

Case-Hardening Steel Equivalents - AISI 8620 / 20NiCrMo2-2 / 16MnCr5 / 20MnCr5 / SCM420 / 20CrMnTi

Crosswalk of 30 case-hardening (carburising) steels between AISI/SAE, EN ISO 683-3 (formerly EN 10084, withdrawn 2018), old DIN, BS 970, JIS G4053 and GB/T 3077. Equivalence: direct = database-listed pair with overlapping bands on every element; nearest = closest grade, at least one band differs; substitute = no listed counterpart. 8620 = 20NiCrMo2-2 / 1.6523 = 805M20 = SNCM220 (C 0.18-0.23, Cr 0.40-0.60, Ni 0.40-0.70, Mo 0.15-0.25 %).

EKINSUN LTD - gears, pinions, shafts and pins machined in the drawing's grade, carburised to the drawing's CHD, from one piece - <https://www.ekinsun.com/materials/case-hardening-steel-equivalents/>

Crosswalk - AISI/SAE | EN ISO 683-3 / EN 10084 name (number) | old DIN | BS 970 | JIS | GB/T 3077 | equivalence

AISI / SAE	EN ISO 683-3 / EN 10084 (number)	Old DIN	BS 970	JIS	GB/T 3077	Equivalence
Ni-Cr-Mo - AISI 86xx / 43xx / 93xx						
8620	20NiCrMo2-2	21NiCrMo2	805M20	SNCM220	20CrNiMo / 20CrNiMoH	direct
8615	-	-	-	-	-	nearest
8617	20NiCrMo2-2	-	805M20	SNCM21 / SNCM21H	-	nearest
8622	1.6543 (eFunda cross-reference; conflict: Hillfoot maps 1.65..	-	805A20	-	-	nearest
8822	1.6643 (eFunda cross-reference)	-	805A20	-	-	nearest
4320	-	-	-	SNCM420	-	nearest
9310	14NiCrMo13-4	-	-	-	-	nearest
Cr-Mo - AISI 41xx and EN 20MoCr4						
4118	18CrMo4 (1.7243)	-	-	-	-	substitute
-	20MoCr4	20MoCr4	-	-	-	substitute
Cr - AISI 51xx and EN 17Cr3						
5115	16MnCr5; 17Cr3 is chemically closest (1.7131 / 1.7016)	16MnCr5 / 17Cr3	590M17; 527M17	-	-	nearest
5120	20MnCr5	20MnCr5	-	SCr420	20Cr	nearest
5115	17Cr3	17Cr3	527M17	-	15CrH	nearest
Mn-Cr - EN 10084 16MnCr5 / 20MnCr5						
5115	16MnCr5	16MnCr5	590M17; 527M17 is the Annex D c..	-	16CrMnH; GB/T 3077 15Cr..	nearest
-	16MnCrS5	16MnCrS5	-	-	-	direct
5120	20MnCr5	20MnCr5	-	-	20CrMnH / 20CrMn; 20CrMn..	nearest
Cr-Ni and Cr-Ni-Mo - EN 10084						
-	17CrNi6-6 (1.5918)	15CrNi6	-	-	17Cr2Ni2H	nearest
-	18NiCr5-4	-	-	-	-	substitute
-	18CrNiMo7-6	17CrNiMo6; 17CrNiMo7 / 18CrNiM..	-	-	18Cr2Ni2MoH; 17Cr2Ni2Mo	direct
High-Ni - EN 14NiCrMo13-4						
-	14NiCrMo13-4	-	-	-	-	nearest
Plain carbon and free-cutting						
1018 / 1020	C16E nearest for 1018, C15E second-nearest; C22 cross-re..	Ck15 / C22	080M15 nearest for 1018; 070M20 /..	S15C / S20C	15	nearest
1117 / 1118	-	-	-	-	-	substitute
-	C10E	Ck10	045M10	-	-	nearest
1015 / 1016; 1018 nearest co..	C15E	Ck15 / C15	080M15 nearest - EN 10084 Annex..	S15C	-	direct
JIS G4053						
-	-	-	-	SCM415	-	nearest
4120; 4118 nearest common g..	18CrMo4; 25CrMo4 / 1.7218 quoted by The World Material is..	-	708M20	SCM420	20CrMo	nearest
-	-	-	-	SNC415	-	substitute
GB/T 3077						
-	20MnCr5 (1.7147)	-	-	-	20CrMnTi	nearest
-	-	-	-	-	20CrMnMo	nearest
BS 970						
3415 / 3310	15NiCr13 (1.5752)	-	655M13	-	-	nearest

AISI / SAE	EN ISO 683-3 / EN 10084 (number)	Old DIN	BS 970	JIS	GB/T 3077	Equivalence
-	15NiCrMo16-5 (1.6723)	-	835M15	-	-	nearest

Composition bands, mass % (copied from the named standard; '-' = not specified)

