EEMUA 159 Edition 5 Imprint 1 - August 2018

Amendment Sheet 1

The amendments which follow are issued under the authority of the EEMUA Storage Tanks Committee which has responsibility for the maintenance of this publication. It is being carried through into the digital edition and future printed editions. It is provided here for reference to those readers who currently own a paper copy.

Replacement text

1. The use of '&' and 'and' in the published text;

The existing '&' is to be replaced with 'and' within the publication text as indicated:

Page	Section	Subsection	Existing Text	Revised Text
23	4.2 Types of corrosion	Bullet point 1	Uniform & Pitting corrosion	Uniform and Pitting corrosion
27	4.2.4 Galvanic corrosion	Paragraph 3, Line 1	Different metals & alloys have different electrochemical…	Different metals and alloys have different electrochemical…
48	5.1.1 Inspection and maintenance (The 7 steps of the out-of-service period)	Step 2, Line 6	…necessary to comply with NDT & Inspection standards.	…necessary to comply with NDT and Inspection standards.
59	5.3.1 General	Paragraph 2, Line 4	…instrument settings, calibration blocks & procedures, probes,…	…instrument settings, calibration blocks and procedures, probes,…
63	5.3.4.1 General	Paragraph 4, Line 5	Next to required inspection & NDT certification; rope access…	Next to required inspection and NDT certification; rope access…
70	5.3.7 Measurement of nozzles and manhole neck plates *(Tank roof nozzle inspection)*	Step 1, Line 2	…including floating roof rim & bleeder up to the first flange.	…including floating roof rim and bleeder up to the first flange.
248	17.2.7 Execution (Do)	Paragraph 1, Line 4	…identification, planning & scheduling of work is implemented…	…identification, planning and scheduling of work is implemented…
249	17.2.9 Closing the loop (Act/Adjust)	Paragraph 3, Line 4	…taken when reviewing preventive & predictive maintenance tasks to…	…taken when reviewing preventive and predictive maintenance tasks to…
265	17.5.2.1 Indenting level	Bullet Point 2, Line 1	The specified maintenance & repair level for the equipment.	The specified maintenance and repair level for the equipment.
265	17.5.2.2 System & equipment description	Paragraph 1, Line 5	…the concept of availability & reliability will be explained in more detail.	…the concept of availability and reliability will be explained in more detail.

2. Published text mentioning the use of electrical equipment in hazardous areas;
The existing text is to be replaced with the amended text within the publication as indicated:

Page 47, Paragraphs 4 and 5 - Existing text:
Depending on the types of product stored and local directives on hazardous area classification, the use of conventional battery operated (non-Ex/ATEX proof) NDT equipment is often prohibited. Such work can only be executed following proper "task-risk analyses" and/or "hot working" permit schemes which specify safety measures to be used during in-service inspections.

The use of EX-proof, ATEX-proof NDT equipment could allow testing under "cold working" conditions, but is not yet common practice and availability of Ex/ATEX equipment is limited.

Page 47, Paragraphs 4 and 5 - Amended Text:

Depending on the types of product stored and local directives on hazardous area classification, the use of conventional battery operated NDT equipment without the appropriate explosion protection (Ex) certification for use in hazardous areas is often prohibited. Such work can only be executed following proper "task-risk analyses" and/or "hot working" permit schemes which specify safety measures to be used during in-service inspections.

The use of appropriately certified explosion protected (Ex) electrical NDT equipment in hazardous areas could allow testing under "cold working" conditions, but is not yet common practice and availability of certified explosion protected (Ex) electrical equipment is limited.

Page 155, Paragraph 4 - Existing text:

EN ISO 16852[27] stipulates the performance requirements, test methods and limits for the use of flame arresters. The required mesh size of an arrester depends on the product vapours and related explosion group. The MESG (Maximum Experimental Safe Gap) varies between <0.5mm and >0.9mm. Flame arresters require an ATEX 2014/34/EU[28] approval certificate.

