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Common Cast Steel Material Comparison Chart

			Chemical Composition, max (unless range is given), %																Tensile Properties, min (unless range is given)					Energy Value, ft.lbf		
Specification		Grade or Class	C	Si	Mn	S	P	Cu	Ni	Cr	Mo	V	N	Cb/Nb	B	Se	W	Hardness max, HB	Tensile Strength min, Ksi	Yield Point Ksi	Yield Strength Ksi @ 0.2%	Elongation in 2 in, %	Reduction of Area, %	CVN min of 2 and avg of 3 specimens	CVN min for single specimen	Testing Temp., F
ASTM A27	Carbon Steel	N-1	0.25	0.80	0.75	0.060	0.060																			
		N-2	0.35	0.80	0.60	0.060	0.060																			
		U60-30	0.25	0.80	0.75	0.060	0.060												60	30		22	30			
		60-30	0.30	0.80	0.60	0.060	0.060												60	30		24	35			
		65-35	0.30	0.80	0.70	0.060	0.060												65	35		24	35			
		70-36	0.35	0.80	0.70	0.060	0.060												70	35		22	30			
		70-40	0.25	0.80	1.20	0.060	0.060												70	40		22	30			
ASTM A128	Manganese Steel	A	11.0 min	1.00			0.070																			
		B-1	11.5-14.0	1.00			0.070																			
		B-2	11.5-14.0	1.00			0.070																			
		B-3	11.5-14.0	1.00			0.070																			
		B-4	11.5-14.0	1.00			0.070																			
		C	11.5-14.0	1.00			0.070			1.5-2.5																
		D	11.5-14.0	1.00			0.070		3.00-4.00																	
		E-1	11.5-14.0	1.00			0.070				0.90-1.20															
		E-2	11.5-14.0	1.00			0.070				1.80-2.10															
		F	6.0-8.0	1.00			0.070				0.90-1.20															
ASTM A148	Carbon/Alloy Steel	80-40				0.060	0.050												80	40		18	30			
		80-50				0.060	0.050												80	50		22	35			
		90-60				0.060	0.050												90	60		20	40			
		105-85				0.060	0.050												105	85		17	35			
		115-95				0.060	0.050												115	95		14	30			
		130-115				0.060	0.050												130	115		11	25			
		135-125				0.060	0.050												135	125		9	22			
		150-135				0.060	0.050												150	135		7	18			
		160-145				0.060	0.050												160	145		6	12			
		165-150				0.020	0.020												165	150		5	20			
		165-150L				0.020	0.020												165	150		5	20	20	16	
		210-180				0.020	0.020												210	180		4	15			
		210-180L				0.020	0.020												210	180		5	15	15	12	
		260-210				0.020	0.020												260	210		3	6			
		260-210L				0.020	0.020												260	210		3	6	6	4	
ASTM A216	Carbon Steel	WCA	0.25	0.60	0.70	0.045	0.040	0.30	0.50	0.50	0.20	0.03														
		WCB	0.30	0.60	1.00	0.045	0.040	0.30	0.50	0.50	0.20	0.03														
		WCC	0.25	0.60	1.20	0.045	0.040	0.30	0.50	0.50	0.20	0.03														
ASTM A297	Heat Resistant Steel	HF	0.20-0.40	2.00	2.00	0.040	0.040		8-12	18-23	0.50															
		HH	0.20-0.50	2.00	2.00	0.040	0.040		11-14	24-28	0.50															
		HI	0.20-0.50	2.00	2.00	0.040	0.040		14-18	26-30	0.50															
		HK	0.20-0.60	2.00	2.00	0.040	0.040		18-22	24-28	0.50															
		HE	0.20-0.50	2.00	2.00	0.040	0.040		8-11	26-30	0.50															
