15-5PH Stainless Steel

Typical Applications

Shafts

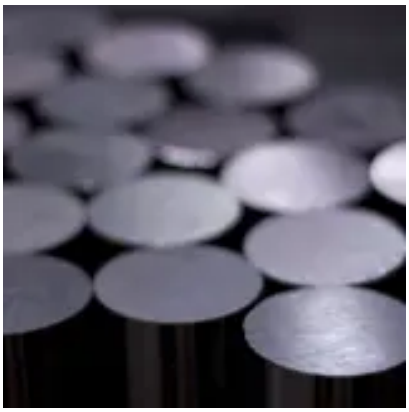
Gears

Aircraft Structural parts

Fittings

Fasteners

Valve parts



AMS 5659 Suppliers & Stockholders

Dynamic Metals is a specialist supplier and stockholder of 15-5 PH stainless steel, supplying aerospace and motorsport industries with certified material to AMS 5659 and AMS 5862. No minimum order quantities.

15-5 PH is a martensitic precipitation hardening stainless steel offering a well-proven combination of high strength, good toughness and reliable corrosion resistance. It was developed specifically to address the transverse property limitations of 17-4 PH — and it is this through-section consistency that makes it the preferred choice for components loaded across multiple axes in service.

Mechanical properties are developed through precipitation heat treatment, with tensile strength ranging from 931 MPa in the H1150 condition through to 1310 MPa at H900. Six discrete ageing conditions allow engineers to select precisely the right balance of strength and ductility for their application — from maximum strength for fasteners and fittings through to improved toughness for structural components requiring damage tolerance.

The alloy is produced by consumable electrode remelting — either vacuum arc remelting (VAR) or electroslag remelting (ESR). This is a specification requirement under both AMS 5659 and AMS 5862, and it is what gives 15-5 PH its characteristically consistent transverse mechanical properties across large section sizes. The copper and niobium additions within the composition further stabilise the heat treatment response, making property development predictable across varying section geometries.

AMS 5659 covers bars, wire, forgings, flash-welded rings and extrusions. AMS 5862 covers sheet, strip and plate up to 4 inches (102 mm) nominal thickness. All material is supplied in the solution heat-treated condition, with age hardening carried out by the customer to their required condition. Full material certification and traceability to the original remelt heat is provided with every shipment.

Related Products

15 5Ph Stainless Steel

17 4Ph

17 7Ph

431 - 1-4057 STAINLESS STEEL

A286 Bar

A286 Sheet

Aermet 100

Ph 13 8Mo

S145 Stainless Steel

A286



Key Features and Benefits

• Tensile strength from 931 MPa (H1150) to 1310 MPa (H900) — six selectable ageing conditions to suit a wide range of application requirements

• Produced exclusively by VAR or ESR remelting — a specification requirement under AMS 5659 and AMS 5862, delivering superior transverse mechanical properties versus conventionally melted grades

• Copper (2.50–4.50%) and niobium additions provide stable, predictable heat treatment response across varying section sizes

• Machines, welds and forms readily — more fabrication-friendly than higher-strength PH grades at comparable strength levels

• Available as bar, wire, forgings and extrusions (AMS 5659) and sheet, strip and plate (AMS 5862) — covering the full range of machined and structural applications

Technical specification

Related Specifications

AMS 5659

UNS S15500

W.Nr 1.4545

AMS 5862

Specific Gravity

7.8 g/cm3

Chemical Composition (WT %)

	Min	Max
C	-	0.07
Si	-	1.00
Mn	-	1.00
P	-	0.030
S	-	0.015
Cr	14.00	15.50
Mo	-	0.50
Ni	3.50	5.50
Cb	5 x %	0.45
Cu	2.50	4.50
Fe	Bal	-

Typical Mechanical Properties in the Annealed Condition

				H900	H925	H1025	H1075	H1100	H1150
0.2% Proof Stress	MPA	Min	-	1172	1069	1000	862	793	724
Tensile Strength	MPA	Min	-	1310	1172	1069	1000	965	931
Elongation	%	Min	L	10	10	12	13	14	16

Elongation	%	Max	T	6	7	8	9	10	11
Reduction of area	%	Min	L	35	38	45	45	45	50
Reduction of area	%	Max	T	20	25	32	33	34	35
Hardness	HB	Min	-	388	375	331	311	302	277

Applications

15-5 PH is specified in applications where reliable strength and corrosion resistance must be maintained across the full section of a component — not just in the longitudinal direction. Typical uses include aircraft structural components, landing gear elements, aerospace fasteners and fittings, gas turbine shafts, gears and valve components in power generation, pump shafts and impellers in chemical processing environments, and drivetrain components in motorsport where fatigue resistance and corrosion resistance are both required.

