

**Table 3. Hardness of Alloys Resulting from Laser Hardening from the Liquid State (MZ) and in Solid Phase (HAZ)**

Material	Chemical content, %	Initial hardness Hv	Hardness, Hv		
			MZ	HAZ	
Low-carbon steel	C 0.03; Mn 0.05; Si 0.001	100	230–320	170–180	
	C 0.2; Mn 0.5; Si 0.27	200	450–500	400–650	
Carbon steels	C 0.45; Mn 0.65; Si 0.27	250	700–750	650–850	
		440	700–850	700–850	
	C 0.65; Mn 1.0; Si 0.27	180	900–1100	1000–1100	
	C 0.8; Mn 0.25; Si 0.27	280	1000–1150	1050–1200	
High-carbon steel	C 1.2; Mn 0.25; Si 0.25	280	1000–1200	1100–1300	
Chromium steels	C 0.4; Cr 1.0; Mn 0.65; Si 0.27	280	800–900	800–850	
	C 1.0; Cr 1.5;	300	1100–1200	950–1100	
	Mn 0.28; Si 0.25				
Nickel-chromium steels	C 0.4; Cr 0.6; Ni 1.2; Mn 0.7;	320	600–650	700–750	
	C 0.12; Cr 0.8; Ni 3.0; Mn 0.5 ;	260	450–500	500–550	
	C 0.14; Cr 1.0; Ni 3.0; Mn 1.0	280	700–800	800–900	
Silicon-chromium steels	C 0.9; Cr 1.1; Si 1.4; Mn 0.5	700	700–900	950–1000	
Manganese-wolfram chromium steel	C 1.0; Cr 1.1; W 1.4; Mn 0.9; Si 0.25	750	1000–1050	950–1100	
High-alloyed tool steels	C 1.5; Cr 12.0; Mo 0.5; V 0.25;	780	500–600	1000–1100	
	C 0.85; W 6.0; Mo 5.0; Cr 4.1; V 1.9;	780	700–1100	980–1200	
	C 0.75; W 18.0; Mo 1.0; Cr 4.2; V 1.2	800	700–900	950–1100	
High-chromium steels	C 0.2; Cr 13.0; Mn <0.8;	230	660–720	600–700	
	C 0.4; Cr 13.0; Mn <0.8	280	830–900	780–820	
Grey cast irons	C 2.6; Si 1.2; Mn 0.4; S 0.12;	160	600–800	380–650	
	C 2.9; Si 1.6; Mn 1.0; S 0.12	210	850–1000	850–890	
	C 3.4; Si 2.0; Mn 0.8; S 0.02	250	900–1100	880–980	
Grey cast iron with a higher concentration of:					
	S	C 3.5; Si 1.8; Mn 0.5; S 0.2	250	930	250–930
	P	C 3.5; Si 2.0; Mn 0.5; P 1.0	220	1180	220–1190
	Si	C 3.4; Si 4.0; Mn 0.5; S 0.02	150	1100	150–1100
Alloy cast iron	C 2.7; Si 0.3; Mn 1.0; Cr 27.5	—	600	450–600	
	C 2.6; Si 2.3; Mn 1.0; Cr 2.0	200	450	200–450	
	Ni 21.0; S 0.02; P 0.02				
	C 3.0; Si 0.7; Mn 0.8; Cr 1.8	—	300	400	
	Ni 4.2; S 0.06; P 0.06				
	C 3.3; Si 2.1; Mn 6.0; Ni 12.0	180	700	180–700	
Titanium alloys	Al 4.0; Mn 1.4	280	800–1600	350	
	Al 1.5; Cr 2.5	180	780	200	
	Al 5.1; Cr 2.0; Mo 1.9	340	750–890	360–500	
	Al 5.0; Sn 2.5	300	800	340	
	Al 6.0; V 4.6	340	860–890	490–510	
	Al 6.5; Mo 3.3	280	600	400	
	Al 2.7; V 4.5; Mo 5.0	380	486–510	300–430	
Aluminum alloys	Cu 2.2; Mg 1.6; Si 0.8; Ni 1.1	170	94–179	170	
	Cu 4.2; Mg 1.5; Mn 0.8	152	103–165	152	
	Cu 0.3; Si 9.5; Mg 0.3; Fe 0.64	55	86–96	55	
	Si 7.0; Mg 0.3	85	95–122	85	
	Si 5.0; Mg 0.4; Cu 7.0	84	122–257	84	
	Si 12.0; Mg 1.0; Mn 0.5	117	235–265	117	
	Si 13.0; Mg 0.9; Sn 0.01; Ni 1.0	109	179–203	109	