		HT	0.35-0.75	2.50	2.00	0.040	0.040		33-37	15-19	0.50															
		HU	0.35-0.75	2.50	2.00	0.040	0.040		37-41	17-21	0.50															
		HW	0.35-0.75	2.50	2.00	0.040	0.040		58-62	10-14	0.50															
		HX	0.35-0.75	2.50	2.00	0.040	0.040		64-68	15-19	0.50															
		HC	0.50	2.00	1.00	0.040	0.040		4.00	26-30	0.50															
		HD	0.50	2.00	1.50	0.040	0.040		4-7	26-30	0.50															
		HL	0.20-0.60	2.00	2.00	0.040	0.040		18-22	28-32	0.50															
		HN	0.20-0.50	2.00	2.00	0.040	0.040		23-27	19-23	0.50															
		HP	0.35-0.75	2.50	2.00	0.040	0.040		33-37	24-28	0.50															
ASTM A351	Stainless Steel for Pressure-Containing Parts	CF3	0.03	2.00	1.50	0.040	0.040		8-12	17-21	0.50								70		30	35				
		CF3A	0.03	2.00	1.50	0.040	0.040		8-12	17-21	0.50								77		35	35				
		CF8	0.08	2.00	1.50	0.040	0.040		8-11	18-21	0.50								70		30	35				
		CF8A	0.08	2.00	1.50	0.040	0.040		8-11	18-21	0.50								77		35	35				
		CF3M	0.03	1.50	1.50	0.040	0.040		9-13	17-21	2.00-3.00								70		30	30				
		CF3MA	0.03	1.50	1.50	0.040	0.040		9-13	17-21	2.00-3.00								80		37	30				
		CF8M	0.08	1.50	1.50	0.040	0.040		9-12	18-21	2.00-3.00								70		30	30				
		CF3MN	0.03	1.50	1.50	0.040	0.040		9-13	17-21	2.00-3.00		0.10-0.20						75		37	35				
		CF8C	0.08	2.00	1.50	0.040	0.040		9-12	18-21	0.50			1.00					70		30	30				

		CF10	0.04-0.10	2.00	1.50	0.040	0.040		8-11	18-21	0.50								70		30	35				
		CF10M	0.04-0.10	1.50	1.50	0.040	0.040		9-12	18-21	2.00-3.00								70		30	30				
		CH8	0.08	1.50	1.50	0.040	0.040		12-15	22-26	0.50								65		28	30				
		CH10	0.04-0.10	2.00	1.50	0.040	0.040		12-15	22-26	0.50								70		30	30				
		CH20	0.04-0.20	2.00	1.50	0.040	0.040		12-15	22-26	0.50								70		30	30				
		CK20	0.04-0.20	1.75	1.50	0.040	0.040		19-22	23-27	0.50								65		28	30				
		HK30	0.25-0.35	1.75	1.50	0.040	0.040		19-22	23-27	0.50								65		35	10				
		HK40	0.35-0.45	1.75	1.50	0.040	0.040		19-22	23-27	0.50								62		35	10				
		HT30	0.25-0.35	2.50	2.00	0.040	0.040		33-37	13-17	0.50								65		28	15				
		CF10MC	0.10	1.50	1.50	0.040	0.040		13-16	15-18	1.75-2.25			1.20					70		30	20				
		CN7M	0.07	1.50	1.50	0.040	0.040	3.00-4.00	27.5-30.5	19-22	2.00-3.00								62		25	35				
		CN3MN	0.03	1.00	2.00	0.010	0.040	0.75	23.5-25.5	20-22	6.00-7.00		0.18-0.26						80		38	35				
		CE8MN	0.08	1.50	1.00	0.040	0.040		8-11	22.5-23.5	3.00-4.50		0.10-0.30						95		65	25				
		CG6MMN	0.06	1.00	4-6	0.030	0.040		11.5-13.5	20.5-23.5	1.50-3.00	0.10-0.30	0.20-0.40	0.1-0.3					85		42.5	30				
		CF8M	0.08	1.50	1.50	0.040	0.040		9-13	18-21	3.00-4.00								75		35	25				
		CF10SMnN	0.10	3.5-4.5	7-9	0.030	0.060		8-9	16-18			0.08-0.18						85		42.5	30				
		CT15C	0.05-0.15	0.5-1.5	0.15-1.50	0.030	0.030		31-34	19-21				0.5-1.5					63		25	20				
		CK3MCuN	0.025	1.00	1.20	0.010	0.045	0.50-1.00	17.5-19.5	19.5-20.5	6.00-7.00		0.18-0.24						80		38	35				
