

CNC MATERIALS

PLASTIC

MATERIAL	PROPERTIES	METRIC	IMPERIAL
ABS	Tensile Strength	35 MPa	5,100 psi
	Elongation @ Break	40%	40%
	Hardness	Rockwell R100	Rockwell R100
	Density	0.969 g / cu. cm.	0.035 lbs / cu. in.
	Maximum Temperature	71° C	160° F
Acrylic	Tensile Strength	55 MPa	8,000 psi
	Elongation @ Break	6%	6%
	Hardness	Rockwell M95	Rockwell M95
	Density	1.19 g / cu. cm.	0.043 lbs / cu. in.
	Maximum Temperature	77° C	170° F
Delrin (30% Glass-Filled)	Tensile Strength	53 MPa	7,700 psi
	Elongation @ Break	6%	6%
	Hardness	Rockwell M87	Rockwell M87
	Density	1.55 g / cu. cm.	0.056 lbs / cu. in.
	Maximum Temperature	85° C	185° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
Delrin	Tensile Strength	62 MPa	9,000 psi
	Elongation @ Break	25%	25%
	Hardness	Rockwell M90	Rockwell M90
	Density	1.412 g / cu. cm.	0.051 lbs / cu. in.
	Maximum Temperature	82° C	180° F
Delrin AF (13% PTFE-Filled)	Tensile Strength	53-56 MPa	7,690-8,100 psi
	Elongation @ Break	10.30%	10.30%
	Hardness	Rockwell R115-R118	Rockwell R115-R118
	Density	1.495 g / cu. cm.	0.054 lbs / cu. in.
	Maximum Temperature	85° C	185° F
Garolite G-10	Tensile Strength	241 MPa	35,000-50,000 psi
	Elongation @ Break	N/A	N/A
	Hardness	Rockwell M110	Rockwell M110
	Density	1.91 g / cu. cm.	0.069 lbs / cu. in.
	Maximum Temperature	129° C	265° F
HDPE	Tensile Strength	28 MPa	4,000 psi
	Elongation @ Break	500%	500%
	Hardness	Rockwell R65	Rockwell R65
	Density	0.958 g / cu. cm.	0.035 lbs / cu. in.
	Maximum Temperature	82° C	180° F
Nylon (30% Glass-Filled)	Tensile Strength	93 MPa	13,500 psi
	Elongation @ Break	3%	3%
	Hardness	Rockwell M88	Rockwell M88
	Density	1.329 g / cu. cm.	0.048 lbs / cu. in.
	Maximum Temperature	110° C	230° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
Nylon	Tensile Strength	77 MPa	11,200 psi
	Elongation @ Break	50%	50%
	Hardness	Rockwell R110	Rockwell R110
	Density	1.135 g / cu. cm.	0.041 lbs / cu. in.
	Maximum Temperature	85° C	185° F
PEEK (30% Glass-Filled)	Tensile Strength	28 MPa	14,000 psi
	Elongation @ Break	3%	3%
	Hardness	Rockwell R126	Rockwell R126
	Density	1.495 g / cu. cm.	0.054 lbs / cu. in.
	Maximum Temperature	249° C	480° F
PEEK	Tensile Strength	97 MPa	14,000 psi
	Elongation @ Break	20%	20%
	Hardness	Rockwell R125	Rockwell R125
	Density	1.301 g / cu. cm.	0.047 lbs / cu. in.
	Maximum Temperature	249° C	480° F
Polycarbonate	Tensile Strength	55 MPa	8,000 psi
	Elongation @ Break	110%	110%
	Hardness	Rockwell R120	Rockwell R120
	Density	1.246 g / cu. cm.	0.045 lbs / cu. in.
	Maximum Temperature	82° C	180° F
Polypropylene	Tensile Strength	17 MPa	2,500 psi
	Elongation @ Break	34%	34%
	Hardness	Rockwell R55	Rockwell R55
	Density	1.163 g / cu. cm.	0.042 lbs / cu. in.
	Maximum Temperature	80° C	176° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
PPS (Polyphenylene Sulfide)	Tensile Strength	93 MPa	13,500 psi
	Elongation @ Break	4%	4%
	Hardness	Rockwell R125	Rockwell R125
	Density	1.356 g / cu. cm.	0.049 lbs / cu. in
	Maximum Temperature	218° C	425° F
PTFE (Teflon)	Tensile Strength	31 MPa	4,500 psi
	Elongation @ Break	300%	300%
	Hardness	Rockwell R60	Rockwell R60
	Density	1.273 g / cu. cm.	0.046 lbs / cu. in.
	Maximum Temperature	204° C	400° F
UHMW	Tensile Strength	34 MPa	5,000 psi
	Elongation @ Break	200%	200%
	Hardness	Durometer 70D	Durometer 70D
	Density	0.941 g / cu. cm.	0.034 lbs / cu. in.
	Maximum Temperature	82° C	180° F
ULTEM 1000	Tensile Strength	117-121 MPa	17,000-17,500 psi
	Elongation @ Break	40%	40%
	Hardness	Rockwell R111-R125	Rockwell R111-R125
	Density	1.273 g / cu. cm.	0.046 lbs / cu. in
	Maximum Temperature	168° C	335° F

