



Premium

Cold-work Tool Steel

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produced by Kind&Co. provide balanced, special properties with regard to

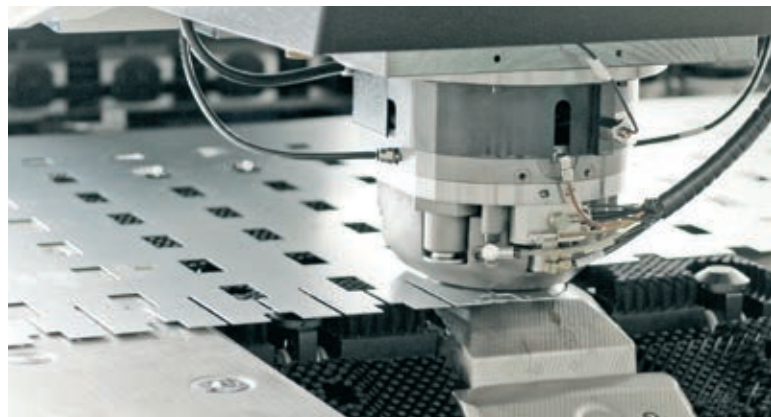
- **Outstanding wear resistance**
- **High compressive strength**
- **Very good resistance to chipping**
- **Good machining properties**
- **Cost efficiency**



High strength and ductility for improved durability

In the cutting and forming industry, the requirements for tools are constantly increasing due to growing demands on processing material, higher precision and an ever-increasing cost pressure with regard to processes.

Premium Cold-work Tool Steel simultaneously requires both strength and ductility in order to increase the service life of the tools and to lower costs. To improve ductility, we constantly enhance the purity and homogeneity of our steel. Our electro-slag-remelting (ESR) process allows us to produce bars with the highest levels of purity along with a uniform solidification microstructure across the entire bar, width and length.



Brand name	Short term	AISI	JIS	Mass. %								
				C	Si	Mn	Cr	Mo	Ni	V	W	Nb
CH 16 V	X153CrMoV12	D2	SKD 11	1,50	0,25	0,25	11,25	0,80	-	0,85	-	-
CH5M	X100CrMoV5	A2		1,00	0,30	0,60	5,25	1,10	-	0,20	-	-
KL	60WCrV7	S1		0,60	0,60	0,30	1,10	-	-	0,15	-	-
PK	45WCrV7	-		0,45	1,00	0,30	1,10	-	-	0,20	-	-
N 400	45NiCrMo16	-		0,45	0,25	0,40	1,35	0,25	4,00	-	-	-
CS1	-	-		0,50	0,30	0,40	5,00	1,90	-	0,55	-	+
USD H	X50CrVMo5-1	H13 mod.		0,51	0,85	0,30	4,90	1,35	-	0,90	-	-
CR7V-L	-	-		0,42	0,50	0,40	6,50	1,30	-	0,80	-	-
HS1	-	-		0,50	0,90	0,80	8,00	1,50	-	1,70	-	-
FSR	-	-		1,20	0,30	0,30	11,50	1,40	-	1,70	2,40	-
PM 823	-	-		0,84	0,85	0,35	7,70	1,50	-	2,45	-	-
PW 812	-	-		1,13	0,85	0,35	7,70	1,50	-	2,45	1,10	-

Characteristics and Comparison of Properties

Brand name	AISI JIS	Characteristics	Resistance to wear	Resistance to chipping	Resistance to plastic deformation	Machinability
CH 16 V	D2 SKD 11	High Cr-alloyed ledeburitic cold-work tool steel with high abrasive wear resistance. Nitridable after special heat treatment.	●●●●○	●○○○○	●●●●○	●●●○○
CH 5M	A2 -	Air-hardenable cold-work tool steel with well-balanced combination of wear resistance and toughness.	●●●○○	●●○○○	●●●○○	●●●○○
KL	S1 -	Oil-hardenable cold-work tool steel with good toughness and cutting properties.	●●○○○	●●●○○	●●○○○	●●●○○
PK	-	Tough cold-work tool steel for applications with permanent shock impacts.	●●○○○	●●●○○	●○○○○	●●●○○
N 400	- -	High Ni-alloyed cold-work tool steel with excellent toughness and good through-hardenability. Good polishability.	●○○○○	●●●●●	●○○○○	●●○○○
CS1	- -	This Cr-Mo-V-alloyed premium tool steel, produced by ESSR, is characterized by very high toughness in combination with high hardness.	●●○○○	●●●●●	●●●○○	●●○○○
USD H	H13 mod. -	Tool steel based on hot-work tool steel H13 with increased C-content. Well balanced profile of properties with high wear resistance and very good toughness.	●●○○○	●●●○○	●●●○○	●●●○○
CR7V-L	- -	The composition of this Cr-Mo-V-alloyed tool steel aims at high wear resistance in combination with high toughness.	●●○○○	●●●○○	●●○○○	●●●○○
HS1	- -	This ESR-remelted cold-work tool steel, based on the composition of CR7V-L, displays a further wear resistance.	●●●○○	●●●○○	●●●○○	●●●○○
FSR	- -	Premium cold-work tool steel combining excellent wear resistance and high compressive strength,	●●●●●	●○○○○	●●●●●	●●●○○
PM 823	- -	Premium cold-work tool steel for a wide range of applications. PMR 823 combines a very high abrasive wear resistance, outstanding compressive strength, very good tempering resistance and toughness.	●●●○○	●●●○○	●●●●●	●●●○○
PW 812	- -	Premium cold-work tool steel with high V- and W-concentrations. PW 812 combines outstanding abrasive wear resistance, good toughness, good hardenability and high compressive strength.	●●●●●	●●○○○	●●●●●	●●●○○



