API 5DP Drill Pipe Grade Chart: E75, X95, G105 and S135

Technical comparison of common API 5DP drill-pipe-body grades by yield strength, tensile strength, general application meaning and grade selection logic.

Standard focus API 5DP / ISO 11961 drill-pipe-body grade values	Grades covered E75, X95, G105, S135	Selection principle Strength should be read together with torque, fatigue exposure, well profile and connection condition

1. Grade Comparison Table

The main mechanical difference between E75, X95, G105 and S135 drill pipe is the specified yield and tensile strength of the drill pipe body. These values are the core data points used when comparing API 5DP drill pipe grades.

Grade	Minimum Yield Strength	Maximum Yield Strength	Minimum Tensile Strength	General Application Meaning
E75	75,000 psi / 517 MPa	105,000 psi / 724 MPa	100,000 psi / 689 MPa	Conventional drilling, moderate hook load, controlled well profile and lower fatigue exposure.
X95	95,000 psi / 655 MPa	125,000 psi / 862 MPa	105,000 psi / 724 MPa	Transition grade when E75 strength margin is limited but extreme high-strength performance is not required.
G105	105,000 psi / 724 MPa	135,000 psi / 931 MPa	115,000 psi / 793 MPa	Common high-strength option for deeper wells, higher tensile load and directional sections with controlled fatigue management.
S135	135,000 psi / 931 MPa	165,000 psi / 1138 MPa	145,000 psi / 1000 MPa	High-strength grade for high-tension, high-torque, extended-reach and complex well profiles.

Strength reading: E75 begins at 75 ksi yield strength, X95 at 95 ksi, G105 at 105 ksi and S135 at 135 ksi. The higher number increases pipe-body tensile margin, but field suitability still depends on the whole drill string system, not the pipe body alone.

2. Why a Higher Grade Is Not Always Better

A higher drill pipe grade provides a higher minimum yield strength, but it does not automatically reduce every drilling risk. In actual service, the drill pipe body works under combined tension, torque, internal pressure and repeated bending. Severe dogleg, long horizontal displacement, heavy mud weight and high rotary torque can shift the limiting factor from static yield strength to fatigue behavior, connection capacity or tool-joint condition.

Technical Factor	Engineering Meaning
Pipe-body strength	Improves tensile load margin, but does not remove thread, shoulder, weld-zone or fatigue risk.
Connection capacity	Must be compatible with the pipe body grade; the connection can become the weak point even when the body grade is high.
Fatigue exposure	Doglegs, horizontal sections and cyclic bending can control service life before the pipe reaches yield strength.
Inspection condition	Thread condition, hardbanding, handling marks, corrosion pits, NDT records and hardness control affect field reliability.

3. Quick Grade Selection Summary

The following summary gives a practical reading of grade ranges by drilling condition. It is not a replacement for drill string design; it shows how grade strength is commonly interpreted together with load, well profile and fatigue exposure.

Typical Drilling Condition	Likely Grade Range	Technical Interpretation
Vertical wells with moderate hook load and controlled trajectory	**E75 / X95**	Suitable where tensile load, rotary torque and bending cycles remain moderate.
Deeper wells or moderate directional sections	**X95 / G105**	Used when the drill string needs higher load margin than E75 but not necessarily the full S135 strength level.
Deep wells with higher hook load and managed fatigue exposure	**G105**	Often read as a balanced high-strength grade when strength, fatigue behavior and connection condition are evaluated together.
High-torque, extended-reach or long horizontal sections	**S135**	Considered when tensile and torsional margins are critical and inspection, connection and handling condition are tightly controlled.

Reading note: E75 suits controlled load conditions; X95 is a transition grade; G105 is often the balanced high-strength option; S135 provides the highest listed strength in this group but requires close attention to fatigue exposure, connection integrity, thread condition and inspection results.