Grade	Standard	C	Mn	Si	Cr	Ni	Mo
8620	SAE J404	0.18-0.23	0.70-0.90	0.15-0.35	0.40-0.60	0.40-0.70	0.15-0.25
8615	SAE J404	0.13-0.18	0.70-0.90	0.15-0.35	0.40-0.60	0.40-0.70	0.15-0.25
8617	SAE J404	0.15-0.20	0.70-0.90	0.15-0.35	0.40-0.60	0.40-0.70	0.15-0.25
8622	SAE J404	0.20-0.25	0.70-0.90	0.15-0.35	0.40-0.60	0.40-0.70	0.15-0.25
8822	SAE J404	0.20-0.25	0.75-1.00	0.15-0.35	0.40-0.60	0.40-0.70	0.30-0.40
4320	SAE J404	0.17-0.22	0.45-0.65	0.15-0.35	0.40-0.60	1.65-2.00	0.20-0.30
9310	SAE J404	0.08-0.13	0.45-0.65	0.15-0.35	1.00-1.40	3.00-3.50	0.08-0.15
4118	SAE J404	0.18-0.23	0.70-0.90	0.15-0.35	0.40-0.60	-	0.08-0.15
20MoCr4	EN 10084	0.17-0.23	0.70-1.00	<=0.40	0.30-0.60	-	0.40-0.50
5115	SAE J404	0.13-0.18	0.70-0.90	0.15-0.35	0.70-0.90	-	-
5120	SAE J404	0.17-0.22	0.70-0.90	0.15-0.35	0.70-0.90	-	-
17Cr3	EN 10084	0.14-0.20	0.60-0.90	<=0.40	0.70-1.00	-	-
16MnCr5	EN 10084	0.14-0.19	1.00-1.30	<=0.40	0.80-1.10	-	-
16MnCrS5	EN 10084	0.14-0.19	1.00-1.30	<=0.40	0.80-1.10	-	-
20MnCr5	EN 10084	0.17-0.22	1.10-1.40	<=0.40	1.00-1.30	-	-
17CrNi6-6	EN 10084	0.14-0.20	0.50-0.90	<=0.40	1.40-1.70	1.40-1.70	-
18NiCr5-4	EN 10084	0.16-0.21	0.60-0.90	<=0.40	0.90-1.20	1.20-1.50	-
18CrNiMo7-6	EN 10084	0.15-0.21	0.50-0.90	<=0.40	1.50-1.80	1.40-1.70	0.25-0.35
14NiCrMo13-4	EN 10084	0.11-0.17	0.30-0.60	<=0.40	0.80-1.10	3.00-3.50	0.20-0.30
1018 / 1020	SAE J403	1018: 0.15-0.20; 1020: 0.18-0.23	1018: 0.60-0.90; 1020: 0.30-0.60	- (not specified in SAE J403 ta..	-	-	-
1117 / 1118	SAE J403	0.14-0.20 (both)	1117: 1.00-1.30; 1118: 1.30-1.60	-	-	-	-
C10E	EN 10084	0.07-0.13	0.30-0.60	<=0.40	-	-	-
C15E	EN 10084	0.12-0.18	0.30-0.60	<=0.40	-	-	-
SCM415	JIS G4053	0.13-0.18	0.60-0.90	0.15-0.35	0.90-1.20	<=0.25	0.15-0.25
SCM420	JIS G4053	0.18-0.23	0.60-0.90	0.15-0.35	0.90-1.20	<=0.25	0.15-0.25
SNC415	JIS G4053	0.12-0.18	0.35-0.65	0.15-0.35	0.20-0.50	2.00-2.50	-
20CrMnTi	GB/T 3077	0.17-0.23	0.80-1.10	0.17-0.37	1.00-1.30	<=0.30	-
20CrMnMo	GB/T 3077	0.17-0.23	0.90-1.20	0.17-0.37	1.10-1.40	-	0.20-0.30
655M13	BS 970	0.10-0.16	0.35-0.60	0.10-0.35	0.70-1.00	3.00-3.75	-
835M15	BS 970	0.12-0.18	0.25-0.50	0.10-0.35	not sourced	3.90-4.30	0.15-0.30

Notes: CHD to ISO 2639 = depth at which the Vickers profile falls to 550 HV1 (US effective case depth: depth to 50 HRC). Carburised surface 58-62 HRC, core 28-35 HRC typical. 42CrMo4 / 4140 (C 0.38-0.45 / 0.38-0.43 %) are quenched-and-tempered steels, not case-hardening steels. 18CrNiMo7-6 has no AISI twin; 4320 differs in Cr 0.40-0.60 vs 1.50-1.80; 655M13 (EN36, C {R[^{655M13}][^c]} %) is a 3 % Ni steel without Mo, paired with 15NiCr13 / 1.5752 in EN 10084 Annex D, and is not 8620. 835M15 Cr is not sourced. 14NiCrMo13-4 survives only in the withdrawn EN 10084:2008.