VULCAN
Engineering Steels

M1020 BRIGHT CARBON STEEL BAR

M1020 is a low carbon mild steel. This bar is supplied in cold drawn or Turned and Polished condition. This bar has excellent weldability, good machinability, reasonable strength and good ductility.
M1020 is used extensively across all industrial sectors and is also suitable for carburizing (case hardening). Due to it's low carbon content M1020 is not suitable for Flame or Induction hardening. In a bright finish it is ideally suited for CNC machining, and machining components where much of the length does not require machining.

Stocked Sizes	-	Round Metric	-	6 mm – 200 mm Ø
		Round Imperial	-	3/16'' – 8'' Ø
		Square Metric	-	20mm – 75 Sq
		Square Imperial	-	3/8'' – 5'' Sq

Closest Related Specifications	
Australia	AS 1443 – 2004 M1020
Japan	JIS G4051 S20C
USA	AISI C1020 ASTM A29 – 91 1020 SAE 1020 UNS G10200

Chemical Composition		
	Min. %	**Max %**
Carbon	0.15	0.25
Silicon		0.35
Manganese	0.30	0.90
Phosphorous		0.05
Sulphur		0.05

Typical Mechanical Properties – Cold Drawn & Turned and Polished (For Guidance Only)				
	Up to 16mm	17-38mm	39-63mm	Turned & Polished (All Sizes)
Tensile Strength (Mpa)	480-790	460-710	430-660	410-560
Yield Strength (Mpa)	380-610	370-570	340-480	230-330
Elongation in 50mm (%)	10	12	13	22
Hardness (Brinell BHN)	142-235	135-210	120-195	115-170

Standard Bright Tolerance (h11) in mm								
3-6mm	+6-10mm	+10-18mm	+18-30mm	+30-50mm	+50-80mm	+80-120mm	+120-180mm	+180-250mm
+0/-0.075	+0/-0.09	+0/-0.11	+0/-0.13	+0/-0.16	+0/-0.19	+0/-0.22	+0/-0.25	+0/-0.29mm

Annealing

Heat to 870-910 Deg C. Hold until temperature is uniform throughout the section and allow to cool in furnace.

Normalizing

Heat to 890- 940 Deg C. Hold until temperature is uniform through the section, soak for 10-15 minutes and allow to cool in still air.

Stress Relieving

Heat to 650-700 Deg C. Hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air

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M1030 BRIGHT CARBON STEEL BAR

M1030 is a low carbon mild steel. This bar is supplied in cold drawn or Turned and Polished condition, and has reasonable weldability, good machinability, medium strength and good ductility.
M1030 is used across all industrial sectors where higher strength than M1020 is required. In a bright finish it is ideally suited for CNC machining, and machining components where much of the length does not require machining.

Stocked Sizes - Round Metric - 10 mm – 100 mm Ø
Round Imperial - 5/16'' – 4'' Ø
(Larger & smaller sizes available on request)

Closest Related Specifications	
Australia	AS 1443 – 2004 M1030
Japan	JIS G4051 S30C
USA	AISI C1030 ASTM A29 – 91 1030 SAE 1030 UNS G10300

Chemical Composition		
	Min. %	**Max %**
Carbon	0.25	0.35
Silicon		0.35
Manganese	0.30	0.90
Phosphorous		0.05
Sulphur		0.05

Typical Mechanical Properties – Cold Drawn & Turned and Polished (For Guidance Only)				
	Up to 16mm	17-38mm	39-63mm	Turned & Polished (All Sizes)
Tensile Strength (Mpa)	560-850	540-740	520-710	500-630
Yield Strength (Mpa)	440-670	430-600	410-570	250-350
Elongation in 50mm (%)	10	11	12	20
Hardness (Brinell BHN)	170-245	160-215	155-210	150-190

