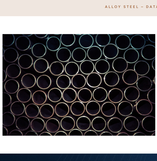
ALLOY STEEL - DATA AND SPECIFICATIONS



OVERVIEW OF ALLOY STEEL

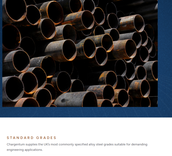
Alloy steel is a high-performance engineering material produced by adding controlled amounts of alloying elements such as chromium, nickel, molybdenum, manganese, and silicon to carbon steel. These additions significantly improve strength, toughness, fatigue resistance, hardenability, wear resistance, and impact performance.

Alloy steel is widely used throughout aerospace, defence, oil and gas, rail, mining, automotive, power generation, construction equipment, marine, and heavy engineering industries where components are subjected to high loads, cyclic stresses, impact forces, and demanding operating environments.

Chargentum supplies alloy steel round bars in hardened and tempered conditions, providing excellent mechanical properties, toughness, and mechanical performance for precision engineering applications throughout the UK.

ALLOY STEEL TYPES

Type	Alternative Designation	Alloy Type	Typical Applications
EN19T Round Bar	605M36T	Manganese-Molybdenum Alloy Steel	Shafts, Axles, Studs, Fasteners
EN19T Round Bar	708M40T	Chromium-Molybdenum Alloy Steel	Hydraulic Rods, Gears, Drive Shafts
EN24T Round Bar	817M40T	Nickel-Chromium-Molybdenum Alloy Steel	Aerospace Components, Transmission Systems



Notes:

- All grades are supplied in hardened and tempered condition (T Condition)
- Excellent fatigue resistance
- Good machinability
- Suitable for induction hardening
- Available with full mill certification

STANDARD GRADES

Chargentum supplies the UK's most commonly specified alloy steel grades suitable for demanding engineering applications.

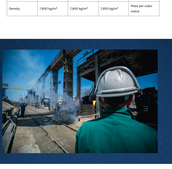
Grade	Alternative Designation	Tensile Strength (MPa)	Yield Strength (MPa)	Typical Applications
EN19T	605M36T	850–1000	680	General Engineering
EN19T	708M40T	850–1000	680	Hydraulic and Mechanical Equipment
EN24T	817M40T	850–1000	680–850	Aerospace and High-Performance Engineering

CHEMICAL COMPOSITION (TYPICAL % BY MASS)

Element	EN19T	EN19T	EN19T	Function
Carbon (C)	0.30–0.45	0.36–0.44	0.36–0.44	Strength and hardness
Silicon (Si)	0.10–0.35	0.10–0.35	0.10–0.35	Deoxidation
Manganese (Mn)	1.30–1.70	0.60–0.95	0.45–0.70	Toughness
Chromium (Cr)	Residual	0.80–1.40	0.90–1.40	Wear resistance
Nickel (Ni)	Residual	Residual	1.30–1.80	Toughness
Molybdenum (Mo)	Residual	0.20–0.35	0.20–0.35	Hardenability
Sulphur (S)	≤0.05	≤0.05	≤0.05	Controlled in medium
Phosphorus (P)	≤0.05	≤0.05	≤0.05	Controlled in medium

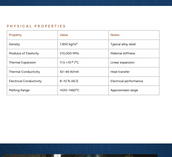
MECHANICAL PROPERTIES

Property	EN19T	EN19T	EN24T	Notes
Yield Strength	680 MPa	680 MPa	680–850 MPa	Permanent deformation point
Tensile Strength	850–1000 MPa	850–1000 MPa	850–1000 MPa	Maximum load before failure
Elongation	13–16%	13–16%	13–16%	Ductility before fracture
Reduction of Area	45%	45%	45%	Plastic deformation
Hardness	248–302 HB	248–302 HB	248–302 HB	Hardened and tempered
Modulus of Elasticity	210,000 MPa	210,000 MPa	210,000 MPa	Material stiffness
Density	7,850 kg/m³	7,850 kg/m³	7,850 kg/m³	Mass per cubic metre



DELIVERY CONDITIONS

Condition	Description
Hardened & Tempered (T)	Standard supply condition
Hot Rolled	Standard mill finish
Peeled	Improved dimensional accuracy
Turned	Machined finish
Ground	Precision finish
Precision Ground	Tight tolerance applications
Ultrasonically Tested	Available on request

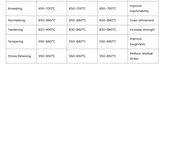


PHYSICAL PROPERTIES

Property	Value	Notes
Density	7,850 kg/m³	Typical alloy steel
Modulus of Elasticity	210,000 MPa	Material stiffness
Thermal Expansion	11.5 ×10⁻⁶ /°C	Linear expansion
Thermal Conductivity	42–48 W/mK	Heat transfer
Electrical Conductivity	8–10 % IACS	Electrical performance
Melting Range	1425–1460°C	Approximate range

