

API Ballot 6767
TG OCTG

Work Item Number	WI 2473
Title of Work Item	Update to 5CT Annex I for C125
Ballot Revision Level	1
Type of Ballot (Initial, Comment, Comment resolution (reference API ballot#), 1 st Re-ballot, 2 nd Re-ballot, etc.)	Initial
Submitter Name(s)	Gustavo López Turconi
API Document Modified	API 5CT
API Document, API Modifying Document(s) and Revision Level(s)	11 th Edition E1 E2 A1
Revision Key	Actual Text in black Changes to Text in red-strikeout Additions to Text in red highlighted ,

Work Item Charge: Update of Annex I Requirements for Validation of End Sizing with or without Thermal Recovery Processes of Plain End by i. Adding requirements for Grade C125 and ii. Improve clarity on I.4 Control during Production

Ballot Rationale: i. Addendum 1 introduced Grade C125 but provisions in Annex I are missing. The objective is to include the grade aligned with other sour service grades. ii. Requirements for sampling for testing during production in I.4 are unclear. The term “production run” is not thoroughly defined in 5CT and therefore there are discrepancies on the interpretation on when a sample shall be taken for control during manufacture shall be clarified considering the particularities of the manufacture..

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Ballot Text:

Requirements for Validation of End Sizing with or without Thermal Recovery Processes of Pipe Ends

I.1 General

c) for Grades C90, T95, C110, **C125** and Q125, a specific process validation is mandatory for the particular combination of grade, target chemical composition, size, pipe end deformation process. and connection geometry, unless a previous validation is available.

I.2 Test Specimens

For Grades C90, T95, ~~and C110~~ **and C125**, sour service tests shall be performed on NACE TM0177-2016, Method A and/or Method D, specimens. When applicable, the test specimen sizes, method, and acceptance criteria shall be in accordance with 6.14 and 9.10.

I.3.3 Test Requirements for Grades C90, T95, ~~and C110~~ **and C125**

For the cases described in I.1 where process validation is mandatory, unless other acceptance criteria is agreed upon between the purchaser and manufacturer, the following requirements shall be met (see Table I.1 or Table I.2).

I.4 Thermal Recovery Operations—Control during Production

I.4.1 Sample Location

The test specimens shall be taken from a pipe end corresponding to the beginning of the production ~~run~~ **of the specific product** without changes to the set points for controlled variables ~~or~~ at a frequency documented by the manufacturer **not exceeding 1 year** ~~that has been agreed upon by the purchaser.~~

I.4.3 Test Requirements for Grades C90, T95, ~~and C110~~ **and C125** during Production

Production shall proceed within the parameters of the previously validated process, unless agreed upon between the manufacturer and purchaser. Unless other acceptance criteria for control during production is agreed upon between the purchaser and manufacturer, the following requirements shall be met (see Table I.3 or Table I.4).

I.4.3.1 Tensile Testing

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The difference of yield strength between the deformed and the unaffected pipe body shall be less than or equal to 34 MPa (5 ksi) for Grades C90 and T95, ~~or~~ 41 MPa (6 ksi) for Grade C110 ~~or 45 MPa (6.5 ksi) for Grade C125~~. If the difference is greater than 34 MPa (5 ksi) for Grades C90 and T95, ~~or~~ 41 MPa (6 ksi) for Grade C110 ~~or 45 MPa (6.5 ksi) for Grade C125~~, and less than or equal to 52 MPa (7.5 ksi) for Grades C90 and T95, ~~or~~ 59 MPa (8.5 ksi) for Grade C110 ~~or 69 MPa (10 ksi) for Grade C125~~, two additional confirmation tests on the same pipe end or three additional tests on pipe ends representative of equipment startup conditions may be performed to verify the product and the process. Specimens for additional confirmation tests shall be taken from the same end (expanded or swaged) as the original test. If the results meet the acceptance criteria, the verification is acceptable. All additional tests on deformed area (and nascent strain area, when applicable) shall show a difference with unaffected pipe body less than or equal to 34 MPa (5 ksi) for Grades C90 and T95, ~~or~~ 41 MPa (6 ksi) for Grade C110 ~~or 45 MPa (6.5 ksi) for Grade C125~~.

