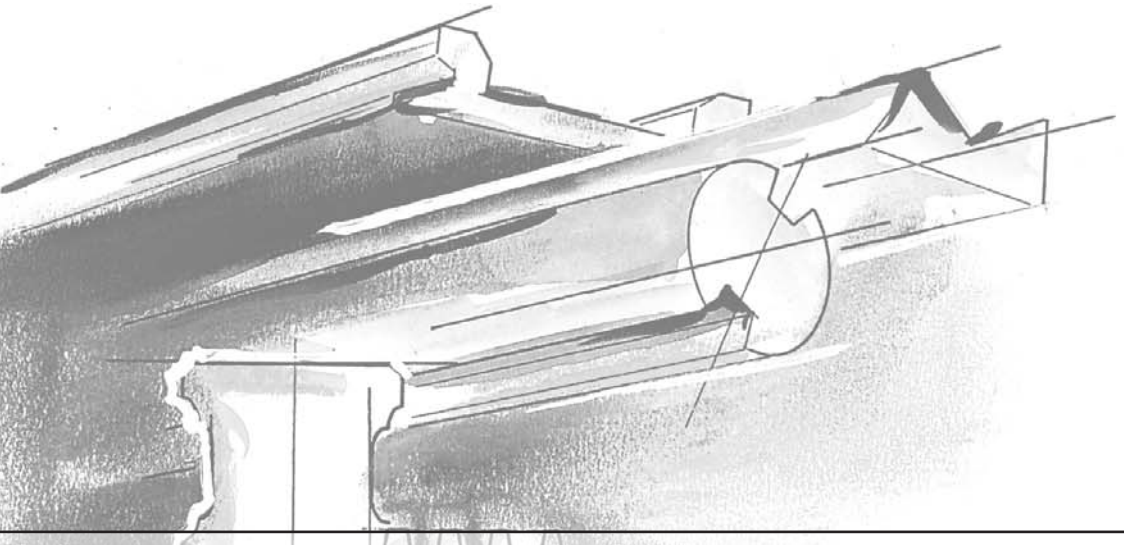
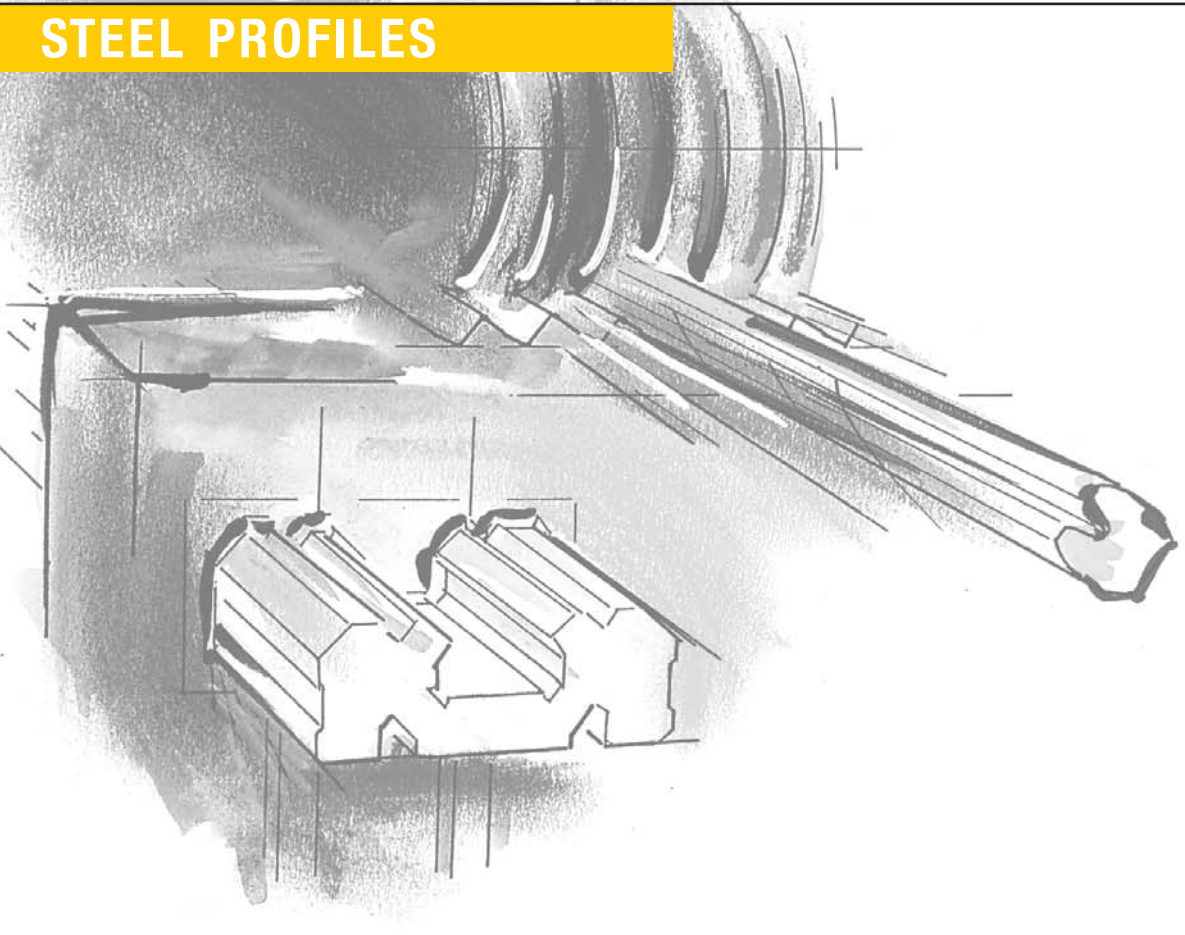


