

# Materials for CNC machining

## Plastics

Categories **Structural applications** Mechanical parts Tooling High temperature applications Automotive Medical Marine Aerospace Electronics Chemical Optical Oil and Gas

Material	Ultimate tensile strength (MPa)	Operating temperature	Cost	Common applications
POM	60 - 70	Up to 82°C	\$ \$	Bearing Bushings Electric insulation parts
PC	60 - 72.4	Up to 120°C	\$ \$	Transparent manifolds Machine guards
ABS	27.6 - 55.2	Up to 60°C	\$ \$	Pipes Handles Instrument panels
Nylon 6	64.7 - 79.1	Up to 100°C	\$ \$	Seal rings Wear pads Circuit insulation boards
Nylon+GF (30%)	113 - 138.1	Up to 100°C	\$ \$	Timing sprockets Brake fluid resevoirs
G-10	260 - 310	Up to 140°C	\$ \$	Insulators Jigs and fixtures
PMMA (Acrylic)	55 - 83	Up to 80°C	\$ \$	Panels Fenders Screen
PP	23 - 33	Up to 130°C	\$ \$	Battery cases Instrument panels
PP+GF (30%)	68 - 85	Up to 100°C	\$ \$	Pumps and valves Gaskets
HDPE	22.1 - 31	Up to 80°C	\$ \$	Pipes Fittings Chemical containers
UHMWPE	38.6 - 48.3	Up to 110°C	\$ \$	Bearing Valves Wear plates
PEEK	70.3 - 103	Up to 260°C	\$ \$ \$ \$	Valve seals Fluid manifolds Electrical insulators
PTFE (Teflon)	25 - 31	Up to 260°C	\$ \$	Bearing Valve seals Plugs
PET	50 - 90	Up to 115°C	\$	Gear housing Connector housing
FR-4	240 - 310	Up to 145°C	\$ \$	Bus bars Arc shields
PVC	46 - 58	Up to 100°C	\$	Pumps and valve bodies Gaskets and bearing cages

## Metal

Material	Grade	Ultimate tensile strength (MPa)	Cost	Common applications
Aluminium	2014	190 - 500	\$ \$	Aircraft structures Aerospace fittings Truck frames
	2017	190 - 430	\$ \$	Structural products Pulleys and gauges Aircraft components
	2024	200 - 540	\$ \$	Aircraft fuselage Truck wheels Wing tension members
	5052	190 - 320	\$ \$	Aircraft tubes Electrical appliances Oil pipes
	5083	270 - 350	\$ \$	Pressure vessels Vehicle bodies
	6063	110 - 300	\$	Pipe and tubes for irrigation systems Door and windows frames
	6082	140 - 340	\$	Pylons Structural frames
	7050	500 - 552	\$ \$ \$	Fuselage frames Wing skins
	MIC6	166	\$ \$ \$	Assembly jigs Vacuum chucks
	6060*	80 - 140	\$	Enclosing constructions Pipes
	6061-T6	291 - 320	\$	Structural products Boat components
7075-T6	434 - 580	\$ \$ \$	Aircraft fittings Fuse parts	
Stainless steel	301	590 - 1460	\$ \$ \$ \$	Screen frames Air frame sections

Material	Grade	Ultimate tensile strength (MPa)	Cost	Common applications
Stainless steel	303	528 - 639	\$ \$ \$ \$	Bushings Nuts and bolts Aircraft fittings
	304/304L	480 - 620	\$ \$ \$	Heat exchangers Marine environment equipment
	316/316L	480 - 620	\$ \$ \$ \$	Exhaust manifolds Heat exchangers Marine environment equipment
	416	741 - 1400	\$ \$ \$ \$	Valves Pump shafts and motor shafts
	420	622 - 688	\$ \$ \$ \$	Needle valves Surgical equipment
	430	450 - 586	\$ \$ \$ \$	Element supports and fasteners Automotive trim and lashing wires
	440C	760 - 1970	\$ \$ \$ \$	Valve components Ball bearings and races
	15-5	890 - 1490	\$ \$ \$ \$ \$	Marine gas turbine compressor sections Aircraft components
	17-4PH	896 - 990	\$ \$ \$ \$ \$	Aircraft and gas turbines Chemical process components
	2205 Duplex	640 - 950	\$ \$ \$ \$ \$	Tubes and pipes Pressure vessels Heat exchangers
Mild steel	1018	190 - 440	\$ \$	Anchor pins Fixtures Mounting plates
	A36	400 - 550	\$ \$	Frames Bearing plates Fixtures
	S235JR*	340 - 520	\$ \$	Structural components Fixtures
	1045	620 - 680	\$ \$ \$	Axles Bolts Shafts Studs
	C45*	530-580	\$ \$	Axles Bolts Shafts Studs
	S355J2*	450 - 680	\$ \$	Structural components Fixtures
Alloy steel	4340	670 - 820	\$ \$ \$	Shafts Aircraft landing gear
	4140	915 - 1130	\$ \$ \$	Nuts Shafts Bolts Jigs
	1.7131*	550 - 800	\$ \$ \$	Nuts Shafts Bolts Jigs
	1.7225*	600 - 860	\$ \$ \$	Nuts Shafts Bolts Jigs
	1215	540	\$ \$	Shafts Bolts Nuts Jigs Boiler and pressure vessels
Tool steel	A2	2040 - 2360	\$ \$ \$ \$	Cams Bending dies Plastic injection moulds
	A3	1950 - 2380	\$ \$ \$ \$	Cams Bending dies Plastic injection moulds
Tool steel	D2	2100 - 2500	\$ \$ \$ \$	Cutters Cold extrusion dies Drawing punches
	H13	1200 - 1590	\$ \$ \$ \$	Casings Dummy blocks for hot extrusion Hot working punches
	O1	2040 - 2360	\$ \$ \$ \$	Bushings Collets Punches Gauges
	S7	2100 - 2200	\$ \$ \$ \$	Jackhammer parts Chisels Dies Hot stamps
Brass	C360 (C36000)	140	\$ \$	Pump shafts Bushings Connectors Couplings
Copper	C110	220 - 230	\$ \$ \$	Bus bars Electromagnets
	C101	310 - 380	\$ \$ \$	Generator windings Bus bars
Titanium	Grade 1	240	\$ \$ \$ \$	Aircraft turbines Aircraft structural components
	Grade 2	344 - 420	\$ \$ \$ \$	Pressure vessels Aircraft turbines Aircraft structural components
	Grade 5	950	\$ \$ \$ \$ \$	Heat exchangers Aircraft turbines Aircraft structural components
Inconel 718		1100 - 1530	\$ \$ \$ \$ \$	Valve gates Turbines Shafts
Invar		621 - 810	\$ \$ \$ \$ \$	Electrical circuit breakers Optical devices

\* Available for EU customer only