		CE20N	0.20	1.50	1.50	0.040	0.040		8-11	23-26	0.50		0.08-0.20						80		40	30				
		CG3M	0.03	1.50	1.50	0.040	0.040		9-13	18-21	3.00-4.00								75		35	25				
ASTM A352	Steel Casting for Pressure-Containing Parts for low temperature services	LCA	0.25	0.60	0.70	0.045	0.040	0.30	0.50	0.50	0.20	0.03							60-85		30	24	35	13	10	-25
		LCB	0.30	0.60	1.00	0.045	0.040	0.30	0.50	0.50	0.20	0.03							65-90		35	24	35	13	10	-50
		LCC	0.25	0.60	1.20	0.045	0.040	0.30	0.50	0.50	0.20	0.03							70-95		40	22	35	15	12	-50
		LC1	0.25	0.60	0.50-0.80	0.045	0.040				0.45-0.65								65-90		35	24	35	13	10	-75
		LC2	0.25	0.60	0.50-0.80	0.045	0.040		2.00-3.00										70-95		40	24	35	15	12	-100
		LC2-1	0.22	0.50	0.55-0.75	0.045	0.040		2.50-3.50	1.35-1.85	0.30-0.60								105-130		80	18	30	30	25	-100
		LC3	0.15	0.60	0.50-0.80	0.045	0.040		3.00-4.00										70-95		40	24	35	15	12	-150
		LC4	0.15	0.60	0.50-0.80	0.045	0.040		4.00-5.00										70-95		40	24	35	15	12	-175
		LC9	0.13	0.45	0.90	0.045	0.040	0.30	8.50-10.00	0.50	0.20	0.03							85		75	20	30	20	15	-320
		CA6NM	0.06	1.00	1.00	0.030	0.040		3.50-4.50	11.5-14.0	0.40-1.00								110-135		80	15	35	20	15	-100
ASTM A487	Alloy Steel Suitable for Pressure Service	1A	0.30	0.80	1.00	0.045	0.040					0.04-0.12							85-110		55	22	40			
		1B	0.30	0.80	1.00	0.045	0.040					0.04-0.12							90-115		65	22	45			
		1C	0.30	0.80	1.00	0.045	0.040					0.04-0.12						235	90		65	22	45			
		2A	0.30	0.80	1.00-1.40	0.045	0.040				0.10-0.30								85-110		53	22	35			
		2B	0.30	0.80	1.00-1.40	0.045	0.040				0.10-0.30								90-115		65	22	40			
		2C	0.30	0.80	1.00-1.40	0.045	0.040				0.10-0.30							235	90		65	22	40			
		4A	0.30	0.80	1.00	0.045	0.040		0.40-0.80	0.40-0.80	0.15-0.30								90-115		60	18	40			
		4B	0.30	0.80	1.00	0.045	0.040		0.40-0.80	0.40-0.80	0.15-0.30								105-130		85	17	35			
		4C	0.30	0.80	1.00	0.045	0.040		0.40-0.80	0.40-0.80	0.15-0.30							235	90		60	18	35			
		4D	0.30	0.80	1.00	0.045	0.040		0.40-0.80	0.40-0.80	0.15-0.30							235	100		75	17	35			
		4E	0.30	0.80	1.00	0.045	0.040		0.40-0.80	0.40-0.80	0.15-0.30								115		95	15	35			
		6A	0.05-0.38	0.80	1.30-1.70	0.045	0.040		0.40-0.80	0.40-0.80	0.30-0.40								115		80	18	30			
		6B	0.05-0.38	0.80	1.30-1.70	0.045	0.040		0.40-0.80	0.40-0.80	0.30-0.40								120		95	12	25			
		7A	0.05-0.20	0.80	0.60-1.00	0.045	0.040	0.15-0.50	0.70-1.00	0.40-0.80	0.40-0.60	0.03-0.10			0.002-0.006				115		100	15	30			
		8A	0.05-0.20	0.80	0.50-0.90	0.045	0.040			2.00-2.75	0.90-1.10								85-110		55	20	35			
		8B	0.05-0.20	0.80	0.50-0.90	0.045	0.040			2.00-2.75	0.90-1.10								105		85	17	30			
		8C	0.05-0.20	0.80	0.50-0.90	0.045	0.040			2.00-2.75	0.90-1.10							235	100		75	17	35			
		9A	0.05-0.33	0.80	0.60-1.00	0.045	0.040			0.75-1.10	0.15-0.30								90		60	18	35			
		9B	0.05-0.33	0.80	0.60-1.00	0.045	0.040			0.75-1.10	0.15-0.30								105		85	16	35			
		9C	0.05-0.33	0.80	0.60-1.00	0.045	0.040			0.75-1.10	0.15-0.30							235	90		60	18	35			
