



Association Française des Ingénieurs en Appareils à Pression

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Guideline for acoustic emission testing of pressure equipment

2nd edition, 2009

Erratum N^{br}1 dated June 14th, 2011

This first erratum sums up amendments and clarifications to be made in the body of the guideline and its annexes, subject of the decision BSEI N° 09-102 June 29th 2009.

It was validated by GEA during their the plenary session of January 20th 2011 and and was subject of approval BSEI No. 11-017 of 28 January 2011 concerning the consideration of options for treatment of some differences found in connection with inspections and of the scope of Annexes.

These corrections are to be considered as mandatory in the guideline referenced above.

They are presented in order of the pages of the guideline and its annexes. They cover:

- Correction of typos
- Changes or additions of paragraphs.

Body of the guideline:

Page 18: N_c is the limit value of N_{ce} and not N_{3e}

Page 36 § 9.2.2: addition of the following note:

“For permanent installations (permanent sensor or wave guide),

-in case of failure of a measuring point with technical impossibility of repair or replacement,

- in the case of an increase in attenuation over time with technical impossibility of repair or replacement, special steps must be taken by Level 3 personnel to ensure complete coverage of the ESP: the lowering of the values of evaluation and reference thresholds of the same gap will increase the size of the area covered by each sensor. The lowering of the thresholds should be at least done on the neighboring sensors of faulty sensor (s). The acquisition threshold must be adapted accordingly. The new range of coverage to the new threshold value assessment must be justified from the attenuation curve and indicated in the report. The impact of these changes will be analyzed. The criteria for validation of the zonal location or planar should be respected. The values of the criteria for defining categories of areas remain unchanged.”

Page 37- Table 2: alarm and stop criteria for N_1 are E_{ia} and E_{id} and not E_{ea} and E_{ed}

Annex 3:

Page 45 § 1:

- Delete in the first paragraph “ without circulation of process fluid”
- Add at the end of 3rd paragraph “without circulation of fluid”

Page 46 § 3.4- 1st line: read **6 dB** and not 6 dB_{EA}

Page 49 § 5.3- 2nd line: read **6 dB** and not 6 dB_{EA}

Page 50 § 7.1: add “See **note in body of the guideline § 9.2.2**”

Page 50 under Table 1:

- (3) Cycle with N sequences after N exceeded alarm criteria. Limit values for the concerned sequence
- (4) Criteria 2 and 3 apply if criterion 4 is exceeded ($N > N_{1S}$)

Page 53 – Category 3: replace “**is verified/exceeded**” by “are verified/exceeded”

Page 55 –Figure 3:

- Add to minimum sequence : to perform between 95% of PMA and Pmax, without checking Kaiser effect
- P1 is at **95% of PMA** and not 0.95 PMA
- Add to curve zoom “**Optional pressurisation sequences (10 min holds)**”

Annex 4:

Page 57:

- **Group G150:** read **12 dB** and not 12 dB_{EA}
- **Group G75:** read **12 dB** and not 12 dB_{EA} and **24 dB** and not 24 dB_{EA}

Page 62- Table 3: FA_{Max} is **2.8** and not 1.8 for A>60 (red value in new following table)

Table 3: digital application of the FAEA calculation for type Group G75

Cluster parameters	Value	Coefficient	
Number of events in cluster (N)	$N \leq 5$ $5 < N \leq 10$ $N > 10$	FN = 1 FN = 2 FN = 3	
Amplitude of highest amplitude event in cluster (Fa_{Max}) and average amplitude of events in cluster (FA_{Avg}) In dB_{EA}	$A \leq 50$ $50 < A \leq 60$ $A > 60$	FA_{Avg} 0,3 0,6 1,2	FA_{Max} 0,7 1,4 2,8
Energy of highest energy event in cluster (FE_{Max}) and cumulative energy in cluster (FE_{Σ}) In eu (*)	$E \leq 1.10^4$ $1.10^4 < E \leq 5.10^4$ $E > 5.10^4$	FE_{Σ} 0,4 0,8 1,6	FE_{Max} 0,6 1,2 2,4

Annex 6:

Page 65 § 1:

- Delete in the first paragraph “ without circulation of process fluid”
- Add at the end of 3rd paragraph “**without circulation of fluid**”

Page 66 § 3.4- 1st line: read **6 dB** and not $6 dB_{EA}$

Page 68 § 4.5- 2nd paragraph: Table 1 is at § 7.2 and not 7.2.1

Page 69 § 5.3- 2nd line: read **6 dB** and not $6 dB_{EA}$

Page 70 § 7.1: add “See **note in body of the guideline § 9.2.2**”

Page 71 under Table 1:

- (3) Cycle with N sequences after N exceeded alarm criteria. Limit values for the concerned sequence
- (4) Criteria 2 and 3 apply if criterion 4 is exceeded ($N > N_{IS}$)

Page 72- case 2: two of the criteria ④ or ⑤ or ⑥ are exceeded

Page 74- for category 2 and 3: replace “**is verified/exceeded**” by “are verified/exceeded”

Annex 8:

Page 80 § 6.2.1: see §6.2.3 and not 6.2.3.2

Page 85-2nd line: (see § 9.2.3 in body of the guideline)

Page 85 § 6.5.1: add” See **note in body of the guideline § 9.2.2**”

Page 85 § 6.5.2 -1st line (see § 9.2.3 in body of the guide line)

Page 86 under Table 1:

- (3) Cycle with N sequences after N exceeded alarm criteria. Limit values for the concerned sequence
- (4) Criteria 2 and 3 apply if criterion 4 is exceeded ($N > N_{1s}$)

Page 89 Table 3: replace the values of the category 3 (last column) of the criteria 4, 5 and 6 from 600, 500 and 40 by **550, 40 and 30** respectively (values in red into the new table below)

Table 3

Criteria : The case of low alloy steels with yield strength less than or equal to 460 MPa after potential filtering of AE activity linked to external sources for loading at $P_{max}=110\%$ PMA

Criterion definition	Category 1	Category 2	Category 3
2 Activity, evolution/ zone*	$\Delta N/\Delta P$ decreasing with increasing pressure (1)	$\Delta N/\Delta P$ constant with increasing pressure	$\Delta N/\Delta P$ increasing with increasing pressure
3 Intensity, evolution/ zone*	$\Delta I/\Delta P$ decreasing with increasing pressure (1)	$\Delta I/\Delta P$ constant with increasing pressure	$\Delta I/\Delta P$ increasing with increasing pressure
4 N_{1s} / zone*	< 50	≥ 50 et < 550	≥ 550
5 N_{2s} / zone*	< 5	≥ 5 et < 40	≥ 40
6 N_{3s} / zone*	< 10	≥ 10 et < 30	≥ 30
8 Loading ratio / zone */**	≥ 1	$\geq 0,95$ et < 1	< 0,95
9 Activity, evolution/ cluster	$\Delta N/\Delta P$ decreasing with increasing pressure	$\Delta N/\Delta P$ constant with increasing pressure	$\Delta N/\Delta P$ increasing with increasing pressure
10 Intensity, evolution/ cluster	$\Delta I/\Delta P$ decreasing with increasing pressure	$\Delta I/\Delta P$ constant with increasing pressure	$\Delta I/\Delta P$ increasing with increasing pressure

Annex 9:

Page 94- 4th paragraph of the scope: Replace “Insulation: Fireproofed or not” by “**Insulation: insulated, fireproofed, or not**”

Page 96 § 4.2.1- 2nd line: delete” page 9”

”are exceeded/verified”: add “**See note in body of the guideline § 9.2.2**”

Page 100 under Table 1: Criteria 2 and 3 apply if criterion 4 is exceeded ($N > N_{1s}$)

Page 101 § 5.2.3.1 and 5.2.3.2: replace “are exceeded” by”are exceeded/verified”

Page 102: replace “are exceeded” by» **are exceeded/verified**” for categories 2 and 3

Page 105 § 6.2.2: add “**See note in body of the guideline § 9.2.2**”

Page 105 –Table 3: the 4th criterion numbered 3 shall be replaced by “**4**”

Page 106 § 6.3.5-last line: (see §9.2.4 in body of the guideline)