MATERIALS

ZOLLERN

STEEL PROFILES



MATERIALS

STEEL

ZOLLERN ISOPROFIL steel profiles are fabricated in a wide range of different steels according to intended use.

Detailed information on the chemical composition and mechanical properties of the steels used can be found in the separate tables of materials.

FREE-CUTTING STEELS

Free-cutting steels are used everywhere in large-scale production where economic machining is of particular importance.

CHEMICAL COMPOSITION OF FREE-CUTTING STEELS (LADLE ANALYSIS)

Free-cutting steels for general use

Designation			Chemical properties in %					
DIN	Euro Standard	Material No.	C max.	Si max.	Mn	P max.	S	Pb
9 SMn 28	11SMn30	1.0715	0,14	0,05	0,90–1,30	0,11	0,27–0,33	–
9 SMnPb 28	11SMnPb30	1.0718	0,14	0,05	0,90–1,30	0,11	0,27–0,33	0,20–0,35
9 SMn 36	11SMn37	1.0736	0,14	0,05	1,10–1,50	0,11	0,34–0,40	–
9 S MnPb 36	11SMnPb37	1.0737	0,14	0,05	1,10–1,50	0,11	0,34–0,40	0,20–0,35

Further materials on demand

Free-cutting steels for quenching and tempering

Designation			Chemical properties in %					
DIN	Euro Standard	Material No.	C max.	Si max.	Mn	P max.	S	Pb
35 S 20	35S20	1.0726	0,32–0,39	0,4	0,70–1,10	0,06	0,15–0,25	–
35 SPb 20	35SPb20	1.0756	0,32–0,39	0,4	0,70–1,10	0,06	0,15–0,25	0,15–0,35
45 S 20	46S20	1.0727	0,42–0,50	0,4	0,70–1,10	0,06	0,15–0,25	–
45 SPb 20	46SPb20	1.0757	0,42–0,50	0,4	0,70–1,10	0,06	0,15–0,25	0,15–0,35

