



16Mn steel

PROPERTTIES, APPLICATIONS AND ADVANTAGES

16Mn is a kind of high strength low alloy structural steel, the carbon content of 0.12% -0.20% to join main alloying elements manganese, silicon, vanadium, niobium, and titanium.

The range of 16Mn pipe sizes that may be examined by each method shall be subjected to the limitations in the scope of the respective practice.

16Mn Steel is a carbon-manganese steel, carbon content of 0.16%, the yield point is equal to 343MPa (strength level belonging to 343MPa). Less the 16Mn steel alloy content, good weldability, and generally do not have to warm-up before welding.

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What is 16Mn?

What is 16Mn?

16Mn is a low-alloy high-strength structural steel that contains carbon, manganese, silicon, and traces of other alloys such as phosphorus and sulfur. It has good weldability and formability, as well as high toughness and strength, making it a popular choice for various structural applications.

Features and properties of 16Mn

High strength:

16Mn has a higher tensile strength and yield strength than ordinary carbon structural steels, making it an ideal material for high-stress structural applications.

Excellent toughness

16Mn has excellent toughness, allowing it to withstand impact loads and resist deformation.

Corrosion resistance:

16Mn has good corrosion

Good weldability:

16Mn has good weldability, allowing it to be easily welded to other materials using conventional welding methods.

resistance, making it suitable for use in outdoor and marine environments.

Affordable:

Despite its superior properties, 16Mn remains an

Good formability:

16Mn can be easily shaped and formed using various fabrication techniques, including cold working and hot rolling.

affordable option for structural steel applications.



In summary,

16Mn is a low-alloy high-strength structural steel with superior strength, good weldability and formability, excellent toughness, good corrosion resistance, and affordability. Its combination of properties makes it a popular choice in various industries such as construction, machinery, and transportation.



What is 16Mn?

WHAT'S THE DIFFERENCE BETWEEN 16MN AND Q345?

16Mn and Q345 are both grades of steel commonly used in structural applications, with the main difference lying in their chemical composition and mechanical properties:

16Mn:

It is a low-alloy steel with a carbon content of around 0.16%.

Defined with a consistent composition under the old standard.

Has a fixed yield strength of 343 MPa and lacks the detailed sub-grade distinctions of Q345.

Primarily used for welded structures such as bridges, ships, vehicles, boilers, and pressure vessels.

Tensile strength typically ranges from 490 MPa to 660 MPa.

Q345:

Q345 is classified into three quality grades: Q345A, Q345B, and Q345C.

It is a low-alloy, high-strength structural steel with additional elements like Nb, V, and Ti compared to 16Mn.

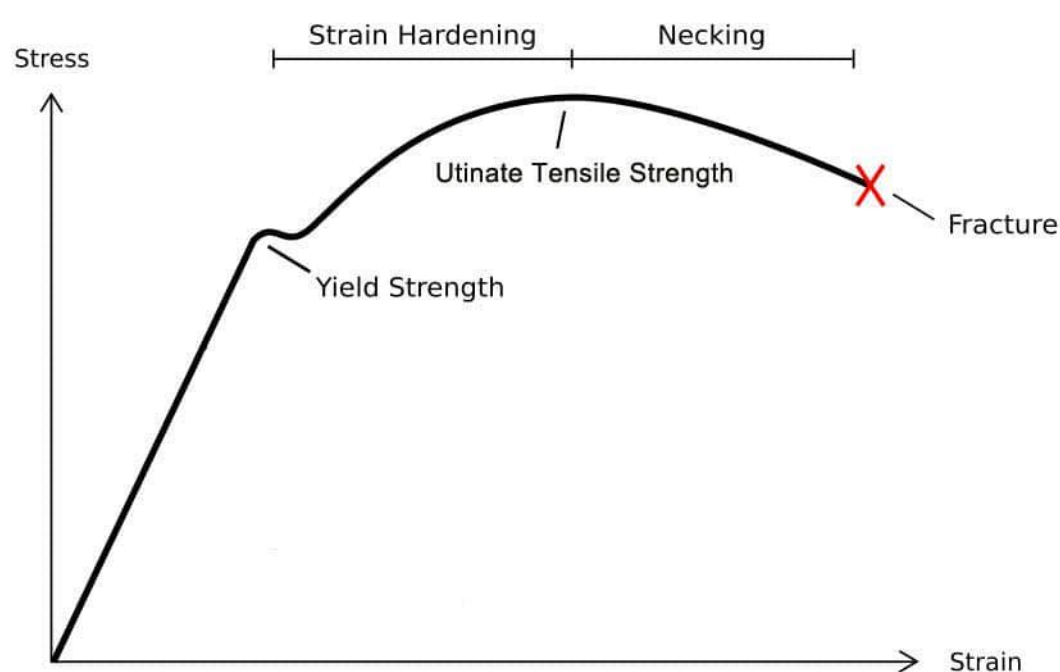
Offers five quality grades (Q345A, Q345B, Q345C, Q345D, Q345E), with slight variations in phosphorus, sulfur, and alloying elements (e.g., vanadium, niobium, titanium) to enhance properties like toughness or low-temperature performance. For example, Q345E has stricter impurity controls and added elements for better cold-weather resilience.

