MIM Material Properties

INDO-MIM™

COMPLEXITY SIMPLIFIED

Material Designation	Alloy Composition (wt %)	Condition	UTS (MPa)	YS (0.2%) (MPa)	Elongation (%)	Hardness	Density g/cm³ (min)	Remarks
CASE HARDENED STEELS								
MIM 4600 (MIM 2200)	Ni 1.5-2.5% Mo 0.50% max C 0.15% max Fe Balance	Sintered	300	170	22	100 HRB max	7.50	Can be case hardened to surface hardness of 600 - 750 HV1
MIM 4600 (Modified) (MIM 2700)	Ni 6-8% Mo 0.5% max C 0.15% max Fe Balance	Sintered	425	300	13	350 HV1 max	7.55	Can be case hardened to surface hardness of 500 - 600 HV1
MIM 8620	Cr 0.5-1% Ni 0.5-1% Mo 0.1-0.25% C 0.2% max Fe Balance	Sintered	320	130	25	100 HRB max	7.50	Can be case hardened to surface hardness of 600 - 750 HV1
MIM 9310	Cr 0.3-0.8% Ni 2.5-3.5% Mo 0.1-0.25% C 0.2% max Fe Balance	Sintered	540	350	15	375 HV1 max	7.50	Can be case hardened to surface hardness of 600 - 750 HV1
HARDENED & TEMPERED STEELS								
MIM 4605 (MIM 4605)	Ni 1.5-2.5% Mo 0.50% max C 0.3-0.6% Fe Balance	Sintered	600	235	10	100 HRB max	7.50	Can be heat treated to 32 - 50 HRC
		Heat Treated	1200	1100	5	32 - 38 HRC		
			1550	1400	3	42 - 48 HRC		
MIM 4630 - modified	Ni 6-8% Mo 0.5% max C 0.2-0.5% Fe Balance	Sintered	700	430	7	45 HRC max	7.50	Can be heat treated to 35 - 50 HRC
		Heat Treated	1200	1000	6	32 - 38 HRC		
			1500	1200	4	42 - 48 HRC		
MIM 4340	Ni 1.5-2.5% Cr 0.75-1.25% Mo 0.50% max C 0.3-0.6% Fe Balance	Sintered	750	300	9	100 HRB max	7.50	Can be heat treated to 32 - 50 HRC
		Heat Treated	1200	1100	6	32 - 38 HRC		
			1500	1350	4	42 - 48 HRC		
MIM 4140	Ni 0.75-1.25% Cr 0.75-1.25% Mo 0.50% max C 0.3-0.6% Fe Balance	Sintered	750	300	9	100 HRB max	7.50	Can be heat treated to 32 - 50 HRC
		Heat Treated	1200	1100	7	32 - 38 HRC		
			1550	1400	4	42 - 48 HRC		
MIM 52100	Ni 0.25% max Cr 1.3-1.8% Mo 0.5% max C 0.8-1.2% Fe Balance	Sintered	1000	650	5	35 HRC max	7.50	Can be heat treated to 55 - 66 HRC
		Heat Treated	1500	1100	2	60 - 65 HRC		
STAINLESS STEELS								
MIM SS 316 (MIM SS 316L)	C 0.08% max Ni 10-14% Mo 2-3% Cr 16-18% Fe Balance	Sintered	480	150	45	100 HRB max	7.65	-
MIM SS 304	C 0.08% max Ni 8-11% Cr 17.5-20% Si-1% max Mn-2% max Fe Balance	Sintered	450	160	25	100 HRB max	7.55	-
MIM SS 316 Duplex	C 0.08% max Ni 4.5-7.0% Cr 21-23% Mo 2.5-3.5% Fe Balance	Sintered	732	447	24	100 HRB max	7.65	-
MIM SS 440C	C 0.9-1.2% Cr 16-18% Ni 0.75% max Mo 0.5% max Fe Balance	Hipped	725	600	4	40 HRC max	7.50	Can be heat treated to 52 - 63 HRC
		Hipped & Heat Treated	1700	1550	<1	55-63 HRC		
MIM SS 420 (MIM 420)	C 0.15-0.4%, Cr 12-14%, Fe balance	Heat Treated	1450	1150	5	39-46 HRC	7.24	Can be heat treated to 39 - 46 HRC