Further materials on demand

MECHANICAL PROPERTIES FOR DIFFERENT CONDITIONS OF TREATMENT

Designation			As-supplied condition						
				U		+C			+C +SR
DIN	Euro Standard	Material No.	Thickness	Hardness	Tensile strength	Yield strength	Tensile strength	Fract. Elongation	Tensile strength
			mm	HB max.	N/mm²	N/mm² min.	N/mm²	$(L_0=5d_0)$ % min.	N/mm² max.
9 SMn 28	11SMn30	1.0715	<10	170	380–570	440	560–810	6	550
9 SMnPb 28	11SMnPb30	1.0718	10–16	170	380–570	410	510–760	7	550
9 SMn 36	11SMn37	1.0736	16–40	159	380–570	375	460–710	8	550
9 SMnPb 36	11SMnPb37	1.0737	40–63	159	380–570	305	410–660	9	550
			63–100	156	360–520	245	380–630	10	550
35 S 20	35S20	1.0726	<10	197	490–660	480	640–880	6	680
35 SPb 20	35SPb20	1.0756	10–16	197	490–660	400	590–830	7	680
			16–40	192	490–660	315	540–740	8	680
			40–63	192	490–640	285	510–710	9	680
			63–100	187	480–630	255	480–680	10	–
45 S 20	46S20	1.0727	<10	229	590–760	570	740–980	5	750
45 SPb 20	46SPb20	1.0757	10–16	229	590–760	470	690–930	6	750
			16–40	223	590–760	375	640–830	7	750
			40–63	223	590–740	325	610–800	8	750
			63–100	217	580–730	305	580–770	9	–

STRUCTURAL STEELS

Because of their mechanical properties structural-steels are used as an engineering material in the construction of machinery and motor vehicles. The materials with a carbon content up to about 0.20 % and 0.4 – 1.4 % Mn are characterised by good welding properties.

LADLE ANALYSIS

Designation			Chemical values[1)]	Target values for Mechanical Properties in Condition C Tensitive Strength Rm in N/mm², Elongation A_5 in % mind.									
				Thickness up to 10 mm		Thickness 10 up to 16 mm		Thickness 16 up to 25 mm		Thickness 25 up to 40 mm		Thickness 40 up to 80 mm	
Designation	Euro Standard	Material No.	C in %	Rm	A5	Rm	A5	Rm	A5	Rm	A5	Rm	A5
St 37-2	S235JR	1.0037	max. 0,20	470–770	8	440–690	8	440–690	10	420–690	11	380–600	12
St 44-2	S275JR	1.0044	max. 0,22	580–840	7	530–820	8	510–790	9	490–740	10	440–670	11
St 50-2	E295	1.0050	ca. 0,30	620–920	6	580–830	7	550–800	8	540–790	9	500–740	10
St 52-3	S355J2G3	1.0570	max. 0,22	650–950	6	600–850	7	550–800	8	530–780	9	520–750	10
St 60-2	E335	1.0060	ca. 0,40	470–1040	5	680–990	6	670–920	7	640–890	8	620–850	9
18 MnV 5	–	–	max. 0,20	>750	>10	>700	>10	>700	>10	>650	>20	>600	>20

1) chemical properties EN 10025
Further materials on demand

STEELS FOR QUENCHING AND TEMPERING (QT STEELS)

Machine components are manufactured from QT steels, if they are subject to such high tensile, compressive, bending and/or torsional stresses – whether static, alternating or sudden – that the universal structural steels, with their mechanical properties, are no longer adequate.

For improved cutting properties we sell a few steels with a controlled sulphur content of 0.020–0.035 %, and also with added lead.

UNALLOYED QT STEELS

Unalloyed QT steels are preferred for low-stress components in the construction of machinery and motor vehicles.