Page 155, Paragraph 4 - Amended text:

EN ISO 16852[27] stipulates the performance requirements, test methods and limits for the use of flame arresters. The required mesh size of an arrester depends on the product vapours and related explosion group. The MESG (Maximum Experimental Safe Gap) varies between <0.5mm and >0.9mm. Flame arresters require an appropriate IECEx and/or an ATEX 2014/34/EU[28] approval certification.

3. Amendment of title Table 4-1;

Page 30 - Existing text:

Table 4-1 Expected internal corrosion rates (typical (mm/year)) for tanks

Page 30 - Amended text:

Table 4-1 General internal corrosion rates (typical (mm/year)) for uncoated tanks

4. <u>Amendment of text explaining formula parameters;</u>
The existing text is to be replaced with the amended text within the publication as indicated:

<u>Page 120 - Existing text:</u>

Where:

D	Tank diameter (m)
tmin	Averaged minimum thickness of thinnest shell course (which may well be a lower shell course than the top shell course (mm)
t	Averaged minimum thickness of the shell course under consideration(mm)
h	Original Height of the shell course under consideration (mm)
He	Transposed shell course height using tmin (m)
HE	Transposed total tank shell height (m)
K	Load factor for combined wind and vacuum loads
HP	Maximum unstiffened height of transposed shell under wind and vacuum loads (m)
Vw	Wind speed as per original design (see also Section 5.1.2) (m/s)
va	Design vacuum of tank (mbar)
L	Interspacing between existing or additional wind girders on HE
n	Number of existing or additional wind girders

Note: For tanks operating at elevated temperatures see Appendix F.

<u>Page 120 - Amended text:</u>

Where:

D	Tank diameter (m)
tmin	Minimum average thickness of thinnest shell course (which may well be a lower shell course than the top shell course (mm)
t	Minimum average thickness of the shell course under consideration(mm)
h	Original Height of the shell course under consideration (mm)
He	Transposed shell course height using tmin (m)
HE	Transposed total tank shell height (m)
K	Load factor for combined wind and vacuum loads
HP	Maximum unstiffened height of transposed shell under wind and vacuum loads (m)
Vw	Wind speed as per original design (see also Section 5.1.2) (m/s)
va	Design vacuum of tank (mbar)
L	Interspacing between existing or additional wind girders on HE
n	Number of existing or additional wind girders

Note: For tanks operating at elevated temperatures see Appendix F.

5. Amendment of sub-section title 8.7.3.4;
The existing text is to be replaced with the amended text within the publication as indicated:

Page 135 - Existing text:

8.7.3.4 General corrosion circular bolted blind off plates

Page 135 - Amended text:

8.7.3.4 General corrosion of reinforcing plates around nozzles

6. Inclusion of sub-section title 10.3.3.1;
The following text is to be included at the top of page 150:

Page 150 - Text to be included:

10.3.3.1 Operational pressure/vacuum relief vents

7. Amendment of text sub-section 15.2.4.1, Point 4;
The existing text is to be replaced with the amended text within the publication as indicated:

Page 228 - Existing text:

A risk assessment has been performed resulting in a decision where all stakeholders involved agree to deviate from the requirements listed under Section 15.2.3.

Page 228 - Amended text:

A risk assessment has been performed resulting in a decision where all stakeholders involved agree to deviate from the requirements listed under Section 15.2.1.

8. Amendment of text sub-section 15.2.4.4, Point 2;
The existing text is to be replaced with the amended text within the publication as indicated:

Page 229 - Existing text:

- Repairs shall be executed only by using Tombstone plates in accordance with Figure 9-4 of API 653 (allowing only radial welds to be laid in this section of the bottom plates).

Page 229 - Amended text:

- Repairs shall be executed only by using Tombstone plates in accordance with Section 9 of API 653 (allowing only radial welds to be laid in this section of the bottom plates).

9. Amendment of text sub-section C.1.8;
The existing text is to be replaced with the amended text within the publication as indicated:

Page 364 - Existing text:

Tolerances on level and verticality should be in accordance with Section 7.5.1, and on roundness in accordance with Section 12.9.3.

