Technical Data Sheet

AMS 4590

AMS 4590 is a remarkable nickel aluminum bronze alloy known for its exceptional properties. This high-performance material has mechanical superiority over commercial nickel aluminum bronzes and rival's beryllium copper without the associated industrial hygiene requirements. With high ductility, excellent hardness, sliding properties, impact strength, and impressive creep resistance, this AMS bronze excels in a wide range of applications. It remains stable even in vacuum environments.

Key Features:

- High mechanical strength & hardness
- Good sliding properties
- Withstands high loads
- Corrosion & wear resistant
- High ductility
- Stable in vacuum environments
- Competes with Beryllium Copper
- Heat-treated to achieve best physical properties
- Compliant with AMS 4590

Nominal Composition:

Copper (Cu)	Aluminum (Al)	Iron (Fe)	Nickel (Ni)	Manganese (Mn)	Others
Balance	10.5%	4.8%	5.0%	1.5%	max. 0.5%

Applications:

- Used for a variety of applications in the aerospace industry
- Developed for aircraft components
- Retractable landing gear gears & engine spacer bearings
- Aircraft landing gear bushings
- Gear wheels, wear & guide plates
- Suitable for high loads, abrasion & friction at high temperatures
- Applications in marine, steel & aerospace industries

AMS 4590 is used in various industries. Originally developed for aircraft components such as retractable landing gear gears and engine spacer bearings, its use has expanded to include aircraft landing gear bearings and bushings, tube bending industry tools, gear wheels, and wear and guide plates. Its unique combination of mechanical strength, ductility, and corrosion resistance makes it an ideal choice for a wide range of demanding engineering and manufacturing applications.

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Mechanical Properties (Nominal values)	Extruded	
	Ø ≤ 25.4 mm	Ø > 25.4 mm
Tensile Strength R_m (MPa)	1000	965
Yield Strength $R_{p\ 0.5}$ (MPa)	793	724
Elongation A_5 (%)	8	8
Brinell Hardness (10/3000)	286	286
Compressive Strength R_{mc} (MPa)	1324	1324
Compressive Yield Strength $R_{pc0.1}$ (MPa)	731	689
Shear Strength R_{cm} (MPa)	538	538
Modulus of Elasticity E (GPa)	124	124
Charpy a_k (J)	7	7
Fatigue (100 million cycles) σ_N (MPa)	352	352

Physical Properties:

Density ρ (g/cm^3)	Coefficient of Expansion α ($10^{-6}/K$)	Thermal Conductivity λ (W/m·K)	Electrical Conductivity (% I.A.C.S.)	Specific Heat c_p (J/g·K)
7.45	16	42	8.2	0.45

Machining Parameters:

Operation	Cutting Speed v_c (m/min)	Feed f (mm/rev)	Depth a (mm)	Tool Specification
Milling – Roughing	100 - 150	0.1 - 0.4	up to 4	K10 - K20
Milling – Finishing	90 - 115	0.05 - 0.1	0.1 - 0.5	K10 - K20
Turning – Roughing	150 - 200	0.1 - 0.2	up to 2	K10 - K20
Turning – Finishing	180 - 250	0.05 - 0.1	0.1 - 0.2	K10 - K20

Scan the QR Code to view our machining recommendations:

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