

DIN EN ISO 16890-2:2023-12 (E)

Air filters for general ventilation - Part 2: Measurement of fractional efficiency and air flow resistance (ISO 16890-2:2022)

Contents	Page
European foreword	5
Foreword	6
Introduction	8
1 Scope	10
2 Normative references	10
3 Terms and definitions	10
3.1 Air flow and resistance	11
3.2 Test device	11
3.3 Aerosol	11
3.4 Particle counter	12
3.5 Efficiency	12
3.6 Other terms	13
4 Symbols and abbreviated terms	13
4.1 Symbols	13
4.2 Abbreviated terms	15
5 General test requirements	15
5.1 Test device requirements	15
5.2 Test device installation	15
5.3 Test rig requirements	16
6 Test materials	16
6.1 Liquid phase aerosol	16
6.1.1 DiEthylHexylSebacate (DEHS) test aerosol	16
6.1.2 DEHS properties	16
6.1.3 Liquid phase aerosol generation	16
6.2 Solid phase aerosol	17
6.2.1 Potassium chloride (KCl) test aerosol	17
6.2.2 KCl properties	17
6.2.3 Solid phase aerosol generation	18
6.3 Reference aerosols	19
6.3.1 Reference aerosol for 0,3 µm to 1,0 µm	19
6.3.2 Reference aerosol for 1,0 µm to 10,0 µm	19
6.4 Aerosol loading	19
7 Test equipment	20
7.1 Test rig	20
7.1.1 Dimensions	20
7.1.2 Construction materials	20
7.1.3 Test rig shape	21
7.1.4 Test rig air supply	21
7.1.5 Test rig isolation	21
7.1.6 D/S mixing orifice	21
7.1.7 Aerosol sampling	22
7.1.8 Test rig air flow rate measurement	24
7.1.9 Resistance to air flow measurement	24
7.1.10 Test devices not measuring 610 mm × 610 mm (24.0 inches × 24.0 inches)	25
7.1.11 Dust injection testing	25
7.2 Aerosol particle counter	26
7.2.1 General	26
7.2.2 OPC sampled size range	26
7.2.3 OPC particle size ranges	26
7.2.4 Sizing resolution	27
7.2.5 Calibration	27

7.2.6	Air flow rate.....	27
7.2.7	Zero counting.....	27
7.2.8	Dual OPC(s).....	27
7.3	Temperature, relative humidity.....	27
8	Qualification of test rig and apparatus.....	28
8.1	Schedule of qualification testing requirements.....	28
8.1.1	General	28
8.1.2	Qualification testing	28
8.1.3	Qualification documentation.....	28
8.2	Qualification testing.....	29
8.2.1	Test rig — Pressure system testing	29
8.2.2	OPC — Air flow rate stability test.....	30
8.2.3	OPC — Zero test.....	30
8.2.4	OPC — Sizing accuracy	30
8.2.5	OPC — Overload test.....	31
8.2.6	Aerosol generator — Response time	31
8.2.7	Aerosol generator — Neutralizer	32
8.2.8	Test rig — Air leakage test.....	33
8.2.9	Test rig — Air velocity uniformity	33
8.2.10	Test rig — Aerosol uniformity	34
8.2.11	Test rig — Downstream mixing.....	35
8.2.12	Test rig — Empty test device section pressure	37
8.2.13	Test rig — 100 % efficiency test and purge time	37
8.2.14	Test rig — Correlation ratio	38
8.3	Maintenance.....	38
8.3.1	General	38
8.3.2	Test rig — Background counts.....	39
8.3.3	Test rig — Reference filter test.....	39
8.3.4	Test rig — Pressure reference test.....	40
8.3.5	Test rig — Final filter resistance	41
9	Test methods.....	41
9.1	Air flow rate	41
9.2	Measurement of resistance to air flow	41
9.3	Measurement of fractional efficiency	41
9.3.1	Aerosol sampling protocol	41
9.3.2	Background sampling	41
9.3.3	Testing sequence for a single OPC.....	42
9.3.4	Testing sequence for dual OPC.....	46
10	Data reduction and calculations.....	47
10.1	Correlation ratio.....	47
10.1.1	Correlation ratio general	47
10.1.2	Correlation ratio data reduction	48
10.2	Penetration and fractional efficiency	49
10.2.1	Penetration and fractional efficiency general	49
10.2.2	Penetration data reduction	50
10.3	Data quality requirements	52
10.3.1	Correlation background counts	52
10.3.2	Efficiency background counts	52
10.3.3	Correlation ratio	52
10.3.4	Penetration	53
10.4	Fractional efficiency calculation	54
11	Reporting results	54
11.1	General	54
11.2	Required reporting elements	54
11.2.1	Report general	54
11.2.2	Report values	54

11.2.3 Report summary.....	55
11.2.4 Report details.....	56
Annex A (informative) Example.....	59
Annex B (informative) Resistance to air flow calculation.....	66
Bibliography.....	68