



钢铁之家

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全球钢号百科!

Global Steel Grade Encyclopedia



涵盖的行业或国家与地区类别



美国材料与试验协会

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

E 40 K Superclean – slows down formation of hot cracks effectively

During pressure die casting molten light metal is poured into a previously tempered mould at a tremendous velocity and at high pressure. In the process the mould is exposed to extreme mechanical and simultaneously thermal cyclic load. During the long production phases, fatigue cracks (hot cracks) form sooner or later due to these process-related factors. At the latest when the cracks merge together and chipping occur, they would be transferred to the surface of the die-cast component and result in the failure of the mould.

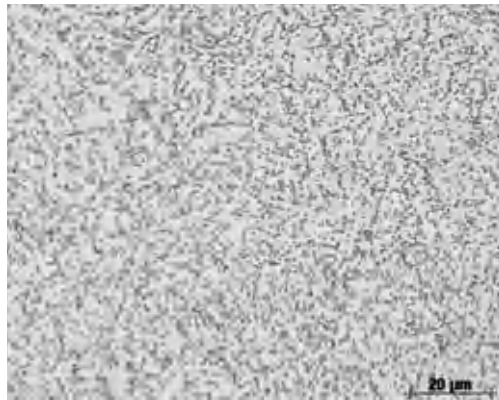
Intelligent lightweight construction in the automotive industry leads among others to an increasing use of die-cast aluminium components also for structural elements. To meet these ever-expanding requirements Deutsche Edelstahlwerke has developed a high-quality special steel with excellent mechanical properties: Thermo-
dur® E 40 K Superclean.

Outstanding material competence for maximum performance and efficiency

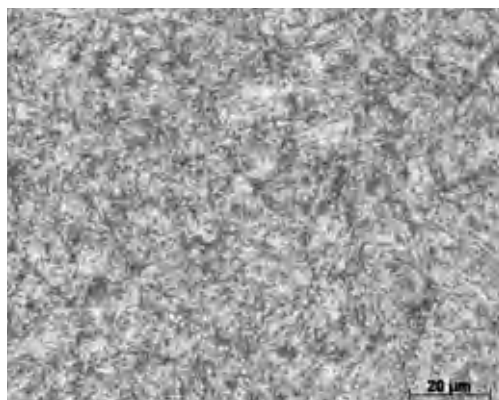
The chemical composition of this high-performance steel is precisely adjusted in the modern secondary metallurgic treatment facilities at Deutsche Edelstahlwerke.

Thermodur® E 40 K Superclean is treated to achieve an extremely homogeneous structure in both annealed and tempered states by means of an electro-slag remelting process and a special structural treatment.

As a result, Thermodur® E 40 K Superclean features the required properties of improved temperature stability combined with high toughness.

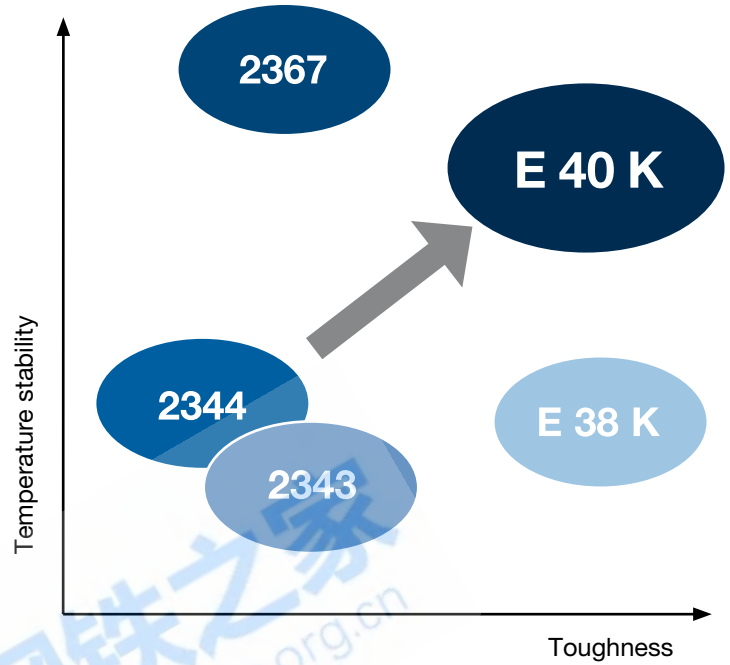


Annealed structure



Tempered structure

Compared to other proven Cr-Mo-V alloyed hot-work steels Thermodur® E 40 K Super-clean offers the perfect combination of high temperature stability and toughness for highly stressed tools.

