

API Specification 5L 44th Edition

Differences and Improvements from the 43rd Edition

April 9, 2008

Chemical Composition Limits

Assume 42" OD x .500" WT Grade X80 PSL2 spiral DSAW non-expanded

Element	43rd max	44th max
C	0.22 b	0.12 b
Mn	1.85 b	1.85 b
P	0.025	0.025
S	0.015	0.015
Si	-	0.45
Cu	-	0.50 f
Ni	-	1.00 f
Cr	-	0.50 f
Mo	-	0.50 f
V	-	-
Nb	-	-
Ti	0.06	-
Nb+V+Ti	0.15	0.15 f
N	-	-
B	-	-
CE (IIW)	0.43 a	0.43 a, f
Pcm	0.25 a	0.25 a

where the 44th ed is less restrictive than the 43rd ed

the 44th ed is identical to the 43rd ed

the 44th ed is more restrictive than 43rd ed

- a CE (IIW) applies for C > 0.12% and Pcm applies for C ≤ 0.12%
- b For each reduction of 0.01% below the specified maximum carbon, an increase of 0.05% above the specified maximum for manganese is permissible, up to a maximum of 2.00% for X80
- f unless otherwise agreed

Tensile Test Acceptance Criteria - Grade X80

	API 5L 43rd Edition		API 5L 44th Edition	
	Minimum	Maximum	Minimum	Maximum
Pipe Body Yield Strength (MPa)	552	690	555	705
Pipe Body Tensile Strength (MPa)	621	827	625	825
Weld Tensile Strength (MPa)	621	827	625	-
Pipe Body Yield Strength (psi)	80,000	100,000	80,500	102,300
Pipe Body Tensile Strength (psi)	90,000	120,000	90,600	119,700
Weld Tensile Strength (psi)	90,000	120,000	90,600	-

where the 44th ed is less restrictive than the 43rd ed
the 44th ed is marginally more restrictive than the 43rd ed

This is just one example. The requirements are similar, however the values have been rounded up to the nearest 5 MPa when API 5L was harmonized with ISO 3183.

The 44th edition of API 5L has the following new high strength grades:

X90, X100 and X120

Impact Test Acceptance Criteria (42" OD x .500" WT X80)

Parameter	Location	Requirement	Test Temp (F)	API 5L 43rd Edition		API 5L 44th Edition	
				Minimum	Min Ave	Minimum	Min Ave
Charpy	Pipe Body	Absorbed Energy (ft-lbs)	32	20	50	30	-
	Pipe Body	Ductility (% shear)	32	40	70		
	Weld Metal	Absorbed Energy (ft-lbs)	32	-	-	20	-
	HAZ	Absorbed Energy (ft-lbs)	32	-	-	20	-
DWTT	Pipe Body	Ductility (% shear)	32	40	60	85	85

where DWTT = drop weight tear test
HAZ = heat affected zone

The 44th ed is less restrictive than the 43rd ed

The 44th ed is identical to the 43rd ed

The 44th ed is more restrictive than the 43rd ed

Pipe Diameter Acceptance Criteria

(assume 42" OD x .500" WT X80 PSL2 spiral DSAW)