Page 364 - Amended text:

Tolerances on level and verticality should be in accordance with Section 6.5.1, and on roundness in accordance with Section 11.5.3.

10.Amendment of text sub-section C.3.1;
The existing text is to be replaced with the amended text within the publication as indicated:

Page 367, Paragraph 4 - Existing text:

It is important that patch plates are not used within the critical zone, i.e. in the peripheral area 75mm radially inwards from the tank shell.

Page 367, Paragraph 4 - Amended text:

It is important that patch plates are not used nor local welding of pits is carried out within the critical zone, i.e. in the peripheral area 150mm radially inwards from the tank shell. In this area as per section 15.2.4.4 repair shall only be executed with tombstones plates or by replacing of the annular section.

11.Amendment of title - Figure C11a;
The existing text is to be replaced with the amended text within the publication as indicated:

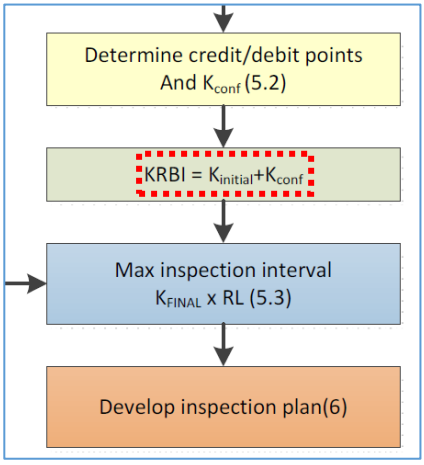
Page 370 - Existing text:

Figure C-11a Explanation of welding sequence for shell-to-bottom junction
(continued next page)

Page 370 - Amended text:

Figure C-11a Repair solutions for shell plates (continued next page)

12.Amendment to Figure E-1;
The existing text is to be replaced with the amended text within the publication as indicated:



Page 418 - Existing text:

KRBI = $K_{initial}$+K_{conf}

Page 418 - Amended text:

K_{final} = $K_{initial}$+K_{conf}

13. <u>Amendment of formula and inclusion of text sub-section E.3.5.4 Step 2;</u>
The existing text is to be replaced with the amended text within the publication as indicated:

<u>Page 428 - Existing text:</u>

$$K_{conf} = \frac{1 \times K_{cr} + 3 \times K_{ie} + 2 \times K_{ma} + 1 \times K_{pr}}{7}$$

(Value between 0 and 1)

$$K_{conf} = 0.4 \times K_{conf} - 0.2$$

(Value may not exceed -0.2 and +0.2)

<u>Page 428 - Amended text:</u>

$$K_{conf\ initial} = \frac{1 \times K_{cr} + 3 \times K_{ie} + 2 \times K_{ma} + 1 \times K_{pr}}{7}$$

(Value between 0 and 1)

$$K_{conf} = 0.4 \times K_{conf\ initial} - 0.2$$

(Value may not exceed -0.2 and +0.2)

The combined value of $K_{final} = K_{conf} + K_{initial}$ may not exceed 1.0
Where:
K_{inital} is established by the location in the Risk Assessment Matrix (RAM) – see model calculations steps, pages 434 to 450.

14. <u>Amendment of formula E.4.2.4.2.2;</u>
The existing formula is to be replaced with the amended formula within the publication as indicated:

<u>Page 432 - Existing formula:</u>

$$RL_A = \frac{\left[\frac{100 - max((RT_t; RT_u))}{100} \times t_{avg;meas} - 50\% \times t_{limit}\right] + C \times CR_{pitt;t}}{(CR_{pit,t} + RL \times CR_{gen})}$$

$$RL_B = \frac{\left[\frac{100 - max((RT_t; RT_u))}{100} \times t_{avg;meas} - 50\% \times t_{limit}\right] + C \times CR_{gen}}{(CR_{gen} + RL \times CR_{pit;u})}$$

