Agenda Item 653-1007

Title: Corrections to Table 4.2

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Revision: 0

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Purpose: To correct Annex references in Table 4.2

Source: INQ-653-D017 Joint Efficiencies for Welded Joints

Impact: Technical correction to Table 4.2

Discussion: According Table 4.2 the Joint Efficiency for welded tank shells in accordance with API 650 First to Sixth edition (1961 to 1978) is 1.00 for butt joints if "Appendices D and G" are applicable. The wording "AND" implies that BOTH appendix D and appendix G must be applicable to the existing tank built under API 650 First to Sixth edition). However, API 650 First and Second editions do not have an appendix G and any tank built to this edition can never satisfy the requirement of applicability to appendix G, since it did not exist (also applicable for some other editions). Appendix G first appears as a supplement to API 650 Third edition

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Should the text in the "Applicability or Limits" column read "Annexes D OR G" instead of "Annexes D AND G". (Butt joint according to API 650, First to Sixth Edition, Joint Efficiency 1.00)

The current table is shown on the next page

Current Table:

Table 4.2—Joint Efficiencies for Welded Joints

Standard	Edition and Year	Type of Joint	Joint Efficiency E	Applicability or Limits
API 650	Seventh and Later (1980 to Present)	Butt	1.00	Basic Standard
		Butt	0.85	Appendix A Spot RT
		Butt	0.70	Appendix A No RT
	First to Sixth (1961 to 1978)	Butt	0.85	Basic Standard
		Butt	1.00	Appendices D and G
API 12C	14th and 15th (1957 to 1958)	Butt	0.85	
	3rd to 13th (1940 to 1956)	Lap [a]	0.75	3/8 in. max. t
		Butt [c]	0.85	
	First and Second (1936 to 1939)	Lap [a]	0.70	7/16 in. max. t
		Lap [b]	0.50 + k/5	1/4 in. max. t
		Butt [c]	0.85	
Unknown		Lap [a]	0.70	7/16 in. max. t
		Lap [b]	0.50 + k/5	1/4 in. max. t
		Butt	0.70	
		Lap [d]	0.35	

[a] Full double lap-welded.
[b] Full fillet weld with at least 25 % intermittent full fillet opposite side; k = percent of intermittent weld expressed in decimal form.
[c] Single butt-welded joints with a back-up bar were permitted from the years of 1936 to 1940 and 1948 to 1954.
[d] Single lap-welded only.

Proposed Changes:

Revise Table 4.2 to separate the first and second editions as these editions do not have Appendix G.

Table 4.2-Joint Efficiencies for Welded Joints

Standard	Edition and Year	Type of Joint	Joint Efficiency *E*	Applicability or Limits
API 650	Seventh and Later (1980 to Present)	Butt	1.00	Basic Standard
		Butt	0.85	Appendix A Spot RT
		Butt	0.70	Appendix A No RT
	Third to Sixth (1966 to 1978)	Butt	0.85	Basic Standard
		Butt	1.00	Appendices **D or G**
	First and Second (1961 to 1964)	**Butt**	**0.85**	**Basic Standard**
		Butt	**1.00**	**Appendix D**
API 12C	14th and 15th (1957 to 1958)	Butt	0.85	
	3rd to 13th (1940 to 1956)	Lap [a]	0.75	3/8 in. max. *t*
		Butt [c]	0.85	
	First and Second (1936 to 1939)	Lap [a]	0.70	7/16 in. max. *t*
		Lap [b]	0.50 + *k*/5	¼ in. max. *t*
		Butt [c]	0.85	
Unknown		Lap [a]	0.70	7/16 in. max. *t*
		Lap [b]	0.50 + *k*/5	¼ in. max. *t*
		Butt	0.70	
		Lap [d]	0.35	

a. Full double lap weld
b. Full fillet weld with at least 25 % intermittent full fillet opposite side; *k* = percent of intermittent weld expressed in decimal form.
c. Single butt-welded joints with a back-up bar were permitted from the years 1936 to 1940 and 1948 to 1954
d. Single lap-welded only.

References:

From API 650 1st edition

From API 650 2nd edition

From Supplement to API 650 3rd edition

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