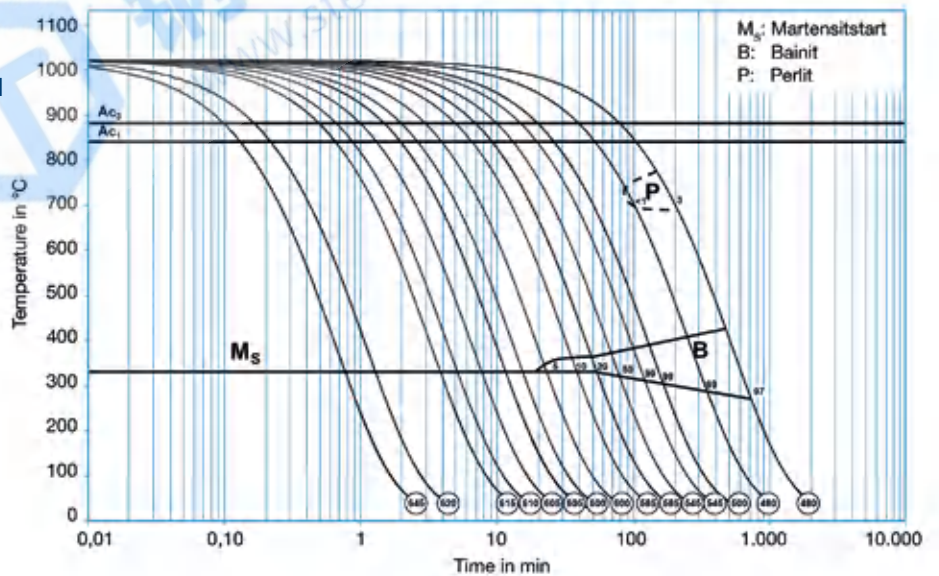


Impact bending samples (tempered to 44 - 46 HRC) after testing on a 450J pendulum impact testing machine

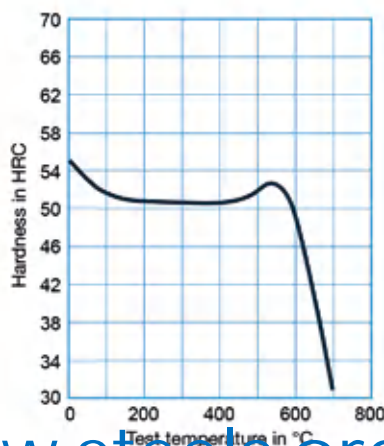
E 40 K SUPERCLEAN

Chemical properties	C	Si	Mn	S	Cr	Mo	V	Additions	
	0,35	0,30	0,30	< 0,003	5,00	1,75	0,80	+	
Steel properties	High toughness combined with improved high-temperature strength, optimum resistance to hot cracking, high hot wear resistance, optimum homogeneity of microstructure and isotropy of mechanical values.								
Physical properties	Coefficient of thermal expansion at °C								
	at 45 HRC								
				20 - 100	20 - 200	20 - 300	20 - 400	20 - 500	20 - 600
	10⁻⁶ m/(m • K)			11,5	12,0	12,3	12,6	12,9	13,2
	Thermal conductivity at °C								
	W/(m • K)								
	RT	100	200	300	400	500	600		
	28,3	29,3	30,9	31,0	30,7	29,5	27,8		
Applications	Universally usable hot-work steel thanks to an outstanding combination of temperature stability and toughness, particularly suitable for highly stressed die-casting moulds, extrusion dies and forging dies.								
Heat treatment	Soft annealing °C		Cooling			Hardness HB			
	750 - 800		Furnace			max. 230			
	Hardening °C		Quenching			Hardness after quenching HRC			
	1020 - 1040		Air, oil or saltbath			55			
	Tempering °C		300	400	500	550	600	650	
	HRC		51	51	52	51	48	36	

TIME-TEMPERATURE-TRANSFORMATION DIAGRAM



TEMPERING DIAGRAM, LEFT



HIGH-TEMPERATURE STRENGTH DIAGRAM, RIGHT