<u>Page 432 - Amended formula:</u>

$$RL_A = \frac{\left[\frac{100 - max(RT_t; RT_u)}{100} \times t_{avg;meas} - 50\% \times t_{limit}\right] + C \times CR_{pit;t}}{(CR_{pit;t} + CR_{gen})}$$

$$RL_B = \frac{\left[\frac{100 - max(RT_t; RT_u)}{100} \times t_{avg;meas} - 50\% \times t_{limit}\right] + C \times CR_{gen}}{(CR_{gen} + CR_{pit;u})}$$

15. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 10' on page 435 as follows:

<u>Page 435 - Existing text:</u>

10d Establish consequence factor for economic aspects (E.3.3.5)
use formula: maximum of (10a+10b)/2 and 10c

Economic consequence factor, χ	**2.5**

<u>Page 435 - Amended text:</u>

10d Establish consequence factor for economic aspects (E.3.3.5)
use formula: taking the maximum of either (10a+10b)/2 or 10c

Economic consequence factor, χ	**2.5**

16. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 12e' on page 436 as follows:

<u>Page 436 - Existing text</u>

12d Location of the tank farm

- in plant area within populous area *)	**4**	
- sloping tankfarm *)	**3**	**1**
- flat tankfarm *)	**2**	
- tankfarm within an abandoned area *)	**1**	

*) Is the tank located near a public fence?

- No	**0**	**0**
- Yes	**1**	

12e Establish consequence factor for Health and Safety aspects
use formula: maximum of (12b+12c+12d+12e)/3 and 12a

Health and safety consequence factor, χ	**2.67**

<u>Page 436 - Amended text:</u>

12d Location of the tank farm

- in plant area within populous area *)	**4**	
- sloping tankfarm *)	**3**	**1**
- flat tankfarm *)	**2**	
- tankfarm within an abandoned area *)	**1**	

12e *) Is the tank located near a public fence?

- No	**0**	**0**
- Yes	**1**	

Establish consequence factor for Health and Safety aspects
use formula: taking the maximum of either (12b+12c+12d+12e)/3 or 12a

Health and safety consequence factor, χ	**2.67**

17. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 14c' on page 436 as follows:

<u>Page 436 - Existing text:</u>

14c Establish consequence factor for environmental aspects
use formula: maximum of 14a and 14b

Environmental consequence factor, χ | **2**

<u>Page 436 - Amended text:</u>

14c Establish consequence factor for environmental aspects
use formula: taking the maximum of either 14a or 14b

Environmental consequence factor, χ | **2**

18. <u>Inclusion of text, Model Calculations - Appendix E;</u>
The following text is to be included below 'query 34' on page 439 as follows:

<u>Page 439 – Text to be included:</u>

34 Establish adjusted factor Kfinal

Adjusted confidence rating factor, $\mathbf{K_{final} = K_{initial} + K_{conf}}$ | **0.58**

The combined value of $K_{final} = K_{initial} + K_{conf}$ may not exceed 1.0

19. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 7d' on page 441 as follows:

<u>Page 441 - Existing text</u>

7d Establish consequence factor for economic aspects (E.3.3.5)
use formula: maximum of (7a+7b)/2 and 7c

Economic consequence factor, χ | **2.5**

<u>Page 441 - Amended text:</u>

7d Establish consequence factor for economic aspects (E.3.3.5)
use formula: taking the maximum of either (7a+7b)/2 or 7c

Economic consequence factor, χ | **2.5**

20. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 9d' to 'query 9e' on pages 441 and 442 as follows:

<u>Pages 441 and 442 - Existing text</u>

9d	Location of the tank farm		
	- in plant area within populous area *)	**4**	
	- sloping tankfarm *)	**3**	**1**
	- flat tankfarm *)	**2**	
	- tankfarm within an abandoned area *)	**1**	
	*) Is the tank located near a public fence?		
	No	**0**	**0**
	Yes	**1**	

9e	Establish consequence factor for Health and Safety aspects *use formula: maximum of (9b+9c+9d+9e)/3 and 9a* Health and safety consequence factor, χ	**2.67**