Performance Characteristics

Six precipitation hardening conditions — H900 through H1150 — give engineers direct control over the strength and toughness balance of finished components. Tensile strength ranges from 1310 MPa at H900 down to 931 MPa at H1150, with 0.2% proof stress from 1172 MPa to 724 MPa across the same range. Longitudinal elongation runs from a minimum of 10% at H925 through to 16% at H1150. Transverse elongation — the figure that most clearly distinguishes 15-5 PH from 17-4 PH — ranges from 6% minimum at H925 to 11% minimum at H1150, measured and certified per AMS 5659. These properties are consistent through large section sizes, a direct consequence of the remelting process mandated by the specification.

Corrosion and Environment

The chromium content of 14.00–15.50% forms a stable passive oxide layer that resists atmospheric and mild chemical corrosion across all heat treatment conditions from H900 through H1150. 15-5 PH performs reliably in the environments typically encountered in aerospace structural applications — humidity, salt atmosphere and mild chemical exposure — without requiring additional surface protection in most cases. In power generation, it is well suited to steam and mild process media environments. Corrosion resistance is meaningfully better than standard martensitic stainless grades, owing to the higher chromium content and the contribution of the copper addition to passive film stability.

Melting and Material Quality

Both AMS 5659 and AMS 5862 require production by consumable electrode remelting — either vacuum arc remelting (VAR) or electroslag remelting (ESR). This is not an optional process enhancement; it is written into the specification. The remelting process eliminates sulphide inclusions that would otherwise reduce transverse ductility and toughness, and it ensures consistent chemistry throughout the full cross-section of every bar, plate and forging. Every heat is subject to macrostructure examination and chemical analysis, with tensile properties verified after precipitation heat treatment. Full certification with traceability to the original remelt heat is supplied with every shipment.

Available Forms

- Bar — AMS 5659
- Plate and sheet — AMS 5862
- Available in solution annealed condition ready for customer age hardening
- No minimum order quantities on stock items
- Suitable for prototype development through to production requirements

Dynamic Metals supplies 15-5 PH to AMS 5659 as bar, wire and forgings, and to AMS 5862 as sheet, strip and plate up to 4 inches (102 mm) nominal thickness. All material is supplied in the solution heat-treated condition, ready for customer age hardening to the required H-condition. No minimum order quantities apply on stock items, making us equally suited to prototype development programmes and full production contracts.

Machining and Processing

15-5 PH should be machined in the solution annealed condition, before age hardening to the required H-condition. The copper addition within the composition aids chip formation, making the alloy more straightforward to machine than many higher-strength PH grades. Dimensional change during ageing is predictable and minimal, which allows complex geometries to be machined close to final dimensions before heat treatment. The alloy is weldable using standard TIG and MIG processes with appropriate filler selection; for joints requiring full mechanical properties, post-weld re-solution treatment and re-ageing is recommended. The niobium addition stabilises the microstructure during welding and reduces the risk of sensitisation. Applicable solution annealing and precipitation hardening parameters are defined within AMS 5659 and AMS 5862.

Advantages of 15-5 PH -

15-5 PH was developed to solve a specific limitation of 17-4 PH — inconsistent transverse properties in larger section sizes. By requiring consumable electrode remelting within the specification itself, the alloy delivers through-section consistency that standard air-melted grades simply cannot match. The six-condition ageing system gives engineers flexibility that most high-strength alloy steels do not offer — a single stock material can be processed to meet a range of different strength and toughness targets. Good fabricability in the annealed condition, combined with reliable corrosion resistance without surface coating, reduces both manufacturing complexity and total component cost for aerospace structural applications. Wide approval by major aerospace OEMs means qualification burden for new programmes is typically lower than for less established grades.

Why Choose Dynamic Metals? -

Dynamic Metals has supplied 15-5 PH to aerospace, power generation and motorsport customers since 1997. We hold certified stock to both AMS 5659 and AMS 5862, supplied with full material certification and traceability to the original VAR or ESR remelt heat. Our team can advise on condition selection, heat treatment parameters and specification requirements. No minimum order quantities apply — we can support development programmes and production contracts alike. AS9100 certified. Prompt UK delivery on standard stock sizes and custom requirements available.



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