STANDARDS & SPECIFICATIONS

Grade	BS Designation	Equivalent	AISI/SAE Equivalent	DIN Equivalent
EN19T	605M36T	817M40	Similar Engineering Grade	1.7218
EN19T	708M40T	42CrMo4	4140	1.7225
EN24T	817M40T	34CrNiMo6	4340	1.6582



HEAT TREATMENT INFORMATION

Process	EN19T	EN19T	EN24T	Purpose
Annealing	650–700°C	650–700°C	650–700°C	Improve machinability
Normalising	850–880°C	850–880°C	850–880°C	Grain refinement
Hardening	820–850°C	830–860°C	830–860°C	Increase strength
Tempering	550–660°C	550–660°C	550–660°C	Improve toughness
Stress Relieving	550–650°C	550–650°C	550–650°C	Reduce residual stress

METAL TYPES & APPLICATIONS

EN19T (708M40T) ALLOY STEEL ROUND BAR

EN19T (708M40T) is a manganese molybdenum alloy steel supplied in the hardened and tempered condition. It offers an excellent combination of tensile strength, toughness, fatigue resistance and machinability, making it suitable for a wide range of engineering applications. EN19T is commonly used for shafts, axles, studs, bolts, couplings, gears, and general purpose components where a balanced strength to toughness ratio is required without the additional alloy content found in EN19T and EN24T.

The grade responds well to machining and heat treatment processes and is widely specified across the automotive, oil, agricultural, construction equipment, and manufacturing sectors. Chargentum supplies EN19T round bars in a comprehensive range of diameters, delivered throughout the UK.

Diameter (mm)	Weight (kg/m)	Length (mm)	Condition	Grade	Typical Applications
50	15.41	6000-6000	T	EN19T	Bushing
25	3.85	5000-6000	T	EN19T	Fasteners
20	2.47	6000-6000	T	EN19T	Shafts
16	1.58	6000-6000	T	EN19T	Pins
40	9.87	5000-6000	T	EN19T	Axles
45	12.48	5000-6000	T	EN19T	Couplings
50	15.41	5000-6000	T	EN19T	Machine Parts
55	18.66	5000-6000	T	EN19T	Drive Components
60	22.20	5000-6000	T	EN19T	Gear Blanks
65	26.05	5000-6000	T	EN19T	Shafts
70	30.21	5000-6000	T	EN19T	Engineering Components
75	34.69	5000-6000	T	EN19T	Heavy Machinery
80	39.48	5000-6000	T	EN19T	Industrial Equipment
85	44.59	5000-6000	T	EN19T	Mechanical Assemblies
90	49.94	5000-6000	T	EN19T	Large Components
95	55.84	5000-6000	T	EN19T	Power Transmission
100	61.65	5000-6000	T	EN19T	Large Shafts
110	74.59	5000-6000	T	EN19T	Structural Machinery
125	96.31	5000-6000	T	EN19T	Heavy Components
140	120.87	5000-6000	T	EN19T	Large Engineering Equipment
150	138.79	5000-6000	T	EN19T	Forged Components
160	157.93	5000-6000	T	EN19T	Heavy Machinery
180	199.78	5000-6000	T	EN19T	Large Engineering Projects
200	246.60	5000-6000	T	EN19T	Mining Equipment
250	385.31	5000-6000	T	EN19T	Heavy Industrial Applications

BUY EN19T (708M40T) ALLOY STEEL ROUND BAR

EN19T (708M40T) ALLOY STEEL ROUND BAR

EN19T (708M40T) is a chromium molybdenum alloy steel supplied in the hardened and tempered condition. It offers an excellent combination of tensile strength, toughness, fatigue resistance and machinability, making it suitable for a wide range of engineering applications.

EN19T is commonly specified for hydraulic piston rods, drive shafts, gears, spindles, shafts, bolts, couplings, mining equipment, and heavy engineering components. The chromium and molybdenum content provides improved hardenability and wear performance compared to EN19T, making it suitable for applications involving cyclic loading and higher stress levels.

Chargentum supplies EN19T alloy steel round bar in a comprehensive range of diameters with nationwide UK delivery.

Diameter (mm)	Weight (kg/m)	Length (mm)	Condition	Grade	Typical Applications
20	2.47	6000-6000	T	EN19T	Hydraulic Components
25	3.85	6000-6000	T	EN19T	High Tensile Fasteners
30	5.55	6000-6000	T	EN19T	Precision Shafts
35	7.55	6000-6000	T	EN19T	Engineering Pins
40	9.87	6000-6000	T	EN19T	Drive Shafts
45	12.48	6000-6000	T	EN19T	Couplings
50	15.41	6000-6000	T	EN19T	Spindles
55	18.66	6000-6000	T	EN19T	Hydraulic Rods
60	22.20	6000-6000	T	EN19T	Gear Components
65	26.05	6000-6000	T	EN19T	Industrial Components
70	30.21	6000-6000	T	EN19T	Mechanical Equipment
75	34.69	6000-6000	T	EN19T	Mining Equipment
80	39.48	6000-6000	T	EN19T	Heavy Machinery
85	44.59	6000-6000	T	EN19T	Drive Systems
90	49.94	6000-6000	T	EN19T	Power Transmission
95	55.84	6000-6000	T	EN19T	Engineering Components
100	61.65	6000-6000	T	EN19T	Heavy Engineering
110	74.59	6000-6000	T	EN19T	Power Generation
125	96.31	6000-6000	T	EN19T	Oil & Gas Equipment
140	120.87	6000-6000	T	EN19T	Industrial Systems
150	138.79	6000-6000	T	EN19T	Heavy Machinery
180	157.93	6000-6000	T	EN19T	Structural Equipment
180	199.78	6000-6000	T	EN19T	Mining Components
200	246.60	6000-6000	T	EN19T	Heavy Industrial Equipment