LADLE ANALYSIS

Designation			Chemical properties in %				
DIN	Euro Standard [1]	Material No.	C max.	Si max.	Mn	P max.	S
C 22	C 22	1.0402	0,17–0,24	0,40	0,40–0,70	0,045	0,045
Ck 22	C 22E	1.1151	0,17–0,24	0,40	0,40–0,70	0,035	0,035
Cm 22	C22R	1.1149	0,17–0,24	0,40	0,40–0,70	0,035	0,020–0,040
C 35	C35	1.0501	0,32–0,39	0,40	0,50–0,80	0,045	0,045
Ck 35	C35E	1.1181	0,32–0,39	0,40	0,50–0,80	0,035	0,035
Cm 35	C35R	1.1180	0,32–0,39	0,40	0,50–0,80	0,035	0,020–0,040
C 45	C45	1.0503	0,42–0,50	0,40	0,50–0,80	0,045	0,045
Ck 45	C45E	1.1191	0,42–0,50	0,40	0,50–0,80	0,035	0,035
Cm 45	C45R	1.1201	0,42–0,50	0,40	0,50–0,80	0,035	0,020–0,040
Cf 53	–	1.1213	0,50–0,57	0,15–0,35	0,40–0,70	0,025	0,035
C 55	C55	1.0535	0,52–0,60	0,40	0,60–0,90	0,045	0,045
Ck 55	C55E	1.1203	0,52–0,60	0,40	0,60–0,90	0,035	0,035
Cm 55	C55R	1.1209	0,52–0,60	0,40	0,60–0,90	0,035	0,020–0,040
C 60	C60	1.0601	0,57–0,65	0,40	0,60–0,90	0,045	0,045
Ck 60	C60E	1.1221	0,57–0,65	0,40	0,60–0,90	0,035	0,035
Cm 60	C60R	1.1223	0,57–0,65	0,40	0,60–0,90	0,035	0,020–0,040

1) Tramp elements EN 10083-1 and EN 10083-2
Further materials on demand

MECHANICAL PROPERTIES FOR UNALLOYED QT STEELS

Designation			As-supplied condition				cold drawn and soft annealed – A+C			
				cold drawn – C				cold drawn and normalised – C+N		
DIN	Euro Stand.	Material No.	Thickness	Tensile strength	Yield strength	Fract. Elongation	Hardness	Tensile strength	Yield strengthe	Fract. Elongation
			mm	Rm N/mm^2 min.	Rp0,2 N/mm^2 min.	($L_0=5d_0$) % min.	HB max.	Rm N/mm^2 min.	Rp0,2 N/mm^2 min.	($L_0=5d_0$) % min.
C 22	C22	1.0402	<5	580	460	5	170	430	240	24
Ck 22	C22E	1.1151	5–10	540	410	6	170	430	240	24
Cm 22	C22R	1.1149	10–16	500	350	7	170	430	240	24
			16–25	450	320	8	170	410	210	25
			25–40	450	270	9	170	410	210	25
			40–100	410	230	11	170	410	210	25
			100–160	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.
C 35	C 35	1.0501	<5	680	570	5	190	550	300	18
Ck 35	C 35E	1.1181	5–10	640	480	6	190	550	300	18
Cm 35	C 35R	1.1180	10–16	580	400	7	190	550	300	18
			16–25	550	370	8	190	520	270	19
			25–40	550	310	8	190	520	270	19
			40–100	520	280	9	190	520	270	19
			100–160	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.
C 45	C 45	1.0503	<5	770	640	4	207	620	340	14
Ck 45	C 45E	1.1191	5–10	730	560	5	207	620	340	14
Cm 45	C 45R	1.1201	10–16	680	470	6	207	620	340	14
			16–25	630	430	6	207	580	305	16
			25–40	630	370	7	207	580	305	16
			40–100	580	330	8	207	580	305	16
			100–160	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.
Cf 53	–	1.1213	<16	840	680	5	223	680	370	11
			16–100	680	450	6	223	640	330	12
C 55	C 55	1.0535	<16	840	680	5	229	680	370	11
Ck 55	C 55E	1.1203	16–100	680	450	6	229	640	330	12
Cm 55	C 55R	1.1209	–	–	–	–	–	–	–	–
C 60	C 60	1.0601	<5	860	700	4	241	710	380	10
Ck 60	C 60E	1.1221	5-10	800	630	5	241	710	380	10
Cm 60	C 60R	1.1223	10–16	750	520	6	241	710	380	10
			16–25	700	470	6	241	670	340	11
			25–40	700	410	7	241	670	340	11
			40–100	670	380	8	241	670	340	11
			100–160	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.	n.V.

n.V. = by agreement

ALLOYED QT STEELS

Because of their chemical composition alloyed QT steels are characterised by their high strength, ductility and improved performance in terms of wear. These steels are suitable for example for the manufacture of crankshafts, steering knuckles, pinion shafts, steering components etc.