METAL

MATERIAL	PROPERTIES	METRIC	IMPERIAL
Alloy Steel A514	Yield Strength	689 MPa	100,000 psi
	Elongation @ Break	18%	18%
	Hardness	Rockwell C20	Rockwell C20
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in
	Maximum Temperature	-	-
Alloy Steel 4130	Yield Strength	345 MPa	50,000 psi
	Elongation @ Break	26.50%	26.50%
	Hardness	Rockwell B85	Rockwell B85
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in
	Maximum Temperature	-	-
Alloy Steel 4340	Yield Strength	841 MPa	122,000 psi
	Elongation @ Break	13%	13%
	Hardness	Rockwell C20	Rockwell C20
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in
	Maximum Temperature	-	-
Aluminum (MIC6)	Tensile Strength	164 MPa	23,900 psi
	Elongation @ Break	3%	3%
	Hardness	Brinell 65	Brinell 65
	Density	2.768 g / cu. cm.	0.1 lbs / cu. in.
	Maximum Temperature	649° C	1200° F
Aluminum (2024)	Yield Strength	283 MPa	41,000 psi
	Elongation @ Break	15%	15%
	Hardness	Brinell 120	Brinell 120
	Density	2.768 g / cu. cm.	0.1 lbs / cu. in
	Maximum Temperature	149° C	300° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
Aluminum (5052)	Yield Strength	159 MPa	23,000 psi
	Elongation @ Break	8%	8%
	Hardness	Brinell 60	Brinell 60
	Density	2.685 g / cu. cm.	0.097 lbs / cu. in
	Maximum Temperature	149° C	300° F
Aluminum (6061-T6)	Tensile Strength	241 MPa	35,000 psi
	Elongation @ Break	12.50%	12.50%
	Hardness	Brinell 95	Brinell 95
	Density	2.768 g / cu. cm.	0.1 lbs / cu. in.
	Maximum Temperature	582° C	1080° F
Aluminum (6063)	Yield Strength	110 MPa	16,000 psi
	Elongation @ Break	11%	11%
	Hardness	Brinell 55	Brinell 55
	Density	2.685 g / cu. cm.	0.097 lbs / cu. in
	Maximum Temperature	100° C	212° F
Aluminum (7050)	Yield Strength	469 MPa	68,000 psi
	Elongation @ Break	11%	11%
	Hardness	Rockwell B86	Rockwell B86
	Density	2.823 g / cu. cm.	0.102 lbs / cu. in.
	Maximum Temperature	193° C	380° F
Aluminum (7075-T6)	Tensile Strength	421 MPa	61,000 psi
	Elongation @ Break	11%	11%
	Hardness	Brinell 150	Brinell 150
	Density	2.768 g / cu. cm.	0.1 lbs / cu. in
	Maximum Temperature	476° C	890° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
Brass (360)	Tensile Strength	103 MPa	15,000 psi
	Elongation @ Break	53%	53%
	Hardness	Rockwell B35	Rockwell B35
	Density	4.918 g / cu. cm.	0.307 lbs / cu. in
	Maximum Temperature	582° C	1650° F
Bronze (932)	Tensile Strength	124 MPa	18,000 psi
	Elongation @ Break	10%	10%
	Hardness	Rockwell B34	Rockwell B34
	Density	8.913 g / cu. cm.	0.322 lbs / cu. in.
	Maximum Temperature	260° C	500° F
Carbon Steel (1045)	Yield Strength	531 MPa	77,000 psi
	Elongation @ Break	19%	19%
	Hardness	Rockwell B90	Rockwell B90
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in.
	Maximum Temperature	-	-
Cast Iron	Yield Strength	827 MPa	120,000 psi
	Elongation @ Break	1%	1%
	Hardness	Rockwell C20	Rockwell C20
	Density	7.141 g / cu. cm.	0.258 lbs / cu. in.
	Maximum Temperature	-	-
Copper 101	Tensile Strength	255 MPa	37,000 psi (1/2 hard)
	Elongation @ Break	14%	14%
	Hardness	Rockwell F60	Rockwell F60
	Density	8.940 g / cu. cm.	0.323 lbs / cu. in.
	Maximum Temperature	260° C	500° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
Copper 110	Tensile Strength	290 MPa	42,000 psi (1/2 hard)
	Elongation @ Break	20%	20%
	Hardness	Rockwell F40	Rockwell F40
	Density	8.913 g / cu. cm.	0.322 lbs / cu. in.
	Maximum Temperature	260° C	500° F
Grade 5 Titanium	Yield Strength	827 MPa	120,000 psi
	Elongation @ Break	10%	10%
	Hardness	Rockwell C30	Rockwell C30
	Density	4.429 g / cu. cm.	0.16 lbs / cu. in
	Maximum Temperature	1649° C	3000° F
Nitronic 60	Yield Strength	345 MPa	50,000 psi
	Elongation @ Break	35%	35%
	Hardness	Rockwell B85	Rockwell B85
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in.
	Maximum Temperature	982° C	1800° F
Stainless Steel 303	Tensile Strength	241 MPa	35,000 psi
	Elongation @ Break	42.5%	42.5%
	Hardness	Rockwell B95	Rockwell B95
	Density	8.027 g / cu. cm.	0.29 lbs / cu. in
	Maximum Temperature	1399° C	2550° F
Stainless Steel (304L)	Tensile Strength	207 MPa	30,000 psi
	Elongation @ Break	50%	50%
	Hardness	Rockwell B80 (med)	Rockwell B80 (med)
	Density	8.027 g / cu. cm.	0.29 lbs / cu. in.
	Maximum Temperature	816° C	1500° F

