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Definition and Applications

API 5L X46

- ALLLAND Production Standards Overview

1. Definition

The American Petroleum Institute (API) developed the API 5L X46 pipe grade for transporting oil, gas, and other fluids. In the API 5L standard, X46 belongs to the X series of pipes, where “X” refers to the yield strength level, and X46 indicates a minimum yield strength of 46,000 psi (about 317 MPa). It falls between traditional carbon steel and modern high-strength microalloyed steel, making it suitable for medium-pressure fluid transportation.

2. ALLLAND API 5L X46 Steel Pipe Dimensions

Parameters	Dimensions
O.D.	21.3 mm – 1420 mm（0.5" – 56"）
WT	2.0 mm – 50 mm（0.08" – 2.0"）
Length	4 m – 12 m（13' – 40'）
Material	Carbon steel / Low-alloy high-strength steel
Process	Seamless/ ERW/ SSAW/ LSAW
Connection	Butt-weld/ Socket-weld/ Threaded

3. Application

API 5L X46 steel pipe is primarily used for medium-to-high-pressure oil and gas transmission pipelines, long-distance crude oil and natural gas gathering and transportation systems, as well as municipal gas and industrial water supply projects. Due to its high yield strength and excellent toughness, this steel grade is also widely utilized in water conservancy projects, pipeline infrastructure construction, and certain offshore engineering projects, maintaining stable and safe operational performance under complex working conditions and high-pressure environments.

Critical Tolerances

Item	Size Range	Tolerance
OD	≤ 60.3 mm	±0.5 mm
	>60.3 mm ~ ≤168.3 mm	±0.75%
	>168.3 mm ~ ≤610 mm	±0.75%
	>610 mm	±0.75%
WT	≤ 15.0 mm	-12.5% / +Unspecified
	>15.0 mm	-10% / +Unspecified
LENGTH	Random length	4.88 m – 12.2 m
	Exact length	±500 mm
	Double random length	10.7 m – 12.2 m

Chemical and Mechanical Properties of API 5L X46

1. Chemical Composition (wt%, max)

Element	C	Mn	P	S	Si	V	Nb	Ti	CE
Content (%)	≤ 0.26	≤ 1.40	≤ 0.030	≤ 0.030	≤ 0.45	≤ 0.05	≤ 0.05	≤ 0.04	≤ 0.40

2. Mechanical Properties

Item	Required Value
Yield Strength	≥320 MPa (46,400 psi)
Tensile Strength	435 – 760 MPa (63,000 – 110,000 psi)
Elongation	≥ 21%
Impact Toughness	PSL2 Mandatory (CVN test)
Hardness	≤ 22 HRC（Control is recommended.）
Service Temperature	-20°C ～ 350°C

Testing Requirements

First, chemical composition analysis is conducted on each batch of steel, with strict controls on carbon content (≤0.26%), manganese content (≤1.40%), sulfur and

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奥蓝德钢管
ALLLAND STEEL PIPE