

BRIGHT FREE CUTTING STEEL – AISI 1215

AISI 1215 Low Carbon Free Cutting Steel, bright drawn or smooth turned with a high and consistent level of machinability but limited strength and ductility.

TYPICAL APPLICATIONS:

Heavily machined components and parts subject to low stress levels, low shock loading, with limited welding and forming

RELATED SPECIFICATIONS:

AS 1443-1994	1214
BS 970-3-1991	230M07
EN 10277	1.0715 11SMn 30
JIS G 4804	SUM22 or SUM23
SAE & UNS	1215 & G12150

TYPICAL SIZE TOLERANCE:

Bright drawn / Smooth turned: **h10**

PLATING: Will electroplate but not suitable for hot dip galvanising

TYPICAL MECHANICAL PROPERTIES:

Finish	Yield Strength MPa	Tensile Strength MPa	Elongation %	Hardness HB
Bright Drawn	290 – 550	400 – 650	7 min	115 – 200
Smooth Turned	230 – 310	370 – 500	17 min	100 – 150

Typical Mechanical Properties are for guidance only.

TYPICAL CHEMICAL ANALYSIS

Carbon	0.07%
Silicon	0.01%
Manganese	1.00%
Phosphorus	0.05%
Sulphur	0.30%

Manganese/Sulphides present assist chip formation; reducing friction and wear on cutting tools, feeds and/or speeds may be greatly increased.

Hot or cold forming is limited due to the high sulphur content.

Not suitable for through hardening flame or induction hardening due to the low carbon content.

Will **Carburise** or **Carbonitride** – Typical surface hardness to **HRC 58**.

Not suitable for nitriding.

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WELDING:

Moderate weldability due to the high sulphur content with is subject to hot shortness and can cause porosity during welding.

Welding when carburised or when carbonitrided is not recommended.

Welding procedure:

Welding electrodes suitable for re-sulphurised steel are recommended.

A pre-heat or post-heat not generally required however, for sections over 50mm pre-heating can be beneficial as can a post-weld stress relieve.

Welding details for guidance only

HEAT TREATMENT:

Forging:

Heat to 1300°C Hold until uniform
Minimum forging temperature 900°C
Air cool on completion

Annealing:

Heat to 890°C – 920°C
Cool in furnace

Normalising:

Heat to 900°C – 940°C
Cool in still air

Stress Relieving:

Heat to 500°C – 700°C
Cool in still air

Heat treatment and Carburising etc, details are for guidance only.

Carburising:

Carburise at 900°C – 920°C

Core Refining (Optional):

Heat to 880°C – 900°C
Quench in water or oil

Case Hardening:

Heat to 760°C – 790°C
Quench in water

Tempering:

Temper at 120°C – 230°C to improve case toughness with minimum effect on its hardness. This will also reduce the possibility of grinding cracks.

Carbonitriding:

Heat to 800°C – 875°C
Quench and Temper as required