Grade	Type	Unaffected Area	Deformed (and Nascent Strain) ^a Areas				Difference between Deformed (and Nascent Strain ^a)Areas with Unaffected Area	
		Yield Strength ^b (MPa)	Yield Strength ^b (MPa)	Hardness (HRC)	Impact (J)	SSC	Yield Strength ^b Difference (MPa)	Impact (J)
		min	min	max	min		max	min
1	2	3	4	5	6	7	8	9
L80	1	Table C.5		6.7.1 a)	Table 10 and Table 11	—	69	75% of energy of the unaffected area ^c
L80	3Cr					—	69	
L80	9Cr					—	69	
L80	13Cr					—	69	
C90	—					6.14	34	
T95	—			34				
C110	—			41				
C125	—			45				
P110	—			—	76			
Q125	—	—	86					

^a If applicable.

^b Yield strength shall be determined in accordance with 6.2.3 or using the 0.2 % offset method or other method agreed between purchaser and manufacturer.

^c Minimum absorbed energy for Grade L80 13Cr may be agreed between purchaser and manufacturer

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Table I.2—Requirements for Process Validation (USC Units)

Grade	Type	Unaffected Area	Deformed (and Nascent Strain ^a) Areas				Difference between Deformed (and Nascent Strain ^a) Areas with Unaffected Area	
		Yield Strength ^b (ksi)	Yield Strength ^b (ksi)	Hardness (HRC)	Impact ^t (ft-lb)	SSC	Yield Strength ^b Difference (ksi)	Impact (ft-lb)
		min	min	max	min		max	min
1	2	3	4	5	6	7	8	9
L80	1	Table E.5		6.7.1 a)	Table 10 and Table 11	—	10	75 % of energy of the unaffected area ^c
L80	3Cr					—	10	
L80	9Cr					—	10	
L80	13Cr					—	10	
C90	—					6.14	5	
T95	—						5	
C110	—						6	
C125	—						6.5	
P110	—			—		—	11	
Q125	--			—		—	12.5	

^a If applicable.

^b Yield strength shall be determined in accordance with 6.2.3 or using the 0.2 % offset method or other method agreed between purchaser and manufacturer.

^c Minimum absorbed energy for Grade L80 13Cr may be agreed between purchaser and manufacturer

Grade	Type	Unaffected Area	Deformed (and Nascent Strain ^a) Areas			Difference between Deformed (and Nascent Strain ^a) Areas with Unaffected Area	
		Yield Strength _b (MPa)	Yield Strength _b (MPa)	Hardness, (HRC)	SSC	Yield Strength _{b,c} Difference (MPa)	
		min	min	max		max	
1	2	3	4	5	6	7	
L80	1	Table C.5			6.7.1 a)	—	69
L80	3Cr					—	69
L80	9Cr					—	69
L80	13Cr					—	69
C90	—				6.14		34
T95	—						34
C110	—						41
C125	—						45
P110	—				—	—	76
Q125	—				—	—	86

^a If applicable.

^b Yield strength shall be determined in accordance with 6.2.3 or using the 0.2 % offset method or other method agreed between purchaser and manufacturer.

^c Retesting is allowed on additional samples. Acceptance criteria in parentheses. See I.4.4.

^a If applicable.

^b Yield strength shall be determined in accordance with 6.2.3 or using the 0.2 % offset method or other method agreed between purchaser and manufacturer.

^c Retesting is allowed on additional samples. Acceptance criteria in parentheses. See I.4.4.

Table I.4—Requirements during Production (USC Units)

Grade	Type	Unaffected Area	Deformed (and Nascent Strain ^a) Areas			Difference between Deformed (and Nascent Strain ^a) Areas with Unaffected Area	
		Yield Strength _b (ksi)	Yield Strength _b (ksi)	Hardness, (HRC)	SSC	Yield Strength _{b,c} Difference (ksi)	
		Min	min	max		max	
1	2	3	4	5	6	7	
L80	1	Table E.5			6.7.1 a)	—	10
L80	3Cr					—	10
L80	9Cr					—	10
L80	13Cr					—	10
C90	—					6.14	5
T95	—				5		
C110	—				6		
C125	—				6.5		
P110	—				—		11
O125	—				—	12.5	

^a If applicable.

^b Yield strength shall be determined in accordance with 6.2.3 or using the 0.2 % offset method or other method agreed between purchaser and manufacturer.

^c Retesting is allowed on additional samples. Acceptance criteria in parentheses. See I.4.4.