

X95 Drill Pipe Specification, Configuration and Inspection Guide

API 5DP Grade X mechanical properties, matched tool-joint configuration and procurement verification

GRADE DESIGNATION

API Grade X

Commonly identified in the market as X95 drill pipe.

PIPE-BODY YIELD

95-125 ksi

Equivalent to 655-862 MPa.

MINIMUM TENSILE

105 ksi

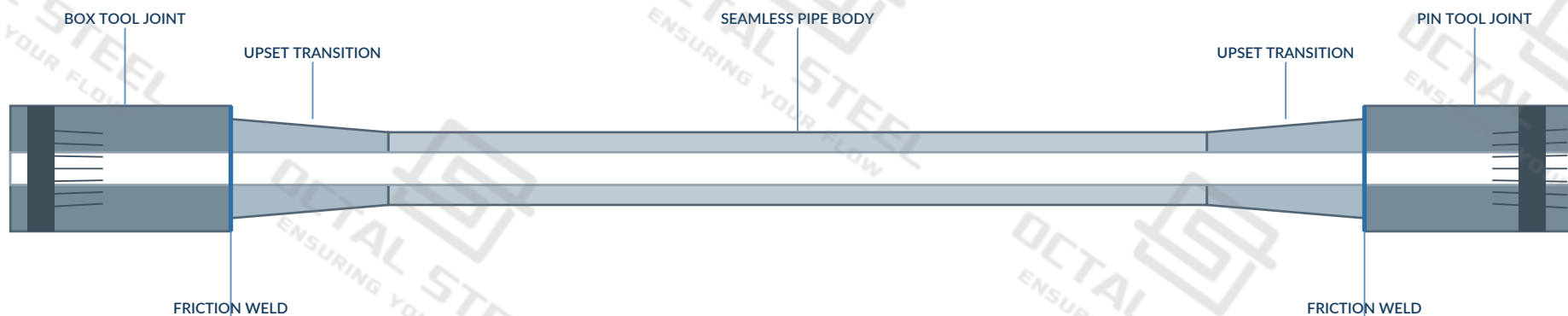
Equivalent to 724 MPa.

STANDARD BASIS

API 5DP

With ISO 11961 technical-delivery framework.

Finished-joint construction



Internal bore shown schematically - final ID and drift depend on the approved configuration.



Important: Grade X defines the pipe-body material range. The allowable load of the finished joint still depends on pipe OD, wall thickness, remaining wall, upset geometry, tool-joint OD/ID and connection capacity.

Mechanical Properties and Acceptance Data

API 5DP Grade X / X95

X95 mechanical properties should be verified against the actual heat and production-lot records. The table below separates pipe-body values from weld-zone and tool-joint acceptance points.

Property / control point	Requirement	Evidence expected
Pipe-body yield strength	95-125 ksi 655-862 MPa	Tensile report linked to pipe-body heat and heat-treatment lot
Minimum tensile strength	105 ksi 724 MPa	Tensile specimen identification and reported result
Pipe-body phosphorus	0.020% maximum	Heat analysis on the MTC
Pipe-body sulfur	0.015% maximum	Heat analysis on the MTC
PSL-1 pipe-body CVN	10 x 10 mm: 54 J average / 47 J individual 10 x 7.5 mm: 43 / 38 J 10 x 5 mm: 30 / 26 J Test temperature: 21 +/- 3 C	Charpy report showing specimen size, orientation and test temperature
Weld-zone hardness	37 HRC maximum Surface value and mean through-wall value	Weld-lot hardness report
Non-SS tool-joint box hardness	285-341 HBW	Tool-joint heat-treatment and hardness record

PSL-1 test-frequency highlights

- Grade X pipe body below 6-5/8 in.: Tensile and Charpy: 1 per 200 pieces or per lot, whichever is smaller.
- Grade X pipe body 6-5/8 in. and larger: Tensile and Charpy: 1 per 100 pieces or per lot, whichever is smaller.
- Weld-zone surface hardness: Every weld, at 3 circumferential positions spaced 120 degrees apart.

How to read these values

The listed values qualify the material and production lot; they are not finished-joint hook-load or torque ratings. Pipe-body capacity changes with OD, wall thickness and remaining section. Under combined tension and rotation, available margin is lower than for



Request heat-specific MTC, tensile, Charpy, weld-zone hardness and tool-joint hardness records.

