

Austempering Section Size and Bainite Hardness Chart

Maximum section size that can be fully austempered for a given carbon and manganese analysis, with the hardness bainite reaches against fresh martensite in the same steel.

Reference only. The values on this sheet are reproduced from the source named at the foot of it. They are a published reference rather than a specification of ours, and the sheet carries no tolerances. Section sizes are the largest that stay fully bainitic, so a part at the listed diameter or below is the intended use and a larger part is not covered. Diameters and sheet thicknesses are in inches. The maximum HRC column is the hardness the bainite itself reaches, not the hardness of a tempered part, and the hardness comparison beside it is taken on structures as formed, before any tempering.

Section size limit by carbon and manganese

Source, Table 12.2 on printed page 116 of the source, which is PDF page 120 of the copy consulted. The table is reproduced with the source's own figure for the largest diameter and sheet thickness that can be fully austempered.

%C	%Mn	Max HRC	Max. diameter (in)	Max. sheet thickness (in)
0.95-1.05	0.30-0.50	57-60	0.148	0.118
0.95-1.05	0.60-0.90	57-60	0.187	0.150
0.80-0.90	0.30-0.50	55-58	0.156	0.125
0.80-0.90	0.60-0.90	55-58	0.218	0.174
0.60-0.70	0.60-0.90	53-56	0.187	0.150
0.60-0.70	0.90-1.20	53-56	0.281	0.225
0.60-0.70	1.60-2.00	53-56	0.625	0.50
1.0 + 0.4-0.6 Cr	0.40-0.60	57-60	0.312	0.250

The source prints the first carbon range as .95-1.05 and the sixth manganese range as 0.90-1.20. Both are printed above in their corrected forms and no value was changed. Diameters and sheet thicknesses are in inches. The maximum HRC column is the hardness the bainite itself reaches, not the hardness of a tempered part.

Fresh martensite against maximum bainite

Source, Table 12.1 on printed page 116 of the source, which is PDF page 120 of the copy consulted.

Steel	Martensite Rc	Max. bainite Rc
10113	65	62
1095	66	58
1080	66	57
1060	65	53
1050	62	48

The first designation is printed as 10113 in the source and does not match a standard AISI number. The row is reproduced as published. Rc is the Rockwell C hardness of the structure as formed, before any tempering.

Aobo Steel, tool steel supplier

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