

Standard	Material	CHEMICAL COMPOSITION %													MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J			
各国结构用钢 2.1.1 碳素结构钢和优质碳素结构钢 (1) GB标准碳素结构钢 (GB700-88)																					
GB	Q195	0.06-0.12	≤0.30	0.25-0.5	0.045	0.05	≤0.30	≤0.30		0.30				315-390	195	33			N		
GB	Q215A	0.09-0.15	≤0.30	0.25-0.5	0.045	0.05	≤0.30	≤0.30		0.30				335-410	215	31			N		
GB	Q215B	0.09-0.15	≤0.30	0.25-0.55	0.045	0.045	≤0.30	≤0.30		0.30				375-406	235	26			N		
GB	Q235A	0.14-0.22	≤0.30	0.30-0.65	0.045	0.05	≤0.30	≤0.30		0.30											
GB	Q235B	0.12-0.20	≤0.30	0.30-0.70	0.045	0.045	≤0.30	≤0.30		0.30											
GB	Q235C	≤0.18	≤0.30	0.35-0.80	0.040	0.040	≤0.30	≤0.30		0.30				410-510	255	24			N		
GB	Q235D	≤0.17	≤0.30	0.35-0.80	0.035	0.035	≤0.30	≤0.30		0.30				490-610	275	20			N		
GB	Q255A	0.18-0.28	≤0.30	0.40-0.70	0.045	0.050	≤0.30	≤0.30		0.30											
GB	Q255B	0.18-0.28	≤0.30	0.40-0.70	0.045	0.045	≤0.30	≤0.30		0.30											
GB	Q275	0.28-0.38	≤0.35	0.50-0.80	0.045	0.050	≤0.30	≤0.30		0.30									N		
(2) GB标准优质碳素钢 (GB699-88)																					
GB	08F	0.05-0.11	≤0.03	0.25-0.50	0.035	0.035	≤0.10	≤0.25		0.25				295	175	35	60		131	N	
GB	10F	0.07-0.14	≤0.07	0.25-0.50	0.035	0.035	≤0.15	≤0.25		0.25				315	185	33	55		137	N	
GB	15F	0.12-0.19	≤0.07	0.25-0.50	0.035	0.035	≤0.25	≤0.25		0.25				355	205	29	55		143	N	
GB	08	0.05-0.12	0.17-0.37	0.35-0.65	0.035	0.035	≤0.10	≤0.25		0.25				325	195	33	60		131	N	
GB	08AL	0.05-0.12	≤0.03	0.25-0.65	0.035	0.035	≤0.10	≤0.25		0.25										N	
GB	10	0.07-0.14	0.17-0.37	0.35-0.65	0.035	0.035	≤0.15	≤0.25		0.25				335	205	31	55		137	N	
GB	15	0.12-0.19	0.17-0.37	0.35-0.65	0.035	0.035	≤0.25	≤0.25		0.25				375	225	27	55		143	N	
GB	20	0.17-0.24	0.17-0.37	0.35-0.65	0.035	0.035	≤0.25	≤0.25		0.25				410	245	25	55		156	N	
GB	25	0.22-0.30	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				450	275	23	50	71	170	N	
GB	30	0.27-0.35	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				490	295	21	50	63	179	N	
GB	35	0.32-0.40	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				530	315	20	45	55	197	N	
GB	40	0.37-0.45	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				570	335	19	45	47	217	N	
GB	45	0.42-0.50	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				600	355	16	40	39	229	N	
GB	50	0.47-0.55	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				630	375	14	40	31	241	N	
GB	55	0.52-0.60	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				645	380	13	35		255	N	
GB	60	0.57-0.65	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				675	400	12	35		255	N	
GB	65	0.62-0.70	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				695	410	10	30		255	N	
GB	70	0.67-0.75	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25		0.25				715	420	9	30		269	N	

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		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
GB	75	0.72-0.80	0.17-0.37	0.50-0.80	0.035	0.035	\leq 0.25	\leq 0.25		0.25			1080	880	7	30		285	N
GB	80	0.77-0.90	0.17-0.37	0.50-0.80	0.035	0.035	\leq 0.25	\leq 0.25		0.25			1080	930	6	30		285	N
GB	85	0.82-0.90	0.17-0.37	0.50-0.80	0.035	0.035	\leq 0.25	\leq 0.25		0.25			1130	980	6	30		302	N
GB	15Mn	0.12-0.19	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			410	245	26	55		163	N
GB	20Mn	0.17-0.24	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			450	275	24	50		197	N
GB	25Mn	0.22-0.30	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			490	295	22	50	71	207	N
GB	30Mn	0.27-0.35	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			540	315	20	45	63	217	N
GB	35Mn	0.32-0.40	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			560	335	18	45	55	229	N
GB	40Mn	0.37-0.45	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			590	355	17	45	47	229	N
GB	45Mn	0.42-0.50	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			620	375	15	40	39	241	N
GB	50Mn	0.48-0.56	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			645	390	13	40	31	255	N
GB	60Mn	0.57-0.65	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			695	410	11	35		269	N
GB	65Mn	0.62-0.70	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			735	430	9	30		285	N
GB	701Mn	0.67-0.75	0.17-0.37	0.70-1.00	0.035	0.035	\leq 0.25	\leq 0.25		0.25			785	450	8	30		285	N

2.1.2 低合金高强度钢、耐候钢和建筑用钢筋 (1) GB新标准低合金高强度钢 (GB/T 1591-94)

GB	Q295	等级A: \leq 0.16	\leq 0.55	0.80-1.50	0.045	0.045							390-570	295	23						
		等级B: \leq 0.16	\leq 0.55	0.80-1.50	0.040	0.040								390-570	295	23	34				
GB	Q345	等级A: \leq 0.20	\leq 0.55	1.00-1.60	0.045	0.045								470-630	345	21					
		等级B: \leq 0.20	\leq 0.55	1.00-1.60	0.040	0.040								470-630	345	21	34				
		等级C: \leq 0.20	\leq 0.55	1.00-1.60	0.035	0.035									470-630	345	22	34			
		等级D: \leq 0.18	\leq 0.55	1.00-1.60	0.030	0.030									470-630	345	22	34			
		等级E: \leq 0.18	\leq 0.55		0.025	0.025									470-630	345	22	27			
GB	Q390	等级A: \leq 0.20	\leq 0.55	1.00-1.60	0.045	0.045								490-650	390	19					
		等级B: \leq 0.20	\leq 0.55	1.00-1.60	0.040	0.040								490-650	390	19	34				
		等级C: \leq 0.20	\leq 0.55	1.00-1.60	0.035	0.035									490-650	390	20	34			
		等级D: \leq 0.20	\leq 0.55	1.00-1.60	0.030	0.030									490-650	390	20	34			
		等级E: \leq 0.20	\leq 0.55	1.00-1.60	0.025	0.025									490-650	390	20	27			
GB	Q420	等级A: \leq 0.20	\leq 0.55	1.00-1.70	0.045	0.045								520-680	420	18					
		等级B: \leq 0.20	\leq 0.55	1.00-1.70	0.040	0.040								520-680	420	18	34				
		等级C: \leq 0.20	\leq 0.55	1.00-1.70	0.035	0.035								520-680	420	19	34				
		等级D: \leq 0.20	\leq 0.55	1.00-1.70	0.030	0.030								520-680	420	19	34				
		等级E: \leq 0.20	\leq 0.55	1.00-1.70	0.025	0.025								520-680	420	19	34				
GB	Q460	等级C: \leq 0.20	\leq 0.55	1.00-1.70	0.035	0.035								550-720	460	17	34				
		等级D: \leq 0.20	\leq 0.55	1.00-1.70	0.030	0.030								550-720	460	17	34				
		等级E: \leq 0.20	\leq 0.55	1.00-1.70	0.025	0.025								550-720	460	17	27				

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		

(2) GB标准低合金结构钢 (GB1591-88)

GB	09MnV	≤0.12	0.20-0.55	0.80-1.20	0.045	0.045							0.04-0.12			430-580	295	23		27	
GB	09MnNb	≤0.12	0.20-0.55	0.80-1.20	0.045	0.045										410-560	295	24		27	
GB	09Mn2	≤0.12	0.20-0.55	1.40-1.80	0.045	0.045										440-590	295	22		27	
GB	12Mn	0.09-0.16	0.20-0.55	1.10-1.50	0.045	0.045										440-590	295	22		27	
GB	18Nb	0.14-0.22	0.17-0.37	0.40-0.80	0.045	0.045										470-620	345	20		27	
GB	09MnCuPTi	≤0.12	0.20-0.55	1.00-1.50	0.05-0.12	0.045										490-640	345	22		27	
GB	10MnSiCu	≤0.12	0.80-1.10	1.25-1.60	0.045	0.045										490-640	345	22		27	
GB	12MnV	≤0.15	0.20-0.55	1.00-1.40	0.045	0.045							0.04-0.12			490-640	345	22		27	
GB	14MnNb	0.12-0.18	0.20-0.55	0.80-1.20	0.045	0.045										490-640	355	21		27	
GB	16Mn	0.12-0.20	0.20-0.55	1.20-1.60	0.045	0.045										510-660	345	22		27	
GB	16MnRE	0.12-0.20	0.20-0.55	1.20-1.60	0.045	0.045										510-660	345	22		27	
GB	10MnPNbRE	≤0.14	0.20-0.55	0.80-1.20	0.06-0.12	0.045										510-660	390	20		27	
GB	15MnV	0.12-0.18	0.20-0.55	1.20-1.60	0.045	0.045							0.04-0.12			550-700	410	19		27	
GB	15MnTi	0.12-0.18	0.20-0.55	1.20-1.60	0.045	0.045										530-680	390	20		27	
GB	16MnNb	0.12-0.20	0.20-0.55	1.00-1.40	0.045	0.045										530-680	390	20		27	
GB	14MnVTiRE	≤0.18	0.20-0.55	1.30-1.60	0.045	0.045							0.04-0.10			550-700	440	19		27	
GB	15MnVN	0.12-0.20	0.20-0.55	1.30-1.70	0.045	0.045							0.10-0.20			590-740	440	19		27	

2.1.4 合金结构钢 (1) GB标准合金结构钢的钢号及化学成分(GB 3077-88)

GB	20Mn2	0.17-0.24	0.17-0.37	1.40-1.80			≤0.30	≤0.30								785	590	10	40	47	187	Q+T
GB	30Mn2	0.27-0.34	0.17-0.37	1.40-1.80			≤0.30	≤0.30								785	635	12	45	63	207	Q+T
GB	35Mn2	0.32-0.39	0.17-0.37	1.40-1.80			≤0.30	≤0.30								835	682	12	45	55	207	Q+T
GB	40Mn2	0.37-0.44	0.17-0.37	1.40-1.80			≤0.30	≤0.30								885	735	12	45	55	217	Q+T
GB	45Mn2	0.42-0.49	0.17-0.37	1.40-1.80			≤0.30	≤0.30								885	735	10	45	47	217	Q+T
GB	50Mn2	0.47-0.55	0.17-0.37	1.40-1.80			≤0.30	≤0.30								930	785	9	40	39	229	Q+T
GB	20MnV	0.17-0.24	0.17-0.37	1.30-1.60			≤0.30	≤0.30					0.07-0.12			785	590	10	40	55	187	Q+T
GB	30Mn2MoW	0.27-0.34	0.17-0.37	1.70-2.00			≤0.30	≤0.30	0.40-0.50							980	835	12	50	71	269	Q+T
GB	27SiMn	0.24-0.32	1.10-1.40	1.10-1.40			≤0.30	≤0.30								980	835	12	40	39	217	Q+T
GB	35SiMn	0.32-0.40	1.10-1.40	1.10-1.40			≤0.30	≤0.30								885	735	15	45	47	229	Q+T
GB	42SiMn	0.39-0.45	1.10-1.40	1.10-1.40			≤0.30	≤0.30								885	735	15	40	47	229	Q+T
GB	20SiMn2MoV	0.17-0.23	0.90-1.20	2.20-2.60			≤0.30	≤0.30	0.30-0.40				0.05-0.12			1375		10	45	55	269	Q+T
GB	25SiMn2MoV	0.22-0.28	0.90-1.20	2.20-2.60			≤0.30	≤0.30	0.30-0.40				0.05-0.12			1470		10	40	47	269	Q+T
GB	37SiMn2MoV	0.33-0.39	0.60-0.90	1.60-1.90			≤0.30	≤0.30	0.40-0.50				0.05-0.12			980	835	12	50	63	269	Q+T
GB	40B	0.37-0.44	0.17-0.37	0.60-0.90			≤0.30	≤0.30						0.0005-0.0035		785	635	12	45	55	207	Q+T
GB	45B	0.42-0.49	0.17-0.37	0.60-0.90			≤0.30	≤0.30						0.0005-0.0035		835	685	12	45	47	217	Q+T

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GB	50B	0.47-0.55	0.17-0.37	0.60-0.90			≤0.30	≤0.30				0.0005-0.0035		785	540	10	45	39	207	Q+T
GB	40MnB	0.37-0.44	0.17-0.37	1.10-1.40			≤0.30	≤0.30						980	785	10	45	47	207	Q+T
GB	45MnB	0.42-0.49	0.17-0.37	1.10-1.40			≤0.30	≤0.30						1030	835	9	40	39	217	Q+T
GB	20Mn2B	0.17-0.24	0.17-0.37	1.50-1.80			≤0.30	≤0.30						980	785	10	45	55	187	Q+T
GB	20MnMoB	0.16-0.22	0.17-0.37	0.90-1.20			≤0.30	≤0.30	0.20-0.30					1080	885	10	50	55	207	Q+T
GB	15MnVB	0.12-0.18	0.17-0.37	1.20-1.60			≤0.30	≤0.37			0.07-0.12			885	635	10	45	55	207	Q+T
GB	20MnVB	0.17-0.23	0.17-0.37	1.20-1.60			≤0.30	≤0.37			0.07-0.12			1080	885	10	45	55	207	Q+T
GB	40MnVB	0.37-0.44	0.17-0.37	1.10-1.40			≤0.30	≤0.37			0.05-0.10			980	785	10	45	47	207	Q+T
GB	20MnTiB	0.17-0.24	0.17-0.37	1.30-1.60			≤0.30	≤0.37				0.0005-0.0035		1130	930	10	45	55	187	Q+T
GB	25MnTiBRE	0.22-0.28	0.20-0.45	1.30-1.60			≤0.30	≤0.30				0.0005-0.0040		1375		10	40	47	229	Q+T
GB	20SiMnVB	0.17-0.24	0.50-0.80	1.30-1.60			≤0.30	≤0.30			0.07-0.12	0.0005-0.0035		1175	980	10	45	55	207	Q+T
GB	15Cr	0.12-0.18	0.17-0.37	0.40-0.70			0.70-1.00	≤0.30						735	490	11	45	55	179	Q+T
GB	15CrA	0.12-0.17	0.17-0.37	0.40-0.70			0.70-1.00	≤0.30						685	490	12	45	55	179	Q+T
GB	20Cr	0.18-0.24	0.17-0.37	0.50-0.80			0.70-1.00	≤0.30						835	540	10	40	47	179	Q+T
GB	30Cr	0.27-0.34	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30						885	685	11	45	47	187	Q+T
GB	35Cr	0.32-0.39	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30						930	735	11	45	47	207	Q+T
GB	40Cr	0.37-0.44	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30						980	785	9	45	47	207	Q+T
GB	45Cr	0.42-0.49	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30						1035	835	9	40	39	217	Q+T
GB	50Cr	0.47-0.54	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30						1080	930	9	40	39	229	Q+T
GB	38CrSi	0.35-0.43	1.00-1.30	0.30-0.60			1.30-1.60	≤0.30						980	835	12	50	55	225	Q+T
GB	12CrMo	0.08-0.15	0.17-0.37	0.40-0.70			0.40-0.70	≤0.30	0.40-0.55					410	265	24	60	110	179	Q+T
GB	15CrMo	0.12-0.18	0.17-0.37	0.40-0.70			0.80-1.10	≤0.30	0.40-0.55					440	295	22	60	90	179	Q+T
GB	20CrMo	0.17-0.24	0.17-0.37	0.40-0.70			0.80-1.10	≤0.30	0.15-0.25					885	685	12	50	78	197	Q+T
GB	30CrMo	0.26-0.34	0.17-0.37	0.40-0.70			0.80-1.10	≤0.30	0.15-0.25					930	785	12	50	63	229	Q+T
GB	30CrMoA	0.26-0.33	0.17-0.37	0.40-0.70			0.80-1.10	≤0.30	0.15-0.25					930	745	12	50	71	229	Q+T
GB	35CrMo	0.32-0.40	0.17-0.37	0.40-0.70			0.80-1.10	≤0.30	0.15-0.25					980	835	12	45	63	229	Q+T
GB	42CrMo	0.38-0.45	0.17-0.37	0.50-0.80			0.90-1.20	≤0.30	0.15-0.25					1080	930	12	45	63	217	Q+T
GB	12CrMoV	0.08-0.15	0.17-0.37	0.40-0.70			0.30-0.60	≤0.30	0.25-0.35		0.15-0.30			440	225	22	50	78	241	Q+T
GB	35CrMoV	0.30-0.38	0.17-0.37	0.40-0.70			1.00-1.30	≤0.30	0.20-0.30		0.10-0.20			1080	930	10	50	71	241	Q+T
GB	12Cr1MoV	0.08-0.15	0.17-0.37	0.40-0.70			0.90-1.20	≤0.30	0.25-0.35		0.15-0.30			490	245	22	50	71	179	Q+T
GB	25Cr2MoV	0.22-0.29	0.17-0.37	0.40-0.70			1.50-1.80	≤0.30	0.25-0.35		0.15-0.30			930	785	14	55	63	241	Q+T
GB	25Cr2Mo1VA	0.22-0.29	0.17-0.37	0.50-0.80			2.10-2.50	≤0.30	0.90-1.10		0.30-0.50			735	590	16	50	47	241	Q+T
GB	20Cr3MoWVA	0.17-0.24	0.17-0.37	0.30-0.60			2.60-3.00	≤0.30	0.35-0.50		0.70-0.90			785	635	14	40	55	229	Q+T
GB	38CrMoAl	0.35-0.42	0.20-0.45	0.30-0.60			1.35-1.65	≤0.30	0.15-0.25					980	835	14	50	71	229	Q+T
GB	20CrV	0.17-0.23	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30			0.10-0.20			835	590	12	45	55	197	Q+T
GB	40CrV	0.37-0.44	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30			0.10-0.20			855	735	10	50	71	241	Q+T