<u>Page 441 and 442 - Amended text:</u>

9d	Location of the tank farm		
	- in plant area within populous area *)	**4**	
	- sloping tankfarm *)	**3**	**1**
	- flat tankfarm *)	**2**	
	- tankfarm within an abandoned area *)	**1**	
9e	*) Is the tank located near a public fence?		
	No	**0**	**0**
	Yes	**1**	

Establish consequence factor for Health and Safety aspects
use formula: taking the maximum of either (9b+9c+9d+9e)/3 or 9a
Health and safety consequence factor, χ **2.67**

21. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 18' on page 443 as follows:

<u>Page 443 - Existing text</u>

Step 4 Determine remaining life

17 Duration between previous periodic inspection and current examination 38 years

18

	course	t min in [mm] As built	previous inspection	current inspection	calculated thickness	Calculated average corr. rate [mm/yr]	EEMUA average corr. rate [mm/yr]
		Column A	Column B	Column C	Column D[1]	Column E[2]	Column F[3]
Top	9	6.0	4.8	4.7	3.3	0.00263	
	8	6.0	5.3	4.8	3.4	0.01316	
	7	6.0	6.0	5.0	4.1	0.02632	
	6	11.0	10.0	7.0	5.3	0.07895	
	5	14.0	13.0	10.0	9.3	0.07895	
	4	19.0	18.0	15.0	14.4	0.07895	
	3	25.0	24.0	21.0	20.0	0.07895	
	2	28.0	27.0	23.0	22.0	0.10526	
Bottom	1	31.0	30.0	27.0	26.0	0.07895	

[1] *Column D = maximum of 19a, 19b and 19c.*
[2] *Column E = (Column B - Column C) / Step 17*
[3] *Column F = When Column B or C are unknown use Table 2.*

<u>Page 443 - Amended text:</u>

Step 4 Determine remaining life

17 Duration between previous periodic inspection and current examination 38 years

18

	course	t min in [mm] As built	previous inspection	current inspection	calculated thickness	Calculated average corr. rate [mm/yr]	EEMUA average corr. rate [mm/yr]
		Column A	Column B	Column C	Column D[1]	Column E[2]	Column F[3]
Top	9	6.0	4.8	4.7	3.3	0.00263	
	8	6.0	5.3	4.8	3.4	0.01316	
	7	6.0	6.0	5.0	4.1	0.02632	
	6	11.0	10.0	7.0	5.3	0.07895	
	5	14.0	13.0	10.0	9.3	0.07895	
	4	19.0	18.0	15.0	14.4	0.07895	
	3	25.0	24.0	21.0	20.0	0.07895	
	2	28.0	27.0	23.0	22.0	0.10526	
Bottom	1	31.0	30.0	27.0	26.0	0.07895	

[1] *Column D = maximum of 20a, 20b or 20c.*
[2] *Column E = (Column B - Column C) / Step 17*
[3] *Column F = When Column B or C are unknown use Table 4-1, page 30.*

22. <u>Amendment to text Model Calculations - Appendix E;</u>
The following text below the table in 'query 21' on page 443 is to be amended within the publication as indicated:

<u>Page 443 - Existing text:</u>

[2] Column 21B = 21a × Box 20

<u>Page 443 - Amended text:</u>

[2] Column 21B = 21a × Box 19

23. <u>Amendment to 'Score' parameters, Model Calculations - Appendix E;</u>
The following parameters on 'query 27' page 445 are to be amended within the publication as indicated:

<u>Page 445 - Existing 'Score' parameters:</u>

		Score	
27a	Does the item under evaluation have significant pitting?		
	- Yes	**1**	**0.00**
	- No	**0**	

<u>Page 445 - Amended 'Score' parameters:</u>

		Score	
27a	Does the item under evaluation have significant pitting?		
	- Yes	**0**	**0.00**
	- No	**1**	

24. <u>Inclusion of text, Model Calculations - Appendix E;</u>
The following text is to be included below 'query 30' on page 445 as follows:

<u>Page 445 – Text to be included:</u>

30	Adjusted confidence rating factor, $\mathbf{K_{final} = K_{initial} + K_{conf}}$	**0.73**

The combined value of $K_{final} = K_{initial} + K_{conf}$ may not exceed 1.0

25. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 6a/6b' on page 446 as follows:

<u>Page 446 - Existing text</u>

6a	Roof support structure is located below roof plates		
	- Crevice corrosion is likely to occur	**2**	
	- Crevice corrosion is <u>not</u> likely to occur	**0**	**0**
	- roof is self-supporting type or membrane, or structure is placed on top of the roof plates	**0**	
6b	Roof supporting structure is located on top of the roof plates		
	- Water drawoff point not adequate and water accumulation likely to occur	**2**	
	- Water drawoff point adequate and water accumulation unlikely	**0**	**2**
	- roof supporting structure is not located on top of roof plates	**0**	
	Maximum of 6a and 6b	Weighted score	**2**

<u>Page 446 - Amended text:</u>

6a	Roof support structure is located below roof plates		
	- Crevice corrosion is likely to occur	**2**	
	- Crevice corrosion is <u>not</u> likely to occur	**0**	**0**
	- roof is self-supporting type or membrane, or structure is placed on top of the roof plates	**0**	
6b	Roof supporting structure is located on top of the roof plates		
	- Water drawoff point not adequate and water accumulation likely to occur	**2**	
	- Water drawoff point adequate and water accumulation unlikely	**0**	**2**
	- roof supporting structure is not located on top of roof plates	**0**	
	Taking the maximum of either 6a or 6b	Weighted score	**2**

26. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 8d' on page 447 as follows:

<u>Page 447 - Existing text</u>

8d	Establish consequence factor for economic aspects (E.3.3.5) *use formula: maximum of (8a + 8b)/2 and 8c*	Economic consequence factor, χ	**2.5**

<u>Page 447 - Amended text:</u>

8d	Establish consequence factor for economic aspects (E.3.3.5) *use formula: taking the maximum of either (8a + 8b)/2 or 8c*	Economic consequence factor, χ	**2.5**

27. <u>Amendment to text, Model Calculations - Appendix E;</u>
The following text is to be amended - 'query 10d' to 'query 10e' on pages 447 and 448 as follows:

<u>Page 447 and 448 - Existing text</u>

10d	Location of the tank facility		
	- in plant area within populous area *)	**4**	
	- sloping tankfarm *)	**3**	**1**
	- flat tankfarm *)	**2**	
	- tankfarm within an abandoned area *)	**1**	
	*) Is the tank located near a public fence?		
	- No	**0**	**0**
	- Yes	**1**	

10e	Establish consequence factor for Health and Safety aspects *use formula: maximum of 10a and (10b+10c+10d)/3*	
	Health and safety consequence factor, χ	**2.67**

<u>Page 447 and 448 - Amended text:</u>

10d	Location of the tank facility		
	- in plant area within populous area *)	**4**	
	- sloping tankfarm *)	**3**	**1**
	- flat tankfarm *)	**2**	
	- tankfarm within an abandoned area *)	**1**	
10e	*) Is the tank located near a public fence?		
	- No	**0**	**0**
	- Yes	**1**	

Establish consequence factor for Health and Safety aspects *use formula: taking the maximum of either 10a or (10b+10c+10d+10e)/3*	
Health and safety consequence factor, χ	**2.67**

28. <u>Amendment to 'Score' parameters, Model Calculations - Appendix E;</u>
The following parameters on 'query 29a' page 450 are to be amended within the publication as indicated:

<u>Page 450 - Existing 'Score' parameters:</u>

29a	Does the item under evaluation have significant pitting? - Yes - No	**1** **0**	**0.00**

<u>Page 450 - Amended 'Score' parameters:</u>

29a	Does the item under evaluation have significant pitting? - Yes - No	**0** **1**	**0.00**

29. <u>Amendment of formula E.6.3.6;</u>
The existing formula is to be replaced with the amended formula within the publication as indicated:

<u>Page 458 - Existing text:</u>

0.999 = 1 - (1-a)2 → 0.1 = (1-a)2 → 0.0316 = 1-a → a = 0.9684.