MECHANICAL PROPERTIES FOR ALLOYED QT STEELS

Designation		As-supplied condition				
			annealed and soft drawn A+C		soft drawn and soft annealed C+A	
DIN/EN	Material No.	Thickness	Strength Rm	Hardness	Strength Rm	Hardness
		mm	N/mm^2 max.	HB max.	N/mm^2 max.	HB max.
34 Cr 4	1.7033	≤16	940	285		223
34 CrS 4	1.7037	16–40	920	270	760	223
		40–80	900	265		223
25 CrMo 4	1.7218	≤16	880	270		212
25 CrMoS 4	1.7213	16–40	860	255	710	212
		40–80	840	250		212
34 CrMo 4	1.7220	≤16	940	290		223
34 CrMoS 4	1.7226	16–40	920	275	760	223
		40–80	900	270		223
42 CrMo 4	1.7225	≤16	980	300		241
42 CrMoS 4	1.7227	16–40	960	285		241
		40–80	940	280		241
36 CrNiMo 4	1.6511	≤16	1000	300		248
		16–40	980	290	840	248
		40–80	960	285		248
34 CrNiMo 6	1.6582	≤16	1000	310		248
		16–40	980	295	840	248
		40–80	960	290		248
58 CrMoV 4	1.7792	alle	1050	305	865	255

LADLE ANALYSIS

Designation		Chemical properties in %								
DIN/EN	Material No.	C max.	Si max.	Mn	P max.	S	Cr	Mo	Ni max.	V
34 Cr 4	1.7033	0,30–0,37	0,40	0,60–0,90	0,035	≤0,035	0,90–1,20	–	–	–
34 CrS 4	1.7037	0,30–0,37	0,40	0,60–0,90	0,035	0,020–0,040	0,90–1,20	–	–	–
25 CrMo 4	1.7218	0,22–0,29	0,40	0,60–0,90	0,035	≤0,035	0,90–1,20	0,15–0,30	–	–
25 CrMoS 4	1.7213	0,22–0,29	0,40	0,60–0,90	0,035	0,020–0,040	0,90–1,20	0,15–0,30	–	–
34 CrMo 4	1.7220	0,30–0,37	0,40	0,60–0,90	0,035	≤0,035	0,90–1,20	0,15–0,30	–	–
34 CrMoS 4	1.7226	0,30–0,37	0,40	0,60–0,90	0,035	0,020–0,040	0,90–1,20	0,15–0,30	–	–
42 CrMo 4	1.7225	0,38–0,45	0,40	0,60–0,90	0,035	≤0,035	0,90–1,20	0,15–0,30	–	–
42 CrMoS 4	1.7227	0,38–0,45	0,40	0,60–0,90	0,035	0,020–0,040	0,90–1,20	0,15–0,30	–	–
36 CrNiMo 4	1.6511	0,32–0,40	0,40	0,50–0,80	0,035	≤0,035	0,90–1,20	0,15–0,30	0,90–1,20	–
34 CrNiMo 6	1.6582	0,30–0,38	0,40	0,50–0,80	0,035	≤0,035	1,30–1,70	0,15–0,30	1,30–1,70	–
58 CrMoV 4	1.7792	0,58–0,62	0,20–0,30	0,80–0,95	0,020	≤0,010	0,90–1,05	0,15–0,20	0,25	0,10–0,15

Further materials on demand

CASE HARDENING STEELS

Case-hardening steels are machinery steels with a relativly low carbon content and a surface layer which is carburised or carbonitrided prior to hardening. After hardening of the surface layer, these steels have a high capacity for retaining their hardness and are very resistant to wear, whilst the core material is characterised mainly by a good degree of ductility.

For improved cutting properties steels with controlled sulphur content of 0.020–0.035 % and with 0.15–0.35 % added lead can also be supplied.

UNALLOYED CASE-HARDENING STEELS

Preferred uses after case-hardening are for example: for components and machine parts with a low core strength and moderate stressing, e.g. journals, bushing, die stampings or levers.