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment	
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
GB	50CrV	0.47-0.54	0.17-0.37	0.50-0.80			0.80-1.10	≤0.30			0.10-0.20			1275	1130	10	40		255	Q+T
GB	15CrMn	0.12-0.18	0.17-0.37	1.10-1.40			0.40-0.70	≤0.30						785	590	12	50	47	179	Q+T
GB	20CrMn	0.17-0.23	0.17-0.37	0.90-1.20			0.90-1.20	≤0.30						930	735	10	45	47	187	Q+T
GB	40CrMn	0.37-0.45	0.17-0.37	0.90-1.20			0.90-1.20	≤0.30						980	835	9	45	47	229	Q+T
GB	20CrMnSi	0.17-0.23	0.90-1.20	0.80-1.10			0.80-1.10	≤0.30						785	635	12	45	55	207	Q+T
GB	25CrMnSi	0.22-0.28	0.90-1.20	0.80-1.10			0.80-1.10	≤0.30						1080	885	10	40	39	217	Q+T
GB	30CrMnSi	0.27-0.34	0.90-1.20	0.80-1.10			0.80-1.10	≤0.30						1080	885	10	45	39	229	Q+T
GB	30CrMnSiA	0.28-0.34	0.90-1.20	0.80-1.10			0.80-1.10	≤0.30						1080	835	10	45	39	229	Q+T
GB	35CrMnSiA	0.32-0.39	1.10-1.40	0.80-1.10			1.10-1.40	≤0.30						1620	1275	9	40	31	241	Q+T
GB	20CrMnMo	0.17-0.23	0.17-0.37	0.90-1.20			1.10-1.40	≤0.30	0.20-0.30					1175	885	10	45	55	217	Q+T
GB	40CrMnMo	0.37-0.45	0.17-0.37	0.90-1.20			0.90-1.20	≤0.30	0.20-0.30					980	785	10	45	63	217	Q+T
GB	20CrMnTi	0.17-0.23	0.17-0.37	0.80-1.10			1.00-1.30	≤0.30						1080	835	10	45	55	217	Q+T
GB	30CrMnTi	0.24-0.32	0.17-0.37	0.80-1.10			1.00-1.30	≤0.30						1470		9	40	47	229	Q+T
GB	20CrNi	0.17-0.23	0.17-0.37	0.40-0.70			0.45-0.75	1.00-1.40						785	590	10	50	63	197	Q+T
GB	40CrNi	0.37-0.44	0.17-0.37	0.50-0.80			0.45-0.75	1.00-1.40						980	785	10	45	55	241	Q+T
GB	45CrNi	0.42-0.49	0.17-0.37	0.50-0.80			0.45-0.75	1.00-1.40						980	785	10	45	55	255	Q+T
GB	50CrNi	0.47-0.54	0.17-0.37	0.50-0.80			0.45-0.75	1.00-1.40						1080	835	8	40	39	255	Q+T
GB	12CrNi2	0.10-0.17	0.17-0.37	0.30-0.60			0.60-0.90	1.50-1.90						785	590	12	50	63	207	Q+T
GB	12CrNi3	0.10-0.17	0.17-0.37	0.30-0.60			0.60-0.90	2.75-3.15						930	685	11	50	71	217	Q+T
GB	20CrNi3	0.17-0.24	0.17-0.37	0.30-0.60			0.60-0.90	2.75-3.15						930	735	11	55	78	241	Q+T
GB	30CrNi3	0.27-0.33	0.17-0.37	0.30-0.60			0.60-0.90	2.75-3.15						980	785	9	45	63	241	Q+T
GB	37CrNi3	0.34-0.41	0.17-0.37	0.30-0.60			1.20-1.60	3.00-3.50						1130	980	10	50	47	269	Q+T
GB	12Cr2Ni4	0.10-0.16	0.17-0.37	0.30-0.60			1.25-1.65	3.25-3.65						1080	835	10	50	71	269	Q+T
GB	20Cr2Ni4	0.17-0.23	0.17-0.37	0.30-0.60			1.25-1.65	3.25-3.65						1175	1080	10	45	63	269	Q+T
GB	20CrNiMo	0.17-0.23	0.17-0.37	0.60-0.95			0.40-0.70	0.35-0.75	0.20-0.30					980	785	9	40	47	197	Q+T
GB	40CrNiMoA	0.37-0.44	0.17-0.37	0.50-0.80			0.60-0.90	1.25-1.65	0.15-0.25					980	835	12	55	78	269	Q+T
GB	45CrNiMoVA	0.42-0.49	0.17-0.37	0.50-0.80			0.80-1.10	1.30-1.80	0.20-0.30			0.10-0.20		1470	1325	7	35	31	269	Q+T
GB	18Cr2Ni4WA	0.13-0.19	0.17-0.37	0.30-0.60			1.35-1.65	4.00-4.50						1175	835	10	45	78	269	Q+T
GB	25Cr2Ni4WA	0.21-0.28	0.17-0.37	0.30-0.60			1.35-1.65	4.00-4.50						1080	930	11	45	71	269	Q+T

(3) GB标准合金结构钢钢丝的力学性能与补充钢号 (GB/T 3079-93) b. 合金结构钢钢丝的钢号及化学成分 热处理 力学性能

GB	38CrA	0.34-0.42	0.17-0.37	0.50-0.80	0.025	0.025	0.80-1.10	≤0.40		0.25				885	785	12	50			Q+T
GB	30CrMnMoTiA	0.28-0.34	0.17-0.37	0.80-1.10	0.025	0.025	1.00-1.30	≤0.25	0.25-0.30	0.25				1520		9				Q+T
GB	30CrNi2MoVA	0.26-0.33	0.17-0.37	0.30-0.60	0.025	0.025	0.60-0.90	2.00-2.50	0.20-0.30	0.25	0.15-0.30			885		10				Q+T
GB	30SiMn2MoVA	0.27-0.33	0.40-0.60	1.60-1.85	0.025	0.025	≤0.25	≤0.25	0.40-0.60	0.25	0.15-0.25			885		10				Q+T
GB	30CrMnSiNi2A	0.27-0.34	0.90-1.20	1.00-1.30	0.025	0.025	0.90-1.20	1.40-1.80		0.25				1570		9	45			Q+T

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		

2.1.7 弹簧钢和轴承钢 (1) GB标准弹簧钢 (GB 1222-84)																				
GB	65	0.62-0.70	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25						980	785	9	35		285	Q+T
GB	70	0.62-0.75	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25						1030	835	8	30		285	Q+T
GB	85	0.82-0.90	0.17-0.37	0.50-0.80	0.035	0.035	≤0.25	≤0.25						1130	980	6	30		302	Q+T
GB	65Mn	0.62-0.70	0.17-0.37	0.90-1.20	0.035	0.035	≤0.25	≤0.25						980	785	8	30		302	Q+T
GB	55Si2Mn	0.52-0.60	1.50-2.00	0.60-0.90	0.035	0.035	≤0.35	≤0.35						1275	1175	6	30		302	Q+T
GB	55Si2MnB	0.52-0.60	1.50-2.00	0.60-0.90	0.035	0.035	≤0.35	≤0.35				0.0005-0.001		1275	1175	6	30		321	Q+T
GB	55SiMnVB	0.52-0.60	0.70-1.00	1.00-1.30	0.035	0.035	≤0.35	≤0.35			0.08-0.16	0.0005-0.001		1370	1225	5	30		321	Q+T
GB	60Si2Mn	0.56-0.64	1.50-2.00	0.60-0.90	0.035	0.035	≤0.35	≤0.35						1275	1175	5	25		321	Q+T
GB	60Si2MnA	0.56-0.64	1.60-2.00	0.60-0.90	0.030	0.030	≤0.35	≤0.35						1570	1370	5	20		321	Q+T
GB	60Si2CrA	0.56-0.64	1.40-1.80	0.40-0.70	0.030	0.030	0.70-1.00	≤0.35						1765	1570	6	20		321	Q+T
GB	60Si2CrVA	0.56-0.64	1.40-1.80	0.40-0.70	0.030	0.030	0.90-1.20	≤0.35			0.10-0.20			1860	1665	6	20		321	Q+T
GB	55CrMnA	0.52-0.60	0.17-0.37	0.65-0.95	0.030	0.030	0.65-0.95	≤0.35						1225	1080	9	20		321	Q+T
GB	60CrMnA	0.56-0.64	0.17-0.37	0.70-1.00	0.030	0.030	0.70-1.00	≤0.35						1225	1080	9	20		321	Q+T
GB	60CrMnMoA	0.56-0.64	0.17-0.37	0.70-1.00	0.030	0.030	0.70-1.00	≤0.35	0.25-0.35										321	Q+T
GB	50CrVA	0.46-0.54	0.17-0.37	0.50-0.80	0.030	0.030	0.80-1.10	≤0.35			0.10-0.20			1275	1125	10	40		321	Q+T
GB	60CrMnBA	0.56-0.64	0.17-0.37	0.70-1.00	0.030	0.030	0.70-1.00	≤0.35				0.0005-0.001		1225	1080	9	20		321	Q+T
GB	30W4Cr2VA	0.26-0.34	0.17-0.37	≤0.40	0.030	0.030	2.00-2.50	≤0.35			0.50-0.80			1470	1325	7	40		321	Q+T

2.2 德国 2.2.1 工程用碳素钢 (1) 工程用碳素钢的钢号及化学成分 (DIN EN 10025(1994))																				
DIN	S185													310-540	185	18				
DIN	S235JR	≤0.20		≤1.40	0.045	0.045									235	26		27		
DIN	S235JRG1	≤0.20		≤1.40	0.045	0.045								360-510	235	26		27		
DIN	S235JRG2	≤0.20		≤1.40	0.045	0.045								360-510	235	26		27		
DIN	S235J0	≤0.17		≤1.40	0.040	0.040								360-510	235	26		27		
DIN	S235J2G3	≤0.17		≤1.40	0.035	0.035								360-510	235	26		27		
DIN	S235J2G4	≤0.17		≤1.40	0.035	0.035								360-510	235	26		27		
DIN	S275JR	≤0.22		≤1.50	0.045	0.045								430-580	275	22		27		
DIN	S275J0	≤0.20		≤1.50	0.040	0.040								430-580	275	22		27		
DIN	S275J2G3	≤0.20		≤1.50	0.035	0.035								430-580	275	22		27		
DIN	S275J2G4	≤0.20		≤1.50	0.035	0.035								430-580	275	22		27		
DIN	S355JR	≤0.24	≤0.55	≤1.60	0.045	0.045								510-680	355	22		27		
DIN	S355J0	≤0.22	≤0.55	≤1.60	0.040	0.040								510-680	355	22		27		
DIN	S355J2G3	≤0.22	≤0.55	≤1.60	0.035	0.035								510-680	355	22		27		
DIN	S355J2G4	≤0.22	≤0.55	≤1.60	0.035	0.035								510-680	355	22		27		
DIN	S355K2G3	≤0.22	≤0.55	≤1.60	0.035	0.035								510-680	355	22		40		

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
DIN	S355K2G4	≤0.22	≤0.55	≤1.60	0.035	0.035							510-680	355	22		40		
DIN	E295				0.045	0.045							490-660	295	20				
DIN	E335				0.045	0.045							590-770	335	16				
DIN	E360				0.045	0.045							690-900	360	11				

2.2.4 表面硬化钢 (1) DIN标准渗碳钢(DIN 17210-86)

DIN	C10	0.07-0.30	≤0.40	0.30-0.60	0.045	0.045							640-780	390	13	35	69	131	Q+T
DIN	C15	0.12-0.18	≤0.40	0.30-0.60	0.045	0.045							740-880	440	12	35	48	143	Q+T
DIN	Ck10 (C10E)	0.07-0.13	≤0.40	0.30-0.60	0.035	0.035							640-780	390	13	40	89	131	Q+T
DIN	Ck15 (C15E)	0.12-0.18	≤0.40	0.30-0.60	0.035	0.035							740-880	440	12	35	69	143	Q+T
DIN	14NiCr10 (ECN25)	0.10-0.17	0.15-0.35	0.40-0.70	0.035	0.035	0.55-0.95	2.25-2.75					980-1270	735	9	40	69	205	Q+T
DIN	14NiCr14 (ECN35)	0.10-0.17	≤0.40	0.40-0.70	0.035	0.035	0.60-0.95	3.00-3.50					1030-1320	835	9	40	55	230	Q+T
DIN	14NiCr18 (ECN45)	0.10-0.17	0.15-0.35	0.40-0.70	0.035	0.035	0.90-1.30	4.25-4.75					1270-1420	930	7	35	41	245	Q+T
DIN	15CrNi6 (ECN15)	0.14-0.19	≤0.40	0.40-0.60	0.035	0.035	1.40-1.70	1.40-1.70					960-1270	685	8	35	41	217	Q+T
DIN	18CrNi8 (ECN20)	0.15-0.20	0.15-0.40	0.40-0.60	0.035	0.035	1.80-2.10	1.80-2.10					1230-1470	835	7	30	41	235	Q+T
DIN	21NiCrMo2	0.17-0.23	≤0.40	0.65-0.95	0.035	0.035	0.35-0.70	0.40-0.70	0.15-0.25				980-1270	785	9	35	41	197	Q+T
DIN	17CrNiMo6	0.15-0.20	≤0.40	0.50-0.90	0.035	0.035	1.50-1.80	1.40-1.70	0.25-0.35				1180-1420	830	7	30	41	229	Q+T
DIN	13Cr2 (EC30)	0.10-0.16	0.15-0.35	0.40-0.60	0.035	0.035	0.30-0.50						690-930	685	14	35	48	170	Q+T
DIN	15Cr3 (EC60)	0.12-0.18	0.15-0.40	0.40-0.60	0.035	0.035	0.40-0.70						780-1030	510	10	35	41	174	Q+T
DIN	16MnCr5 (EC80)	0.14-0.19	≤0.40	1.00-1.30	0.035	0.035	0.80-1.10						880-1180	635	9	35	34	207	Q+T
DIN	16MnCrS5	0.14-0.19	≤0.40	1.00-1.30	0.035	0.02-0.040	0.80-1.10						880-1180	635	9	35	41	207	Q+T
DIN	20MnCr5 (EC100)	0.17-0.22	≤0.40	1.10-1.40	0.035	0.035	1.00-1.30						1080-1370	735	7	30	34	217	Q+T
DIN	20MnCrS5	0.17-0.22	≤0.40	1.10-1.40	0.035	0.02-0.040	1.00-1.30						1080-1370	735	7	30	27	217	Q+T
DIN	15CrMo5 (ECMo80)	0.13-0.17	0.15-0.35	0.80-1.10	0.035	0.035	1.00-1.30		0.20-0.30				880-1180	635	9	35	41	207	Q+T
DIN	20CrMo5 (ECMo100)	0.18-0.23	0.15-0.35	0.90-1.20	0.035	0.035	1.00-1.40		0.20-0.30				1080-1370	735	7	30	27	217	Q+T
DIN	23CrMoB3-3	0.20-0.25	0.15-0.35	0.70-0.90	0.035	0.035	0.70-0.90		0.30-0.40				1180-1470	835	7	30	27	217	Q+T
DIN	20CrMo2/20CrMoS2	0.18-0.23	0.15-0.35	0.60-0.80	0.035	0.02-0.040	0.50-0.70		0.30-0.40				880-1180	635	9	35	41	207	Q+T
DIN	20MoCr4	0.17-0.23	≤0.40	0.70-1.00	0.035	0.035	0.30-0.60		0.40-0.50				880-1180	635	9	35	41	207	Q+T
DIN	20MoCrS4	0.17-0.23	≤0.40	0.70-1.00	0.035	0.02-0.040	0.30-0.60		0.40-0.50				880-1180	635	9	35	48	207	Q+T
DIN	25MoCr4	0.23-0.29	0.15-0.40	0.60-0.90	0.035	0.035	0.40-0.60		0.40-0.50				1080-1370	735	7	30	34	217	Q+T
DIN	25MoCrS4	0.23-0.29	0.15-0.40	0.60-0.90	0.035	0.02-0.035	0.40-0.60		0.40-0.50				1080-1370	735	7	30	27	217	Q+T

2.2.5 调质结构钢 (1) DIN标准调质结构钢的钢号及化学成分

DIN	C22	0.17-0.24	≤0.40	0.40-0.70	0.045	0.045	≤0.40	≤0.40	≤0.10				550-700	350	20	40		156	Q+T
DIN	C25	0.22-0.29	≤0.40	0.40-0.70	0.045	0.045	≤0.40	≤0.40	≤0.10				550-700	370	19	40		156	Q+T
DIN	C30	0.27-0.34	≤0.40	0.50-0.80	0.045	0.045	≤0.40	≤0.40	≤0.10				600-750	400	18	35		170	Q+T
DIN	C35	0.32-0.39	≤0.40	0.50-0.80	0.045	0.045	≤0.40	≤0.40	≤0.10				630-780	430	17	35		183	Q+T

Standard	Material	CHEMICAL COMPOSITION %												MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J		
DIN	C40	0.37-0.44	≤0.40	0.50-0.80	0.045	0.045	≤0.40	≤0.40	≤0.10				650-800	460	16	30		197	Q+T	
DIN	C45	0.42-0.50	≤0.40	0.50-0.80	0.045	0.045	≤0.40	≤0.40	≤0.10				700-850	500	14	30		207	Q+T	
DIN	C50	0.47-0.55	≤0.40	0.60-0.90	0.045	0.045	≤0.40	≤0.40	≤0.10				750-900	520	13	25		217	Q+T	
DIN	C55	0.52-0.60	≤0.40	0.60-0.90	0.045	0.045	≤0.40	≤0.40	≤0.10				800-950	550	12	25		229	Q+T	
DIN	C60	0.57-0.65	≤0.40	0.60-0.90	0.045	0.045	≤0.40	≤0.40	≤0.10				850-1000	580	11	20		241	Q+T	
DIN	C22E/Ck22	0.17-0.24	≤0.40	0.40-0.70	0.035	0.035	≤0.40	≤0.40	≤0.10				550-700	350	20	50	55	156	Q+T	
DIN	C25E/Ck25	0.22-0.29	≤0.40	0.40-0.70	0.035	0.035	≤0.40	≤0.40	≤0.10				550-700	370	19	45	50	156	Q+T	
DIN	C30E/Ck30	0.27-0.34	≤0.40	0.50-0.80	0.035	0.035	≤0.40	≤0.40	≤0.10				600-750	400	18	40	45	170	Q+T	
DIN	C35E/Ck35	0.32-0.39	≤0.40	0.50-0.80	0.035	0.035	≤0.40	≤0.40	≤0.10				630-780	430	17	40	40	183	Q+T	
DIN	C40E/Ck40	0.37-0.44	≤0.40	0.50-0.80	0.035	0.035	≤0.40	≤0.40	≤0.10				650-800	460	16	35	35	197	Q+T	
DIN	C45E/Ck45	0.42-0.50	≤0.40	0.50-0.80	0.035	0.035	≤0.40	≤0.40	≤0.10				700-850	500	14	35	30	207	Q+T	
DIN	C50E/Ck50	0.47-0.55	≤0.40	0.60-0.90	0.035	0.035	≤0.40	≤0.40	≤0.10				750-900	520	13	30		217	Q+T	
DIN	C55E/Ck55	0.52-0.60	≤0.40	0.60-0.90	0.035	0.035	≤0.40	≤0.40	≤0.10				800-950	550	12	30		229	Q+T	
DIN	C60E/Ck60	0.57-0.65	≤0.40	0.60-0.90	0.035	0.035	≤0.40	≤0.40	≤0.10				850-1000	580	11	25		247	Q+T	
DIN	40Mn4	0.36-0.44	0.25-0.50	0.80-1.10									880-1080	635	12	40	34	217	Q+T	
DIN	90Mn4	0.85-0.95	0.25-0.50	0.90-1.10									~1670	1375	~5			350	Q+T	
DIN	20Mn5	0.17-0.23	≤0.60	1.00-1.50	0.035	0.030							540-690	390	22	50	69		Q+T	
DIN	30Mn5	0.27-0.34	0.15-0.40	1.20-1.50	0.035	0.035	≤0.30						780-930	540	14	45	41	217	Q+T	
DIN	36Mn5	0.32-0.40	≤0.40	1.20-1.50	0.035	0.035							930-1080	685	9	35	41	217	Q+T	
DIN	28Mn6	0.25-0.32	≤0.40	1.30-1.65	0.035	0.035	≤0.40	≤0.40	≤0.10				780-930	590	13	40	40	223	Q+T	
DIN	X120Mn12	1.10-1.30	0.30-0.50	12.00-13.00	0.100	0.040	1.50						880-1130	410	40	40	124		Q+T	
DIN	38MnSi4	0.34-0.42	0.70-0.90	0.90-1.20	0.035	0.035							930-1130	785	11	35	21	217	Q+T	
DIN	46MnSi4	0.42-0.50	0.70-0.90	1.10-1.40	0.035	0.035							1030-1230	835	11	35	27	217	Q+T	
DIN	37MnSi5	0.33-0.40	1.10-1.40	0.90-1.20	0.035	0.035							980-1180	785	11	35	34	217	Q+T	
DIN	50MnSi4	0.45-0.53	0.70-1.10	0.80-1.20	0.035	0.035							830-980	620	11	40	34	217	Q+T	
DIN	53MnSi4	0.50-0.57	0.80-1.10	1.60-1.90	0.035	0.035							880-1030	635	12	35	27	217	Q+T	
DIN	42MnV7	0.38-0.45	0.15-0.35	0.40-0.80	0.035	0.035					0.07-0.12		980-1270	885	10	30	21	217	Q+T	
DIN	36NiCr6	0.32-0.40	0.15-0.35	0.40-0.80	0.035	0.035	0.30-0.70	1.25-1.75	≤0.10				980-1180	785	11	45	48		Q+T	
DIN	36NiCr10	0.32-0.40	0.15-0.35	0.40-0.80	0.035	0.035	0.55-0.95	2.25-2.75					1030-1180	785	10	45	48		Q+T	
DIN	31NiCr14	0.27-0.35	0.15-0.35	0.40-0.80	0.035	0.035	0.55-0.95	3.25-3.75					930-1080	735	11	45	55		Q+T	
DIN	35NiCr18	0.30-0.40	0.15-0.35	0.50-0.80	0.035	0.035	1.10-1.50	4.25-4.75					1270-1470	1030	7	35	34		Q+T	
DIN	36CrNiMo4	0.32-0.40	≤0.40	0.30-0.60	0.035	0.035	0.90-1.20	0.90-1.20	0.15-0.30				1100-1300	900	10	45	40	248	Q+T	
DIN	28NiCrMo4	0.24-0.34	0.15-0.40	0.30-0.60	0.035	0.035	1.00-1.30	1.00-1.30	0.20-0.30				740-930	590	13	60	27	217	Q+T	
DIN	30CrNiMo8	0.26-0.34	≤0.40	0.30-0.60	0.035	0.035	1.80-2.20	1.80-2.20	0.30-0.50				1250-1450	1050	9	40	35	248	Q+T	
DIN	34CrNiMo6	0.30-0.38	≤0.40	0.50-0.80	0.035	0.035	1.30-1.70	1.30-1.70	0.15-0.30				1200-1400	1000	9	40	40	248	Q+T	
DIN	32Cr2	0.28-0.35	≤0.40	0.50-0.80	0.035	0.035	0.40-0.60						700-850	450	15	40	40	197	Q+T	