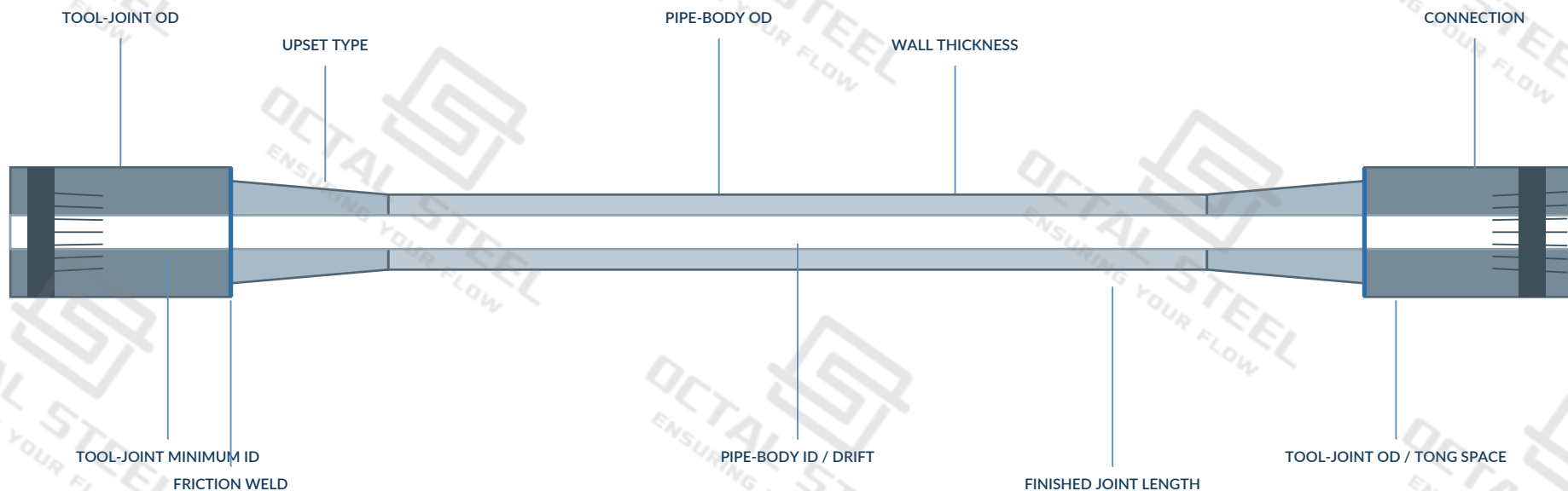
Data basis: API Spec 5DP Addendum 1 (Jan 2025), including chemistry, Charpy, hardness and test-frequency updates; Grade X basic strength values cross-checked against the Baosteel Drill Pipe Product Manual.

Complete Configuration Matching

Pipe body + upset + tool joint + connection

X95 is not a complete purchasing description. A finished joint must be defined by a matched pipe-body and tool-joint configuration.

Configuration variables on the finished joint



Illustrative purchase-line format

5 in. x 19.5 lb/ft - Grade X - NC50 - R2

This is an example of how a purchase line is structured, not a universal X95 configuration. The approved data sheet must still state the upset, tool-joint OD, minimum ID, tong space, finished length and dimensional tolerances.



Do not release an order described only as "5 in. X95".

Why the matched configuration matters

- Nominal weight + wall: Set pipe-body ID, steel area and tensile section.
- Tool-joint OD: Affects annular clearance, wear allowance and handling fit.
- Tool-joint minimum ID: Affects drift passage and hydraulic pressure loss.
- Connection: Controls thread form, shoulder contact, gauging and make-up data.
- Finished length: Must match the tally, rig handling and replacement-joint requirement.

Replacement and Mixed-String Verification

Typical procurement risk points

A. Replacement joint for an existing X95 string

Start with the existing tally, original data sheet and latest inspection record. Grade and pipe OD alone do not establish interchangeability.

EXISTING JOINT

OD | weight | upset | TJ OD/ID | connection | length

REPLACEMENT JOINT

OD | weight | upset | TJ OD/ID | connection | length



Same grade and NC connection can still hide a different nominal weight, tool-joint bore, OD or finished length.

B. X95 in a mixed-grade drill string

A mixed string can be used when each section has an adequate calculated margin and the transition is clearly controlled.

S135

G105

X95

Higher-load section

X95 remains where verified margin is adequate

Operating limit: the weakest relevant pipe-body, tool-joint or connection section controls - not the highest grade present in the string.