LADLE ANALYSIS

Designation			Chemical properties in %					
DIN	Euro Standard	Material No.	C max.	Si max.	Mn	P max.	S	Pb
C 10	–	1.0301	0,07–0,13	0,40	0,30–0,60	0,045	≤0,045	–
Ck 10	C 10 E	1.1121	0,07–0,13	0,40	0,30–0,60	0,035	≤0,035	–
C 15	–	1.0401	0,12–0,18	0,40	0,30–0,60	0,045	≤0,045	–
C15Pb	–	1.0403	0,12–0,18	0,40	0,30–0,60	0,045	≤0,045	0,020–0,035
Ck 15	C 15 E	1.1141	0,12–0,18	0,40	0,30–0,60	0,035	≤0,035	–
Cm 15	C 15 R	1.1140	0,12–0,18	0,40	0,30–0,60	0,035	0,020–0,040	–

Further materials on demand

MECHANICAL PROPERTIES FOR UNALLOYED CASE-HARDENING STEELS

Designation			As-supplied condition				colt drawn and soft annealed A+C
				colt drawn – C			
DIN	Euro Standard	Material No.	Thickness	Tensile strength	Yield strength	Fracture Elongation	Hardness
			mm	N/mm^2 min.	N/mm^2 min.	$(L_0=5d_0)$ % min.	HB max.
C 10		1.0301	<5	500	400	7	131
Ck 10	C 10 E	1.1121	5–10	480	365	8	131
C 10 Pb	–	1.0302	10–16	450	300	9	131
			16–25	420	270	10	131
			25–40	380	240	11	131
			40–100	340	180	12	131
C 15	–	1.0401	<5	540	440	6	143
C 15 Pb	–	1.0403	5–10	500	385	7	143
Ck 15	C 15 E	1.1141	10–16	480	340	8	143
Cm 15	C 15 R	1.1140	16–25	450	300	9	143
			25–40	420	250	10	143
			40–100	370	200	12	143

ALLOYED CASE-HARDENING STEELS

Alloyed case-hardening steels are used where there is a high degree of wear, e.g. toothed wheels, gearwheels, shafts, bolts, universal joints etc..

LADLE ANALYSIS

Designation			Chemical properties in %							
DIN	Euro Standard	Material No.	C	Si max.	Mn	P max.	S	Cr	Ni	Mo
16 MNCr 5		1.7131	0,14–0,19	0,40	1,00–1,30	0,035	≤0,035	0,80–1,10	–	–
16 MnCrS 5		1.7139	0,14–0,19	0,40	1,00–1,30	0,035	0,020–0,035	0,80–1,10	–	–
20 MnCr 5		1.7147	0,17–0,22	0,40	1,10–1,40	0,035	≤0,035	1,00–1,30	–	–
20 MnCrS 5		1.7149	0,17–0,22	0,40	1,10–1,40	0,035	0,020–0,035	1,00–1,30	–	–
15 CrNi 6		1.5919	0,14–0,19	0,40	0,40–0,60	0,035	≤0,035	1,40–1,70	1,40–1,70	–
14 NiCr 14		1.5752	0,10–0,18	0,40	0,40–0,70	0,035	≤0,035	0,60–0,90	3,00–3,50	–
18 CrNi 8		1.5920	0,15–0,20	0,15–0,40	0,40–0,60	0,035	≤0,035	1,80–2,10	1,80–2,10	–
21 NiCrMo 2	20 NiCrMo 2-2	1.6523	0,17–0,23	0,40	0,65–0,95	0,035	≤0,035	0,40–0,70	0,40–0,70	0,15–0,25
17 CrNiMo 6	18 CrNiMo 7-6	1.6587	0,15–0,20	0,40	0,40–0,60	0,035	≤0,035	1,50–1,80	1,40–1,70	0,25–0,35