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
DIN	38Cr2	0.35-0.42	≤0.40	0.50-0.80	0.035	0.035	0.40-0.60						800-950	550	14	35	40	207	Q+T
DIN	44Cr2	0.42-0.48	≤0.40	0.50-0.80	0.025	0.035	0.40-0.60		0.30				880-1080	640	12	40	35	255	Q+T
DIN	46Cr2	0.42-0.50	≤0.40	0.50-0.80	0.035	0.035	0.40-0.60						900-1100	650	12	35	35	223	Q+T
DIN	28Cr4	0.24-0.31	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20						850-1000	650	12	40	40	217	Q+T
DIN	34Cr4	0.30-0.37	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20						900-1100	700	11	35	40	223	Q+T
DIN	37Cr4	0.34-0.41	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20						950-1150	750	11	35	35	235	Q+T
DIN	41Cr4	0.38-0.45	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20						1100-1200	800	10	30	35	241	Q+T
DIN	25CrMo4	0.22-0.29	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20	0.15-0.30					900-1100	700	12	50	50	212	Q+T
DIN	34CrMo4	0.30-0.37	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20	0.15-0.30					1000-1200	800	11	45	40	223	Q+T
DIN	42CrMo4	0.38-0.45	≤0.40	0.60-0.90	0.035	0.035	0.90-1.20	0.15-0.30					1100-1300	900	10	40	35	241	Q+T
DIN	43CrMo4	0.40-0.46	≤0.40	0.60-0.90	0.025	0.035	0.90-1.20	0.15-0.30	0.30				1080-1270	880	10	40	35	255	Q+T
DIN	48CrMo4	0.46-0.52	≤0.40	0.50-0.80	0.035	0.035	0.90-1.20	0.15-0.30	0.30				1080-1270	880	9	40	35	255	Q+T
DIN	50CrMo4	0.46-0.54	≤0.40	0.50-0.80	0.035	0.035	0.90-1.20	0.15-0.30					1100-1300	900	9	40	35	248	Q+T
DIN	32CrMo12	0.28-0.35	≤0.40	0.40-0.70	0.035	0.035	2.80-3.30	0.30-0.50					1230-1420	1030	9	35	34	248	Q+T
DIN	42CrV6	0.38-0.46	0.15-0.35	0.50-0.80	0.035	0.035	1.40-1.70			0.07-0.12			1080-1270	885	10	40	34	235	Q+T
DIN	30CrMoV9	0.26-0.34	≤0.40	0.40-0.70	0.035	0.035	2.30-2.70	0.15-0.25		0.10-0.20			1250-1450	1050	9	35	25	248	Q+T
DIN	14CrMoV6-9	0.11-0.17	≤0.25	0.80-1.00	0.020	0.015	1.25-1.50	0.80-1.00		0.20-0.30			1000-1300	850	10	45	40	110	Q+T
DIN	51CrV4/50CrV4	0.47-0.55	≤0.40	0.70-1.10	0.035	0.035	0.90-1.20				0.10-0.25		1100-1300	900	9	40	35	248	Q+T
DIN	58CrV4	0.55-0.62	0.15-0.40	0.70-1.10	0.035	0.035	0.90-1.20				0.10-0.20		1320-1570	1080	7	40	21	235	Q+T

2.2.9 高温结构用钢和低温用钢 (1) DIN标准高温结构用钢

DIN	P235GH/H I	≤0.16	≤0.35	0.40-1.20	0.030	0.025	≤0.30	≤0.30	≤0.08	0.30	≤0.02		350-480	215	25		31	105-140	Q+T
DIN	P265GH/H II	≤0.20	≤0.40	0.50-1.40	0.030	0.025	≤0.30	≤0.30	≤0.08	0.30	≤0.02		410-530	245	23		31	120-155	Q+T
DIN	P295GH/17Mn4	0.08-0.20	≤0.40	0.90-1.50	0.030	0.025	≤0.30	≤0.30	≤0.08	0.30	≤0.02		460-580	285	22		31	130-170	Q+T
DIN	P355GH/19Mn6	0.10-0.220.32-0.39	≤0.60	1.00-1.70	0.030	0.025	≤0.30	≤0.30	≤0.08	0.30	≤0.02		510-650	335	21		31	140-185	Q+T
DIN	Ck35	0.42-0.50	≤0.40	0.50-0.80	0.035	0.035	≤0.40	≤0.40	≤0.10				490-590	275	22		55	145-175	Q+T
DIN	Ck45	0.17-0.22	≤0.40	0.50-0.80	0.035	0.035	≤0.40	≤0.40	≤0.10				590-710	355	18		34	175-210	Q+T
DIN	19Mn5 (P310GH)	0.12-0.20	0.30-0.60	1.00-1.30	0.045	0.045	≤0.30						510-610	315	20		34	152-180	Q+T
DIN	16Mo3/15Mo3	0.18-0.25	≤0.35	0.40-0.90	0.030	0.025	≤0.30	≤0.30	0.25-0.35	0.30			440-570	265	23		48	130-170	Q+T
DIN	22Mo4	0.12-0.20	0.20-0.40	0.40-0.70	0.030	0.030	≤0.30		0.30-0.40				490-590	295	20		55	145-175	Q+T
DIN	16Mo5	0.17-0.20	0.15-0.50	0.50-0.80	0.040	0.040			0.45-0.65				450-590	265	21		41		Q+T
DIN	21MoV5-3	0.17-0.25	0.15-0.35	0.50-0.80	0.035	0.035	0.20-0.40	≤0.30	0.45-0.55		0.25-0.35		540-690	375	19		48	160-205	Q+T
DIN	17MoV8-4	0.14-0.22	0.15-0.35	0.50-0.80	0.035	0.035	0.20-0.40	≤0.30	0.80-1.00		0.30-0.40		690-830	590	17		41	205-250	Q+T
DIN	14MoV6-3	0.10-0.18	0.10-0.35	0.40-0.70	0.035	0.035	0.30-0.60		0.50-0.70		0.22-0.32		490-640	345	20		41	145-640	Q+T
DIN	16CrMo4	0.13-0.20	0.15-0.35	0.50-0.80	0.035	0.035	0.90-1.20	≤0.40	0.20-0.30				540-690	345	20		41	160-205	Q+T
DIN	24CrMo5	0.20-0.28	≤0.40	0.50-0.80	0.035	0.035	0.90-1.20	≤0.60	0.20-0.35				590-740	440	18		55	175-220	Q+T

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq						
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J	Hardness HB
NF	S275J2G4	≤ 0.18		1.50	0.035	0.035													
NF	E295				0.045	0.045													
NF	S355JR	≤ 0.24	≤ 0.55	≤ 1.60	0.045	0.045													
NF	S355J0	≤ 0.20	≤ 0.55	≤ 1.60	0.040	0.040													
NF	S355J2G3	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035													
NF	S355J2G4	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035													
NF	S355K2G3	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035													
NF	S355K2G4	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035													
NF	E335				0.045	0.045													
NF	E360				0.045	0.045													

(2) NF标准结构用碳素钢的钢号及化学成分 (NF A33-101)

NF	AF34 C10	≤ 0.12	≤ 0.30	0.30-0.60	0.040	0.040													
NF	AF37 C12	0.08-0.15	≤ 0.30	0.30-0.60	0.040	0.040													
NF	AF42 C20	0.14-0.21	0.10-0.40	0.50-0.80	0.040	0.040													
NF	AF50 C30	0.25-0.33	0.10-0.40	0.50-0.80	0.040	0.040													
NF	AF50 S	≤ 0.20	≤ 0.55	≤ 1.50	0.040	0.040													
NF	AF55 C35	0.31-0.39	0.10-0.40	0.50-0.80	0.040	0.040													
NF	AF60 C40	0.37-0.45	0.10-0.40	0.50-0.80	0.040	0.040													
NF	AF65 C45	0.43-0.51	0.10-0.40	0.50-0.80	0.040	0.040													
NF	AF70 C55	0.50-0.58	0.10-0.40	0.50-0.80	0.040	0.040													

2.3.3 表面硬化钢和调质结构钢 (1) NF标准渗碳钢的钢号及化学成分 (NF A35-551(84), A35-567(84))

NF	XC10	0.06-0.12	0.15-0.35	0.30-0.60	0.035	0.035													
NF	XC12	0.10-0.16	0.15-0.35	0.30-0.60	0.035	0.035													
NF	XC18	0.16-0.22	0.15-0.35	0.40-0.70	0.035	0.035													
NF	16MC5	0.14-0.19	0.10-0.40	1.00-1.30	0.035	0.035	0.80-1.10												
NF	20MC5	0.17-0.22	0.10-0.40	1.10-1.40	0.035	0.035	1.00-1.30												
NF	18CD4	0.16-0.22	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20	0.15-0.25											
NF	10NC6	0.07-0.12	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20	1.20-1.50											
NF	16NC6	0.12-0.17	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20	1.20-1.50											
NF	20NC6	0.16-0.21	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20	1.20-1.50											
NF	14NC11	0.11-0.17	0.10-0.40	0.25-0.60	0.035	0.035	0.60-0.90	2.50-3.00											
NF	20NCD2	0.17-0.23	0.10-0.40	0.65-0.95	0.035	0.035	0.40-0.65	0.40-0.70	0.15-0.25										
NF	18NCD6	0.14-0.20	0.10-0.40	0.60-0.90	0.035	0.035	0.85-1.15	1.20-1.60	0.15-0.25										
NF	21B3	0.18-0.24	0.10-0.40	0.60-0.90	0.035	0.035						0.0008-0.0050							

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq						
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J	Hardness HB
NF	37Cr4	0.34-0.41	≤ 0.40	0.60-0.90	0.035	0.035	0.90-1.20												
NF	37CrS4	0.34-0.41	≤ 0.40	0.60-0.90	0.035	0.020-0.040	0.90-1.20												
NF	38Cr2	0.35-0.42	≤ 0.40	0.50-0.80	0.035	0.035	0.40-0.60												
NF	38CrS2	0.35-0.42	≤ 0.40	0.50-0.80	0.035	0.020-0.040	0.40-0.60												
NF	41Cr4	0.38-0.45	≤ 0.40	0.60-0.90	0.035	0.035	0.90-1.20												
NF	41CrS4	0.38-0.45	≤ 0.40	0.60-0.90	0.035	0.020-0.040	0.90-1.20												
NF	42CrMo4	0.38-0.45	≤ 0.40	0.60-0.90	0.035	0.035	0.90-1.20		0.15-0.30										
NF	42CrMoS4	0.38-0.45	≤ 0.40	0.60-0.90	0.035	0.020-0.040	0.90-1.20		0.15-0.30										
NF	46Cr2	0.42-0.50	≤ 0.40	0.50-0.80	0.035	0.035	0.40-0.60												
NF	46CrS2	0.42-0.50	≤ 0.40	0.50-0.80	0.035	0.020-0.040	0.40-0.60												
NF	50CrMo4	0.46-0.54	≤ 0.40	0.50-0.80	0.035	0.035	0.90-1.20		0.15-0.30										
NF	51CrV4	0.47-0.55	≤ 0.40	0.70-1.10	0.035	0.035	0.90-1.20			0.10-0.25									
碳素钢																			
NF	C22	0.17-0.24	≤ 0.40	0.40-0.70	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C25	0.22-0.29	≤ 0.40	0.40-0.70	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C30	0.27-0.34	≤ 0.40	0.50-0.80	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C35	0.32-0.39	≤ 0.40	0.50-0.80	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C40	0.37-0.44	≤ 0.40	0.50-0.80	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C45	0.42-0.50	≤ 0.40	0.50-0.80	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C50	0.47-0.55	≤ 0.40	0.60-0.90	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C55	0.52-0.60	≤ 0.40	0.60-0.90	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
NF	C60	0.57-0.65	≤ 0.40	0.60-0.90	0.045	0.045	≤ 0.40	≤ 0.40	≤ 0.10										
硼处理钢																			
NF	20MnB5	0.17-0.23	≤ 0.40	1.10-1.40	0.035	0.040						0.0008-0.005							
NF	27MnCrB5-2	0.24-0.30	≤ 0.40	1.10-1.40	0.035	0.040	0.30-0.60					0.0008-0.005							
NF	30MnB5	0.27-0.33	≤ 0.40	1.15-1.45	0.035	0.040						0.0008-0.005							
NF	33MnCrB5-2	0.30-0.36	≤ 0.40	1.20-1.50	0.035	0.040	0.30-0.60					0.0008-0.005							
NF	38MnB5	0.36-0.42	≤ 0.40	1.15-1.45	0.035	0.040						0.0008-0.005							
NF	39MnCrB6-2	0.36-0.42	≤ 0.40	1.40-1.70	0.035	0.040	0.30-0.60					0.0008-0.005							

2.3.5 螺栓用钢和锚链用钢 (1) NF标准紧定螺栓用钢的钢号及化学成分 (NF A35-556(84))

NF	32C4	0.30-0.35	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20												
NF	38C4	0.35-0.40	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20												
NF	42C4	0.40-0.45	0.10-0.40	0.60-0.90	0.035	0.035	0.90-1.20												
NF	38B3	0.34-0.40	0.10-0.40	0.60-0.90	0.035	0.035						0.0008-0.0050							
NF	38CB1	0.34-0.40	0.10-0.40	0.60-0.90	0.035	0.035	0.20-0.40					0.0008-0.0050							

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq							
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J	Hardness HB	Heat treatment
NF	XC35	0.32-0.38	0.10-0.40	0.50-0.80	0.040	0.035														
NF	XC38TS	0.35-0.40	0.10-0.40	0.50-0.80	0.025	0.030														
NF	XC48TS	0.45-0.51	0.10-0.40	0.50-0.80	0.025	0.030														
NF	XC65	0.60-0.69	0.10-0.40	0.50-0.80	0.035	0.035														
NF	XC70	0.68-0.77	0.10-0.40	0.50-0.80	0.035	0.035														
NF	XC80	0.75-0.85	0.10-0.40	0.50-0.80	0.035	0.035	≤ 0.12													
NF	XC85	0.80-0.98	0.20-0.40	0.40-0.70	0.040	0.040														
NF	XC130	1.20-1.35	0.20-0.35	0.30-0.45	0.030	0.025	0.20-0.50													
NF	Z2NKD18.8	≤ 0.03	≤ 0.10	≤ 0.10	0.030	0.025		17.0-19.0	4.60-5.20											
NF	Z12N5	0.08-0.14	0.10-0.35	0.35-0.60	0.040	0.035		4.70-5.40												
NF	Z18N5	0.18-0.20	≤ 0.35	0.35-0.60	0.040	0.035		4.70-5.40												
NF	Z55NMC12.05	0.50-0.70	≤ 0.50	4.50-5.50	0.030	0.025	2.50-3.00	11.5-12.5	0.30-0.70											
NF	Z120M12	1.05-1.35	0.20-0.60	11.0-14.0	0.045	0.035														

2.5 日本 2.5.1 工程和焊接结构用钢 (1) JIS标准普通结构用碳素钢和焊接结构用钢的钢号及化学成分

普通结构用碳素钢																				
JIS	SS330				0.050	0.050								330-430	205	26				
JIS	SS400				0.050	0.050								400-510	245	21				
JIS	SS490				0.050	0.050								490-605	280	19				
JIS	SS540	≤ 0.30		1.60	0.050	0.040								540	400	16				
焊接结构用钢																				
JIS	SM400A	≤ 0.23		$\geq 2.5 \times C$	0.035	0.035								400-510	245	23		≥ 27		
JIS	SM400B	≤ 0.20	≤ 0.35	0.60-1.00	0.035	0.035														
JIS	SM400C	≤ 0.18	≤ 0.35	≤ 1.40	0.035	0.035														
JIS	SM490A	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035								490-610	325	22		≥ 27		
JIS	SM490B	≤ 0.18	≤ 0.55	≤ 1.60	0.035	0.035														
JIS	SM490C	≤ 0.18	≤ 0.55	≤ 1.60	0.035	0.035														
JIS	SM490YA	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035								490-610	365	19		≥ 27		
JIS	SM490YB	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035														
JIS	SM520B	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035								520-640	365	19		≥ 27		
JIS	SM520C	≤ 0.20	≤ 0.55	≤ 1.60	0.035	0.035														
JIS	SM570	≤ 0.18	≤ 0.55	≤ 1.60	0.035	0.035							$\leq 0.44\%$	570-720	460	19		≥ 47		

2.5.3 机械结构用钢 (JIS G4051(1979))

JIS	S10C	0.08-0.13	0.15-0.35	0.30-0.60	0.030	0.035	≤ 0.20	≤ 0.20		≤ 0.30				310	205	33				N
JIS	S12C	0.10-0.15	0.15-0.35	0.30-0.60	0.030	0.035	≤ 0.20	≤ 0.20		≤ 0.30				370	235	30				N

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq					Hardness HB	Heat treatment
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
JIS	SCM420H	0.17-0.23	0.15-0.35	0.55-0.90	0.030	0.030	0.85-1.25	≤ 0.25	0.15-0.35	≤ 0.30									
JIS	SCM435H	0.32-0.39	0.15-0.35	0.55-0.90	0.030	0.030	0.85-1.25	≤ 0.25	0.15-0.35	≤ 0.30									
JIS	SCM440H	0.37-0.44	0.15-0.35	0.55-0.90	0.030	0.030	0.85-1.25	≤ 0.25	0.15-0.35	≤ 0.30									
JIS	SCM445H	0.42-0.49	0.15-0.35	0.55-0.90	0.030	0.030	0.85-1.25	≤ 0.25	0.15-0.35	≤ 0.30									
JIS	SCM822H	0.19-0.25	0.15-0.35	0.55-0.90	0.030	0.030	0.85-1.25	≤ 0.25	0.15-0.35	≤ 0.30									
JIS	SNC415H	0.11-0.18	0.15-0.35	0.30-0.70	0.030	0.030	0.20-0.55	1.95-2.50		≤ 0.30									
JIS	SNC631H	0.26-0.35	0.15-0.35	0.30-0.70	0.030	0.030	0.55-1.05	2.45-3.00		≤ 0.30									
JIS	SNC815H	0.11-0.18	0.15-0.35	0.30-0.70	0.030	0.030	0.65-1.05	2.95-3.50		≤ 0.30									
JIS	SNCM220H	0.17-0.23	0.15-0.35	0.60-0.95	0.030	0.030	0.35-0.65	0.35-0.75	0.15-0.35	≤ 0.30									
JIS	SNCM420H	0.17-0.23	0.15-0.35	0.40-0.70	0.030	0.030	0.35-0.65	1.55-2.00	0.15-0.35	≤ 0.30									