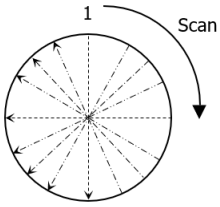
<u>Page 458 - Amended text:</u>

0.999 = 1 - (1-a)2 → 0.001 = (1-a)2 → 0.03162 = 1-a → a = 0.9684

Amendment to Appendix B.3 – Inspection sheets

1. Ultrasonic Thickness Measurements Tank Shell;

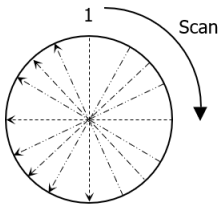
Page 341 - 'Thickness measurements tank shell' section Existing text:



Diameter	No of scan lines
D < 20	4
20 ≤ D ≤ 36	8
D > 36	Max. 15m interval

Thickness measurements tank shell:
Locate minimum required scan lines equally over circumference of tanks.
As a minimum: measure plate thickness, per scan line, on each shall course at 3 locations ⅛h, ⅜h and 30mm above lowest horizontal weld seam of each course.
OR (preferably)
Use automatic UT crawler and measure each 100mm over the full shell height per scan line.

Page 341 - 'Thickness measurements tank shell' section Amended text:

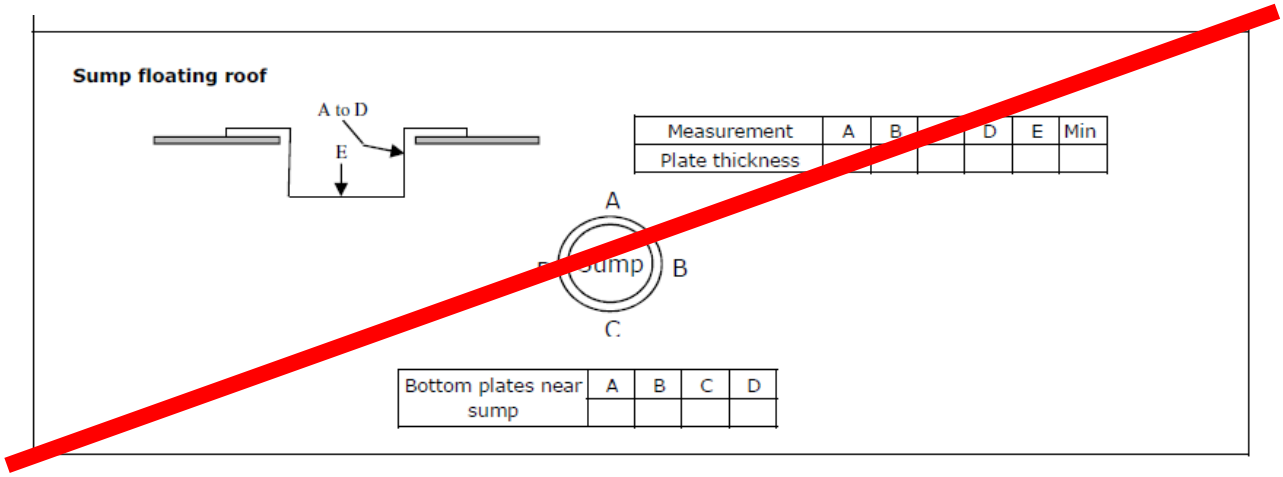


Diameter	No of scan lines
D < 20	4
20 ≤ D ≤ 36	8
D > 36	Max. 15m interval

Thickness measurements tank shell:
Locate minimum required scan lines equally over circumference of tanks.
As a minimum: measure plate thickness, per scan line, on each shell course at 3 locations ⅛h, ⅜h and 30mm above lowest horizontal weld seam of each course.
OR (preferably)
Use automatic UT crawler and measure each 100mm over the full shell height per scan line.