Recommended application and hardness level in Cold Work Tools (Hardness Value in HRC)

Blanking and Punching Dies for general use

Up to 3 mm thickness

CH 16V (60-62)	PM 823 (60-63)	PW 812 (61-63)	FSR (60-63)			
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3-6 mm thickness

CH 5 M (58-62)	CH16 V (58-62)	HS1 (57-59)	CS1 (56-58)	PM 823 (60-62)	PW 812 (61-62)	FSR (60-62)
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6-12 mm thickness

KL (52-56)	USD H (55-57)	CR7V-L (54-56)	CS1 (54-56)	PM 823 (56-58)		
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> 12 mm thickness

PK (52-54)	N 400 (52-54)	CS1 (52-54)	CR7V-L (52-54)			
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Blanking and Punching Dies for material of elevated tensile strength > 600 N/mm² and austenitic steels

Up to 3 mm thickness

CH 16V (58-62)	PM 823 (60-62)	PW 812 (60-62)	FSR (60-62)			
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3-6 mm thickness

CH16 V (56-60)	HS1 (56-58)	CS1 (55-57)	PM 823 (58-60)	PW 812 (58-60)		
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6-12 mm thickness

KL (50-54)	USD H (53-56)	CR7V-L (52-54)	CS1 (54-56)	HS1 (56-58)	PM 823 (54-57)	
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> 12 mm thickness

PK (48-52)	N 400 (48-52)	CS1 (50-54)	CR7V-L (50-52)			
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Shearing Blades and Industrial Knives

Up to 3 mm thickness

CH 16V (58-62)	PM 823 (60-62)	PW 812 (60-62)	FSR (60-62)			
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3-6 mm thickness

CH16 V (56-60)	HS1 (56-58)	CS1 (55-57)	PM 823 (58-60)	PW 812 (58-60)		
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6-12 mm thickness

KL (50-54)	USD H (53-56)	CR7V-L (52-54)	CS1 (54-56)	HS1 (54-57)	PM 823 (54-57)	
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> 12 mm thickness

PK (48-52)	N 400 (48-52)	CS1 (50-54)	CR7V-L (50-52)			
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Trimming Dies

Cold Trimming for sheets

CH16 V (56-60)	HS1 (56-58)	CS1 (55-57)	PM 823 (58-60)	PW 812 (58-60)		
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Cold Trimming for medium and larger thickness

CR7V-L (52-55)	USD H (53-56)	CS1 (55-57)	HS1 (56-58)			
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Semi Hot Trimming

CR7V-L (52-56)	USD H (53-57)	CS1 (55-58)	HS1 (56-59)			
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Bending Tools

KL (50-54)	USD H (53-56)	CR7V-L (52-57)	CS1 (54-58)	PM 823 (58-60)		
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Billet Shearing Tools

Thickness < 50 mm

KL (50-54)	USD H (52-55)	CS1 (54-57)				
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Thickness > 50 mm

N 400 (48-50)	KL (50-53)	PK (51-53)				
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Thread rolling Tools

CH 5 M (58-62)	CH 16V (60-63)	CR7V-L (53-56 HRC)	HS1 (56-59)	PM 823 (60-62)		
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The Soul of Steel – Specialists for Premium tool steel Solutions

As an open die forge offering an upstream melting shop, as well as downstream machining, our site at Wiehl-Bielstein in Germany covers the entirety of the production chain. From the melting of steel through to the production of ready-to-use tools, we have more than 125 years of concentrated expertise that we combined with the latest technology, thus enabling us to fully meet the requirements of our customers' products with our accompanying services. Nowadays, the selection of the right tool steels with the associated features is more important than ever before in achieving high tool life combined with simultaneous low tool costs.

The use of high-quality tool steels is capable of accelerating production rates. At the same time, the use of high quality Tool Steels considerably extends the service life of the tools. This leads to high cost-effectiveness throughout the entire production cycle.

The challenges of the present, as well as the challenges that await the industry in the future, can only be mastered by the incorporation of premium Tool Steels grades equipped to meet the requirements that the industry faces.



Production processes

Melting

Forging

Heat treatment

Mechanical processing

Vacuum hardening

Surface treatment

Products

Hot-work tool steels

Cold-work tool steels

Die forging steels

Plastic mould steels

Industries

Die casting

Extrusion

Die forging

Pipe technology

Plastics technology

Hot-stamping

Special applications

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