2.5.5 合金结构钢 (1) JIS标准合金结构钢的钢号及化学成分

Ni-Cr钢																			
JIS	SNC236	0.32-0.40	0.15-0.35	0.50-0.80	0.030	0.030	0.50-0.90	1.00-1.50		≤ 0.30			740	590	22	50	118	217-277	Q+T
JIS	SNC415H	0.12-0.18	0.15-0.35	0.35-0.65	0.030	0.030	0.20-0.50	2.00-2.50		≤ 0.30			780		17	45	88	235-241	Q+T
JIS	SNC631H	0.27-0.35	0.15-0.35	0.35-0.65	0.030	0.030	0.60-1.00	2.50-3.00		≤ 0.30			830	685	18	50	118	248-302	Q+T
JIS	SNC815H	0.12-0.18	0.15-0.35	0.35-0.65	0.030	0.030	0.70-1.00	3.00-3.50		≤ 0.30			980		12	45	78	285-388	Q+T
JIS	SNC836	0.32-0.40	0.15-0.35	0.35-0.65	0.030	0.030	0.60-1.00	3.00-3.50		≤ 0.30			930	785	15	45	78	269-321	Q+T
Ni-Cr-Mo钢																			
JIS	SNCM220H	0.17-0.23	0.15-0.35	0.60-0.90	0.030	0.030	0.40-0.65	0.40-0.70	0.15-0.30	≤ 0.30			830		17	40	59	248-341	Q+T
JIS	SNCM240	0.38-0.43	0.15-0.35	0.70-1.00	0.030	0.030	0.40-0.65	0.40-0.70	0.15-0.30	≤ 0.30			880	785	17	50	69	255-311	Q+T
JIS	SNCM415	0.12-0.18	0.15-0.35	0.40-0.70	0.030	0.030	0.40-0.65	1.60-2.00	0.15-0.30	≤ 0.30			880		16	45	69	255-341	Q+T
JIS	SNCM420H	0.17-0.23	0.15-0.35	0.40-0.70	0.030	0.030	0.40-0.65	1.60-2.00	0.15-0.30	≤ 0.30			980		15	40	69	293-375	Q+T
JIS	SNCM431	0.27-0.35	0.15-0.35	0.60-0.90	0.030	0.030	0.60-1.00	1.60-2.00	0.15-0.30	≤ 0.30			830	685	20	55	98	248-302	Q+T
JIS	SNCM439	0.36-0.43	0.15-0.35	0.60-0.90	0.030	0.030	0.60-1.00	1.60-2.00	0.15-0.30	≤ 0.30			980	885	16	45	69	293-352	Q+T
JIS	SNCM447	0.44-0.50	0.15-0.35	0.60-0.90	0.030	0.030	0.60-1.00	1.60-2.00	0.15-0.30	≤ 0.30			1030	930	14	40	59	302-368	Q+T
JIS	SNCM616	0.13-0.20	0.15-0.35	0.80-1.20	0.030	0.030	1.40-1.80	2.80-3.20	0.40-0.60	≤ 0.30			1180		14	40	78	341-415	Q+T
JIS	SNCM625	0.20-0.30	0.15-0.35	0.35-0.60	0.030	0.030	1.00-1.50	3.00-3.50	0.15-0.30	≤ 0.30			930	835	18	18	78	269-321	Q+T
JIS	SNCM630	0.25-0.35	0.15-0.35	0.35-0.60	0.030	0.030	2.50-3.50	2.50-3.50	0.50-0.70	≤ 0.30			1080	885	15	15	78	302-352	Q+T
JIS	SNCM815	0.12-0.18	0.15-0.35	0.35-0.60	0.030	0.030	0.70-1.00	4.00-4.50	0.15-0.30	≤ 0.30			1080		12	12	69	311-375	Q+T
Cr 钢																			
JIS	SCr415	0.13-0.18	0.15-0.35	0.60-0.85	0.030	0.030	0.90-1.20	≤ 0.25		≤ 0.30			780		15	40	59	217-302	Q+T
JIS	SCr420	0.18-0.23	0.15-0.35	0.60-0.85	0.030	0.030	0.90-1.20	≤ 0.25		≤ 0.30			830		14	35	49	235-321	Q+T
JIS	SCr430	0.28-0.33	0.15-0.35	0.60-0.85	0.030	0.030	0.90-1.20	≤ 0.25		≤ 0.30			780	635	18	55	88	229-293	Q+T
JIS	SCr435	0.33-0.38	0.15-0.35	0.60-0.85	0.030	0.030	0.90-1.20	≤ 0.25		≤ 0.30			880	735	15	50	69	255-321	Q+T
JIS	SCr440	0.38-0.43	0.15-0.35	0.60-0.85	0.030	0.030	0.90-1.20	≤ 0.25		≤ 0.30			930	785	13	45	59	269-331	Q+T

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥						
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J	Hardness HB
ASTM	1141	0.37-0.45		1.35-1.65	≤0.040	0.08-0.13													
ASTM	1144	0.40-0.48		1.35-1.65	≤0.040	0.24-0.33													
ASTM	1145	0.42-0.49		0.70-1.00	≤0.040	0.04-0.07													
ASTM	1146	0.42-0.49		0.70-1.00	≤0.040	0.08-0.13													
ASTM	1151	0.48-0.55		0.70-1.00	≤0.040	0.08-0.13													
ASTM	1211	≤0.13		0.60-0.90	0.07-0.12	0.10-0.15													
ASTM	1212	≤0.13		0.70-1.00	0.07-0.12	0.16-0.23													
ASTM	1213	≤0.13		0.70-1.00	0.07-0.12	0.24-0.33													
ASTM	1215	≤0.09		0.75-1.05	0.04-0.09	0.26-0.35													
ASTM	12L13	≤0.13		0.70-1.00	0.07-0.12	0.24-0.33													
ASTM	12L14	≤0.15		0.85-1.15	0.04-0.09	0.26-0.35													
ASTM	12L15	≤0.09		0.75-1.05	0.04-0.09	0.26-0.35													

(2) SAE标准碳素易切削结构钢的钢号及化学成分 (SAE J403-91)

SAE/AISI	1110	0.08-0.13		0.30-0.60	≤0.040	0.08-0.13													
SAE/AISI	1117	0.14-0.20		1.00-1.30	≤0.040	0.08-0.13													
SAE/AISI	1118	0.14-0.20		1.30-1.60	≤0.040	0.08-0.13													
SAE/AISI	1123	0.20-0.27		1.20-1.50	≤0.040	0.06-0.09													
SAE/AISI	1137	0.32-0.39		1.35-1.65	≤0.040	0.08-0.13													
SAE/AISI	1140	0.37-0.44		0.70-1.00	≤0.040	0.08-0.13													
SAE/AISI	1141	0.37-0.45		1.35-1.65	≤0.040	0.08-0.13													
SAE/AISI	1144	0.40-0.48		1.35-1.65	≤0.040	0.24-0.33													
SAE/AISI	1146	0.42-0.49		0.70-1.00	≤0.040	0.08-0.13													
SAE/AISI	1152	0.48-0.55		0.70-1.00	≤0.040	0.06-0.09													
SAE/AISI	1212	0.13		0.70-1.00	0.07-0.12	0.16-0.23													
SAE/AISI	1213	0.13		0.70-1.00	0.07-0.12	0.24-0.33													
SAE/AISI	1215	0.09		0.75-1.05	0.04-0.09	0.26-0.35													
SAE/AISI	12L14	0.15		0.85-1.15	0.04-0.09	0.26-0.35													

2.9.4 合金结构钢 (1) AISI SAE标准与UNS系统合金结构钢的钢号及化学成分

AISI	A2317	0.15-0.20	0.20-0.35	0.40-0.60	0.040	0.040		3.25-3.75											
SAE	2317																		
AISI	A2330	0.28-0.33	0.20-0.35	0.60-0.80	0.040	0.040		3.25-3.75											
SAE	2330																		
AISI	2335	0.33-0.38	0.20-0.35	0.60-0.80	0.040	0.040		3.25-3.75											
SAE	2335																		

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
AISI	A2340	0.38-0.43	0.20-0.35	0.70-0.90	0.040	0.040		3.25-3.75											
SAE	2340																		
AISI	A2345	0.43-0.48	0.20-0.35	0.70-0.90	0.040	0.040		3.25-3.75											
SAE	2345																		
AISI	E2512	0.09-0.14	0.20-0.35	0.45-0.60	0.025	0.025		4.75-5.25											
SAE	2512																		
AISI	E2515	0.12-0.17	0.20-0.35	0.40-0.60	0.040	0.040		4.75-5.25											
SAE	2515																		
AISI	E2517	0.15-0.20	0.20-0.35	0.45-0.60	0.025	0.025		4.75-5.25											
SAE	2517																		
AISI	A3115	0.13-0.18	0.20-0.35	0.40-0.60	0.040	0.040	0.55-0.75	1.10-1.40											
SAE	3115																		
AISI	A3120	0.17-0.22	0.20-0.35	0.60-0.80	0.040	0.040	0.55-0.75	1.10-1.40											
SAE	3120																		
AISI	A3130	0.28-0.33	0.20-0.35	0.60-0.80	0.040	0.040	0.55-0.75	1.10-1.40											
SAE	3130																		
AISI		0.33-0.38	0.20-0.35	0.60-0.80	0.040	0.040	0.55-0.75	1.10-1.40											
SAE	3135																		
AISI	3140	0.38-0.43	0.20-0.35	0.70-0.90	0.040	0.040	0.55-0.75	1.10-1.40											
SAE	3140																		
AISI	A3141	0.38-0.43	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	1.10-1.40											
SAE	X3140																		
AISI	A3145	0.43-0.48	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	1.10-1.40											
SAE	3145																		
AISI	A3150	0.48-0.53	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	1.10-1.40											
SAE	3150																		
AISI		0.10-0.20	0.20-0.35	0.30-0.60	0.040	0.050	0.90-1.25	1.50-2.00											
SAE	3215																		
AISI		0.15-0.25	0.20-0.35	0.30-0.60	0.040	0.050	0.90-1.25	1.50-2.00											
SAE	3220																		
AISI		0.25-0.35	0.15-0.30	0.30-0.60	0.040	0.050	0.90-1.25	1.50-2.00											
SAE	3230																		
AISI	A3240	0.35-0.45	0.15-0.30	0.30-0.60	0.040	0.040	0.90-1.25	1.50-2.00											
SAE	3240																		
AISI		0.40-0.50	0.15-0.30	0.30-0.60	0.040	0.040	0.90-1.25	1.50-2.00											
SAE	3245																		

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment		
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J	
AISI		0.45-0.55	0.15-0.30	0.30-0.60	0.040	0.040	0.90-1.25	1.50-2.00													
SAE	3250																				
AISI	E3310	0.08-0.13	0.20-0.35	0.45-0.60	0.025	0.025	1.40-1.75	3.25-3.75													
SAE	3310																				
AISI		0.08-0.13	0.20-0.35	0.15-0.60	0.025	0.025	1.40-1.75	3.25-3.75													
SAE	3312																				
AISI	E3316	0.14-0.19	0.20-0.35	0.45-0.60	0.025	0.025	1.40-1.75	3.25-3.75													
SAE	3316																				
AISI		0.20-0.30	0.15-0.30	0.30-0.50	0.040	0.050	1.25-1.75	3.25-3.75													
SAE	3325																				
AISI		0.30-0.40	0.15-0.30	0.30-0.60	0.040	0.050	1.25-1.75	3.25-3.75													
SAE	3335																				
AISI		0.35-0.45	0.15-0.30	0.30-0.60	0.040	0.050	1.25-1.75	3.25-3.75													
SAE	3340																				
AISI		0.10-0.20	0.15-0.30	0.30-0.60	0.040	0.050	0.60-0.95	2.75-3.25													
SAE	3415																				
AISI		0.30-0.40	0.15-0.30	0.30-0.60	0.040	0.050	0.60-0.95	2.75-3.25													
SAE	3435																				
AISI		0.45-0.55	0.15-0.30	0.30-0.60	0.040	0.050	0.60-0.95	2.75-3.25													
SAE	3450																				
AISI		0.09-0.14	0.15-0.30	0.75-1.00	0.035	0.040		0.15-0.25													
SAE	4012																				
AISI	4017	0.15-0.20	0.25-0.35	0.70-0.90	0.040	0.040		0.20-0.30													
SAE	4017																				
AISI	4023	0.20-0.25	0.15-0.35	0.70-0.90	0.035	0.040		0.20-0.30													
SAE	4023																				
AISI		0.20-0.25	0.15-0.30	0.70-0.90	0.035	0.035		0.20-0.30													
SAE	4024																				
AISI	4027	0.25-0.30	0.15-0.35	0.70-0.90	0.035	0.040		0.20-0.30													
SAE	4027																				
AISI	4028	0.25-0.30	0.15-0.35	0.70-0.90	0.035	0.035-0.050		0.20-0.30													
SAE	4028																				
AISI		0.30-0.35	0.15-0.35	0.70-0.90	0.035	0.040		0.20-0.30													
SAE	4032																				
AISI	4037	0.35-0.40	0.15-0.35	0.70-0.90	0.035	0.040		0.20-0.30													
SAE	4037																				

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment		
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J	
AISI		0.40-0.45	0.15-0.35	0.70-0.90	0.035	0.040			0.20-0.30												
SAE	4042																				
AISI	4047	0.45-0.50	0.15-0.35	0.70-0.90	0.035	0.040			0.20-0.30												
SAE	4047																				
AISI	4053	0.50-0.56	0.20-0.35	0.75-1.00	0.040	0.040			0.20-0.30												
SAE																					
AISI		0.60-0.67	0.20-0.35	0.75-1.00	0.040	0.040			0.20-0.30												
SAE	4063																				
AISI	A4068	0.63-0.70	0.20-0.35	0.75-1.00	0.040	0.040			0.20-0.30												
SAE	4068																				
AISI	4118	0.18-0.23	0.15-0.35	0.70-0.90	0.035	0.040	0.10-0.60		0.08-0.15												
SAE																					
AISI	A4119	0.17-0.22	0.15-0.35	0.70-0.90	0.040	0.040	0.40-0.60		0.20-0.30												
SAE	4119																				
AISI	4120	0.18-0.23	0.15-0.35	0.90-1.20	0.035	0.040	0.40-0.60		0.13-0.20												
SAE	4120																				
AISI	4121	0.18-0.23	0.15-0.35	0.75-1.00	0.035	0.040	0.45-0.65		0.20-0.30												
SAE	4121																				
AISI	A4125	0.23-0.28	0.20-0.35	0.70-0.90	0.040	0.040	0.40-0.60		0.20-0.30												
SAE	4125																				
AISI	4130	0.28-0.33	0.15-0.35	0.40-0.60	0.035	0.040	0.80-1.10		0.15-0.25												
SAE	4130																				
AISI	TS4130	0.28-0.33	0.20-0.35	0.45-0.65	0.040	0.040	0.90-1.20		0.08-0.15												
SAE																					
AISI	4131	0.28-0.33	0.15-0.35	0.50-0.70	0.035	0.040	0.90-1.20		0.15-0.25												
SAE	4131																				
AISI	TS4132	0.30-0.35	0.20-0.35	0.45-0.65	0.040	0.040	0.90-1.20		0.08-0.15												
SAE																					
AISI	E4132	0.30-0.35	0.20-0.35	0.40-0.60	0.025	0.025	0.80-1.10		0.18-0.25												
SAE																					
AISI		0.33-0.38	0.15-0.35	0.70-0.90	0.035	0.040	0.80-1.10		0.15-0.25												
SAE	4135																				
AISI	TS4135	0.33-0.38	0.20-0.35	0.75-1.00	0.025	0.025	0.90-1.20		0.08-0.15												
SAE																					
AISI	E4135	0.33-0.38	0.20-0.35	0.70-0.90	0.025	0.025	0.80-1.10		0.18-0.25												
SAE																					

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment	
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
AISI	4137	0.35-0.40	0.15-0.35	0.70-0.90	0.025	0.040	0.80-1.10		0.15-0.25											
SAE	4137																			
AISI	TS4137	0.35-0.40	0.20-0.35	0.75-1.00	0.040	0.040	0.90-1.20		0.08-0.15											
SAE																				
AISI	E4137	0.35-0.40	0.20-0.35	0.70-0.90	0.025	0.025	0.80-1.10		0.18-0.25											
SAE																				
AISI	4140	0.38-0.43	0.15-0.35	0.75-1.00	0.035	0.040	0.80-1.10		0.15-0.25											
SAE																				
AISI	TS4140	0.38-0.43	0.20-0.35	0.80-1.05	0.040	0.040	0.90-1.20		0.08-0.15											
SAE																				
AISI	4142	0.40-0.45	0.15-0.35	0.75-1.00	0.035	0.040	0.80-1.10		0.15-0.25											
SAE																				
AISI	TS4142	0.40-0.45	0.20-0.35	0.80-1.05	0.040	0.040	0.90-1.20		0.08-0.15											
SAE																				
AISI	4145	0.43-0.48	0.15-0.35	0.75-1.00	0.035	0.040	0.80-1.10		0.15-0.25											
SAE	4145																			
AISI	TS4145	0.43-0.48	0.20-0.35	0.80-1.05	0.040	0.040	0.90-1.20		0.08-0.15											
SAE																				
AISI	4147	0.45-0.50	0.15-0.35	0.75-1.00	0.035	0.040	0.80-1.10		0.15-0.25											
SAE																				
AISI	TS4147	0.45-0.50	0.20-0.35	0.80-1.05	0.040	0.040	0.90-1.20		0.08-0.15											
SAE																				
AISI	4150	0.48-0.53	0.15-0.35	0.75-1.00	0.035	0.040	0.80-1.10		0.15-0.25											
SAE	4150																			
AISI	TS4150	0.48-0.53	0.20-0.35	0.80-1.05	0.040	0.040	0.90-1.20		0.08-0.15											
SAE																				
AISI	4161	0.56-0.64	0.15-0.35	0.75-1.00	0.035	0.040	0.70-0.90		0.25-0.35											
SAE	4161																			
AISI	42B35	0.32-0.39	0.20-0.35	0.70-1.00	0.040	0.040	0.40-0.65		0.08-0.15											
SAE																				
AISI	42B40	0.37-0.45	0.20-0.35	0.70-1.00	0.040	0.040	0.40-0.65		0.08-0.15											
SAE																				
AISI	42B45	0.42-0.50	0.20-0.35	0.70-1.00	0.040	0.040	0.40-0.65		0.08-0.15											
SAE																				
AISI	42B50	0.47-0.55	0.20-0.35	0.75-1.00	0.040	0.040	0.40-0.65		0.08-0.15											
SAE																				

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment		
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J	
AISI		0.08-0.13	0.20-0.35	0.75-1.00			0.40-0.60	1.65-2.00	0.20-0.30		0.03	0.0005-0.003									
SAE	43BV12																				
AISI		0.10-0.15	0.25-0.35	0.45-0.65			0.40-0.60	1.65-2.00	0.08-0.15		0.03	0.0005-0.003									
SAE	43BV14																				
AISI		0.15-0.20	0.20-0.35	0.45-0.65	0.040	0.040	0.40-0.60	1.65-2.00	0.20-0.30												
SAE	4317																				
AISI		0.17-0.22	0.15-0.35	0.45-0.65	0.035	0.040	0.40-0.60	1.65-2.00	0.20-0.30												
SAE	4320																				
AISI		0.35-0.40	0.20-0.35	0.60-0.80	0.040	0.040	0.70-0.90	1.65-2.00	0.20-0.30												
SAE																					
AISI		0.35-0.40	0.20-0.35	0.65-0.85	0.025	0.025	0.70-0.90	1.65-2.00	0.20-0.30												
SAE	E4337																				
AISI		0.38-0.43	0.15-0.35	0.60-0.80	0.035	0.040	0.70-0.90	1.65-2.00	0.20-0.30												
SAE	4340																				
AISI		0.38-0.43	0.15-0.35	0.65-0.85	0.025	0.025	0.70-0.90	1.65-2.00	0.20-0.30												
SAE	E4340																				
AISI		0.18-0.23	0.15-0.30	0.45-0.65	0.035	0.040			0.45-0.60												
SAE	4419																				
AISI		0.20-0.25	0.15-0.35	0.70-0.90	0.035	0.040			0.35-0.45												
SAE	4422																				
AISI		0.24-0.29	0.15-0.30	0.70-0.90	0.035	0.040			0.35-0.45												
SAE	4427																				
AISI		0.18-0.23	0.15-0.30	0.45-0.65	0.035	0.040			0.45-0.60												
SAE	4520																				
AISI		0.06-0.11	≤0.025	0.25-0.45	0.040	0.040		1.40-1.75	0.15-0.25												
SAE	4608																				
AISI		0.10-0.15	0.20-0.35	0.45-0.65	0.040	0.040		1.65-2.00	0.20-0.30												
SAE	46B12																				
AISI		0.10-0.15	0.20-0.35	0.45-0.65	0.040	0.040		1.65-2.00	0.25-0.35			≥0.0005									
SAE	4613																				
AISI		0.13-0.18	0.15-0.35	0.45-0.65	0.035	0.040		1.65-2.00	0.20-0.30												
SAE	4615																				
AISI		0.15-0.20	0.15-0.35	0.45-0.65	0.035	0.040		1.65-2.00	0.20-0.30												
SAE	4617																				
AISI		0.15-0.20	0.20-0.35	0.45-0.65	0.025	0.025		1.65-2.00	0.20-0.30												
SAE	E4617																				