It is widely used in construction and engineering structures due to its higher strength and better performance.

Starts at 345 MPa yield strength (hence the name "Q345," where "Q" stands for yield in Chinese). Sub-grades like Q345D and Q345E offer improved toughness at lower temperatures, tested via Charpy V-notch impact tests, which 16Mn didn't specify.

Tensile strength typically ranges from 470 MPa to 630 MPa.

Mechanical property for Q345B low alloy structural steel



Data of 16Mn Steel

Below is a detailed compilation of data on 16Mn steel, focusing on its chemical composition, mechanical properties, and other relevant specifications.

Chemical compositions (%) of 16Mn

The chemical composition of 16Mn steel is as follows:

Elements	Data
Carbon	0.12-0.20
Silicon	0.20-0.60
Manganese	1.20-1.60
Chromium	—
Molybdenum	—

Mechanical Properties of 16Mn

Properties	Data
Tesile ób/Mpa	470-660
Yield ós/Mpa(min)	275-345
Elongation δ5(%)(min)	21
SAFA Aku/J(min)	-
Brinel hardness HBS(max)	-

The W.T. tolerance of 16Mn

W.T.(S)		Tolerance of W.T.
<3.5		+15%(+0.48mm min)
		-10%(+0.32mm min)
3.5-20		+15%,-10%
>20	D<219	±10%
	D≥219	+12.5%,-10%

