

Carbon Steels - Heat Chemical Ranges and Limits

Chemical Composition Limits, percent				
AISI or SAE	C	Mn	P Max.	S Max.
1005*	.06 max	.35 max	.040	.050
1006*	.08 max	.25/.40	.040	.050
1008	.10 max.	.30/.50	.040	.050
1010	.08/.13	.30/.60	.040	.050
1011*	.08/.13	.60/.90	.040	.050
1012	.10/.15	.30/.60	.040	.050
1013*	.11/.16	.50/.80	.040	.050
1015	.13/.18	.30/.60	.040	.050
1016	.13/.18	.60/.90	.040	.050
1017	.15/.20	.30/.60	.040	.050
1018	.15/.20	.60/.90	.040	.050
1019	.15/.20	.70/1.00	.040	.050
1020	.18/.23	.30/.60	.040	.050
1021	.18/.23	.60/.90	.040	.050
1022	.18/.23	.70/1.00	.040	.050
1023	.20/.25	.30/.60	.040	.050
1025	.22/.28	.30/.60	.040	.050
1026	.22/.28	.60/.90	.040	.050
1029	.25/.31	.60/.90	.040	.050
1030	.28/.34	.60/.90	.040	.050
1035	.32/.38	.60/.90	.040	.050
1037	.32/.38	.70/1.00	.040	.050
1038	.35/.42	.60/.90	.040	.050
1039	.37/.44	.70/1.00	.040	.050
1040	.37/.44	.60/.90	.040	.050
1042	.40/.47	.60/.90	.040	.050
1043	.40/.47	.70/1.00	.040	.050
1044	.43/.50	.30/.60	.040	.050
1045	.43/.50	.60/.90	.040	.050
1046	.43/.50	.70/1.00	.040	.050
1049	.46/.53	.60/.90	.040	.050
1050	.48/.55	.60/.90	.040	.050
1053	.48/.55	.70/1.00	.040	.050
1055	.50/.60	.60/.90	.040	.050
1059*	.55/.65	.50/.80	.040	.050
1060	.55/.65	.60/.90	.040	.050
1064*	.60/.70	.50/.80	.040	.050
1065*	.60/.70	.60/.90	.040	.050
1069*	.65/.75	.40/.70	.040	.050
1070	.65/.75	.60/.90	.040	.050
1074*	.70/.80	.50/.80	.040	.050
1075*	.70/.80	.40/.70	.040	.050
1078	.72/.85	.30/.60	.040	.050
1080	.75/.88	.60/.90	.040	.050
1084	.80/.93	.60/.90	.040	.050

1085*	.80/.93	.70/1.00	.040	.050
1086*	.80/.93	.30/.50	.040	.050
1090	.85/.98	.60/.90	.040	.050
1095	.90/1.03	.30/.50	.040	.050

* SAE Only

**CARBON-MANGANESE STEELS
(Manganese Maximum Over 1.00 Per Cent)**

Chemical Composition Limits, percent				
AISI or SAE	C	Mn	P Max.	S Max.
1513	0.10/0.16	1.10/1.40	0.040	0.050
1518*	0.15/0.21	1.10/1.40	0.040	0.050
1522	0.18/0.24	1.10/1.40	0.040	0.050
1524	0.19/0.25	1.35/1.65	0.040	0.050
1525*	0.23/0.29	0.80/1.10	0.040	0.050
1526	0.22/0.29	1.10/1.40	0.040	0.050
1527	0.22/0.29	1.20/1.50	0.040	0.050
1533	0.30/0.37	1.10/1.40	0.040	0.050
1534	0.30/0.37	1.20/1.50	0.040	0.050
1536	0.30/0.37	1.20/1.50	0.040	0.050
1541	0.36/0.44	1.35/1.65	0.040	0.050
1544	0.40/0.47	0.80/1.10	0.040	0.050
1545	0.43/0.50	0.80/1.10	0.040	0.050
1546	0.44/0.52	1.00/1.30	0.040	0.050
1547*	0.43/0.51	1.35/1.65	0.040	0.050
1548	0.44/0.52	1.10/1.40	0.040	0.050
1551	0.45/0.56	0.85/1.15	0.040	0.050
1552	0.47/0.55	1.20/1.50	0.040	0.050
1553	0.48/0.55	0.80/1.10	0.040	0.050
1566	0.60/0.71	0.85/1.15	0.040	0.050
1570	0.65/0.75	0.80/1.10	0.040	0.050
1572	0.65/0.76	1.00/1.30	0.040	0.050
1580	0.75/0.88	0.80/1.10	0.040	0.050
1590	0.85/0.98	0.80/1.10	0.040	0.050

*SAE only

Note 1. Silicon When silicon ranges or limits are required, consult producer for ranges and limits.

