

DIN EN ISO 18081:2024-10 (E)

Non-destructive testing - Acoustic emission testing (AT) - Leak detection by means of acoustic emission (ISO 18081:2024)

Contents		Page
European foreword		4
Foreword		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	6
4	Qualification of test personnel	7
5	Principle of acoustic emission testing	7
5.1	The acoustic emission phenomenon	7
5.2	Influence of different media and different phases	7
5.3	Influence of pressure differences	8
5.4	Influence of geometry of the leak path	9
5.5	Influence of wave propagation	9
6	Applications	10
7	Testing equipment	10
7.1	General requirements	10
7.2	Sensors	10
7.2.1	Typical frequency ranges (band widths)	10
7.2.2	Mounting technique	11
7.2.3	Temperature range, wave guide	11
7.2.4	Intrinsic safety	11
7.2.5	Immersed sensors	11
7.2.6	Integral electronics (amplifier, RMS converter, ASL converter, band pass)	11
7.3	Portable and non-portable AE instruments	12
7.4	Single and multi-channel AT instruments	12
7.4.1	Single-channel instruments	12
7.4.2	Multi-channel instruments	12
7.5	Determination of features (RMS, ASL vs. hit or continuous AE vs. burst AE)	12
7.6	System verification using artificial leak noise sources	12
8	Test procedure for leak detection	13
8.1	Mounting of sensors	13
8.2	Additional features to be determined	14
8.3	Background noise	14
8.3.1	General	14
8.3.2	Environmental noise	14
8.3.3	Process noise	14
8.4	Data acquisition	14
9	Location procedures	15
9.1	General	15
9.2	Single-sensor location based on AE wave attenuation	15
9.3	Multi-sensor location based on Δt values (linear, planar)	16
9.3.1	Threshold level and peak level timing technique	16
9.3.2	Cross-correlation technique	16
10	Data presentation	17
10.1	Numerical data presentation (level meter)	17
10.2	Parametric dependent function	17
10.3	Frequency spectrum	18

11	Data interpretation	18
11.1	Leak validation.....	18
11.1.1	On-site (during test) and off-site (post analysis).....	18
11.1.2	Correlation with pressure.....	18
11.1.3	Rejection of false indications	18
11.2	Leakage rate estimation	19
11.3	Demand for follow-up actions	19
12	Quality management documents	20
12.1	Test procedure.....	20
12.2	Test instruction.....	20
13	Test documentation and reporting	21
13.1	Test documentation.....	21
13.2	Test report.....	21
	Annex A (informative) Example applications of leak detection	23
	Bibliography	36