GRADE STRENGTH COMPARISON

X95 vs G105 Drill Pipe Strength and Same-Size Performance Comparison

API 5DP / ISO 11961 grade properties and their effect on nominal pipe-body yield capacity.

X95

High-strength drill pipe body grade with a specified minimum yield strength of 95 ksi.

95 ksi	125 ksi	105 ksi
Minimum yield	Maximum yield	Minimum tensile

G105

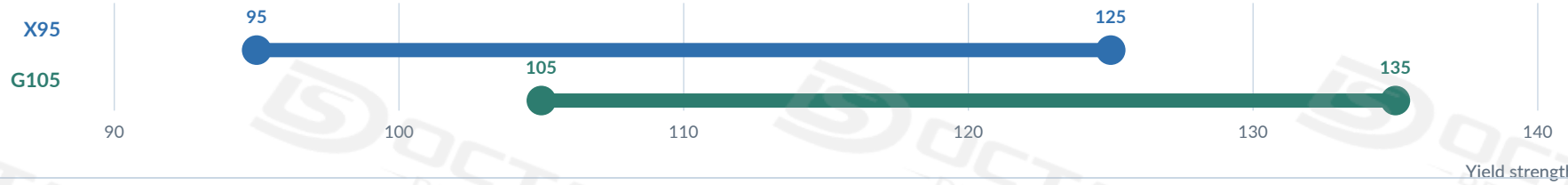
High-strength drill pipe body grade with a specified minimum yield strength of 105 ksi.

105 ksi	135 ksi	115 ksi
Minimum yield	Maximum yield	Minimum tensile

MINIMUM YIELD DIFFERENCE

10 ksi = 69 MPa = 10.5% higher than X95 minimum yield

Specified Strength Window



Basis: ISO 11961:2018 + Amd 1:2020 / API 5DP mechanical grade requirements. Values shown in ksi and rounded MPa equivalents.

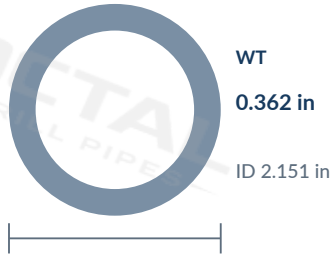
SAME-SIZE PERFORMANCE EXAMPLE

2-7/8 in x 10.40 lb/ft Drill Pipe Body

Same nominal geometry and upset type; only the pipe-body material grade changes from X95 to G105.

OD	NOMINAL WEIGHT	WALL THICKNESS	PIPE-BODY ID	UPSET TYPE
2-7/8 in	10.40 lb/ft	0.362 in	2.151 in	EU

SAME GEOMETRY



TENSILE YIELD	TORSIONAL YIELD	INTERNAL YIELD PRESSURE	COLLAPSE PRESSURE
271.5 kip	14.64 kft-lb	20.93 ksi	20.91 ksi
300.1 kip +10.5%	16.18 kft-lb +10.5%	23.14 ksi +10.5%	23.11 ksi +10.5%

Nominal new pipe-body calculations only. Apply design factors and combined-load interaction; connection and condition may govern.

Calculation basis: nominal OD/ID, specified minimum yield strength, API RP 7G pipe-body equations; values rounded. Not a field allowable-load table.

ENGINEERING LIMITATIONS

What Changes - What Does Not - What Must Be Reviewed

The material grade increases nominal pipe-body yield capacity, but it does not upgrade every part of the drill string.

WHAT INCREASES

- ✓ Pipe-body tensile yield
- ✓ Pipe-body torsional yield
- ✓ Yield-based internal pressure margin
- ✓ Yield-based collapse margin

DOES NOT AUTOMATICALLY INCREASE

- — Tool joint rating
- — Connection torque capacity
- — Fatigue life
- — Sour-service resistance
- — Allowable field operating load

FINAL REVIEW INPUTS

- Actual wall thickness
- Remaining tool joint OD
- Connection capacity
- Combined tension and torque
- Inspection and service history
- Approved product data sheet

FINAL ENGINEERING DECISION

GEOMETRY — OD / ID / wall → **GRADE** — X95 or G105 → **CONDITION** — wear / fatigue / defects → **CONNECTION** — tool joint / thread / shoulder → **APPROVED ENVELOPE** — design factor + combined load

Higher pipe-body grade is useful only when pipe-body strength is the governing limit and all other components remain adequate.

Technical basis: ISO 11961:2018 + Amd 1:2020 / API 5DP; API RP 7G nominal drill-pipe-body performance equations. Verify project-specific ITP and data sheet.