		9D	0.05-0.33	0.80	0.60-1.00	0.045	0.040			0.75-1.10	0.15-0.30							235	100		75	17	35			
		9E	0.05-0.33	0.80	0.60-1.00	0.045	0.040			0.75-1.10	0.15-0.30								115		95	15	35			
		10A	0.30	0.80	0.60-1.00	0.045	0.040		1.40-2.00	0.55-0.90	0.20-0.40								100		70	18	35			
		10B	0.30	0.80	0.60-1.00	0.045	0.040		1.40-2.00	0.55-0.90	0.20-0.40								125		100	15	35			
		11A	0.05-0.20	0.60	0.50-0.80	0.045	0.040		0.70-1.00	0.50-0.80	0.45-0.65								70-95		40	20	35			
		11B	0.05-0.20	0.60	0.50-0.80	0.045	0.040		0.70-1.00	0.50-0.80	0.45-0.65								105-130		85	17	35			
		12A	0.05-0.20	0.60	0.40-0.70	0.045	0.040		0.60-1.00	0.50-0.90	0.90-1.20								70-95		40	20	35			
		12B	0.05-0.20	0.60	0.40-0.70	0.045	0.040		0.60-1.00	0.50-0.90	0.90-1.20								105-130		85	17	35			
		13A	0.30	0.60	0.80-1.10	0.045	0.040		1.40-1.75		0.20-0.30								90-115		60	18	35			
		13B	0.30	0.60	0.80-1.10	0.045	0.040		1.40-1.75		0.20-0.30								105-130		85	17	35			
		14A	0.55	0.60	0.80-1.10	0.045	0.040		1.40-1.75		0.20-0.30								120-145		95	14	30			
		16A	0.12	0.50	2.10	0.020	0.020		1.00-1.40										70-95		40	22	35			
		CA15A	0.15	1.50	1.00	0.040	0.040		1.00	11.5-14	0.50								140-170		40-130	10	25			
		CA15B	0.15	1.50	1.00	0.040	0.040		1.00	11.5-14	0.50								90-115		65	18	30			
		CA15C	0.15	1.50	1.00	0.040	0.040		1.00	11.5-14	0.50							235	90		60	18	35			
		CA15D	0.15	1.50	1.00	0.040	0.040		1.00	11.5-14	0.50							235	100		75	17	35			
		CA15MA	0.15	0.65	1.00	0.040	0.040		1.00	11.5-14	0.15-1.00								90-115		65	18	30			
		CA6NMA	0.06	1.00	1.00	0.030	0.040		3.50-4.50	11.5-14	0.40-1.00								110135		80	15	35			
		CA6NMB	0.06	1.00	1.00	0.030	0.040		3.50-4.50	11.5-14	0.40-1.00							255	100		75	17	35			
ASTM A732	Investment Steel Casting	1A	0.15-0.25	0.20-1.00	0.20-0.60	0.045	0.040																			
		2A,2Q	0.25-0.35	0.20-1.00	0.70-1.00	0.045	0.040																			
		3A,3Q	0.35-0.45	0.20-1.00	0.70-1.00	0.045	0.040																			
		4A,4Q	0.45-0.55	0.20-1.00	0.70-1.00	0.045	0.040																			
		5N	0.30	0.20-0.80	0.70-1.00	0.045	0.040					0.05-0.15														

		6N	0.35	0.20-0.80	1.35-1.75	0.045	0.040				0.25-0.55															
		7Q	0.25-0.35	0.20-0.80	0.40-0.70	0.045	0.040			0.80-1.10	0.15-0.25															
		8Q	0.35-0.45	0.20-0.80	0.70-1.00	0.045	0.040			0.80-1.10	0.15-0.25															
		9Q	0.25-0.35	0.20-0.80	0.40-0.70	0.045	0.040			0.70-0.90	0.20-0.30															
		10Q	0.35-0.45	0.20-0.80	0.70-1.00	0.045	0.040			0.70-0.90	0.20-0.30															
		11Q	0.15-0.25	0.20-0.80	0.40-0.70	0.045	0.040				0.20-0.30															
		12Q	0.45-0.55	0.20-0.80	0.65-0.95	0.045	0.040			0.80-1.10		0.15 min														
		13Q	0.15-0.25	0.20-0.80	0.65-0.95	0.045	0.040			0.40-0.70	0.15-0.25															
		14Q	0.25-0.35	0.20-0.80	0.65-0.95	0.045	0.040			0.40-0.70	0.15-0.25															
		15A	0.95-1.10	0.20-0.80	0.25-0.55	0.045	0.040			1.30-1.60																