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
AISI SAE	4618	0.15-0.20	0.20-0.35	0.45-0.65	0.040	0.040		1.65-2.00	0.25-0.35										
AISI SAE	4620 4620	0.17-0.22	0.15-0.35	0.45-0.65	0.035	0.040		1.65-2.00	0.20-0.30										
AISI SAE	X4620	0.18-0.23	0.20-0.35	0.50-0.70	0.040	0.040		1.65-2.00	0.20-0.30										
AISI SAE	E4620	0.17-0.22	0.20-0.35	0.45-0.65	0.025	0.025		1.65-2.00	0.20-0.27										
AISI SAE	4621	0.18-0.23	0.15-0.35	0.70-0.90	0.035	0.040		1.65-2.00	0.20-0.30										
AISI SAE	4626	0.24-0.29	0.15-0.35	0.45-0.65	0.035	0.040		0.70-1.00	0.15-0.25										
AISI SAE	A4640 4640	0.38-0.43	0.20-0.35	0.60-0.80	0.040	0.040		1.65-2.00	0.20-0.30										
AISI SAE	E4640	0.38-0.43	0.20-0.35	0.60-0.80	0.025	0.025		1.65-2.00	0.20-0.27										
AISI SAE	4715 4715	0.13-0.18	0.15-0.35	0.70-0.90	0.035	0.046	0.45-0.65	0.70-1.00	0.45-0.65										
AISI SAE	4718	0.16-0.21		0.70-0.90			0.35-0.55	0.90-1.20	0.30-0.40										
AISI SAE	4720 4720	0.17-0.22	0.20-0.35	0.50-0.70	0.035	0.040	0.35-0.55	0.90-1.20	0.15-0.25										
AISI SAE	4812	0.10-0.15	0.20-0.35	0.40-0.60	0.040	0.040		3.25-3.75	0.20-0.30										
AISI SAE	4815 4815	0.13-0.18	0.15-0.35	0.40-0.60	0.035	0.040		3.25-3.75	0.20-0.30										
AISI SAE	4817	0.15-0.20	0.15-0.35	0.40-0.60	0.035	0.040		3.25-3.75	0.20-0.30										
AISI SAE	4820 4820	0.18-0.23	0.15-0.35	0.50-0.70	0.035	0.040		3.25-3.75	0.20-0.30										
AISI SAE	5015	0.12-0.17	0.15-0.30	0.30-0.50	0.035	0.040	0.30-0.50												
AISI SAE	50B15	0.12-0.18	0.20-0.35	0.70-1.00	0.040	0.040	0.35-0.60						≥0.0005						
AISI SAE	50B20	0.17-0.23	0.20-0.35	0.70-1.00	0.040	0.040	0.35-0.60						≥0.0005						

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq					Hardness HB	Heat treatment	
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
AISI	5140	0.38-0.43	0.15-0.35	0.70-0.90	0.035	0.040	0.70-0.90													
SAE	5140																			
AISI		0.43-0.49	0.15-0.30	0.70-0.90	0.035	0.040	0.70-0.90													
SAE	5145																			
AISI		0.46-0.51	0.15-0.35	0.70-0.95	0.035	0.040	0.85-1.15													
SAE	5147																			
AISI	5150	0.48-0.53	0.15-0.35	0.70-0.90	0.035	0.040	0.70-0.90													
SAE	5150																			
AISI		0.48-0.55	0.20-0.35	0.70-0.90	0.040	0.040	0.90-1.20													
SAE	5152																			
AISI		0.51-0.59	0.15-0.35	0.70-0.90	0.035	0.040	0.70-0.90													
SAE	5152																			
AISI	5160	0.56-0.64	0.15-0.35	0.75-1.00	0.035	0.040	0.70-0.90													
SAE	5160																			
AISI	51B60	0.56-0.64	0.15-0.35	0.75-1.00	0.035	0.040	0.70-0.90						≥ 0.0005							
SAE	51B60																			
AISI	5195	0.90-1.03	0.15-0.35	0.75-1.00	0.025	0.025	0.70-0.90	≤ 0.25	≤ 0.10											
SAE	5195																			
AISI		0.10-0.20	0.15-0.30	0.30-0.60	0.040	0.050	0.80-1.10						≥ 0.15							
SAE	6115																			
AISI		0.15-0.20	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90						≥ 0.10							
SAE	6117																			
AISI		0.16-0.21	0.15-0.35	0.50-0.70	0.035	0.040	0.50-0.70						$\geq 0.10-0.15$							
SAE	6118																			
AISI		0.17-0.22	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90						≥ 0.10							
SAE	6120																			
AISI		0.20-0.30	0.15-0.30	0.60-0.90	0.040	0.050	0.80-1.10						≥ 0.15							
SAE	6125																			
AISI		0.25-0.35	0.15-0.30	0.60-0.90	0.040	0.050	0.80-1.10						≥ 0.15							
SAE	6130																			
AISI	6135	0.30-0.40	0.15-0.30	0.60-0.90	0.040	0.050	0.80-1.10						≥ 0.15							
SAE																				
AISI		0.35-0.45	0.15-0.30	0.60-0.90	0.040	0.050	0.80-1.10						≥ 0.15							
SAE	6140																			
AISI		0.43-0.48	0.20-0.35	0.70-0.90	0.040	0.050	0.80-1.10						≥ 0.15							
SAE	6145																			

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq					Hardness HB	Heat treatment					
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J				
AISI	6150	0.48-0.53	0.15-0.35	0.70-0.90	0.035	0.040	0.80-1.10																	
SAE	6150																							
AISI	6152	0.48-0.55	0.20-0.35	0.70-0.90	0.040	0.040	0.80-1.10																	
SAE																								
AISI	6159	0.90-1.05	0.15-0.30	0.20-0.45	0.030	0.035	0.80-1.10																	
SAE																								
AISI	7260	0.50-0.70	0.15-0.30	≤ 0.30	0.035	0.040	0.50-1.00																	
SAE																								
AISI	80B20	0.17-0.23	0.20-0.35	0.45-0.70	0.040	0.040	0.15-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B25	0.21-0.28	0.20-0.35	0.50-0.75	0.040	0.040	0.15-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B30	0.27-0.34	0.20-0.35	0.55-0.80	0.040	0.040	0.15-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B35	0.32-0.39	0.20-0.35	0.65-0.95	0.040	0.040	0.15-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B37	0.35-0.40	0.20-0.35	0.75-1.00	0.040	0.040	0.20-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B40	0.37-0.45	0.20-0.35	0.70-1.00	0.040	0.040	0.15-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	TS80B40	0.37-0.45	0.20-0.35	0.70-1.00	0.040	0.040	0.20-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B45	0.42-0.50	0.20-0.35	0.70-1.00	0.040	0.040	0.15-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	TS80B45	0.43-0.48	0.20-0.35	0.70-1.00	0.040	0.040	0.20-0.35	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B50	0.47-0.55	0.20-0.35	0.70-1.00	0.040	0.040	0.25-0.50	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B55	0.50-0.60	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15															
SAE																								
AISI	80B60	0.55-0.65	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15															
SAE																								
AISI	8115	0.13-0.18	0.15-0.35	0.70-0.90	0.035	0.040	0.30-0.50	0.20-0.40	0.08-0.15															
SAE																								
AISI	8117	0.14-0.20	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15															
SAE	8117																							

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment						
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J					
AISI	8137	0.34-0.42	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15																
SAE	8137																								
AISI	TS 8137	0.35-0.40	0.20-0.35	0.70-0.90	0.040	0.040	0.30-0.50	0.20-0.40	0.08-0.15																
SAE																									
AISI	8140	0.37-0.45	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.50	0.20-0.40	0.08-0.15																
SAE	8140																								
AISI	TS 8140	0.38-0.43	0.20-0.35	0.70-0.90	0.040	0.040	0.30-0.50	0.20-0.40	0.08-0.15																
SAE																									
AISI	81B40	0.37-0.45	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15				≥0.0005												
SAE																									
AISI	TS81B40	0.38-0.43	0.20-0.35	0.75-1.05	0.040	0.040	0.35-0.55	0.20-0.40	0.08-0.15				≥0.0005												
SAE																									
AISI	8142	0.39-0.47	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15																
SAE	8142																								
AISI	TS 8142	0.40-0.45	0.20-0.35	0.70-0.90	0.040	0.040	0.30-0.50	0.20-0.40	0.08-0.15																
SAE																									
AISI	8145	0.42-0.50	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15																
SAE	8145																								
AISI	TS 8145	0.43-0.48	0.20-0.35	0.70-0.90	0.040	0.040	0.30-0.50	0.20-0.40	0.08-0.15																
SAE																									
AISI		0.42-0.50	0.20-0.35	0.70-0.90	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15				≥0.0005												
SAE	81B45																								
AISI	TS81B45	0.43-0.48	0.20-0.35	0.75-1.00	0.035	0.040	0.35-0.55	0.20-0.40	0.08-0.15				≥0.0005												
SAE																									
AISI	8147	0.44-0.52	0.20-0.35	0.70-1.00	0.040	0.040	0.30-0.55	0.20-0.40	0.08-0.15																
SAE	8147																								
AISI	TS8147	0.45-0.50	0.20-0.35	0.70-0.90	0.040	0.040	0.30-0.50	0.20-0.40	0.08-0.15																
SAE																									
AISI	8150	0.47-0.55	0.20-0.35	0.75-1.05	0.040	0.040	0.35-0.60	0.20-0.40	0.08-0.15																
SAE	8150																								
AISI	TS8150	0.48-0.53	0.20-0.35	0.75-1.00	0.040	0.040	0.35-0.55	0.20-0.40	0.08-0.15																
SAE																									
AISI	81B50	0.47-0.55	0.20-0.35	0.75-1.05	0.040	0.040	0.35-0.60	0.20-0.40	0.08-0.15				≥0.0005												
SAE	81B50																								
AISI	8155	0.50-0.60	0.20-0.35	0.75-1.05	0.040	0.040	0.35-0.60	0.20-0.40	0.08-0.15																
SAE	8155																								

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment		
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J	
AISI		0.30-0.35	0.20-0.35	0.70-0.90	0.040	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8632																				
AISI	TS8632	0.30-0.35	0.20-0.35	0.70-0.90	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI		0.33-0.38	0.20-0.35	0.75-1.00	0.040	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8635																				
AISI	TS8635	0.33-0.38	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI	8637	0.35-0.40	0.15-0.35	0.75-1.00	0.035	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8637																				
AISI	TS8637	0.35-0.40	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI	8640	0.38-0.43	0.15-0.35	0.75-1.00	0.035	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8640																				
AISI	TS8640	0.38-0.43	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.18-0.15												
SAE																					
AISI		0.38-0.43	0.20-0.35	0.75-1.00	0.041	0.040-0.060	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8641																				
AISI	TS8641	0.30-0.43	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI		0.40-0.45	0.20-0.35	0.75-1.00	0.035	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8642																				
AISI	TS8642	0.40-0.45	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI	8645	0.43-0.48	0.15-0.35	0.75-1.00	0.035	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8645																				
AISI	TS8645	0.43-0.48	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI		0.43-0.48	0.15-0.35	0.75-1.00	0.035	0.040	0.40-0.60	0.40-0.70	0.15-0.25					0.0005-0.003							
SAE	86B45																				
AISI	TS86B45	0.43-0.48	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					
AISI		0.45-0.50	0.20-0.35	0.75-1.00	0.040	0.040	0.40-0.60	0.40-0.70	0.15-0.25												
SAE	8647																				
AISI	TS8647	0.45-0.50	0.20-0.35	0.75-1.00	0.040	0.040	0.55-0.75	0.40-0.70	0.08-0.15												
SAE																					

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
SAE	9440	0.38-0.43	0.20-0.35	0.50-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
AISI		0.38-0.43	0.20-0.35	0.75-1.00	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
SAE	94B40	0.38-0.43	0.20-0.35	0.75-1.00	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15			0.0005-0.003							
AISI		0.40-0.45	0.20-0.35	0.90-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
SAE	9442	0.40-0.45	0.20-0.35	0.90-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
AISI		0.43-0.48	0.20-0.35	0.90-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
SAE	9445	0.43-0.48	0.20-0.35	0.90-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
AISI		0.45-0.50	0.20-0.35	0.90-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
SAE	9447	0.45-0.50	0.20-0.35	0.90-1.20	0.040	0.040	0.30-0.50	0.30-0.60	0.08-0.15										
AISI		0.45-0.50	0.20-0.35	0.50-0.80	0.040	0.040	0.10-0.25	0.40-0.70	0.15-0.25										
SAE	9747	0.45-0.50	0.20-0.35	0.50-0.80	0.040	0.040	0.10-0.25	0.40-0.70	0.15-0.25										
AISI		0.60-0.67	0.20-0.35	0.50-0.80	0.040	0.040	0.10-0.25	0.40-0.70	0.15-0.25										
SAE	9763	0.60-0.67	0.20-0.35	0.50-0.80	0.040	0.040	0.10-0.25	0.40-0.70	0.15-0.25										
AISI		0.38-0.43	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	0.85-1.15	0.20-0.30										
SAE	9840	0.38-0.43	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	0.85-1.15	0.20-0.30										
AISI		0.43-0.48	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	0.85-1.15	0.20-0.30										
SAE	9845	0.43-0.48	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	0.85-1.15	0.20-0.30										
AISI		0.48-0.53	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	0.85-1.15	0.20-0.30										
SAE	9850	0.48-0.53	0.20-0.35	0.70-0.90	0.040	0.040	0.70-0.90	0.85-1.15	0.20-0.30										
AISI	标准渗氮钢	0.38-0.43	0.20-0.40	0.50-0.70			1.40-1.80		0.30-0.40										
SAE		0.38-0.43	0.20-0.40	0.50-0.70			1.40-1.80		0.30-0.40										
AISI	轴承钢	0.95-1.10	0.20-0.35	0.25-0.45	0.040	0.040	0.40-0.60												
SAE	50100	0.95-1.10	0.20-0.35	0.25-0.45	0.040	0.040	0.40-0.60												
AISI	E51100	0.95-1.10	0.20-0.35	0.25-0.45	0.025	0.025	0.90-1.15												
SAE	51100	0.95-1.10	0.20-0.35	0.25-0.45	0.025	0.025	0.90-1.15												
AISI	E52100	0.95-1.10	0.20-0.35	0.25-0.45	0.025	0.025	1.30-1.60												
SAE	52100	0.95-1.10	0.20-0.35	0.25-0.45	0.025	0.025	1.30-1.60												
AISI		0.50-0.70	0.15-0.30	≤0.30	0.035	0.040	3.00-4.00												
SAE	71360	0.50-0.70	0.15-0.30	≤0.30	0.035	0.040	3.00-4.00												
AISI		0.38-0.43	0.15-0.30	0.50-0.70	0.025	0.025	1.40-1.80				0.3-0.4								
SAE	E71400	0.38-0.43	0.15-0.30	0.50-0.70	0.025	0.025	1.40-1.80				0.3-0.4								
AISI		0.50-0.70	0.15-0.30	≤0.30	0.035	0.040	3.00-4.00												
SAE	71660	0.50-0.70	0.15-0.30	≤0.30	0.035	0.040	3.00-4.00												



(2) ASTM标准的标准等级合金结构钢的钢号及化学成分 (ASTM A332-91)

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
2.9.5 保证淬透性结构钢 (1) ASTM标准保证淬透性碳素结构钢 钢号及化学成分 (ASTM A304-95)																			
ASTM	1038H	0.34-0.43	0.15-0.30	0.50-1.00	0.040	0.050													
ASTM	1045H	0.42-0.51	0.15-0.30	0.50-1.00	0.040	0.050													
ASTM	1522H	0.17-0.25	0.15-0.30	0.50-1.00	0.040	0.050													
ASTM	1524H	0.18-0.26	0.15-0.30	1.25-1.75	0.040	0.050													
ASTM	1526H	0.21-0.30	0.15-0.30	1.00-1.50	0.040	0.050													
ASTM	1541H	0.35-0.45	0.15-0.30	1.25-1.75	0.040	0.050													
ASTM	15B21H	0.17-0.24	0.15-0.30	0.70-1.20	0.040	0.050					≥0.0005								
ASTM	15B35H	0.31-0.39	0.15-0.30	0.70-1.20	0.040	0.050					≥0.0005								
ASTM	15B37H	0.30-0.39	0.15-0.30	1.00-1.50	0.040	0.050					≥0.0005								
ASTM	15B41H	0.35-0.45	0.15-0.30	1.25-1.75	0.040	0.050					≥0.0005								
ASTM	15B48H	0.43-0.53	0.15-0.30	1.00-1.50	0.040	0.050					≥0.0005								
ASTM	15B62H	0.54-0.67	0.40-0.60	1.00-1.50	0.040	0.050					≥0.0005								
(2) ASTM标准保证淬透性的合金钢 钢号及化学成分																			
ASTM	1330H	0.27-0.33	0.15-0.35	1.45-2.05															
ASTM	1335H	0.32-0.38	0.15-0.35	1.45-2.05															
ASTM	1340H	0.37-0.44	0.15-0.35	1.45-2.05															
ASTM	1345H	0.42-0.49	0.15-0.35	1.45-2.05															
ASTM	4027H	0.24-0.30	0.15-0.35	0.60-1.00							0.20-0.30								
ASTM	4028H	0.24-0.30	0.15-0.35	0.60-1.00		0.035-0.050					0.20-0.30								
ASTM	4032H	0.29-0.35	0.15-0.35	0.60-1.00							0.20-0.30								
ASTM	4037H	0.34-0.41	0.15-0.35	0.60-1.00							0.20-0.30								
ASTM	4042H	0.39-0.46	0.15-0.35	0.60-1.00							0.20-0.30								
ASTM	4047H	0.44-0.51	0.15-0.35	0.60-1.00							0.20-0.30								
ASTM	4118H	0.17-0.23	0.15-0.35	0.60-1.00			0.30-0.70				0.08-0.15								
ASTM	4130H	0.27-0.33	0.15-0.35	0.30-0.70			0.75-1.20				0.15-0.25								
ASTM	4135H	0.32-0.38	0.15-0.35	0.60-1.00			0.75-1.20				0.15-0.25								
ASTM	4137H	0.34-0.41	0.15-0.35	0.60-1.00			0.75-1.20				0.15-0.25								
ASTM	4140H	0.37-0.44	0.15-0.35	0.65-1.10			0.75-1.20				0.15-0.25								
ASTM	4142H	0.39-0.46	0.15-0.35	0.65-1.10			0.75-1.20				0.15-0.25								
ASTM	4145H	0.42-0.49	0.15-0.35	0.65-1.10			0.75-1.20				0.15-0.25								
ASTM	4147H	0.44-0.51	0.15-0.35	0.65-1.10			0.75-1.20				0.15-0.25								
ASTM	4150H	0.47-0.54	0.15-0.35	0.65-1.10			0.75-1.20				0.15-0.25								
ASTM	4161H	0.55-0.65	0.15-0.35	0.65-1.10			0.65-0.95				0.25-0.35								

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
ASTM	8627H	0.24-0.30	0.15-0.35	0.60-0.95			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8630H	0.27-0.33	0.15-0.35	0.60-0.95			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	86B30H	0.27-0.33	0.15-0.35	0.60-0.95			0.35-0.65	0.35-0.75	0.15-0.25			≥0.0005							
ASTM	8637H	0.34-0.41	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8640H	0.37-0.44	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8642H	0.39-0.46	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8645H	0.42-0.49	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	86B45H	0.42-0.49	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25			≥0.0005							
ASTM	8650H	0.47-0.54	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8655H	0.50-0.60	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8660H	0.55-0.65	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.15-0.25										
ASTM	8720H	0.17-0.23	0.15-0.35	0.60-0.95			0.35-0.65	0.35-0.75	0.20-0.30										
ASTM	8740H	0.37-0.44	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.20-0.30										
ASTM	8822H	0.19-0.25	0.15-0.35	0.70-1.05			0.35-0.65	0.35-0.75	0.30-0.40										
ASTM	9260H	0.55-0.65	1.70-2.20	0.65-1.10															
ASTM	9310H	0.07-0.13	0.15-0.35	0.40-0.70			1.00-1.45	0.08-0.15	2.95-3.55										
ASTM	94B15H	0.12-0.18	0.15-0.35	0.70-1.05			0.25-0.55	0.08-0.15	0.25-0.65			≥0.0005							
ASTM	94B17H	0.14-0.20	0.15-0.35	0.70-1.05			0.25-0.55	0.08-0.15	0.25-0.65			≥0.0005							
ASTM	94B30H	0.27-0.33	0.15-0.35	0.70-1.05			0.25-0.55	0.08-0.15	0.25-0.65			≥0.0005							

