欧洲标准化

AISI

美国钢铁学会



德国工业标准

AMS

航空航天材料规范



国际标准

JASO

日本汽车标准组织

EN

欧洲标准

JB

中国机械行业标准

UNS

统一编号系统

UNI

意大利标准



美国机械工程师协会

SS

瑞典标准



国家标准



日本工业标准

Steel Type : Quenched and Tempered Steel

Steel Grade: 42CrMo

Property Entry Summary

Steel Grade	42CrMo
Steel Classification	Quenched and Tempered Steel
General	Steel Grade Comparison, Chemical Composition
Heat Treatment Parameter	Critical temperature, Normalizing, Quenching, Tempering
Transformation Curve	Continuous Cooling Transformation Curve, Temperature Time Transformation Curve, Phase Equilibrium Transformation

General

Steel Grade Comparison

Britain (BS)	The USA (AISI)	French (NF)	Japan (JIS)	West Germany (DIN)
708M40	4140	42CD4	SCM4	42CrMo4
708A42				
709M40				

Chemical Composition (%)

C	Si	Mn	P	S	Mo	Cr	Cu
0.38~0.45	0.20~0.40	0.5~0.8	≤0.04	≤0.04	0.15~0.25	0.9~1.2	≤0.03

Reference

- [1] Zeng Zhengming. The Handbook of Practical Steel Materials [M]. Electricity Press of China, 2005: 232-279,310-453, 501-512.
- [2] Hu Zhizhong. The Handbook of Steel and Its Heat Treatment Curve. Beijing: Defence Industry Press, 1987.

[3] Lin Huiguo, Lin Gang. The Handbook of Steel Grade [M] .Beijing: Mechanical Industry Press, 1993: 9-71, 241-262.

Heat Treatment Parameter

Critical Temperature and Heat Treatment Condition

Critical Temperature (°C)				Heat Treatment Condition					
A _{c1}	A _{c3}	A _{r1}	M _s	Normalizing	Quenching			Tempering	
730	780	690	360	Temperature (°C)	Temperature (°C)	Cooling agents	HRC	Temperature (°C)	HRC
				850	850~860	Oil	55~59	220~650	58~28

Reference

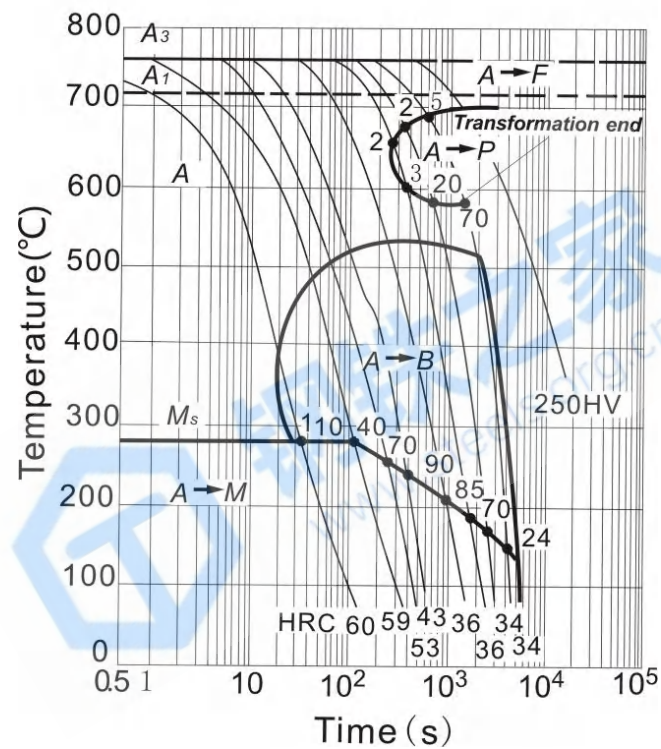
[4] Hu Guangli. Heat Treatment of Steels. Beijing : Defence Industry Press, 1985.

[5] Bao Xintao. Practical Handbook of Heat Treatment of Steel . Shanghai: Science and Technology Press of Shanghai, 2009.

Transformation Curves

Continuous Cooling Transformation (CCT) Curve

Element (wt%)	C	Si	Mn	Cr	Mo	Ni
	0.46	0.22	0.50	1.00	0.21	0.26
Grain size	-----					
Austenitizing temperature (°C)	850					