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MIM 17-4 PH (MIM 17-4 PH)	C 0.07% max, Cr 15-18%, Cu 3-5%, Ni 3-5%, Nb 0.15-0.45%, Fe Balance	Sintered	900	730	7	35 HRC max	7.50	Can be heat treated to H900, H1050, H1100 Conditions
		Heat Treated (H900)	1220	1100	7	35 - 40 HRC		
MIM HK 30	C 0.2-0.5% Cr 23-27% Ni 19-22% Nb 1.2-1.5% Fe Balance	Sintered	550	200	30	325 HV1 max	7.40	-
Nickel Free SS	C 0.2% max Ni 0.25% max Cr 16.5-17.5% Mo 3.0-3.5% Mn 10-12% Si 1% max Fe Balance	Sintered	790	550	20	50-60 HR 15N	7.70	-
TOOL STEELS								
MIM S7	C 0.45-0.7% Cr 2.5-3.5% Si 0.2-1.0% Mo 1.0-1.8% Ni 0.30% max Fe Balance	Heat Treated	1750	1530	2	46 - 53 HRC	7.30	Can be heat treated to 45 - 53 HRC
MIM M2	C 0.8-1.1% Cr 3.5-4.5% Mo 4.5-5.5% W 5.5-6.5% V 1.5-2.2% Fe Balance	Sintered	700	400	1	55 - 63 HRC	7.90	Can be heat treated to 55 - 66 HRC
		Heat Treated	900	700	1	60 - 65 HRC		
MAGNETIC MATERIALS								
MIM Fe-3Si (MIM -FE-3%Si Grade 1)	C 0.08% max, Si 2.5-3.5%, Fe Balance	Sintered	525	372	23	90 HRB max	7.55	-
MIM Fe-49Co-2V (MIM - FE-50% Co)	C 0.08% max, Co 47-50% V 2.5% max Fe Balance	Sintered	201	132	<1	100 HRB max	7.85	-
MIM SS 430 (MIM SS 430L)	C 0.08% max, Cr 16-18%, Fe Balance	Sintered	438	242	25	100 HRB max	7.32	-
MIM Fe-50Ni (MIM -Fe50Ni)	C 0.05% max Ni 49-51% Si 1% max Fe Balance	Sintered	455	160	30	100 HRB max	7.85	-
TUNGSTEN HEAVY ALLOYS								
MIM WHA1	Ni 2.5-3.5% Fe 0.5-1.0% W Balance	Sintered	-	-	-	-	17.50	WHA are characterised by the density values. Indo-MIM can produce WHA with density ranging from 17 to 18.25 g/cc.
MIM WHA2	Ni 3-4% Cu/Fe 1% max W Balance	Sintered	-	-	-	-	17.50	
TITANIUM & TITANIUM ALLOYS								
CP-Ti Grade 2	C 0.08% max O 0.25% max H 0.015% max N 0.03% max Fe 0.3% max Ti Balance	Sintered	420 min	360 min	17 min	100 HRB max	4.30	-
Ti-6Al-4V Grade 5	C 0.08% max O 0.20% max H 0.015% max N 0.05% max Fe 0.3% max Al 5.5-6.75% V 3.5-4.5% Ti Balance	Sintered	780 min	680 min	10 min	30 HRC max	4.20	-

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SUPER ALLOYS & OTHERS								
MIM NIM 90	C 0.13% max, Fe 5% max, Ti 2-3%, Al 1-2%, Co 15-21%, Cr 17-21%, Ni Balance	Hipped & Heat treated	1162	782	12	300-450 HV1	7.70	Can be heat treated to 300 - 450 HV1
MIM XEV	C 0.35-0.65% Ni 3.5-5.5% Mn 8-10% Cr 20-22% Nb 1.3-2.5% W 0.8-1.5% N 0.4-0.7% Fe Balance	Heat treated	950	580	10	275-400 HV1	7.80	Can be heat treated to 275 - 400 HV1
MIM MoCrSi2882	C 0.08% max Ni 1.5% max Mo 25-30% Si 1.8-3% Cr 7-10% Co Balance	Hipped	-	625 min	-	52 - 60 HRC	8.60	-
MIM F15	C 0.04% Ni 28.5-29.5% Co 16.75-17.25% Fe Balance	Sintered	460	300	25	90 HRB max	7.75	-
		Hipped	470	330	30	90 HRB max	8.18	

Note:
The material Designation indicated in green font is the equivalent MPIF STD 35 designation.
• Chemical composition indicated is only for principal/major alloying elements. Elements like Mn, Si, P, S and others will be present. Detailed chemistry and the material properties can be had upon request • The mechanical property data is generated as per MPIF Standard 50 • The above indicated values of mechanical properties are typical • Material property details apart from above list can be had by request • Also Indo-MIM can cater to special chemistry requirement upon request.

The data presented herein are typical values, and do not warrant suitability for any specific application or use of this material. Normal variations in the chemical composition, the size of the product and heat treatment parameters may result in different values for the various physical and mechanical properties.

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