IEC 62127-2
(First edition – 2007)

Ultrasonics – Hydrophones –
Part 2: Calibration for ultrasonic fields up to 40 MHz

CORRIGENDUM 1

Page 15

5 Overview of calibration procedures

5.1 Principles

On page 16, instead of:

NOTE 2 "Absolute" **hydrophone** calibration is understood here in the sense of "without reference to another **hydrophone**". This is sometimes also referred to as "primary" or "substitution" procedure, which means a sensitivity comparison with a calibrated reference **hydrophone**. The reference **hydrophone** itself may have been calibrated in "absolute" terms or against another reference **hydrophone**, and so on. Obviously, there are two different, fundamental procedures: to perform an absolute **hydrophone** calibration and to compare the sensitivity of two **hydrophones**. Clauses 9, 10, 11, Annexes D, F and H deal with the former procedure. The latter procedure is dealt with in detail in Clause 12. It should be noted that a substitution calibration usually involves both steps and that the interested user should refer to both Clause 12 and other clauses dealing with absolute calibration (and that **uncertainties** from both fundamental steps contribute to the final calibration **uncertainty** in the case of a substitution calibration).

read:

NOTE 2 "Absolute" **hydrophone** calibration is understood here in the sense of "without reference to another **hydrophone**". This is sometimes also referred to as "primary" calibration. On the other hand, **hydrophones** are often calibrated in practice following a "secondary" or "substitution" procedure, which means a sensitivity comparison with a calibrated reference **hydrophone**. The reference **hydrophone** itself may have been calibrated in "absolute" terms or against another reference **hydrophone**, and so on. Obviously, there are two different fundamental procedures: to perform an absolute **hydrophone** calibration and to compare the sensitivity of two **hydrophones**. Clauses 9, 10, 11, and Annexes D, F and H deal with the former procedure. The latter procedure is dealt with in detail in Clause 12. It should be noted that a substitution calibration usually involves both steps and that the interested user should refer to both Clause 12 and the other clauses dealing with absolute calibration (and that **uncertainties** from both fundamental steps contribute to the final calibration **uncertainty** in the case of a substitution calibration).

Page 20

6.3 Hydrophone size

In the second sentence, instead of:

"...the **effective radius of the hydrophone** small be small compared with..."

read:

"the **effective radius of the hydrophone** shall be small compared with..."

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Page 25

10 Free field calibration by planar scanning

On page 26, for Equation (6), instead of:

$$P(l) = \iint \overline{I(x,y,l,t)} \cos \Theta \, dy \, dz \tag{6}$$

read:

$$P(l) = \iint \overline{I(x,y,l,t)} \cos \Theta \, dy \, dx \tag{6}$$

Page 38

Annex D Absolute calibration of hydrophones using the planar scanning technique

D.2 Hydrophone scanning methodology

For Equation (D.2), instead of:

$$\iint \overline{[U_{\mathrm{L}}(x,y,l,t)]^2} \, dy \, dx \approx \left(\frac{\pi}{N}\right) \sum_{i=1}^{N} \left\{ \sum_{r=R_{1i}}^{R_{2i}} [U_{\mathrm{L}}(l,r)]^2 \, r \, \Delta r + [U_{\mathrm{L}}(l,s)]^2 \left(\left(\frac{\Delta r}{2}\right) - s \right)^2 \right\} \tag{D.2}$$

read:

$$\iint \overline{[U_{\mathrm{L}}(x,y,l,t)]^2} \, dy \, dx \approx \left(\frac{\pi}{N}\right) \sum_{i=1}^{N} \left\{ \sum_{r=R_{1i}}^{R_{2i}} [U_{\mathrm{L}}(l,r)]^2 \, r \, \Delta r + [U_{\mathrm{L}}(l,s)]^2 \left(\frac{\Delta r}{2} - s \right)^2 \right\} \tag{D.2}$$

Page 39

D.3 Corrections and sources of measurement uncertainty

D.3.4 Directional response

In the last sentence of the first paragraph, instead of:

$\Theta_1 = \tan^{-1}[(x^2 + y^2)^{½}/l]$

read:

$\Theta_1 = \arctan\,[(x^2 + y^2)^{½}/l]$

Page 41

D.3.6 Noise

In the first paragraph, fourth sentence, instead of :

"The rms noise level, $U_{\mathrm{n}}(l,x,y)$…"

read:

"The rms noise level, $U_{\mathrm{n}}(x,y,l)$…"

D.3.7 Non-linear propagation

For Equation (D.10), instead of:

$$R = l\lambda/\pi\ a_t^2 \quad \text{(D.10)}$$

read:

$$R = l\lambda/\pi\ a_t^2 \quad \text{(D.10)}$$

Page 43

D.4 Rationale behind the planar scanning technique for calibrating hydrophones

D.4.2 Relationship between hydrophone and transducer effective radii

For equation (D.14), instead of:

$$k\ a_h \sin(\theta) \le \quad \text{(D.14)}$$

read:

$$k\ a_h \sin(\theta) \le 1 \quad \text{(D.14)}$$

Page 48

Annex F The absolute calibration of hydrophones by optical interferometry up to 40 MHz

F.2.3.1.1 Measurement system

On page 50, for Equation (F.2), instead of:

$$\zeta = \frac{U_S \lambda_l}{2\pi T \hat{U}} \frac{V(f=0)}{V(f)} \quad \text{(F.2)}$$

read:

$$\zeta = \frac{U_S \lambda_I}{2\pi T F \hat{U}} \frac{V(f=0)}{V(f)} \quad \text{(F.2)}$$

and, directly following Equation (F.2), instead of:

λ_l is the optical wavelength (the wavelength of the light in vacuum;)

read:

λ_I is the optical wavelength (the wavelength of the light in vacuum;)

Page 56

F.2.3.2.4 Calibration corrections and sources of measurement uncertainty

Renumber subclause F.2.3.2.5 as F.2.3.2.4.1 and subclause F.2.3.2.6 as F.2.3.2.5.