各国铸钢 5.1.1 工程与结构用铸钢 (1) GB标准一般工程用碳素铸钢 (GB 11352-89)

GB	ZG200-400 (ZG15)	≤0.20	≤0.50	≤0.80	0.040	0.040	≤0.30	≤0.30	≤0.20	≤0.30	≤0.05			400	200	25	40	30		N
GB	ZG230-450 (ZG25)	≤0.30	≤0.50	≤0.90	0.040	0.040	≤0.30	≤0.30	≤0.20	≤0.30	≤0.05			450	230	22	32	25		N
GB	ZG270-500 (ZG35)	≤0.40	≤0.50	≤0.90	0.040	0.040	≤0.30	≤0.30	≤0.20	≤0.30	≤0.05			500	270	18	25	22		N
GB	ZG310-570 (ZG45)	≤0.50	≤0.60	≤0.90	0.040	0.040	≤0.30	≤0.30	≤0.20	≤0.30	≤0.05			570	310	15	21	15		N
GB	ZG340-640 (ZG55)	≤0.60	≤0.60	≤0.90	0.040	0.040	≤0.30	≤0.30	≤0.20	≤0.30	≤0.05			640	340	10	18	10		N

(2) GB标准焊接结构用碳素铸钢 (GB 7659-87)

GB	ZG200-400H	≤0.20	≤0.50	0.80	0.04	0.04	≤0.30	≤0.30	≤0.15	≤0.30	≤0.05									
GB	ZG230-450H	≤0.20	≤0.50	1.20	0.04	0.04	≤0.30	≤0.30	≤0.15	≤0.30	≤0.05									
GB	ZG275-485H	≤0.25	≤0.50	1.20	0.04	0.04	≤0.30	≤0.30	≤0.15	≤0.30	≤0.05									

(3) GB标准一般工程与结构用低合金铸钢 (GB/T14408-93)

GB	ZGD270-480	0.20	0.60	0.50-0.80	0.040	0.045	1.00-1.50	0.50	0.45-0.65	0.50				485	275	20	35			N
GB	ZGD290-510	0.23	0.60	1.00-1.50	0.025	0.025	0.30	0.40	0.15					510	295	14	30	39	156	N
GB	ZGD345-570	0.30-0.40	0.50-0.75	0.60-1.20	0.030	0.030	0.50-0.80							590	345	14	30		217	N

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥						
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J	Hardness HB
GB	ZGD410-620	0.20	0.75	0.40-0.70	0.040	0.040	4.00-6.00	0.40	0.45-0.65	0.30			620	420	13		25	179-225	Q+T
GB	ZGD535-720	0.25-0.35	0.30-0.60	1.20-1.60	0.040	0.040	0.30-0.70		0.15-0.35				736	539	13	30		212	N
GB	ZGD650-830	0.35-0.45	0.20-0.40	1.60-1.80	0.030	0.030	0.30	0.30	0.15	0.25	0.05		835	685	13	45	35	269-302	Q+T
GB	ZGD730-910	0.25-0.35	0.30-0.60	0.90-1.50	0.040	0.040	0.30-0.90	1.60-2.00	0.15-0.35	0.30	0.03-0.15		981	784	9	20			Q+T
GB	ZGD840-1030	0.30-0.38		0.70-0.90	0.040	0.040	0.40-0.60	0.60-0.80	0.17-0.25	0.4			1050	875	9	22		262-321	Q+T

(4) JB标准合金铸钢 (JB/ZQ 4297-86)

JB	ZG40Mn	0.35-0.45	0.30-0.45	1.20-1.50	0.030	0.030	≤0.30		0.15				≥640	295	12	30		163	N
JB	ZG65Mn	0.62-0.70	0.17-0.37	0.90-1.20	0.030	0.030	≤0.25	≤0.25	≤0.15										N
JB	ZG40Mn2	0.35-0.45	0.20-0.40	1.60-1.80	0.030	0.030	≤0.30		≤0.15				≥590	395	20	55		179	N
													≥835	685	13	45	35	269-302	Q+T
JB	ZG50Mn2	0.45-0.55	0.20-0.40	1.50-1.80	0.030	0.030	≤0.30		≤0.15				≥785	445	18	37			N
JB	ZG20SiMn	≤0.23	≤0.60	1.00-1.50	0.025	0.025	≤0.30	≤0.40	≤0.15				≥510	295	14	30	39	156	N
													500-650	300	24		45	150-190	Q+T
JB	ZG35SiMn	0.30-0.40	0.60-0.80	1.10-1.40	0.030	0.030	≤0.30		≤0.15				≥570	345	12	20	24		N
													≥640	415	12	25	27		Q+T
JB	ZG35SiMnMo	0.32-0.40	1.10-1.40	1.10-1.40	0.030	0.030	≤0.30		0.20-0.30	≤0.30			≥640	395	12	20	24		N
													≥690	495	12	25	27		Q+T
JB	ZG20MnMo	0.17-0.23	0.20-0.40	1.10-1.40	0.030	0.030	≤0.30		0.20-0.35	≤0.30			≥490	295	16		39	156	N
JB	ZG40Cr	0.35-0.45	0.20-0.40	0.50-0.80	0.030	0.030	0.80-1.10		≤0.15				≥630	345	18	26		212	N
JB	ZG20CrMo	0.17-0.25	0.20-0.40	0.50-0.80	0.030	0.030	0.50-0.80		0.40-0.60				≥460	245	18	30	24		Q+T
JB	ZG35CrMo	0.30-0.37	0.30-0.50	0.50-0.80	0.030	0.030	0.80-1.20		0.20-0.30				740-880	510	12		27		Q+T
JB	ZG42CrMo	0.38-0.45	0.30-0.60	0.60-1.00	0.025	0.025	0.80-1.20		0.20-0.30				740-880	540	12		27	220-260	Q+T
JB	ZG50CrMo	0.46-0.54	0.25-0.50	0.50-0.80	0.030	0.030	0.90-1.20		0.15-0.25				740-880	520	11		34	220-260	Q+T
JB	ZG35CrMnSi	0.30-0.40	0.50-0.75	0.90-1.20	0.030	0.030	0.50-0.80		≤0.15				≥690	345	14	30		217	N
JB	ZG55CrMnMo	0.50-0.60	0.25-0.60	1.20-1.60	0.030	0.030	0.60-0.90		0.20-0.30	≤0.30									N
JB	ZG34CrNiMo	0.30-0.37	0.30-0.60	0.60-1.00	0.025	0.025	1.40-1.70	1.40-1.70	0.15-0.35				950-1000	700	12		32	240-290	Q+T

5.2 德国 5.2.1 工程与结构用铸钢 (1) DIN标准一般工程用非合金铸钢 (DIN 1681-85)

DIN	GS-38	≤0.25	0.20-0.60	0.20-0.50	0.040	0.040							380	200	25	40	35		
DIN	GS-45	≤0.25	≤0.60	0.20-0.50	0.040	0.040							450	230	22	31	27		
DIN	GS-52	~0.30	0.30-0.60	0.20-0.50	0.040	0.040							520	260	18	25	27		
DIN	GS-60	~0.40	0.30-0.60	0.20-0.50	0.040	0.040							600	300	15	21	27		

(2) DIN标准焊接结构用低合金铸钢 (DIN 17182-85)

DIN	GS-16Mn5	0.15-0.20	≤0.60	1.00-1.50	0.020	0.015	≤0.30	≤0.40	≤0.15				430-600	260	25		65		N
DIN	GS-20Mn5	0.17-0.23	≤0.60	1.00-1.50	0.020	0.015	≤0.30	≤0.40	≤0.15				500-650	300	22		55		N

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES \geq					Hardness HB	Heat treatment
		C	Si	Mn	P \leq	S \leq	Cr	Ni	Mo	Cu \leq	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
DIN	GS-17CrMo9 10	0.14-0.21	≤ 0.60	0.60-1.00	0.025	0.020	2.00-2.50		0.90-1.10										
DIN	GS-12CrMo9 10	0.08-0.15	0.30-0.50	0.40-0.70	0.040	0.040	2.00-2.50		0.90-1.10										
DIN	GS-19CrMo9 10	0.15-0.22	0.30-0.60	0.60-1.00	0.025	0.025	2.00-2.50		0.90-1.10										
DIN	GS-30CrMoV6 4	0.27-0.34	0.30-0.60	0.60-1.00	0.025	0.025	1.30-1.70		0.30-0.50		0.05-0.15								
DIN	GS-35CrMoV10 4	0.32-0.39	0.30-0.50	0.60-1.00	0.025	0.025	2.20-2.70		0.30-0.50		0.05-0.15								
DIN	GS-36CrMoV10 4	0.32-0.38	0.30-0.50	0.50-0.70	0.025	0.025	2.30-2.70		0.30-0.50		0.05-0.12								
DIN	GS-18MnCrMo6 3	≤ 0.21	≤ 0.50	1.00-1.70	0.025	0.025	~ 0.60		~ 0.40										
DIN	GS-19MnCrMo6 3	≤ 0.22	≤ 0.50	1.00-1.70	0.025	0.025	~ 0.60		~ 0.40										
DIN	GS-20MnCrMo6 3	≤ 0.22	≤ 0.50	1.00-1.70	0.025	0.025	~ 0.60		~ 0.40										
DIN	GS-50CrV4	0.47-0.55	≤ 0.40	0.70-1.10	0.035	0.030	0.90-1.20				0.10-0.20								

5.3 法国 5.3.1 工程与结构用铸钢 (1) NF标准机械结构一般用铸钢的钢号及化学成分 (NF A32-054(94))

NF	GE230	≤ 0.20	≤ 0.60	≤ 1.20	0.035	0.030	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		400	230	25		35		
NF	GE280	≤ 0.25	≤ 0.60	≤ 1.20	0.035	0.030	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		480	280	20		30		
NF	GE320	≤ 0.32	≤ 0.60	≤ 1.20	0.035	0.030	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		560	320	16		25		
NF	GE370	≤ 0.45	≤ 0.60	≤ 1.20	0.035	0.030	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		650	370	12		20		
NF	G16Mn5	0.13-0.20	≤ 0.60	≤ 1.60	0.030	0.025	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		430	250	24		50		
NF	G20Mn6	0.17-0.23	≤ 0.60	≤ 1.80	0.030	0.025	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		500	300	22		40		
NF	G30Mn6	0.25-0.32	≤ 0.60	≤ 1.80	0.030	0.025	≤ 0.30	≤ 0.40	≤ 0.15		≤ 0.05		580	350	16		27		
NF	G10MnMoV6	≤ 0.12	≤ 0.60	≤ 1.80	0.030	0.020	≤ 0.30	≤ 0.40	0.20-0.40		0.05-0.10		500	380	22		60		
NF	G15CrMoV6	0.12-0.18	≤ 0.60	≤ 1.00	0.030	0.020	1.30-1.80	≤ 0.40	0.80-1.00		0.15-0.25		980	930	4		32		
NF	G25CrMo4	0.22-0.28	≤ 0.60	≤ 1.00	0.030	0.020	0.80-1.20	≤ 0.40	0.15-0.35		≤ 0.05		580	380	18		22		
NF	G35CrMo4	0.30-0.38	≤ 0.60	≤ 1.00	0.030	0.020	0.80-1.20	≤ 0.40	0.15-0.35		≤ 0.05		750	520	12		20		
NF	G42CrMo4	0.39-0.45	≤ 0.60	≤ 1.00	0.030	0.020	0.80-1.20	≤ 0.40	0.15-0.35		≤ 0.05		780	580	10		12		
NF	G35NiCrMo6	≤ 0.38	≤ 0.60	≤ 1.00	0.030	0.020	1.40-1.70	1.40-1.70	0.15-0.35		≤ 0.05		800	550	12		32		
NF	G30NiCrMo8	≤ 0.33	≤ 0.60	≤ 1.00	0.030	0.020	0.80-1.20	1.70-2.30	0.30-0.60		≤ 0.05		750	550	15		32		
NF	G20NiCrMo12	≤ 0.22	≤ 0.60	≤ 1.00	0.030	0.020	1.30-1.80	3.00-3.50	0.45-0.60		≤ 0.05		750	650	16		40		
NF	G30NiCrMo14	≤ 0.33	≤ 0.60	≤ 1.00	0.030	0.020	0.80-1.20	3.00-4.00	0.30-0.60		≤ 0.05		1100	1000	7		20		
NF	GX4CrNi13-4	≤ 0.06	≤ 0.80	≤ 1.00	0.035	0.020	12.0-13.5	3.50-4.50	< 0.15		≤ 0.05		900	800	12		35		
NF	GX4CrNi16-4	≤ 0.06	≤ 0.80	≤ 1.00	0.035	0.020	15.5-17.0	4.00-5.50	< 0.15		≤ 0.05		1000	830	10		30		

5.3.3 低温用铸钢 (1) NF标准低温用铸钢的钢号及化学成分 (NF A32-053(92))

NF	FA-M	≤ 0.25	≤ 0.50	≤ 1.00	0.040	0.035							380-530	200	18	26	18		
NF	FB-M	≤ 0.20	≤ 0.50	≤ 1.20	0.040	0.035		≤ 1.00					450-600	230	16	23	18		
NF	FC-M	≤ 0.25	≤ 0.50	≤ 1.50	0.040	0.035		≤ 1.00					520-670	260	16	23	20		
NF	FBI-M	≤ 0.22	≤ 0.50	≤ 1.50	0.040	0.035		0.50-2.00					450-600	230	18	26	18		
NF	FC1-M	≤ 0.25	≤ 0.50	≤ 0.80	0.040	0.035			0.45-0.65				450-600	230	18	26	18		

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
NF	FC2-M	≤0.23	≤0.50	≤0.80	0.040	0.035		2.50-4.00					450-600	230	18	26	20		
NF	FC 2-1-M	≤0.20	≤0.50	≤0.80	0.030	0.030	1.00-2.00	3.00-4.00	0.30-0.60				700-850	500	12	18	40		
NF	FC3-M	≤0.15	≤0.50	≤0.80	0.040	0.035		3.50-4.50					450-600	230	18	26	20		
NF	FCZ-M	≤0.25	≤0.50	≤0.80	0.040	0.040		2.50-4.00					≥450	230	18				

5.3.4 压力容器用铸钢 (1) NF标准压力容器用可焊接铸钢的钢号及化学成分 (NF A32-055(85))

NF	A420CP-M	≤0.23	≤0.60	≤1.00	0.030	0.030							420-530	240	25			130-165	Q+T
NF	A420AP-M	≤0.23	≤0.60	≤1.00	0.030	0.030							420-530	240	25			130-165	Q+T
NF	A420FP-M	≤0.23	≤0.60	≤1.20	0.030	0.030		≤1.00					420-530	240	25			130-165	Q+T
NF	A480CP-M	≤0.23	≤0.60	≤1.50	0.030	0.030							480-600	270	20			140-185	Q+T
NF	A480AP-M	≤0.23	≤0.60	≤1.50	0.030	0.030							480-600	270	20			140-185	Q+T
NF	A480FP-M	≤0.23	≤0.60	≤1.50	0.030	0.030		≤1.00					480-600	270	20			140-165	Q+T
NF	20M5-M	≤0.22	≤0.50	≤1.20	0.030	0.030							470-590	235	20			140-165	Q+T
NF	20MN5-M	≤0.22	≤0.60	≤1.20	0.030	0.030		≤0.50	≤0.30				485-610	280	22			145-190	Q+T
NF	20N12-M	≤0.23	≤0.60	≤1.50	0.030	0.030		2.40-4.00					450-600	230	18			135-180	Q+T
NF	20D5-M	≤0.23	≤0.60	≤1.00	0.030	0.030			0.40-0.70				450-600	250	21			135-180	Q+T
NF	18CD2.05-M	0.14-0.22	≤0.60	≤1.00	0.030	0.030	0.40-0.65		0.45-0.70				500-650	300	18			155-200	Q+T
NF	15CD5.05-M	0.12-0.20	≤0.60	≤1.00	0.030	0.030	1.00-1.50		0.45-0.65				500-650	300	18			155-200	Q+T
NF	15CD9.10-M	0.10-0.18	≤0.60	≤1.10	0.030	0.030	2.00-2.50		0.90-1.10				550-700	325	17			160-200	Q+T
NF	15CDV4.10-M	0.12-0.20	≤0.60	≤1.00	0.030	0.030	1.00-1.50		0.85-1.15		0.15-0.30		600-750	350	15			180-220	Q+T
NF	15CDV9.10-M	0.10-0.18	≤0.60	≤1.00	0.030	0.030	2.00-2.75		0.90-1.20		0.15-0.30		600-750	350	15		16	180-220	Q+T
NF	Z15CD5.05-M	≤0.19	≤1.00	≤1.00	0.030	0.030	4.00-6.00		0.40-0.70				630-780	420	16		24	185-240	Q+T
NF	Z6CN12.1-M	≤0.08	≤0.60	≤1.00	0.025	0.035	11.5-13.0	0.9-1.3	≤0.50				540-700	380	18		40	160-220	Q+T
NF	Z2CN18.10-M	≤0.030	≤1.50	≤1.50	0.030	0.040	17.0-21.0	8.0-12.0					450-650	190	35		80		Q+T
NF	Z3CN20.09-M	≤0.040	≤1.50	≤1.50	0.025	0.035	19.0-21.0	8.0-11.0		≤1.00			480-680	210	35		80		Q+T
NF	Z6CN18.10-M	≤0.08	≤1.50	≤1.50	0.030	0.040	17.0-21.0	8.0-12.0					450-650	190	30		80		Q+T
NF	Z6CNb18.10-M	≤0.08	≤1.50	≤1.50	0.030	0.040	17.0-21.0	8.0-11.0					450-650	190	30		50		Q+T
NF	Z2CND18.12-M	≤0.030	≤1.50	≤1.50	0.030	0.040	17.0-21.0	9.0-13.0	2.00-3.00				450-650	190	40		80		Q+T
NF	Z3CND19.10-M	≤0.040	≤1.50	≤1.50	0.025	0.035	18.0-21.0	9.0-12.0	2.25-2.75	≤1.00			480-680	210	35		80		Q+T
NF	Z6CND18.12-M	≤0.08	≤1.50	≤1.50	0.030	0.040	17.0-21.0	9.0-13.0	2.00-3.00				450-650	190	35		80		Q+T
NF	Z6CNDb18.12-M	≤0.08	≤1.50	≤1.50	0.030	0.040	17.0-21.0	9.0-13.0	1.75-2.50				450-650	190	25		50		Q+T
NF	Z6CNDU25.20.04-M	≤0.08	≤1.50	≤1.50	0.030	0.040	18.0-22.0	23.0-27.0	2.50-6.00	1.50-3.50			450-650	170	30		80	130	Q+T
NF	Z6CNDU20.08-M	≤0.08	≤1.50	≤1.50	0.030	0.040	19.0-23.0	7.0-9.0	2.00-3.00	1.00-2.00			600-700	320	15		50	180	Q+T

5.4 国际标准化组织 (ISO) 5.4.1 普通工程用铸钢 ISO标准普通工程用铸钢的钢号及化学成分及力学性能 (ISO 3755:1991)

ISO	200-400				0.035	0.035							400-550	200	25	40	30		
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Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
ISO	200-400W	≤0.25	≤0.60	≤1.00	0.035	0.035	≤0.35	≤0.40	≤0.15	≤0.40	≤0.05			400-550	200	25	40	45	
ISO	230-450				0.035	0.035								450-600	230	22	31	25	
	230-450W	≤0.25	≤0.60	≤1.20	0.035	0.035	≤0.35	≤0.40	≤0.15	≤0.40	≤0.05			450-600	230	22	31	45	
ISO	270-480				0.035	0.035								480-630	270	18	25	22	
	270-480W	≤0.25	≤0.60	≤1.20	0.035	0.035	≤0.35	≤0.40	≤0.15	≤0.40	≤0.05			480-630	270	18	25	22	
ISO	340-550				0.035	0.035								550-700	340	15	21	20	
	340-550W	≤0.25	≤0.60	≤1.20	0.035	0.035	≤0.35	≤0.40	≤0.15	≤0.40	≤0.05			550-700	340	15	21	20	