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MATERIAL	PROPERTIES	METRIC	IMPERIAL
Stainless Steel (316L)	Tensile Strength	207 MPa	30,000 psi
	Elongation @ Break	39%	39%
	Hardness	Rockwell B95	Rockwell B95
	Density	8.027 g / cu. cm.	0.290 lbs./ cu. in
	Maximum Temperature	816° C	1500° F
Stainless Steel (410)	Tensile Strength	448 MPa	65,000 psi
	Elongation @ Break	30%	30%
	Hardness	Rockwell B90	Rockwell B90
	Density	7.750 g / cu. cm.	0.280 lbs / cu. in
	Maximum Temperature	649° C	1200° F
Stainless Steel (416)	Tensile Strength	517 MPa	75,000 psi
	Elongation @ Break	22.5%	22.5%
	Hardness	Rockwell B80	Rockwell B80
	Density	7.750 g / cu. cm.	0.280 lbs / cu. in.
	Maximum Temperature	649° C	1200° F
Stainless Steel (440C)	Tensile Strength	758 MPa	110,000 psi
	Elongation @ Break	8%	8%
	Hardness	Rockwell C20	Rockwell C20
	Density	7.750 g / cu. cm.	0.280 lbs / cu. in
	Maximum Temperature	427° C	800° F
Stainless Steel (17-4 PH)	Tensile Strength	1103 MPa	160,000 psi
	Elongation @ Break	7%	7%
	Hardness	Rockwell C35	Rockwell C35
	Density	7.78 g / cu. cm.	0.280 lbs./ cu. in.
	Maximum Temperature	593° C	1100°F

MATERIAL	PROPERTIES	METRIC	IMPERIAL
Steel (4140 Alloy)	Tensile Strength	413 MPa	60,000 psi
	Elongation @ Break	21%	21%
	Hardness	Rockwell C15	Rockwell C15
	Density	7.87 g / cu. cm.	0.284 lbs / cu. in.
	Maximum Temperature	248° C	480°F
Steel (1018 Low Carbon)	Tensile Strength	413 MPa	60,000 psi
	Elongation @ Break	15%	15%
	Hardness	Rockwell B90	Rockwell B90
	Density	7.87 g / cu. cm.	0.284 lbs / cu. in.
	Maximum Temperature	1260° C	2300° F
Tool Steel (A2)	Elongation @ Break	22.50%	22.50%
	Hardness	Rockwell B90	Rockwell B90
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in.
	Maximum Temperature	-	-
Zinc-Galvanized Low-Carbon Steel	Yield Strength	207 MPa	30,000 psi
	Elongation @ Break	23%	23%
	Hardness	Rockwell B65	Rockwell B65
	Density	7.861 g / cu. cm.	0.284 lbs / cu. in.
	Maximum Temperature	-	-