Further materials on demand

MECHANICAL PROPERTIES FOR ALLOYED CASE-HARDENING STEELS

Designation			As-supplied condition				
				cold drawn C	cold drawn and soft annealed C+A	cold drawn and treated to ferrite-perlite-composition C+FP	treated to ferrite-perlite-composition and cold drawn FP+C
DIN	Euro Standard	Material No.	Thickness	Tensile strength	Hardness	Hardness	Hardness
			mm	N/mm^2 max.	HB max.	HB	HB
16 MNCr 5		1.7131	<16	820	207	140–170	140–287
16 MnCrS 5		1.7139	16–40	780	207	140–187	140–287
			40–80	720	207	140–187	140–287
20 MnCr 5		1.7147	<16	850	217	152–201	152–301
20 MnCrS 5		1.7149	16–40	830	217	152–201	152–301
			40–80	780	217	152–201	152–301
15 CrNi 6		1.5919	<16	850	217	152–201	152–301
			16–40	830	217	152–201	152–301
			40–80	780	217	152–201	152–301
14 NiCr 14		1.5752	–	–	230	170–210	170–310
18 CrNi 8		1.5920	–	–	235	170–217	170–317
21 NiCrMo 2	20 NiCrMo 2-2	1.6523	<16	820	197	145–192	145–292
			16–40	800	197	145–192	145–292
			40–80	750	197	145–192	145–292
17 CrNiMo 6	18 CrNiMo 7-6	1.6587	<16	900	229	159–207	159–307
			16–40	870	229	159–207	159–307
			40–80	820	229	159–207	159–307

BALL AND ROLLER BEARING STEELS

Ball and roller bearing steels for components of ball and roller bearings which are subjected during operation first and foremostto high local alternating stresses and are exposed to abrasive wear. In the worn condition they exhibit hard spots, at least in the surface zone.

CHEMICAL COMPOSITION (LADLE ANALYSIS) AND ANNEALING HARDNESS OF THE BALL AND ROLLER BEARING STEELS

Designation		Chemical properties in %									Annealing Hardness
DIN/EN	Material No.	C	Si	Mn	P max.	S max.	Cr	Mo	Ni	V	AC / HB max.
58 CrMoV 4	1.7792	0,58–0,62	0,20–0,30	0,80–0,95	0,020	0,010	0,90–1,05	0,15–0,20	0,10–0,15	0,25	230
100 Cr 6	1.3505	0,90–1,05	0,15–0,35	0,25–0,45	0,030	0,025	1,35–1,65	–	–	–	207
100 CrMo 7 3	1.3536	0,90–1,05	0,20–0,40	0,60–0,80	0,030	0,025	1,65–1,95	0,20–0,35	–	–	217

Further materials on demand

STAINLESS STEELS

Stainless steels are those which are distinguished by the fact that they are specially resistant to chemically aggressive substances; they generally have a chromium content of not less than 12 % by weight and a carbon content not exceeding 1.2 % by weight.

LADLE ANALYSIS

Ferritic and Martensitic Steel

Designation			Chemical properties in %									
EN	DIN	Material No.	C	Si max.	Mn max.	P max.	S max.	N max.	Cr	Mo	Ni	Ti
X12Cr13	X10Cr13	1.4006	0,08–0,15	1,00	1,50	0,040	0,015	–	11,5–13,5	–	–	–
X15Cr13	X15Cr13	1.4024	0,12–0,17	1,00	1,00	0,045	0,030	–	12,0–14,0	–	–	–
X20Cr13	X20Cr13	1.4021	0,16–0,25	1,00	1,50	0,040	0,030	–	12,0–14,0	–	–	–
X46Cr13	X46Cr13	1.4034	0,43–0,50	1,00	1,00	0,040	0,030	–	12,5–14,5	–	–	–
X65Cr13	X65Cr13	1.4037	0,58–0,70	1,00	1,00	0,040	0,015	–	12,5–14,5	–	–	–
X14CrMoS17	X12CrMoS17	1.4104	0,10–0,17	1,00	1,50	0,040	0,150–0,350	–	15,5–17,5	0,20–0,60	–	–
X17CrNi16-2	X20CrNi172	1.4057	0,14–0,22	1,00	1,50	0,040	0,015	–	15,0–17,0	–	1,5–2,5	–
	X20CrMo13	1.4120	0,17–0,22	1,00	1,00	0,040	0,015	–	12,0–14,0	0,90–1,30	<1,0	–