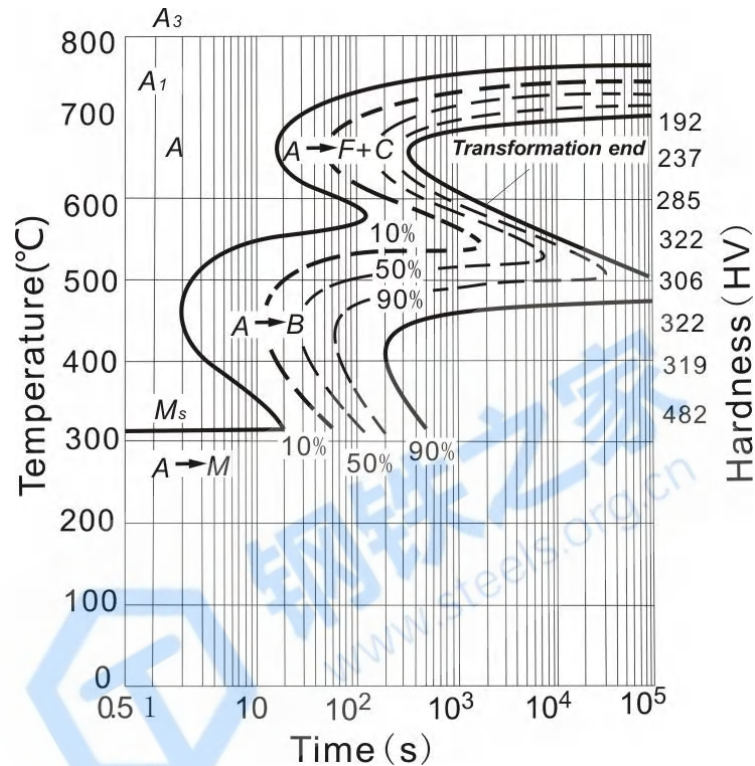


Reference

[6] Hu Zhizhong. The Handbook of Steel and Its Heat Treatment Curve. Beijing: Defence Industry Press, 1987.

Temperature Time Transformation (TTT) Curve

Element (wt%)	C	Si	Mn	Cr	Mo
	0.41	0.29	0.67	1.01	0.23
Grain size	-----				
Austenitizing temperature (°C)	860				

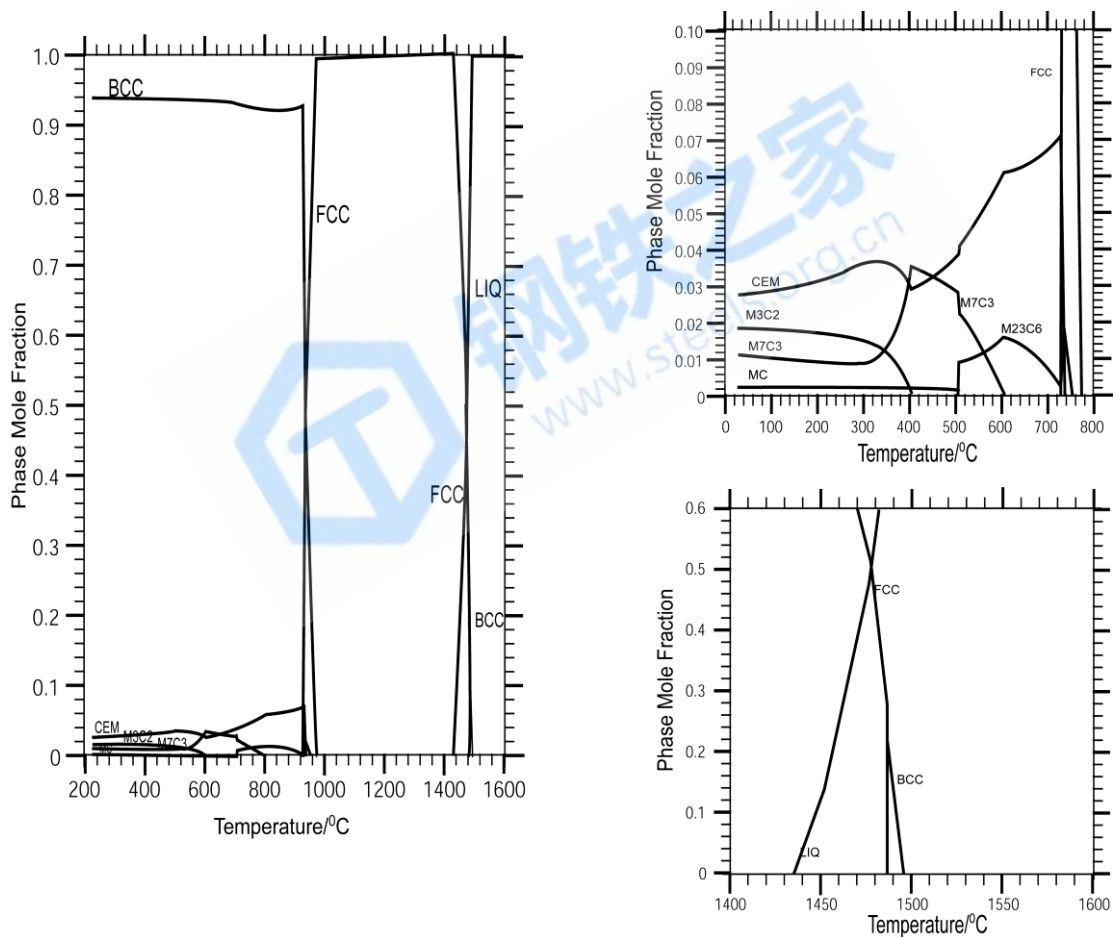


Reference

- [8] H. Yu, S.G. Mhaisalkar. Time-temperature transformation (TTT) cure diagram of a fast cure non-conductive adhesive, Thin Solid Films 504 (2006) 331 – 335.
- [9] Hu Zhizhong. The Handbook of Steel and Its Heat Treatment Curve. Beijing: Defence Industry Press, 1987.

Equilibrium Phase Transformation (EPT) Curve

Element (wt%)	C	Si	Mn	Cr	Ni
	0.40	0.30	0.65	0.61	1.20
Phases considered	<i>Liquid, Fcc, Bcc, M3C2, M7C3, Cementite;</i>				
Phases rejected	<i>Dia, Graph, Fech_chi, Fe4n_1p1;</i>				
Calculation condition	$P=10^5\text{Pa}$, $N=1\text{mole}$				
Database	TCFE3				
Software package	Thermo-Calc				



Remarks

[10] Sundman B, Jansson B, Andersson J-O. The Thermo-Calc databank system. Calphad, 1985,9:153-190.