5.4.2 工程与结构用高强度铸钢 ISO标准工程与结构用高强度铸钢的钢号及化学成分及力学性能(ISO 9477:1992)

ISO	410-620		≤0.60		0.035	0.035								620-770	410	16	40	20	
ISO	540-720		≤0.60		0.035	0.035								720-870	540	14	35	20	
ISO	620-820		≤0.60		0.035	0.035								820-970	620	11	30	18	
ISO	840-1030		≤0.60		0.035	0.035								1030-1180	840	7	22	15	

5.5 日本 (1) JIS标准普通用途碳素铸钢(JIS G5101(1991))

JIS	SC360	≤0.20			0.040	0.040								360	175	23	35		
JIS	SC410	≤0.30			0.040	0.040								410	205	21	35		
JIS	SC450	≤0.35			0.040	0.040								450	225	19	30		
JIS	SC480	≤0.40			0.040	0.040								480	245	17	25		

(2) JIS标准焊接结构用铸钢(JIS G5102 (1991))

JIS	SCW410	≤0.22	≤0.80	≤1.50	0.040	0.040						≤0.40	410	235	21		27	
JIS	SCW450	≤0.22	≤0.80	≤1.50	0.040	0.040						≤0.43	450	255	20		27	
JIS	SCW480	≤0.22	≤0.80	≤1.50	0.040	0.040	≤0.50	≤0.50				≤0.45	480	275	20		27	
JIS	SCW550	≤0.22	≤0.80	≤1.50	0.040	0.040	≤0.50	≤2.50	≤0.30		≤0.20	≤0.48	550	355	18		27	
JIS	SCW620	≤0.22	≤0.80	≤1.50	0.040	0.040	≤0.50	≤2.50	≤0.30		≤0.20	≤0.50	620	430	17		27	

(3) JIS标准结构用高强度铸钢 (JIS G5111(1991))

JIS	SCC3	0.30-0.40	0.30-0.60	0.50-0.80	0.040	0.040								520	265	13	20		143	N
	620													370	13	20		183	Q+T	
JIS	SCC5	0.40-0.50	0.30-0.60	0.50-0.80	0.040	0.040								620	295	9	15		163	N
	690													440	9	15		201	Q+T	
JIS	SCMn1	0.20-0.30	0.30-0.60	1.00-1.60	0.040	0.040								540	275	17	35		143	N
	590													390	17	35		170	Q+T	
JIS	SCMn2	0.25-0.35	0.30-0.60	1.00-1.60	0.040	0.040								590	345	16	35		163	N
	640													440	16	35		183	Q+T	
JIS	SCMn3	0.30-0.40	0.30-0.60	1.00-1.60	0.040	0.040								640	370	13	30		170	N

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
JIS	SCMn3	0.30-0.40	0.30-0.60	1.00-1.60	0.040	0.040							690	490	13	30		197	Q+T
JIS	SCMn5	0.40-0.50	0.30-0.60	1.00-1.60	0.040	0.040							690	390	9	20		183	N
	740												540	9	20		212	Q+T	
JIS	SCSiMn2	0.25-0.35	0.50-0.80	0.90-1.20	0.040	0.04							590	295	13	35		163	N
	640												440	17	35		183	Q+T	
JIS	SCMnCr2	0.25-0.35	0.30-0.60	1.20-1.60	0.040	0.040	0.40-0.80						590	370	13	30		170	N
	640												440	17	35		180	Q+T	
JIS	SCMnCr3	0.30-0.40	0.30-0.60	1.20-1.60	0.040	0.040	0.40-0.80						640	390	9	25		183	N
	690												490	13	30		207	Q+T	
JIS	SCMnCr4	0.35-0.45	0.30-0.60	1.20-1.60	0.040	0.040	0.40-0.80						690	410	9	20		201	N
	740												540	13	25		223	Q+T	
JIS	SCMnM3	0.30-0.40	0.30-0.60	1.20-1.60	0.040	0.040	≤0.20		0.15-0.35				690	390	13	30		183	N
	740												490	13	30		212	Q+T	
JIS	SCCrM1	0.20-0.30	0.30-0.60	0.50-0.80	0.040	0.040	0.80-1.20		0.15-0.35				590	390	13	30		170	N
	690												490	13	30		201	Q+T	
JIS	SCCrM3	0.30-0.40	0.30-0.60	0.50-0.80	0.040	0.040	0.80-1.20		0.15-0.35				690	440	9	25		201	N
	740												540	9	25		217	Q+T	
JIS	SCMnCrM2	0.25-0.35	0.30-0.60	1.20-1.60	0.040	0.040	0.30-0.70		0.15-0.35				690	440	13	30		201	N
	740												540	13	30		212	Q+T	
JIS	SCMnCrM3	0.30-0.40	0.30-0.60	1.20-1.60	0.040	0.040	0.30-0.70		0.15-0.35				740	540	9	25		212	N
	830												635	9	25		223	Q+T	
JIS	SCNCrM2	0.25-0.35	0.30-0.60	0.90-1.50	0.040	0.040	0.30-0.90	1.60-2.00	0.15-0.35				780	590	9	20		223	N
	880												685	9	20		269	Q+T	

5.5.5 承压铸钢 (1) JIS标准高温高压用铸钢(JIS G5151(1991))

JIS	SCPH1	≤0.25	≤0.60	≤0.70	0.040	0.040	≤0.25	≤0.50	≤0.25	≤0.50				410	205	21	35		
JIS	SCPH2	≤0.30	≤0.60	≤1.00	0.040	0.040	≤0.25	≤0.50	≤0.25	≤0.50				480	245	19	35		
JIS	SCPH11	≤0.25	≤0.60	0.50-0.80	0.040	0.040		≤0.50	0.45-0.65	≤0.50				450	245	22	35		
JIS	SCPH21	≤0.20	≤0.60	0.50-0.80	0.040	0.040	1.00-1.50	≤0.50	0.45-0.65	≤0.50				480	275	17	35		
JIS	SCPH22	≤0.25	≤0.60	0.50-0.80			1.00-1.50	≤0.50	0.90-1.20	≤0.50				550	345	16	35		
JIS	SCPH23	≤0.20	≤0.60	0.50-0.80			1.00-1.50	≤0.50	0.90-1.20	≤0.50	0.15-0.25			550	345	13	35		
JIS	SCPH32	≤0.20	≤0.60	0.50-0.80			2.00-2.75	≤0.50	0.90-1.20	≤0.50				480	275	17	35		
JIS	SCPH61	≤0.20	≤0.75	0.50-0.80			4.00-6.50	≤0.50	0.45-0.65	≤0.50				620	410	17	35		

(2) JIS 标准低温高压用铸钢 (JIS G5152(1991))

JIS	SCPL1	≤0.30	≤0.60	≤1.00	0.040	0.040	≤0.25	≤0.50		≤0.50				450	245	21	35	18	
JIS	SCPL11	≤0.25	≤0.60	0.50-0.80	0.040	0.040	≤0.35		0.45-0.65	≤0.50				450	245	21	35	18	

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
JIS	SCPL21	≤0.25	≤0.60	0.50-0.80	0.040	0.040	≤0.35	2.00-3.00		≤0.50			480	275	21	35	21		
JIS	SCPL31	≤0.15	≤0.60	0.50-0.80	0.040	0.040	≤0.35	3.00-4.00		≤0.50			480	275	21	35	21		

5.6 俄罗斯 5.6.1 碳素钢和合金铸钢 (1) ГОСТ标准碳素铸钢(ГОСТ 977-88)

ГОСТ	15 л	0.12-0.20	0.20-0.52	0.45-0.90	0.050	0.050	≤0.30	≤0.30		≤0.30			392	196	24	35	49.1	N
ГОСТ	20 л	0.17-0.25	0.20-0.52	0.45-0.90	0.040	0.045	≤0.30	≤0.30		≤0.30			412	216	22	35	49.1	N
ГОСТ	25 л	0.22-0.30	0.20-0.52	0.45-0.90	0.040	0.045	≤0.30	≤0.30		≤0.30			441	235	19	30	39.2	N
													491	294	22	33	34.3	Q+T
ГОСТ	30 л	0.27-0.35	0.20-0.52	0.45-0.90	0.040	0.045	≤0.30	≤0.30		≤0.30			471	255	17	30	34.3	N
													491	294	17	30	34.3	Q+T
ГОСТ	35 л	0.32-0.40	0.20-0.52	0.45-0.90	0.040	0.045	≤0.30	≤0.30		≤0.30			491	275	15	25	34.3	N
													540	343	16	20	29.4	Q+T
ГОСТ	40 л	0.37-0.45	0.20-0.52	0.45-0.90	0.035	0.035	≤0.30	≤0.30		≤0.30			520	294	14	25	29.4	N
													540	343	14	20	29.4	Q+T
ГОСТ	45 л	0.42-0.50	0.20-0.52	0.45-0.90	0.030	0.030	≤0.30	≤0.30		≤0.30			540	310	12	20	29.4	N
													589	392	10	20	24.5	Q+T
ГОСТ	50 л	0.47-0.55	0.20-0.52	0.45-0.90	0.030	0.030	≤0.30	≤0.30		≤0.30			569	334	11	20	24.5	N
													736	392	14	20	29.4	Q+T

(2) ГОСТ标准合金铸钢

ГОСТ	20ГЛ	0.15-0.25	0.20-0.40	1.20-1.60	0.040	0.040							540	275	18	25	49.1	N
													530	334	14	25	38.3	Q+T
ГОСТ	35ГЛ	0.30-0.40	0.20-0.40	1.20-1.60	0.040	0.040							540	294	12	20	29.4	N
													589	343	14	30	49.1	Q+T
ГОСТ	20ГсЛ	0.16-0.22	0.60-0.80	1.00-1.30	0.030	0.030							540	294	18	30	29.4	N
ГОСТ	30ГсЛ	0.25-0.35	0.60-0.80	1.10-1.40	0.040	0.040							529	343	14	25	29.4	N
													638	392	14	30	49.1	Q+T
ГОСТ	20Г1фЛ	0.16-0.25	0.20-0.50	0.90-1.40	0.050	0.050				0.06-0.12			510	314	17	25	49.1	N
ГОСТ	20фЛ	0.14-0.25	0.20-0.52	0.70-1.20	0.050	0.050				0.06-0.12			491	294	18	35	49.1	N
ГОСТ	30ХГсфЛ	0.25-0.35	0.40-0.60	1.00-1.50	0.050	0.050	0.30-0.50						589	392	15	25	34.3	N
													785	589	14	25	44.1	Q+T
ГОСТ	45фЛ	0.42-0.50	0.20-0.52	0.40-0.90									589	392	12	20	29.4	N
													687	491	12	20	29.4	Q+T
ГОСТ	32Х06Л	0.25-0.35	0.20-0.40	0.40-0.90	0.050	0.050	0.50-0.80						638	441	10	20	49.1	Q+T
ГОСТ	40ХЛ	0.35-0.45	0.20-0.40	0.40-0.90	0.040	0.040	0.80-1.10						638	491	12	25	39.2	Q+T
ГОСТ	20ХМЛ	0.15-0.25	0.20-0.42	0.40-0.90	0.040	0.040	0.40-0.70		0.40-0.60				441	245	18	30	29.4	N

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
ГОСТ	20ХМФЛ	0.18-0.25	0.20-0.40	0.60-0.90	0.25	0.025	0.90-1.20		0.50-0.70					491	275	16	35	29.4	N
ГОСТ	20ГНМФЛ	0.14-0.22	0.20-0.40	0.70-1.20	0.030	0.030	≤0.30	0.70-1.00	0.15-0.25					589	491	15	33	49.1	N
														687	589	14	30	58.9	Q+T
ГОСТ	35ХМЛ	0.30-0.40	0.20-0.40	0.40-0.90	0.040	0.040	0.80-1.10		0.20-0.30					589	392	12	20	29.4	N
														687	540	12	25	39.2	Q+T
ГОСТ	30ХНМЛ	0.25-0.35	0.20-0.40	0.40-0.90	0.040	0.040	1.30-1.60	1.30-1.60	0.20-0.30					687	540	12	20	29.4	N
														785	638	10	20	39.2	Q+T
ГОСТ	35ХГСЛ	0.30-0.40	0.60-0.80	1.00-1.30	0.040	0.040	0.60-0.90							589	343	14	25	29.4	N
														785	589	10	20	39.2	Q+T
ГОСТ	35НГМЛ	0.32-0.42	0.20-0.40	0.80-1.20	0.040	0.040		0.80-1.20	0.15-0.25					736	589	12	25	39.2	Q+T
ГОСТ	20ДХЛ	0.15-0.25	0.20-0.40	0.50-0.80	0.040	0.040	0.80-1.10							491	392	12	30	29.4	N
														638	540	12	30	39.2	Q+T
ГОСТ	08ГДНФЛ	≤0.10	1.15-0.40	0.60-1.00	0.035	0.035		1.15-1.55						441	343	18	30	49.1	N
ГОСТ	13ХНДФЛ	≤0.16	0.20-0.40	0.40-0.90	0.030	0.030	0.15-0.40	1.20-1.60						491	392	18	30	49.1	N
														638	540	12	20	29.4	N
ГОСТ	12ДН2ФЛ	0.08-0.16	0.20-0.40	0.40-0.90	0.035	0.035		1.80-2.20						785	638	12	25	39.2	Q+T
														785	638	12	20	29.4	N
ГОСТ	12ДХН1МФЛ	0.10-0.18	0.20-0.40	0.30-0.55	0.030	0.030	1.20-1.70	1.40-1.80	0.20-0.30	0.40-0.65	0.08-0.15			981	735	10	20	29.4	Q+T
														1275	1079	6	24	39.2	Q+T
ГОСТ	23ХГС2МФЛ	0.18-0.24	1.80-2.00	0.50-0.80	0.025	0.025	0.60-0.90		0.25-0.30					1275	1079	6	24	39.2	Q+T
ГОСТ	12Х7Г3СЛ	0.10-0.15	0.80-1.20	3.00-3.50	0.020	0.020	7.00-7.50							1324	1079	9	40	58.9	Q+T
ГОСТ	25Х2ГНМФЛ	0.22-0.30	0.30-0.70	0.70-1.10	0.025	0.025	1.40-2.00	0.30-0.90	0.20-0.50					638	491	12	30	58.9	N
														1275	1079	5	25	39.2	Q+T
ГОСТ	27Х5ГСМЛ	0.24-0.28	0.90-1.20	0.90-1.20	0.020	0.020	5.00-5.50		0.55-0.60					1472	1177	5	20	39.2	Q+T
ГОСТ	30Х3С3ГМЛ	0.29-0.33	2.80-3.20	0.70-1.20	0.020	0.020	2.80-3.20		0.50-0.60					1766	1472	4	15	19.6	Q+T
ГОСТ	03Н12Х5М3ТЛ	0.01-0.04			0.015	0.015	4.50-5.00	12.00-12.50	2.50-3.00					1324	1275	8	45	49.1	Q+T
ГОСТ	03Н12Х5М3ТЛ	0.01-0.04			0.015	0.015	4.50-5.00	12.00-12.50	2.50-3.00					1472	1422	8	35	29.4	Q+T

5.7 瑞典 5.7.1 非合金铸钢和合金铸钢 (1) SS标准非合金铸钢和合金铸钢的钢号及化学成分

SS	1305	≤0.25	≤0.50	≤0.70	0.040	0.040								450	230				Q+T
SS	1306	≤0.18	≤0.60	≤1.1	0.040	0.040	≤0.30		≤0.30					402	216	25			Q+T
SS	1505	≤0.30	≤0.50	≤0.70	0.040	0.040								520	260				Q+T
SS	1606	≤0.50	≤0.50	≤0.70	0.040	0.040								570	300				Q+T
SS	2120	0.38-0.45	0.10-0.40	1.10-1.40	0.040	0.040								600	400	12			N
SS	2133	≤0.20	≤0.5	≤1.60	0.035	0.035													
SS	2172	≤0.20	0.30-0.60	≤1.5	0.035	0.035	≤0.3		≤0.4					490	290	18			N

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment	
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
SS	2183	1.00-1.35	≤1.0	11.0-14.0	0.08	0.08														
SS	2223	≤0.18	≤0.6	≤0.8	0.040	0.040	0.7-1.3		0.5-0.7	≤0.3			490	274	20					N
SS	2224	≤0.18	≤0.6	≤0.7	0.040	0.040	2.0-2.5		0.9-1.2	≤0.3										
SS	2225	0.22-0.29	0.30-0.60	0.60-0.90	0.035	0.035	0.90-1.20		0.15-0.25				690	490	12					Q+T

5.8 英国 5.8.1 工程与结构用钢 (1) BS标准工程与结构用铸钢的钢号和化学成分(BS 3100Part2~3-1991)

碳素铸钢和C-Mn铸钢																				
BS	A1	≤0.25	≤0.60	≤0.90	0.050	0.050	≤0.30	≤0.40	≤0.15	≤0.30			430	230	22	27				
BS	A2	≤0.35	≤0.60	≤1.00	0.050	0.050							490	260	18	20				
BS	A3	≤0.45	≤0.60	≤1.00	0.050	0.050							540	295	14	18				
BS	A4	0.18-0.25	≤0.60	1.2-1.6	0.050	0.050							540-690	320	16	30	152-207			
BS	A5	0.25-0.33	≤0.60	1.2-1.6	0.050	0.050							620-770	370	13	25	179-229			
BS	A6	0.25-0.33	≤0.60	1.2-1.6	0.050	0.050							690-850	495	13	25	201-255			
低温用铸钢																				
BS	AL1	≤0.20	≤0.60	≤1.1	0.040	0.040	≤0.30	≤0.40	≤0.15	≤0.30			430	230	22	20				
BS	AL2	≤0.25	≤0.60	≤1.2	0.040	0.040	≤0.30	≤0.40	≤0.15	≤0.30			485-655	275	22	20				
BS	AL3	≤0.25	≤0.60	≤1.2	0.040	0.040	≤0.30	≤0.40	≤0.15	≤0.30			485-655	275	22	27				
BS	BL2	≤0.12	≤0.60	≤0.80	0.030	0.030		3.0-4.0					460	280	20	20				
高磁导率铸钢																				
BS	AM1	≤0.15	≤0.60	≤0.50	0.050	0.050	≤0.30	≤0.40	≤0.15	≤0.30			340-430	185	22					
BS	AM2	≤0.25	≤0.60	≤0.50	0.050	0.050	≤0.30	≤0.40	≤0.15	≤0.30			400-490	215	22					
表面硬化与抗磨铸钢																				
BS	AW1		≤0.60	0.60-1.0	0.050	0.050	≤0.30	≤0.40	≤0.15	≤0.30			460		12	25				
BS	AW2	0.40-0.50	≤0.60	≤1.0	0.050	0.050	≤0.30	≤0.40	≤0.15	≤0.30			620	325	12					
BS	AW3	0.50-0.60	≤0.60	≤1.0	0.050	0.050	≤0.30	≤0.40	≤0.15	≤0.30			690	370	8					
高温用铸钢																				
BS	B1	≤0.20	0.20-0.60	0.40-1.0	0.040	0.040	≤0.30	≤0.40	0.45-0.65	≤0.30			460	260	18	20				
BS	B2	≤0.20	≤0.60	0.50-0.80	0.040	0.040	1.0-1.5	≤0.40	0.45-0.65	≤0.30			480	280	17	30			140-212	
BS	B3	≤0.18	≤0.60	0.40-0.70	0.040	0.040	2.0-2.75	≤0.40	0.90-1.2	≤0.30			540	325	17	25			156-235	
BS	B4	≤0.25	≤0.75	0.30-0.70	0.040	0.040	2.5-3.5	≤0.40	0.35-0.60	≤0.30			620	370	13	25			179-255	
BS	B5	≤0.25	≤0.75	0.40-0.70	0.040	0.040	4.0-6.0	≤0.40	0.45-0.65	≤0.30			620	420	13	25			179-255	
BS	B6	≤0.20	≤1.0	0.30-0.70	0.040	0.040	8.0-10.0	≤0.40	0.90-1.2	≤0.30			620	420					179-255	
BS	B7	0.10-0.15	≤0.45	0.40-0.70	0.030	0.030	0.30-0.50	≤0.40	0.40-0.60	≤0.30	0.22-0.30		510	295	17					
高强度铸钢																				
BS	BT1				0.040	0.040							690	495	11	35			201-279	
BS	BT2				0.040	0.040							850	585	8	25			248-327	