Further materials on demand

Austenitic Steel

Designation			Chemical properties in %									
EN	DIN	Mat. No.	C	Si max.	Mn max.	P max.	S max.	N max.	Cr	Mo	Ni	Ti
X5CrNi18-10	X5CrNi1810	1.4301	< 0,07	1,00	2,00	0,045	0,015	0,110	17,0–19,5	–	8,0–10,5	–
X8CrNiS18-9	X10CrNiS189	1.4305	< 0,10	1,00	2,00	0,045	0,150–0,350	0,110	17,0–19,0	–	8,0–10,0	–
X5CrNiMo17-12-2	X5CrNiMo17122	1.4401	< 0,07	1,00	2,00	0,045	0,030	–	16,5–18,5	2,0–2,5	10,5–13,5	–
X6CrNiTi18-10	X6CrNiTi1810	1.4541	< 0,08	1,00	2,00	0,045	0,015	–	17,0–19,0	–	9,0–12,0	5x%C bis 0,70
X6CrNiMoTi17-12-2	X6CrNiMoTi17122	1.4571	< 0,08	1,00	2,00	0,045	0,015	–	16,5–18,5	2,0–2,5	10,5–13,5	5x%C bis 0,70

Further materials on demand

TOOL STEELS

Tool steels are high-quality steels suitable for working or processing of materials and for handling and measuring workpieces. They exhibit a high value of hardness, high resistence to wear and high toughness appropriate to the use for wich they are intended.

Tool steels for cold working are case-hardened if the surface temperature is no more than 200 °C.

CHEMICAL COMPOSITION (LADLE ANALYSIS) AND ANNEALING HARDNESS OF TOOL STEELS FOR COLD WORKING

Designation		Chemical properties in %									Annealing hardness
DIN/EN	Material No.	C	Si	Mn	P max.	S max.	Ni	Cr	Mo	V	AC / HB max.
X 19 NiCrMo 4	1.2764 1)	0,16–0,22	0,10–0,40	0,15–0,45	0,030	0,030	3,80–4,30	1,10–1,40	0,15–0,25	–	265
90 MnCrV 8	1.2842	0,85–0,95	0,10–0,40	1,90–2,10	0,030	0,030	–	0,20–0,50	–	0,05–0,15	229
115 CrV 3	1.2210	1,10–1,25	0,15–0,30	0,20–0,40	0,030	0,030	–	0,50–0,80	–	0,07–0,12	223

1) Air-case hardening steel
Further materials on demand

HEAT-RESISTANT STEELS

Heat resistant steels are materials which retain their mechanical properties at temperatures up to 580°C. The same applies to elevated temperature steels, though resistance here extends to about 800°C.

LADLE

Heat-resistant steels

Designation		Chemical properties in %											
DIN	Mat. No.	C	Si max.	Mn max.	P max.	S max.	Cr	Mo	Ni	V	Ti	W	Co	Nb
X20CrMoV12-1	1.4922	0,17–0,23	0,50	1,00	0,030	0,030	10,0–12,5	0,80–1,20	0,30–0,80	0,25–0,35	–	–	–	–
X22CrMoV12-1	1.4923	0,18–0,24	0,10–0,50	0,30–0,80	0,035	0,035	11,0–12,5	0,80–1,20	0,30–0,80	0,25–0,35	–	–	–	–

Elevated temperature steels

Designation		Chemical properties in %											
DIN	Mat. No.	C	Si max.	Mn max.	P max.	S max.	Cr	Mo	Ni	V	Ti	W	Co	Nb
X6CrNi18-11	1.4948	0,04–0,08	0,75	2,00	0,035	0,015	17,0–19,0	–	10,0–12,0	–	–	–	–	–
X12CrNiWTi16 13	1.4962	max. 0,15	0,50	1,00	0,045	0,03	15,0–17,0	–	12,5–14,5	–	0,40–0,60	2,50–3,00	–	–
X40CoCrNi20 20	1.4977	0,35–0,45	1,00	1,50	0,045	0,03	19,0–21,0	3,5–4,5	19,0–21,0	–	–	3,50–4,50	19,0–21,0	3,50–4,50

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