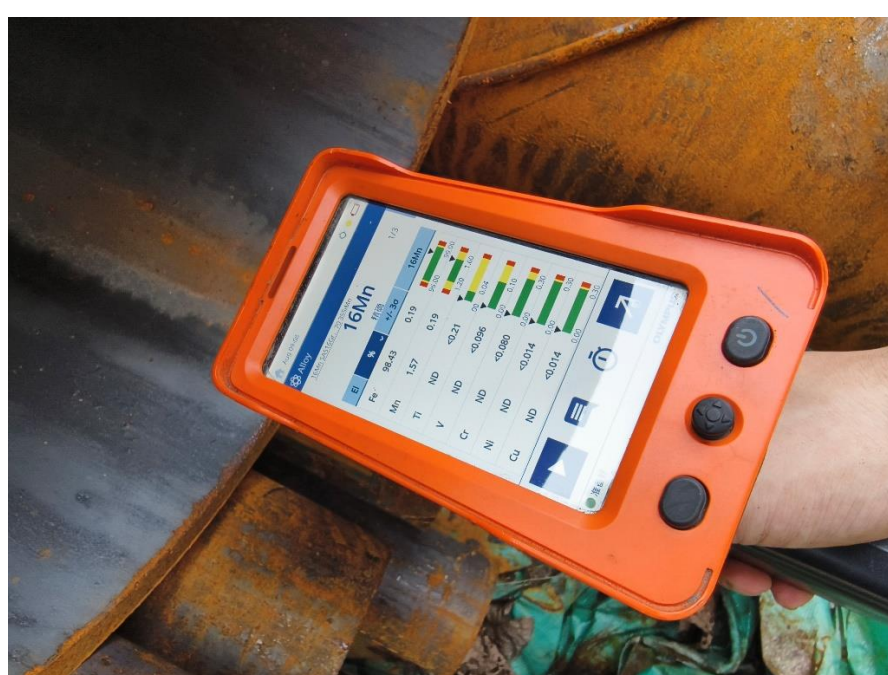
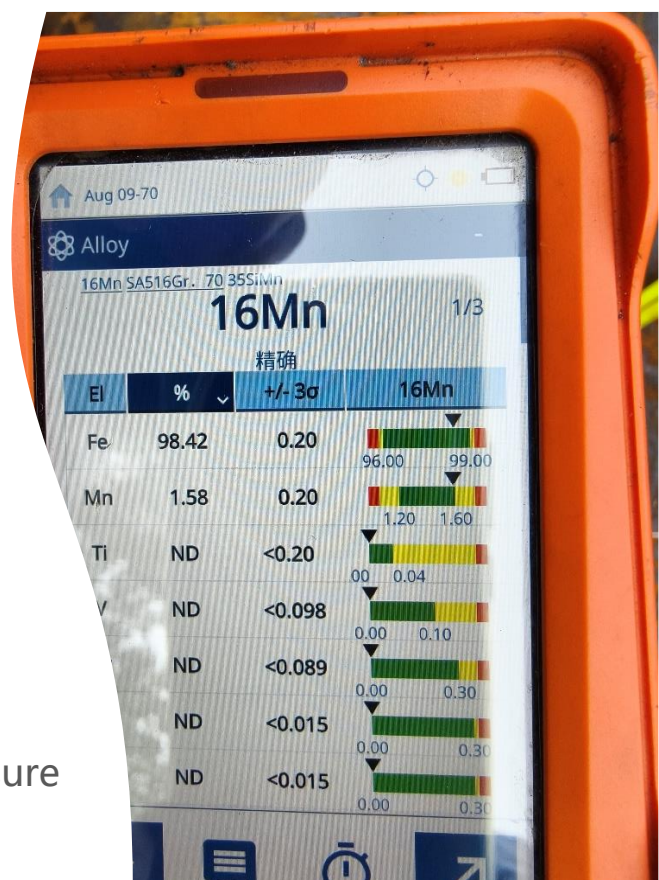


PMI of 16Mn Steel

Positive Material Identification (PMI) is a non-destructive testing method used to verify the chemical composition of materials, ensuring they meet specified standards. For 16Mn steel, PMI is particularly valuable in confirming its alloy content, especially for export purposes where compliance with international standards (e.g., Q345 equivalents like S355J0 or A633) is critical.

PMI involves using portable devices like X-ray fluorescence (XRF) or optical emission spectrometry (OES) to analyze the elemental composition of 16Mn steel on-site or in the lab. This ensures the material matches the expected chemical profile, preventing mix-ups or quality issues in applications like pressure vessels, machinery, or construction.

For 16Mn steel, PMI focuses on identifying key elements such as carbon (C), manganese (Mn), silicon (Si), and trace alloying elements, aligning with its designation as a low-alloy, high-strength structural steel under the old Chinese standard GB 1591-1988 (now updated to Q345 in GB/T 1591-2008).



Why PMI Matters for 16Mn Steel

For your export business, emphasizing PMI in your PPT brochure highlights quality assurance:

Compliance: Confirms 16Mn matches international equivalents (e.g., S355J0, A441), reassuring global clients.

Reliability: Prevents material mix-ups, critical for safety in applications like pressure vessels or structural components.

Traceability: Provides documented proof of quality, enhancing trust with customers in industries like energy or construction.