Standard Bright Tolerance (h11) in mm								
3-6mm	+6-10mm	+10-18mm	+18-30mm	+30-50mm	+50-80mm	+80-120mm	+120-180mm	+180-250mm
+0/-0.075	+0/-0.09	+0/-0.11	+0/-0.13	+0/-0.16	+0/-0.19	+0/-0.22	+0/-0.25	+0/-0.29mm

Annealing
Heat to 850-900 Deg C. Hold until temperature is uniform throughout the section and allow to cool in furnace.
Normalizing
Heat to 870- 920 Deg C. Hold until temperature is uniform through the section, soak for 10-15 minutes per 25mm of cross section, and allow to cool in still air.
Stress Relieving
Heat to 600-700 Deg C. Hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air

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1045 BRIGHT CARBON STEEL BAR

1045 is a medium carbon steel with medium tensile strength. This bar is supplied in As Rolled bright condition (can be cold drawn or turned and polished). 1045 combines reasonable weldability, with good machinability, and can be flame or induction hardened.
Typical Applications are: Various axles, bolts, connecting rods, Hydraulic Clamps and Rams, pins, studs, spindles, rolls and other general engineering applications. Also used for Sprockets, and lower strength gears.

Stocked Sizes	-	Round Metric	10 mm – 150 mm Ø	Square Metric	20 mm – 40 mm Sq
		Round Imperial	3/8'' – 6'' Ø	Square Imperial	3/4'' – 1. 1/2'' Sq
		Hexagon	19 mm – 50.8 mm		

Related Specifications	
Australia	AS 1443 – 1994 1045
Japan	JIS G4051 S45C
USA	AISI C1045 ASTM A29 – 91 1045 SAE 1045 UNS G10450

Chemical Composition		
	Min. %	**Max %**
Carbon	0.43	0.50
Silicon	0.10	0.35
Manganese	0.60	0.90
Phosphorous		0.04
Sulphur		0.04

Typical Mechanical Properties – Cold Drawn & Turned and Polished (For Guidance Only - indicative)				
	Up to 16mm CD	17-38mm CD	39-63mm CD	Turned & Polished (All Sizes)
Tensile Strength (Mpa)	690-950	650-830	640-800	600-730
Yield Strength (Mpa)	540-760	510-650	500-630	300-450
Elongation in 50mm (%)	8	8	9	14
Hardness (Brinell BHN)	205-280	195-245	190-235	179-215

Standard Bright Tolerance (h11) in mm								
3-6mm	+6-10mm	+10-18mm	+18-30mm	+30-50mm	+50-80mm	+80-120mm	+120-180mm	+180-250mm
+0/-0.075	+0/-0.09	+0/-0.11	+0/-0.13	+0/-0.16	+0/-0.19	+0/-0.22	+0/-0.25	+0/-0.29mm

Annealing

Heat to 800-850 Deg C. Hold until temperature is uniform throughout the section and allow to cool in furnace.

Normalizing

Heat to 870- 920 Deg C. Hold until temperature is uniform through the section, soak for 10-15 minutes per 25mm of cross section, and allow to cool in still air.

Stress Relieving

Heat to 550-660 Deg C. Hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air

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S12L14 BRIGHT CARBON STEEL BAR

S12L14 is a premium free machining low tensile, low hardenability carbon steel, with free machining characteristics due to the addition of both Lead and Sulphur. As this material contains Lead, it is not recommended for welding, as it is both problematic and a possible health hazard.
S12L14 is generally only used in the as rolled condition, and then either cold drawn or turned to allow feeding through NC machines. S12L14 can be carburised and electroplated. Core strength will, however, remain low. S12L14 is not recommended for flame, induction or nitride hardening.
Typical applications included lightly stressed components, and machinery parts. Ideally suited for high volume lightly stressed components.

Stocked Sizes - Generally stocked for customer specific requirements. Contact your local branch for further information.