API 5L 43rd Edition

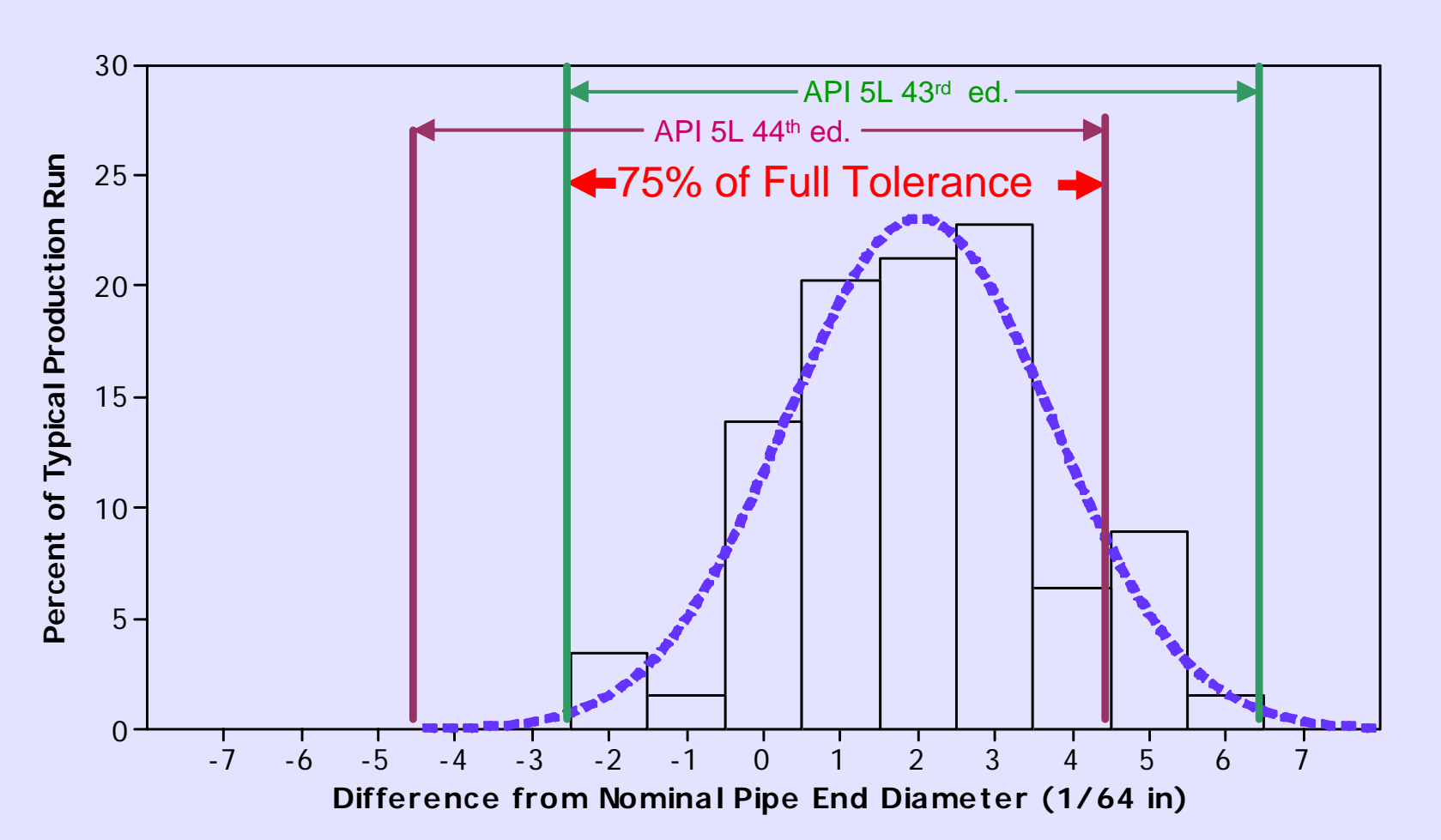
API 5L 44th Edition

	Minimum	Maximum	Minimum	Maximum
Body OD (from nominal)	-1/8 in	+1/4 in	-5/32 in	+5/32 in
End OD (from nominal)	-3/32 in	+3/32 in	-1/16 in	+1/16 in

where the 44th ed is less restrictive than the 43rd ed

the 44th ed is more restrictive than the 43rd ed

Pipe End Diameter Tolerance



Pipe Ends Acceptance Criteria

(42" OD x .500" WT X80 PSL2 spiral DSAW)

	API 5L 43rd Edition	API 5L 44th Edition
	Maximum	Maximum
ID flush-off height	None given	1/2 in
OD flush-off height (if agreed)	No requirement	1/2 in
Local out-of-roundness	No requirement	1/8 in

The 44th edition is more restrictive than the 43rd edition

ANNEX H – SOUR SERVICE (New)

- Steel composition – more restrictive than non-sour with .002% maximum sulfur, ≤ 1.5 calcium/sulfur ratio and requires inclusion shape control.
- HIC testing is mandatory with restrictive acceptance criteria.
- SSC test required, if agreed.
- NDT – more stringent than non-sour (Annex K).

ANNEX J – OFFSHORE SERVICE (New)

More restrictive compared to onshore requirements as follows:

- Steel composition – especially sulfur, niobium and carbon equivalent.
- Out-of-roundness tolerance approximately two times more restrictive.
- Restricted lengths 38.4 to 41.7 feet.
- Straightness 0.15% vs 0.20%.
- Increased frequency of mechanical property testing.
- NDT – more stringent (Annex K).

ANNEX K – NDT for SOUR and OFFSHORE SERVICE (New)

More restrictive as follows:

- End lamination inspection – UT for the last two inches on each pipe end.
- SMLS UT – full body longitudinal inspection and 25% surface coverage for wall thickness is required.
- SAW UT – more comprehensive inspection.
- Body Lamination – UT inspection for at least 20% of the surface of all strip/plate or pipe, if agreed.
- Weld Seam Edge Lamination – UT inspection required, if agreed.

Questions?