

ISO 20486:2017-12 (E)

Non-destructive testing - Leak testing - Calibration of reference leaks for gases

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	2
3	Terms and definitions	2
4	Nominal leakage rates	3
5	Classification of leaks	3
5.1	Permeation leak	3
5.2	Conductance leaks	3
5.2.1	Capillary leak	3
5.2.2	Aperture leak (orifice)	4
5.2.3	Compressed powder leak	4
6	Calibration by comparison	4
6.1	Methods A, As, B and Bs	4
6.2	Applicability of comparison methods	4
6.3	Preparation of leaks and apparatus	5
6.3.1	Leak detector	5
6.3.2	Connection to the leak detector	5
6.3.3	Temperature accommodation	7
6.4	Measurement	7
6.4.1	Set-up	7
6.4.2	General measurement sequence	7
6.5	Evaluation for methods A, As, B and Bs (Comparison)	8
6.5.1	Determination of leakage rate	8
6.5.2	Influence factors to measurement uncertainty	9
7	Volumetric calibration	10
7.1	Direct flow (Method C)	10
7.1.1	General	10
7.1.2	Equipment	10
7.1.3	Preparation of leaks and apparatus	10
7.1.4	Measurement	11
7.1.5	Evaluation for Method C (direct flow measurement)	13
7.2	Leak measurement under water (Method D)	14
7.2.1	General	14
7.2.2	Equipment	14
7.2.3	Preparation of leaks and apparatus	14
7.2.4	Measurement	15
7.2.5	Evaluation for Method D	16
7.2.6	Influence factors to measurement uncertainty	17
7.3	Calibration by (volumetric) gas meter (Method E)	17
7.3.1	General	17
7.3.2	Equipment	18
7.3.3	Preparation of leaks and apparatus	18
7.3.4	Measurement	18
7.3.5	Evaluation for Method E (gas meter)	18
7.3.6	Influence factors to measurement uncertainty	19

7.4	Calibration by pressure change in a known volume (Method F)	19
7.4.1	General	19
7.4.2	Preparation of leaks and apparatus	20
7.4.3	Measurement	22
7.4.4	Special situation in vacuum chambers	23
7.4.5	Evaluation for Method F (pressure change)	25
7.4.6	Influence factors to measurement uncertainty	25
7.5	Calibration by volume change at constant pressure (Method G)	26
7.5.1	Equipment	26
7.5.2	Preparation of leaks and apparatus	26
7.5.3	Measurement	26
7.5.4	Evaluation for Method G (volume change at constant pressure)	27
8	General influences	28
9	Report	28
10	Labelling of reference leaks	29
11	Handling of reference leaks	29
11.1	General	29
11.2	Permeation leaks (normally with reservoir fitted the leak outlet)	29
11.3	Conductance leaks (normally without reservoir)	29
Annex A (informative)	Calculation of leakage rate decrease due to tracer gas depletion in the reservoir	30
Bibliography	32