Related Specifications	
Australia	AS 1443 – 1994 12L14
Japan	JIS G 4804 SUM22L
USA	AISI/SAE 12L14 UNS G12144

Chemical Composition		
	Min. %	**Max %**
Carbon	0	0.15
Silicon	0	0.10
Manganese	0.80	1.20
Phosphorous	0.04	0.09
Sulphur	0.25	0.35
Lead	0.15	0.35

Typical Mechanical Properties – Cold Drawn & Turned and Polished (For Guidance Only - indicative)				
	Up to 16mm CD	17-38mm CD	39-63mm CD	Turned & Polished (All Sizes)
Tensile Strength (Mpa)	480-760	430-690	400-630	370-520
Yield Strength (Mpa)	350-590	330-550	290-500	230-310
Elongation in 50mm (%)	7	8	9	17
Hardness (Brinell BHN)	142-225	120-205	115-185	105-155

Standard Bright Tolerance (h11) in mm								
3-6mm	+6-10mm	+10-18mm	+18-30mm	+30-50mm	+50-80mm	+80-120mm	+120-180mm	+180-250mm
+0/-0.075	+0/-0.09	+0/-0.11	+0/-0.13	+0/-0.16	+0/-0.19	+0/-0.22	+0/-0.25	+0/-0.29mm

Annealing
Heat to 890-920 Deg C. Hold until temperature is uniform throughout the section and allow to cool in furnace.
Normalizing
Heat to 900-940 Deg C. Hold until temperature is uniform through the section, soak for 10-15 minutes per 25mm of cross section, and allow to cool in still air.
Stress Relieving
Heat to 500-700 Deg C. Hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air

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1214 BRIGHT CARBON STEEL BAR

1214 is a free machining low tensile, low hardenability carbon steel, with free machining characteristics due to the addition of Sulphur. The addition of Sulphur makes welding of this material difficult.
1214 is generally only used in the as rolled condition, and then either cold drawn or turned to allow feeding through NC machines. 1214 can be carburised achieving surface hardness of around 60HRC in smaller sections, however this will reduce as section size increases. Core strength will, however, remain low. 1214 is not recommended for flame, induction or nitride hardening.
Typical applications included lightly stressed components, and machinery parts.

Stocked Sizes	-	Round Metric	5 mm – 110 mm Ø
		Round Imperial	1/4'' – 5'' Ø
		Hexagon	7/16'' – 75 mm A/F
		Square	1/4'' – 4'' A/F

Related Specifications	
Australia	AS 1443 – 1994 1214
Japan	JIS G 4804 SUM22
USA	AISI 1213 and 1215 ASTM A29/A29M – 91 1213 and 1215 SAE 1213 and 1215 UNS G12130

Chemical Composition		
	Min. %	**Max %**
Carbon	0	0.15
Silicon	0	0.10
Manganese	0.80	1.20
Phosphorous	0.04	0.09
Sulphur	0.25	0.35

Typical Mechanical Properties – Cold Drawn & Turned and Polished (For Guidance Only - indicative)				
	Up to 16mm CD	17-38mm CD	39-63mm CD	Turned & Polished (All Sizes)
Tensile Strength (Mpa)	480-760	430-690	400-630	370-520
Yield Strength (Mpa)	350-590	330-550	290-500	230-310
Elongation in 50mm (%)	7	8	9	17
Hardness (Brinell BHN)	142-225	120-205	115-185	105-155

Standard Bright Tolerance (h11) in mm								
3-6mm	+6-10mm	+10-18mm	+18-30mm	+30-50mm	+50-80mm	+80-120mm	+120-180mm	+180-250mm
+0/-0.075	+0/-0.09	+0/-0.11	+0/-0.13	+0/-0.16	+0/-0.19	+0/-0.22	+0/-0.25	+0/-0.29mm

Annealing
Heat to 890-920 Deg C. Hold until temperature is uniform throughout the section and allow to cool in furnace.
Normalizing
Heat to 900-940 Deg C. Hold until temperature is uniform through the section, soak for 10-15 minutes per 25mm of cross section, and allow to cool in still air.
Stress Relieving
Heat to 500-700 Deg C. Hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air