PMI of 16Mn Steel

PMI report

Name wt 1		Class Alloy_FP	Date 28/08/2024	Time 11:47:05	Duration 13.1 s
Element	Fe %	Mn %	Cr %	Cu %	Ni %
	98.34	1.49	0.09	0.04	0.03
±	0.136	0.020	0.005	0.005	0.007
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 2		Class Alloy_FP	Date 28/08/2024	Time 11:47:33	Duration 11.1 s
Element	Fe %	Mn %	Cr %	Cu %	Ni %
	98.41	1.41	0.11	0.04	0.03
±	0.150	0.022	0.006	0.006	0.007
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 3		Class Alloy_FP	Date 28/08/2024	Time 11:47:46	Duration 9.1 s
Element	Fe %	Mn %	Cr %	Cu %	
	98.44	1.44	0.09	0.04	
±	0.166	0.024	0.006	0.007	
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 4		Class Alloy_FP	Date 28/08/2024	Time 11:47:57	Duration 8.1 s
Element	Fe %	Mn %	Cr %	Cu %	Ni %
	98.32	1.51	0.10	0.05	0.03
±	0.174	0.026	0.007	0.007	0.008
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 5		Class Alloy_FP	Date 28/08/2024	Time 11:48:23	Duration 11.1 s
Element	Fe %	Mn %	Cr %	Cu %	Ni %
	98.30	1.54	0.10	0.04	0.03
±	0.146	0.022	0.006	0.005	0.007
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 6		Class Alloy_FP	Date 28/08/2024	Time 11:48:37	Duration 8.1 s
Element	Fe %	Mn %	Cr %	Ni %	Cu %
	98.31	1.48	0.11	0.06	0.04
±	0.176	0.026	0.007	0.009	0.007
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 7		Class Alloy_FP	Date 28/08/2024	Time 11:48:46	Duration 7.1 s
Element	Fe %	Mn %	Cr %	Cu %	Ni %
	98.33	1.49	0.10	0.05	0.03
±	0.188	0.028	0.007	0.008	0.009
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					
Name wt 8		Class Alloy_FP	Date 28/08/2024	Time 11:48:55	Duration 7.1 s
Element	Fe %	Mn %	Cr %	Ni %	Cu %
	98.37	1.42	0.10	0.05	0.05
±	0.189	0.027	0.007	0.008	0.007
Grades: 1141/44 (0.00), TS O-2 (0.00)					
Reference:					

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Reasonable shape of 16Mn Steel

The 16Mn steel is a high-strength low-alloy (HSLA) structural steel widely used in construction, pressure vessels, and mechanical applications. Choosing the right shape of 16Mn steel is crucial for optimizing strength, weight, and performance in different industrial uses.

16Mn Steel Plates

16Mn steel plates are flat, rectangular sheets of low-alloy, high-strength structural steel, originally defined under China’s GB 1591-1988 standard and now classified as Q345 in GB/T 1591-2008. Known for their strength, weldability, and versatility, these plates are a popular choice for structural and industrial applications worldwide.



Specifications of 16Mn Steel Plates

Parameter	Details
Thickness	6mm – 100mm (varies by supplier)
Width	1500mm – 4000mm (typical range)
Length	3000mm – 18000mm (customizable)
Surface Finish	Hot-rolled, normalized, or annealed
Delivery Condition	Cold/hard (BK), stress-relieved (BKS), normalized (NBK), annealed (GBK)
Weight	Calculated as: Thickness (mm) × Width (m) × Length (m) × 7.85 (t/m³)



Reasonable shape of 16Mn Steel

Customization: Plates can be cut, bent, or rolled into specific shapes per client requirements.

Standards: Equivalent to S355J0 (EN), A441/A633 (ASTM), St52-3U (DIN), SS490B (JIS).

Advantages of 16Mn Steel Plates

- High Strength: Supports heavy loads, ideal for structural frameworks.
- Good Weldability: Joins easily without preheating in most cases (preheat for thick plates).
- Excellent Formability: Can be bent, rolled, or cut into complex shapes.
- Corrosion Resistance: Suitable for outdoor use with proper treatment.
- Cost-Effective: Affordable alternative to higher-alloy steels.



Applications of 16Mn steel plates

16Mn steel plates are widely used across industries due to their versatility:

Industry	Applications
Construction	Factory buildings, bridges, civil structures
Pressure Vessels	Shells for medium/low pressure vessels, oil tanks
Machinery	Bases, frames, mining equipment components
Transportation	Structural parts for vehicles, railways
Energy	Boiler plates, power plant structures



Reasonable shape of 16Mn Steel

16Mn Steel Pipes

16Mn steel pipes are seamless, hollow sections made from low-alloy, high-strength structural steel, originally specified under China’s GB 1591-1988 standard and now classified as Q345 in GB/T 1591-2008. Renowned for their strength, weldability, and pressure resistance, these pipes are widely used in industries requiring robust piping solutions.