		21	0.20-0.30	1.00	1.00	0.040	0.040			25.0-29.0	5.00-6.00															
		31	0.45-0.55	1.00	1.00	0.040	0.040			24.5-26.5					0.005-0.015		7.0-8.0									
ASTM A743	Stainless Steel for General Application	CF8	0.08	2.00	1.50	0.040	0.040		8.0-11.0	18.0-21.0																
		CG12	0.12	2.00	1.50	0.040	0.040		10.0-13.0	22.0-23.0																
		CF20	0.20	2.00	1.50	0.040	0.040		8.0-11.0	18.0-21.0																
		CF8M	0.08	2.00	1.50	0.040	0.040		9.0-12.0	18.0-21.0	2.0-3.0															
		CF8C	0.08	2.00	1.50	0.040	0.040		9.0-12.0	18.0-21.0																
		CF16F	0.16	2.00	1.50	0.040	0.170		9.0-12.0	18.0-21.0	1.50					0.20-0.35										
		CF16Fa	0.16	2.00	1.50	0.20-0.40	0.040		9.0-12.0	18.0-21.0	0.40-0.80															
		CH10	0.10	2.00	1.50	0.040	0.040		12.0-15.0	22.0-26.0																
		CH20	0.20	2.00	1.50	0.040	0.040		12.0-15.0	22.0-26.0																
		CK20	0.20	2.00	2.00	0.040	0.040		19.0-22.0	23.0-27.0																
		CE30	0.30	2.00	1.50	0.040	0.040		8.0-11.0	26.0-30.0																
		CA15	0.15	1.50	1.00	0.040	0.040		1.00	11.5-14.0	0.50															
		CA15M	0.15	0.65	1.00	0.040	0.040		1.00	11.5-14.0	0.15-1.00															
		CB30	0.30	1.50	1.00	0.040	0.040		2.00	18.0-21.0																
		CC50	0.50	1.50	1.00	0.040	0.040		4.00	26.0-30.0																
		CA40	0.20-0.40	1.50	1.00	0.040	0.040		1.00	11.5-14.0	0.50															
		CA40F	0.20-0.40	1.50	1.00	0.20-0.40	0.040		1.00	11.5-14.0	0.50															
		CF3	0.03	2.00	1.50	0.040	0.040		8.0-12.0	17.0-21.0																
		CF10SMnN	0.10	3.50-4.50	7.00-9.00	0.030	0.060		8.0-9.0	16.0-18.0			0.08-0.18													
		CF3M	0.03	1.50	1.50	0.040	0.040		9.0-13.0	17.0-21.0	2.00-3.00															
		CF3MN	0.03	1.50	1.50	0.040	0.040		9.0-13.0	17.0-22.0	2.00-3.00		0.10-0.20													
		CG6MMN	0.06	1.00	4.00-6.00	0.030	0.040		11.5-13.5	20.5-23.5	1.50-3.00	0.10-0.30	0.20-0.40	0.10-0.30												
		CG3M	0.03	1.50	1.50	0.040	0.040		9.0-13.0	18.0-21.0	3.00-4.00															
		CG8M	0.08	1.50	1.50	0.040	0.040		9.0-13.0	18.0-21.0	3.00-4.00															
		CN3M	0.03	1.00	2.00	0.030	0.030		23.0-27.0	20.0-22.0	4.50-5.50															
		CN3MN	0.03	1.00	2.00	0.010	0.040	0.75	23.5-25.5	20.0-22.0	6.00-7.00		0.18-0.26													
		CN7M	0.07	1.50	1.50	0.040	0.040	3.0-4.0	27.5-30.5	19.0-22.0	2.00-3.00															
		CN7MS	0.07	2.50-3.50	1.00	0.030	0.040	4.00	22.0-35.0	18.0-20.0	2.50-3.00															
		CA6NM	0.06	1.00	1.00	0.030	0.040	1.50-2.00	3.5-4.5	11.5-14.0	0.40-1.00															
		CA6N	0.06	1.00	0.50	0.020	0.020		6.0-8.0	10.5-12.5																
		CA28MWV	0.20-0.28	1.00	0.50-1.00	0.030	0.030		0.5-1.0	11.0-12.5	0.90-1.25	0.20-0.30					0.90-1.25									
		CK3MCuN	0.03	1.00	1.20	0.010	0.045	0.50-1.00	17.5-19.5	19.5-20.5	6.00-7.00		0.18-0.24													
		CK35MN	0.04	1.00	2.00	0.020	0.035	0.40	20.0-22.0	22.0-24.0	6.00-6.80		0.21-0.32													
		CB6	0.06	1.00	1.00	0.030	0.040		3.5-5.5	15.5-17.5	0.50															