2. Ultrasonic Inspection Tank Roof (Fixed);

Page 342 - Sump floating roof section to be removed not applicable to fixed roof tanks:



3. Ultrasonic Inspection Tank Roof (Single Deck Floating Roof);

Page 343 - 'Sump floating roof' section Existing text:

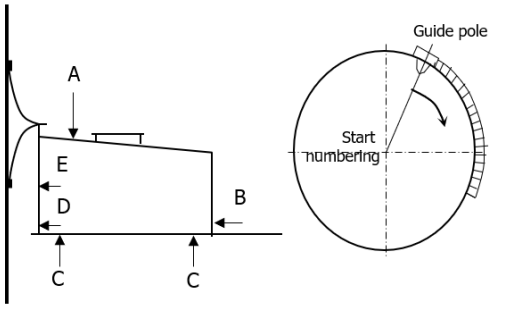
Bottom plates near sump	A	B	C	D

Page 343 - 'Sump floating roof' section Amended text:

Roof plates near sump	A	B	C	D

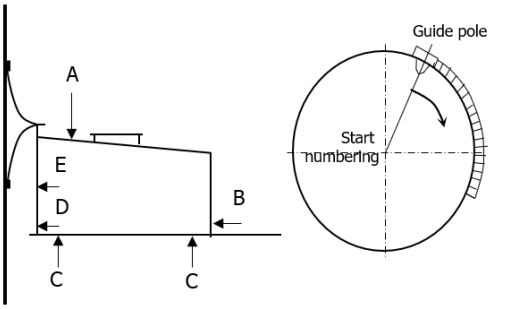
4. Ultrasonic Inspection Pontoons (Single Deck Floating Roof);

Page 344 - 'Pontoons' section Existing text:



Pontoons:
Numbering of pontoons from guide pole.
Measuring point 'E' at height of liquid level.
Measuring point 'A' at 200mm away from outer-rim edge.
Measuring point 'B': 25mm above the connecting weld of the centre embrane to the inner rim plate of the pontoon.
Measuring points 'C1', 'C2', 'C3', 'C4'; 50mm away from, respectively the outer or inner rim plates of the pontoons and 50mm away from the bulkhead plates.
Measuring points 'D1', 'D2', and 'D3'; 25mm above the weld of the lower deck plates of the pontoons.

Page 344 - 'Pontoons' section Amended text:

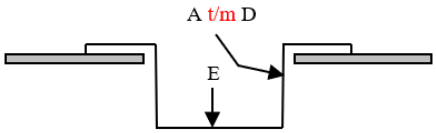


Pontoons:
Numbering of pontoons from guide pole.
Measuring point 'E' at height of liquid level.
Measuring point 'A' at 200mm away from outer-rim edge.
Measuring point 'B': 25mm above the connecting weld of the centre membrane to the inner rim plate of the pontoon.
Measuring points 'C1', 'C2', 'C3', 'C4'; 50mm away from, respectively the outer or inner rim plates of the pontoons and 50mm away from the bulkhead plates.
Measuring points 'D1', 'D2', and 'D3'; 25mm above the weld of the lower deck plates of the pontoons.

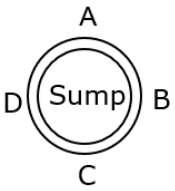
5. Ultrasonic Inspection Tank Roof (Double Deck Floating Roof);

Page 345 - 'Sump floating roof' section Existing text:

Sump floating roof



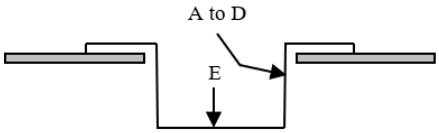
Measurement	A	B	C	D	E	Min
Plate thickness						



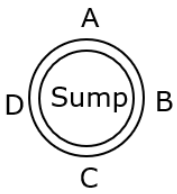
Bottom plates near sump	A	B	C	D

Page 345 - 'Sump floating roof' section Amended text:

Sump floating roof



Measurement	A	B	C	D	E	Min
Plate thickness						



Roof plates near sump	A	B	C	D