Note 2. Copper When copper is required, 0.020 per cent minimum is generally specified.

Note 3. Lead See footnote for lead under Table 2.

CARBON "H" GRADES

Chemical Composition Limits, percent					
Grade No.	C	Mn	P Max.	S Max.	Si
1038-H	.34/.43	.50/1.00	.040	.050	.15/.35
1045-H	.42/.51	.50/1.00	.040	.050	.15/.35
1522-H	.17/.25	1.00/1.50	.040	.050	.15/.35
1524-H	.18/.26	1.25/1.75	.040	.050	.15/.35
1526-H	.21/.30	1.00/1.50	.040	.050	.15/.35
1541-H	.35/.45	1.25/1.75	.040	.050	.15/.35

CARBON BORON "H" GRADES
(These steels can be expected to contain 0.0005 to 0.003 percent Boron)

Chemical Composition Limits, percent					
Grade No.	C	Mn	P Max.	S Max.	Si
15821H	.17/.24	.70/1.20	.040	.050	.15/.35
15B35H	.31/.39	.70/1.20	.040	.050	.15/.35
15637H	.30/.39	1.00/1.50	.040	.050	.15/.35
15B41H	.35/.45	1.25/1.75	.040	.050	.15/.35
15B48H	.43/.53	1.00/1.50	.040	.050	.15/.35
15B62H	.54/.67	1.00/1.50	.040	.050	.40/.60

Silicon. When silicon is required, the following ranges and limits are commonly used:

RESULTURIZED CARBON STEELS
HEAT CHEMICAL RANGES AND LIMITS

Chemical Composition Limits, percent				
AISI or SAE	C	Mn	P Max.	S Max.
1108*	.08/.13	.50/.80	.040	.08/.13
1109*	.08/.13	.60/.90	.040	.08/.13
1110	.08/.13	.30/.60	.040	.08/.13
1117	.14/.20	1.00/1.30	.040	.08/.13
1118	.14/.20	1.30/1.60	.040	.08/.13
1119*	.14/.20	1.00/1.30	.040	.24/.33
1132*	.27/.34	1.35/1.65	.040	.08/.13
1137	.32/.39	1.35/1.65	.040	.08/.13
1139	.35/.43	1.35/1.65	.040	.13/.20
1140	.37/.44	.70/1.00	.040	.08/.13
1141	.37/.45	1.35/1.65	.040	.08/.13
1144	.40/.48	1.35/1.65	.040	.24/.33
1145*	.42/49	.70/1.00	.040	.04/.07
1146	.42/49	.70/1.00	.040	.08/.13

1152	.48/55	.70/1.00	.040	.06/.09
------	--------	----------	------	---------

*SAE Only

Silicon: When silicon is required, the following ranges and limits are commonly used.

**REPHOSPHORIZED AND RESULFURIZED
CARBON STEELS
HEAT CHEMICAL RANGES AND LIMITS**

Chemical Composition Limits, percent				
Grade No.	C Max.	Mn	P	S
1212	.13	.70/1.00	.07/.12	.16/.23
1213	.13	.70/1.00	.07/.12	.24/.33
12L14	.15	.85/1.15	.04/.09	.26/.35
1215	09	75/1.05	04/09	Pb-.15/.35 .26/.35

Silicon: It is not common practice to produce these steels to specified limits for silicon.

Lead: When required, lead is specified as an added element to a standard steel and is identified by inserting letter "L" between second and third numerals.

NOTE: The chemical ranges and limits shown are subject to the check analysis tolerance shown in the A.I.S.I. Manual for Alloy, Carbon and HSLA Steels.