Eight points to match before replacement production

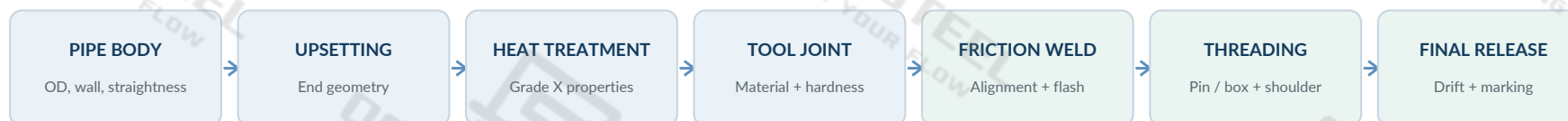
- ☐ Pipe-body OD
Confirm nominal OD and compatible handling equipment.
- ☐ Upset type
Confirm IU, EU or IEU and the approved transition.
- ☐ Tool-joint minimum ID
Check drift and hydraulic passage.
- ☐ Finished length
Match the required range and tally practice.
- ☐ Nominal weight / wall
Match the existing body section and internal diameter.
- ☐ Tool-joint OD
Check annular clearance, wear state and elevator/slip fit.
- ☐ Connection
Confirm designation, gauging basis and make-up data.
- ☐ Options and identity
Hardbanding, coating, markings, protectors and traceability.

High-risk shortcut: accepting a replacement joint from grade + OD + connection name only.

Manufacturing and Inspection Control

Control point -> acceptance evidence

The production route may vary by manufacturer, but the release package should show how each critical section of the finished X95 joint was controlled.



Control point	What is checked	Release evidence
Pipe body	OD, wall thickness, straightness, heat treatment and Grade X mechanical results	MTC and mechanical-test report
Upset transition	Internal profile, external geometry, alignment and surface condition	Upset dimensional report
Tool joint	Material identity, OD, minimum ID, hardness and connection designation	Tool-joint inspection record
Friction weld	Alignment, flash removal, weld profile, heat treatment, hardness and NDT acceptance	Weld-lot and NDT report
Pin and box	Thread form, taper, lead, shoulder condition, standoff and gauge result	API 7-2 thread-gauging record
Final joint	Length, drift, marking, protectors, bundle identity and document linkage	Final inspection report and packing list

Inspection emphasis at the body end

API 5DP requires documented wall-thickness verification along each pipe body. Areas not covered by automated systems - especially the body-to-upset transition - need a documented manual or NDT verification method.

! Passing the pipe-body tensile test does not by itself accept the weld or connection.

Recommended document linkage

- Pipe-body heat -> tensile / Charpy results
- Tool-joint heat -> hardness record
- Friction-weld lot -> NDT / hardness report
- Finished joint -> thread gauging / marking / bundle ID

Standards note: API Spec 7-2 controls threading and gauging of rotary shouldered connections. Addendum 3 to the 2nd Edition was published in September 2025 and became effective for the API Monogram Program on 1 April 2026.

Purchase Verification Checklist

Use at PO review and receiving inspection

GATE 1

Complete configuration

Do the pipe body, upset, tool joint, connection and length form one approved combination?

A. Configuration and service basis

- ☐ Pipe-body OD and nominal weight
- ☐ Wall thickness / body ID / drift requirement
- ☐ IU, EU or IEU upset type
- ☐ Tool-joint OD, minimum ID, tong space and length
- ☐ Connection designation and make-up data
- ☐ R1, R2 or R3 finished-joint requirement
- ☐ Expected tension, torque, overpull and wear allowance
- ☐ H2S / sour-service conditions declared when applicable

GATE 2

Lot-specific evidence

Are heat, tensile, Charpy, weld and tool-joint records linked to the delivered production lots?

B. Inspection, marking and documents

- ☐ PSL and supplementary requirements stated in PO
- ☐ MTC with heat-specific chemistry and tensile results
- ☐ Charpy specimen size, orientation and test temperature
- ☐ Weld-zone NDT and hardness records
- ☐ Tool-joint hardness and dimensional inspection
- ☐ API 7-2 gauging record for pin and box
- ☐ Hardbanding / internal coating / protectors verified
- ☐ Joint marking, bundle identity and packing-list traceability

GATE 3

Finished-joint release

Do gauging, drift, marking, protectors, bundle identity and packing list agree with the PO?

! Sour-service boundary: Standard API Grade X95 is not automatically qualified for H2S service. The environment and applicable ISO 15156 / NACE MR0175 requirements must be specified separately.

Source basis and standards status

[1] American Petroleum Institute, API Spec 5DP, 2nd Edition, Addendum 1 (January 2025); latest-update page lists Errata 3 (March 2025).

[2] ISO 11961:2018, Petroleum and natural gas industries - Steel drill pipe; Amendment 1:2020.

[3] API Spec 7-2, 2nd Edition, Addendum 3 (September 2025; API Monogram effective date 1 April 2026).

[4] Baosteel Drill Pipe Product Manual - API Grade X basic yield and tensile values.

[5] API RP 7G / API RP 7G-2 - drill-stem design and used drill-stem inspection references.

This guide is a procurement aid, not a substitute for the purchased standards, engineering calculations, approved product data sheet or purchase order.