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment	
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
BS	BT3				0.030	0.030								1000	695	6	20		293-362	
抗磨蚀铸钢																				
BS	BW2	0.45-0.60	≤0.75	0.50-1.0	0.040	0.040	0.80-1.50	≤0.40											201-255	
BS	BW3	0.45-0.60	≤0.75	0.50-1.0	0.040	0.040	0.80-1.50	≤0.40											≥293	
BS	BW4	0.45-0.60	≤0.75	0.50-1.0	0.040	0.040	0.80-1.50	≤0.40											≥341	
BS	BW10	1.0-1.35	≤1.0	≥11.0	0.050	0.050														

5.8.4 精密铸钢和精密铸造合金 (1) BS标准碳素和低合金精密铸钢 (BS 3146 Part 1-1974 (1992再确认))

BS	CLA1 gradeA	0.15-0.25	0.20-0.60	0.40-1.00	0.035	0.035	≤0.30	≤0.40	≤0.10	≤0.30				430	195	15			121-174	
BS	CLA1 gradeB	0.25-0.35	0.20-0.60	0.40-1.00	0.035	0.035	≤0.30	≤0.40	≤0.10	≤0.30				500	215	13			143-185	
BS	CLA1 gradeC	0.35-0.45	0.20-0.60	0.40-1.00	0.035	0.035	≤0.30	≤0.40	≤0.10	≤0.30				540	245	13			163-207	
BS	CLA2	0.18-0.25	0.20-0.50	1.20-1.70	0.035	0.035	≤0.30	≤0.40	≤0.10	≤0.30				550-700	≤310	13		40.7	152-201	
BS	CLA3													700-850	495	11		33.9	201-255	
BS	CLA4													850-1000	585	11		20.3	248-302	
BS	CLA5 gradeA													1000	880	9		40.7	269-321	
BS	CLA5 gradeB													1160	1000	5		13.6	341-388	
BS	CLA7	0.15-0.25	0.30-0.80	0.30-0.60	0.035	0.035	2.50-3.50	≤0.40	0.35-0.60	≤0.30				620-770	480	14		33.9	174-223	
BS	CLA8	0.37-0.45	0.20-0.60	0.50-0.80	0.035	0.035	≤0.30	≤0.40	≤0.10	≤0.30				540	245	15			HV>500	
BS	CLA9	0.10-0.18	0.20-0.60	0.60-1.00	0.035	0.035	≤0.30	≤0.40	≤0.10	≤0.30				495	215	15		27.1		
BS	CLA10	0.10-0.18	0.20-0.60	0.30-0.60	0.035	0.035	≤0.30	2.75-3.50	≤0.10	≤0.30				700	350	14		40.7		
BS	CLA11	0.20-0.30	0.30-0.80	0.30-0.60	0.035	0.035	2.90-3.50	≤0.40	0.40-0.70	≤0.30	≤0.02			850-1000	600	8		20.3	248-302	
BS	CLA12 gradeA	0.45-0.55	0.30-0.80	0.50-1.00	0.035	0.035	0.80-1.20	≤0.40	≤0.10	≤0.30				700		8			≤207	
BS	CLA12 gradeB	0.45-0.55	0.30-0.80	0.50-1.00	0.035	0.035	0.80-1.20	≤0.40	≤0.10	≤0.30									≤293	
BS	CLA12 gradeC	0.55-0.65	0.30-0.80	0.50-1.00	0.035	0.035	0.80-1.50	≤0.40	0.20-0.40	≤0.30									≤341	
BS	CLA13	0.12-0.20	0.20-0.60	0.30-0.70	0.035	0.035	≤0.30	1.50-2.00	0.20-0.40	≤0.30				700	350	14		40.7		

5.9 美国 5.9.1 工程与结构用铸钢 (1) ASTM标准与UNS系统一般用途碳素铸钢 (ASTM A27/A27M-93)

ASTM	N1																			
UNS	J02500	≤0.25	≤0.80	≤0.75	0.05	0.06														
ASTM	N2																			
UNS	J03500	≤0.35	≤0.80	≤0.60	0.05	0.06														
ASTM	U-415-205																			
UNS	J02500	≤0.25	≤0.80	≤0.75	0.05	0.06								415	415	22	30			
ASTM	415-205																			
UNS	J03000	≤0.30	≤0.80	≤0.60	0.05	0.06								415	415	24	35			
ASTM	450-240																			
		<0.20	<0.80	<0.70	0.05	0.06								450	450	24	35			

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
UNS	J03001	≤0.30	≤0.80	≤0.70	0.05	0.06								450	450	24	30		
ASTM	485-250	≤0.35	≤0.80	≤0.70	0.05	0.06								485	485	22	30		
UNS	J03501																		
ASTM	485-275	≤0.25	≤0.80	≤1.20	0.05	0.06								485	485	22	30		
UNS	J02501																		

(2) ASTM标准结构用高强度铸钢 (ASTM A148M-93b)

ASTM	550-275				0.06	0.05								550	275	18	30		
ASTM	550-345				0.06	0.05								550	345	22	35		
ASTM	620-415				0.06	0.05								620	415	20	40		
ASTM	725-585				0.06	0.05								725	585	17	35		
ASTM	495-655				0.06	0.05								795	655	14	30		
ASTM	895-795				0.06	0.05								895	795	11	25		
ASTM	930-860				0.06	0.05								930	860	9	22		
ASTM	1035-930				0.06	0.05								1035	930	7	18		
ASTM	1105-1000				0.06	0.05								1105	1000	6	12		
ASTM	1140-1035				0.020	0.020								1140	1035	5	20		
ASTM	1140-1035L				0.020	0.020								1140	1035	5	20	27	
ASTM	1450-1240				0.020	0.020								1450	1240	4	15		
ASTM	1450-1240L				0.020	0.020								1450	1240	4	15	20	
ASTM	1795-1450				0.020	0.020								1795	1450	3	6		
ASTM	1795-1450L				0.020	0.020								1795	1450	3	6	8	

(3) ASTM标准公路桥梁用铸钢 (ASTM A486M-84)

ASTM	485级	≤0.35	≤0.08	≤0.90	0.05	0.06								485	250	22	30	34	
ASTM	620级	≤0.35			0.05	0.06								620	415	20	40	34	
ASTM	825级	≤0.35			0.05	0.06								825	655	14	30	41	

5.9.3 耐热铸钢和高温用铸钢 (3) ASTM标准与UNS系统适合于熔焊的高温用碳素铸钢 (ASTM A216/A216M-93)

ASTM	WCA	≤0.25	≤0.60	≤0.70	0.04	0.045	≤0.50	≤0.50	≤0.20	≤0.30	≤0.03		0.50	415-585	205	24	35		
UNS	J02502																		
ASTM	WCB	≤0.30	≤0.60	≤1.00	0.04	0.045	≤0.50	≤0.50	≤0.20	≤0.30	≤0.03		0.050	485-655	250	22	35		
UNS	J03002																		
ASTM	WCC	≤0.25	≤0.60	≤1.20	0.04	0.045	≤0.50	≤0.50	≤0.20	≤0.30	≤0.03		0.55	485-655	275	22	35		
UNS	J02503																		

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment	
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
5.9.5 承压铸钢 (1) ASTM标准一般用途承压铸钢 (ASTM A487/A487M-93)																				
Grade 1	Class A(V)												585-760	380	22	40				
	Class B(V)	≤0.30	≤0.80	≤1.00	0.04	0.045	≤0.35	≤0.50	≤0.25	≤0.50	0.04-0.12		620-795	450	22	45				
	Class C(V)												≥620	450	22	45		22 (HRC)		
Grade 2	Class A(Mn-Mo)												585-760	365	22	35				
	Class B(Mn-Mo)	≤0.30	≤0.80	1.00-1.40	0.04	0.045	≤0.35	≤0.50	0.10-0.30	≤0.50	≤0.03		620-795	450	22	40				
	Class C(Mn-Mo)												≥620	450	22	40		22 (HRC)		
Grade 4	Class A(Ni-Cr-Mo)												620-795	415	18	40				
	Class B(Ni-Cr-Mo)												725-895	585	17	35				
	Class C(Ni-Cr-Mo)	≤0.30	≤0.80	≤1.00	0.04	0.045	0.40-0.80	0.40-0.80	0.15-0.30	≤0.50	≤0.03		≥620	415	18	35		22 (HRC)		
	Class D(Ni-Cr-Mo)												≥690	515	17	35		22 (HRC)		
	Class E(Ni-Cr-Mo)												≥795	655	15	35				
Grade 6	Class A(Mn-Ni-Cr-Mo)	0.05-0.38	≤0.80	1.30-1.70	0.04	0.045	0.40-0.80	0.40-0.80	0.30-0.40	≤0.50	≤0.03		≥795	550	18	30				
	Class B(Mn-Ni-Cr-Mo)												≥825	650	12	25				
Grade 7	Class A(Ni-Cr-Mo-V)	0.05-0.20	≤0.80	0.60-1.00	0.04	0.045	0.40-0.80	0.70-1.00	0.40-0.60	0.15-0.50		0.002-0.006	≥795	690	15	30				
Grade 8	Class A(Cr-Mo)												585-760	380	20	35				
	Class B(Cr-Mo)	0.05-0.20	≤0.80	0.50-0.90	0.04	0.045	2.00-2.75		0.90-1.10	≤0.50	≤0.03		≥725	585	17	30				
	Class C(Cr-Mo)												≥690	515	17	35		22 (HRC)		
Grade 9	Class A(Cr-Mo)												≥620	415	18	35				
	Class B(Cr-Mo)												≥725	585	16	35				
	Class C(Cr-Mo)	0.05-0.33	≤0.80	0.60-1.00	0.04	0.045	0.75-1.10	≤0.50	0.15-0.30	≤0.50	≤0.03		≥620	415	18	35				
	Class D(Cr-Mo)												≥690	515	17	35		22 (HRC)		
	Class E(Cr-Mo)												≥795	655	15	35				
Grade 10	Class A(Ni-Cr-Mo)	≤0.33	≤0.80	0.60-1.00	0.04	0.045	0.55-0.90	1.40-2.00	0.20-0.40	≤0.50	≤0.03		≥690	485	15	35				
	Class B(Ni-Cr-Mo)												≥860	690	15	35				
Grade 11	Class A(Ni-Cr-Mo)	0.05-0.20	≤0.60	0.50-0.80	0.04	0.045	0.50-0.80	0.70-1.10	0.45-0.65	≤0.50	≤0.03		485-655	275	20	35				
	Class B(Ni-Cr-Mo)												725-895	585	17	35				
Grade 12	Class A(Ni-Cr-Mo)	0.05-0.20	≤0.60	0.40-0.70	0.04	0.045	0.50-0.90	0.60-1.00	0.90-1.20	≤0.50	≤0.03		485-655	275	20	35				
	Class B(Ni-Cr-Mo)												725-895	585	17	35				
Grade 13	Class A(Ni-Mo)	≤0.30	≤0.60	0.80-1.10	0.04	0.045		1.40-1.75	0.20-0.30	≤0.50	≤0.03		620-795	415	18	35				
	Class B(Ni-Mo)												725-895	585	17	35				
Grade 14	Class A(Ni-Mo)	≤0.55	≤0.60	0.80-1.10	0.04	0.045	≤0.40	1.40-1.75	0.20-0.30	≤0.50	≤0.03		825-1000	655	14	30				
Grade 16	Class A(C-Mn-Ni)	≤0.12	≤0.50	≤2.10	0.02	0.02	≤0.20	1.00-1.40	≤0.10	≤0.50	≤0.02		485-655	275	22	35				
CA15	Class A(Cr马氏体型)												965-1170	760-895	10	25				
	Class B(Cr马氏体型)	≤0.15	≤1.50	≤1.00	0.04	0.040	1.5-14.0	≤1.00	≤0.50	≤0.50	≤0.05		620-795	450	18	30				

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %		
ASTM UNS	LCC J02505	≤0.25	≤0.60	≤1.20	0.04	0.045	≤0.50	≤0.50	≤0.20	≤0.30	≤0.03			485-655	275	22	35	20	
ASTM UNS	LC1	≤0.25	≤0.60	≤0.50-0.80	0.04	0.045			0.45-0.60					450-620	240	24	35	18	
ASTM UNS	LC2 J22500	≤0.25	≤0.60	0.50-0.80	0.04	0.045		2.00-3.00						485-655	275	24	35	20	
ASTM UNS	LC2-1 J42215	≤0.22	≤0.50	0.55-0.75	0.04	0.045	1.35-1.85	2.50-3.50	0.30-0.60					725-895	550	18	30	41	
ASTM UNS	LC3 J31550	≤0.15	≤0.60	0.50-0.80	0.04	0.045		3.00-4.00						485-655	275	24	35	20	
ASTM UNS	LC4 J41500	≤0.15	≤0.60	0.50-0.80	0.04	0.045		4.00-5.00						485-655	275	24	35	20	
ASTM UNS	LC9	≤0.13	≤0.45	≤0.90	0.04	0.045		8.50-10.0						585	515	20	30	27	
ASTM UNS	CA6NM	≤0.06	≤1.00	≤1.00	0.04	0.045	11.5-14.0	3.50-4.50	0.40-1.00					760-930	550	15	35	27	

(5) ASTM标准与UNS系统低温下承压部件及其它用途的铁素体和马氏体铸钢 (ASTM A757/A757M-90)

ASTM UNS	A1Q	≤0.30	≤0.60	≤1.00	0.025	0.025	≤0.40	≤0.50	≤0.25	≤0.50	≤0.03			450	240	24	35	17		Q+T
ASTM UNS	A2Q J02503	≤0.25	≤0.60	≤1.20	0.025	0.025	≤0.40	≤0.50	≤0.25	≤0.50	≤0.03			485	275	22	35	20		Q+T
ASTM UNS	B2N, B2Q J22501	≤0.25	≤0.60	0.50-0.80	0.025	0.025	≤0.40	2.0-3.0	≤0.25	≤0.50	≤0.03			485	275	24	35	20		N
ASTM UNS	B3N, B3Q J31500	≤0.15	≤0.60	0.50-0.80	0.025	0.025	≤0.40	3.0-4.0	≤0.25	≤0.50	≤0.03			485	275	24	35	20		N
ASTM UNS	B4N, B4Q J41501	≤0.15	≤0.60	0.50-0.80	0.025	0.025	≤0.40	4.0-5.0	≤0.25	≤0.50	≤0.03			485	275	24	35	20		N
ASTM UNS	C1Q J12582	≤0.25	≤0.60	≤1.20	0.025	0.025	≤0.40	1.5-2.0	0.15-0.30	≤0.50	≤0.03			515	380	22	35	20		Q+T
ASTM UNS	D1N1 J22092	≤0.20	≤0.60	0.40-0.80	0.025	0.025	2.0-2.75	≤0.50	0.90-1.20	≤0.50	≤0.03			584	380	20	35			N
ASTM UNS	D1Q1 J22092													795						
ASTM UNS	D1N2 J22092	≤0.20	≤0.60	0.40-0.80	0.025	0.025	2.0-2.75	≤0.50	0.90-1.20	≤0.50	≤0.03			655	515	18	35			N

Standard	Material	CHEMICAL COMPOSITION %												MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %	Impact test J		
ASTM	D1Q2	≤0.20	≤0.60	0.40-0.80	0.025	0.025	2.0-2.75	≤0.50	0.90-1.20	≤0.50	≤0.03			860						Q+T
UNS	J22092																			
ASTM	D1N3													725	585	15	30			N
UNS	J22092	≤0.20	≤0.60	0.40-0.80	0.025	0.025	2.0-2.75	≤0.50	0.90-1.20	≤0.50	≤0.03									
ASTM	D1Q3													930						Q+T
UNS	J22092																			
ASTM	E1Q	≤0.22	≤0.60	0.50-0.80	0.025	0.025	1.35-1.85	2.5-3.5	0.35-0.60	≤0.50	≤0.03			620	450	22	40	41		Q+T
UNS	J42220																			
ASTM	E2N, E2Q	≤0.20	≤0.60	0.40-0.70	0.020	0.020	1.5-2.0	2.75-3.90	0.40-0.60	≤0.50	≤0.03									
UNS	J42065																			
ASTM	E2N1													620	485	18	35	41		N
	E2Q1													825				41		Q+T
ASTM	E2N2													725	585	15	30	27		N
	E2Q2													930				27		Q+T
ASTM	E2N3													795	690	13	30	20		N
	E2Q3													1000				20		Q+T
ASTM	E3N	≤0.06	≤1.00	≤1.00	0.030	0.030	11.5-14.0	3.5-4.5	0.40-1.00	≤0.50	≤0.03			760	550	15	35	27		N
UNS	J91550																			

5.9.6 精密铸钢和精密铸造合金 (1) ASTM标准碳素和低合金精密铸钢 (ASTM A732/A732M-94)

ASTM	1A	0.15-0.25	0.20-1.00	0.20-0.60	0.04	0.045	≤0.35	≤0.50		≤0.50				414	276	24				Q+T
ICI	1020																			
ASTM	2A													448	310	25				Q+T
ICI	1030	0.25-0.35	0.20-1.00	0.70-1.00	0.04	0.045	≤0.35	≤0.50		≤0.50										
ASTM	2Q													586	414	10				Q+T
ICI	1030																			
ASTM	3A													517	331	25				Q+T
ICI	1040	0.35-0.45	0.20-1.00	0.70-1.00	0.04	0.045	≤0.35	≤0.50		≤0.50										
ASTM	3Q													689	621	10				Q+T
ICI	1040																			
ASTM	4A													621	345	20				Q+T
ICI	1050	0.45-0.55	0.20-1.00	0.70-1.00	0.04	0.045				≤0.50										
ASTM	4Q													862	689	5				Q+T
ICI	1050																			
ASTM	5N	≤0.30	0.20-0.80	0.70-1.00	0.04	0.045	≤0.35	≤0.50		≤0.50	0.05-0.15			586	379	22				Q+T
ICI	6120																			
ASTM	6N	≤0.25	0.20-0.80	1.35-1.75	0.04	0.045	≤0.35	≤0.50	0.25-0.55	≤0.50				621	414	20				Q+T

Standard	Material	CHEMICAL COMPOSITION %											MECHANICAL PROPERTIES ≥					Hardness HB	Heat treatment	
		C	Si	Mn	P ≤	S ≤	Cr	Ni	Mo	Cu ≤	V	B	CE	Tensile Strength Mpa	Yield strength Mpa	Elongate rate %	Reduction of area %			Impact test J
ICI	4020	≤0.35	0.20-0.80	1.55-1.75	0.04	0.045	≤0.35	≤0.50	0.25-0.55	≤0.50				1021	714	20				Q+T
ASTM	7Q	0.25-0.35	0.20-0.80	0.40-0.70	0.04	0.045	0.80-1.10		0.15-0.25	≤0.50				1030	793	7				Q+T
ICI	4130																			
ASTM	8Q	0.35-0.45	0.20-0.80	0.70-1.00	0.04	0.045	0.80-1.10	≤0.50	0.15-0.25	≤0.50				1241	1000	5				Q+T
ICI	4140																			
ASTM	9Q	0.25-0.35	0.20-0.80	0.40-0.70	0.04	0.045	0.70-0.90	1.65-2.00	0.20-0.30	≤0.50				1030	793	7				Q+T
ICI	4330																			
ASTM	10Q	0.35-0.45	0.20-0.80	0.70-1.00	0.04	0.045	0.70-0.90	1.65-2.00	0.20-0.30	≤0.50				1241	1000	5				Q+T
ICI	4340																			
ASTM	11Q	0.15-0.25	0.20-0.80	0.40-0.70	0.04	0.045	≤0.35	1.65-2.00	0.20-0.30	≤0.50				827	689	10				Q+T
ICI	4620																			
ASTM	12Q	0.45-0.55	0.20-0.80	0.65-0.95	0.04	0.045	0.80-1.10	≤0.50		≤0.50	≥0.15			1310	1172	4				Q+T
ICI	6150																			
ASTM	13Q	0.15-0.25	0.20-0.80	0.65-0.95	0.04	0.045	0.40-0.70	0.40-0.70	0.15-0.25	≤0.50				724	586	10				Q+T
ICI	8620																			
ASTM	14Q	0.25-0.35	0.20-0.80	0.65-0.95	0.04	0.045	0.40-0.70	0.40-0.70	0.15-0.25	≤0.50				1030	793	7				Q+T
ICI	8630																			
ASTM	15A	0.95-1.10	0.20-0.80	0.25-0.55	0.04	0.045	1.30-1.60	≤0.50		≤0.50									洛氏硬度≤100HRB	Q+T
ICI	52100																			