220	298.39	3000-6000	T	EN19T	Equipment
250	385.31	3000-6000	T	EN19T	Large Industrial Equipment
300	554.85	3000-6000	T	EN19T	Forged Components
350	755.62	3000-6000	T	EN19T	Heavy Engineering Projects
400	986.40	3000-6000	T	EN19T	Mining Systems
450	1248.42	3000-6000	T	EN19T	Industrial Machinery
500	1541.25	3000-6000	T	EN19T	Heavy Duty Applications

BUY EN19T (709M40T) ALLOY STEEL ROUND BAR

EN24T (817M40T) ALLOY STEEL ROUND BAR

EN24T (817M40T) is a high-strength nickel-chromium-molybdenum alloy steel supplied in the hardened and tempered condition. It offers an outstanding combination of tensile strength, toughness, fatigue resistance, impact resistance, and hardenability, making it one of the most versatile engineering steels available.

The addition of nickel provides superior toughness and shock resistance compared with EN19T, while chromium and molybdenum enhance wear resistance and hardenability. EN24T is frequently specified for aerospace components, transmission systems, highly stressed shafts, gears, heavy-duty fasteners, defence equipment, motorsport applications, marine engineering, and critical load-bearing components.

Chargentum supplies EN24T round bar throughout the UK with mill certification, and nationwide delivery.

Diameter (mm)	Weight (kg/m)	Length (mm)	Condition	Grade	Typical Application
20	2.47	3000-6000	T	EN24T	Aerospace Components
25	3.85	3000-6000	T	EN24T	Precision Engineering
30	5.55	3000-6000	T	EN24T	High Strength Shafts
35	7.55	3000-6000	T	EN24T	Aircraft Components
40	9.87	3000-6000	T	EN24T	Gear Shafts
45	12.49	3000-6000	T	EN24T	Couplings
50	15.42	3000-6000	T	EN24T	Transmission Systems
55	18.66	3000-6000	T	EN24T	Aerospace Fittings
60	22.20	3000-6000	T	EN24T	Aircraft Components
65	26.05	3000-6000	T	EN24T	High Load Components
70	30.21	3000-6000	T	EN24T	Engineering Systems
75	34.69	3000-6000	T	EN24T	Motorsport Components
80	39.46	3000-6000	T	EN24T	Marine Components
85	44.55	3000-6000	T	EN24T	Defence Components
90	49.94	3000-6000	T	EN24T	Heavy Duty Systems
95	55.64	3000-6000	T	EN24T	Precision Components
100	61.65	3000-6000	T	EN24T	Heavy Duty Shafts
110	74.59	3000-6000	T	EN24T	Power Transmission
125	96.33	3000-6000	T	EN24T	Marine Engineering
140	120.87	3000-6000	T	EN24T	Aerospace Structures
150	138.72	3000-6000	T	EN24T	Extreme Load Applications
160	157.83	3000-6000	T	EN24T	Defence Equipment
180	199.78	3000-6000	T	EN24T	Heavy Transmission Systems
200	246.60	3000-6000	T	EN24T	Critical Engineering Components
220	298.39	3000-6000	T	EN24T	Marine Systems
250	385.31	3000-6000	T	EN24T	Heavy Industrial Equipment
300	554.85	3000-6000	T	EN24T	Forged Components
350	755.62	3000-6000	T	EN24T	Aerospace Tooling
400	986.40	3000-6000	T	EN24T	Defence Applications
450	1248.42	3000-6000	T	EN24T	Marine Equipment
500	1541.25	3000-6000	T	EN24T	Heavy Engineering Projects

BUY EN24T (817M40T) ALLOY STEEL ROUND BAR

DOWNLOAD FULL ALLOY STEEL DATASHEET

Download the complete technical datasheet for Alloy steel including:

- Chemical and mechanical properties
- Delivery conditions, tolerances, and finishes
- Full dimension, weight, and grade tables for round bars

DOWNLOAD FULL ALLOY STEEL DATASHEET

EXPLORE MORE ABOUT CHARGENTUM'S STRUCTURAL STEEL, ENGINEERING STEEL, ALLOY STEEL, PERFORATED SHEETS, SEAMLESS TUBES, TOOL STEEL, STAINLESS STEEL, BRASS, COPPER, ALUMINIUM, GREEN STEEL AND METAL GRADES & SPECIFICATIONS

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