Classification, code

- a) Hot rolled steel pipe, codenamed WH;
- b) Cold drawn steel pipe, codenamed WC.

Delivery status

The steel tubes shall be delivered in a heat-treated condition.

Length: 5800mm; 6000mm; 6096mm; 7315mm; 11800mm; 12000mm; and so on.

Max length: 16000mm, also U bending can be offered.

Note

This inventory is part of the inventory, demand and other models in stock or order materials, please contact us.



Reasonable shape of 16Mn Steel



Specifications of 16Mn Steel Pipes

Parameter	Details
Type	Seamless (welded options less common)
Outer Diameter (OD)	Φ219mm – Φ380mm (e.g., stock sizes); customizable up to larger diameters
Wall Thickness	15mm – 16mm (stock examples); varies by request
Length	5800mm – 16000mm (standard range, with U-bending options)
Surface Finish	Hot-rolled, normalized, or annealed
Delivery Condition	Cold/hard (BK), cold/soft (BKW), stress-relieved (BKS), normalized (NBK), annealed (GBK)

Advantages of 16Mn Steel Pipes

- High Strength: Resists deformation under heavy loads or pressure.
- Seamless Design: Eliminates weak points, ideal for fluid transport.
- Weldability: Joins easily in field applications (preheating advised for thick walls).
- Corrosion Resistance: Suitable for harsh environments with proper coating.
- Cost-Effective: Affordable high-performance option.

Applications of 16Mn Steel Pipes

16Mn steel pipes excel in industries requiring reliable piping:

Industry	Applications
Energy	Heater tubes, steam headers, pipelines
Pressure Vessels	Medium/low pressure vessels, oil tanks
Chemical Processing	Gas and chemical transport lines
Construction	Structural supports, piling pipes
Transportation	Fluid lines in railways, vehicles

Example: Used as seamless conduits in oil refineries or as structural piles in construction.



Reasonable shape of 16Mn Steel

16Mn fittings

16Mn steel fittings are components used to connect, redirect, or terminate 16Mn steel pipes or other compatible piping systems. Made from the same low-alloy, high-strength steel as 16Mn pipes and plates, these fittings offer excellent strength, weldability, and durability, making them suitable for demanding industrial applications.



Advantages of 16Mn Steel Fittings

Strength: High yield (343 MPa) and tensile strength (470–660 MPa) for robust connections.

Weldability: Easily welded to 16Mn pipes, no preheating needed in standard conditions.

Durability: Resists wear and deformation in high-stress environments.

Corrosion Resistance: Suitable for outdoor use with coatings.

Cost-Effective: Affordable compared to higher-alloy alternatives.



Reasonable shape of 16Mn Steel

Types of 16Mn Steel Fittings

Elbows: Angles: 45°, 90°, 180°. Use: Changes pipe direction. Example: 90° butt-weld elbow for pipeline turns.	Reducers: Types: Concentric, eccentric. Use: Adjusts pipe diameter. Example: Concentric reducer for pressure vessel inlets.	Flanges: Types: Weld neck, slip-on, blind. Use: Connects pipes to equipment.
Tees: Types: Equal, reducing. Use: Branches pipelines. Example: Equal tee for uniform flow splitting.	Caps: Use: Seals pipe ends. Example: Butt-weld cap for temporary closures.	Couplings: Use: Joins two pipes. Example: Socket-weld coupling for small-diameter lines.



Applications

16Mn steel fittings are integral to systems requiring reliable connections:

Industry	Applications
Energy	Pipelines, steam headers, boiler systems
Pressure Vessels	Vessel piping, oil tank connections
Construction	Structural piping, piling systems
Chemical Processing	Gas and chemical transport lines
Machinery	Hydraulic systems, equipment piping

- Example: Butt-weld elbows and tees in oil refinery pipelines.





Get in Touch

We would absolutely love to hear from you if you are interested in our products or would like to work with us. Even if you just have a comment or suggestion, we would be delighted to hear from you. Please get in touch for more detailed information.

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