

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).

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6.3 Hydrophone size

In the second sentence, instead of:

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

read:

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

10 Free field calibration by planar scanning

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

$$P(l) = \iint \overline{l(x, y, l, t)} \cos \theta \, dy \, dz \quad (6)$$

read:

$$P(l) = \iint \overline{l(x, y, l, t)} \cos \theta \, dy \, dx \quad (6)$$

Annex D Absolute calibration of hydrophones using the planar scanning technique**D.2 Hydrophone scanning methodology**

For Equation (D.2), instead of:

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

read:

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

D.3 Corrections and sources of measurement uncertainty**D.3.4 Directional response**

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

$$\theta_1 = \tan^{-1}[(x^2 + y^2)^{1/2}/l]$$

read:

$$\theta_1 = \arctan [(x^2 + y^2)^{1/2}/l]$$

D.3.6 Noise

In the first paragraph, fourth sentence, instead of :

“The rms noise level, $U_n(l, x, y)$...”

read:

“The rms noise level, $U_n(x, y, l)$...”