

# DIN EN 54-12:2015-10 (E)

## Fire detection and fire alarm systems - Part 12: Smoke detectors - Line detectors using an optical beam

---

Contents		Page
Foreword .....		5
1 Scope .....		7
2 Normative references .....		7
3 Terms and definitions .....		8
4 Requirements .....		9
4.1 Compliance .....		9
4.2 Operational reliability .....		9
4.2.1 Individual alarm indication .....		9
4.2.2 Connection of ancillary devices .....		9
4.2.3 Manufacturer's adjustments .....		9
4.2.4 On-site adjustment of response value .....		9
4.2.5 Protection against ingress of foreign bodies .....		10
4.2.6 Monitoring of detachable detectors and connections .....		10
4.2.7 Requirements for software controlled detectors (when provided) .....		10
4.3 Nominal activation conditions/sensitivity .....		11
4.3.1 Reproducibility .....		11
4.3.2 Repeatability .....		11
4.3.3 Tolerance to beam misalignment .....		11
4.3.4 Rapid changes in attenuation .....		12
4.3.5 Response to slowly developing fires .....		12
4.3.6 Optical path length dependence .....		12
4.3.7 Stray light .....		12
4.4 Tolerance to supply voltage - Variation in supply parameters .....		12
4.5 Performance parameters under fire conditions - Fire sensitivity .....		12
4.6 Durability of nominal activation conditions/sensitivity .....		12
4.6.1 Temperature resistance .....		12
4.6.2 Humidity resistance .....		13
4.6.3 Vibration resistance .....		13
4.6.4 Electrical stability - Electromagnetic Compatibility (EMC), Immunity tests (operational) .....		13
4.6.5 Corrosion resistance - Sulphur dioxide (SO <sub>2</sub> ) corrosion (endurance) .....		13
5 Testing, assessment and sampling methods .....		13
5.1 General .....		13
5.1.1 Atmospheric conditions for tests .....		13
5.1.2 Operating conditions for tests .....		14
5.1.3 Mounting arrangements .....		14
5.1.4 Tolerances .....		14
5.1.5 Measurement of response value .....		14
5.1.6 Provision for tests .....		15
5.1.7 Test schedule .....		15
5.2 Operational reliability .....		16
5.2.1 Individual alarm indication .....		16
5.2.2 Connection of ancillary devices .....		16
5.2.3 Manufacturer's adjustments .....		16
5.2.4 On-site adjustment of response value .....		16
5.2.5 Protection against ingress of foreign bodies .....		17
5.2.6 Monitoring of detachable detectors and connections .....		17

5.2.7	Additional requirements for software controlled detectors .....	17
5.3	Normal activation conditions/sensitivity .....	17
5.3.1	Reproducibility .....	17
5.3.2	Repeatability .....	17
5.3.3	Tolerance to beam misalignment .....	18
5.3.4	Rapid changes in attenuation .....	19
5.3.5	Response to slowly developing fires .....	19
5.3.6	Optical path length dependence .....	19
5.3.7	Stray light .....	20
5.4	Tolerance to supply voltage -- Variation of supply parameters .....	21
5.4.1	Object of the test .....	21
5.4.2	Test procedure .....	21
5.4.3	Test requirements .....	21
5.5	Performance parameters under fire conditions .....	21
5.5.1	Fire sensitivity .....	21
5.6	Durability of nominal activation conditions/sensitivity .....	23
5.6.1	Temperature resistance .....	23
5.6.2	Humidity resistance .....	25
5.6.3	Vibration resistance .....	27
5.6.4	Electrical stability - Electromagnetic compatibility (EMC), immunity tests (operational) ...	29
5.6.5	Corrosion resistance -- Sulphur dioxide (SO <sub>2</sub> ) corrosion (endurance) .....	30
 6	 Assessment and verification of constancy of performance (AVCP) .....	30
6.1	General .....	30
6.2	Type testing .....	31
6.2.1	General .....	31
6.2.2	Test samples, testing and compliance criteria .....	32
6.2.3	Test reports .....	32
6.3	Factory production control (FPC) .....	32
6.3.1	General .....	32
6.3.2	Requirements .....	33
6.3.3	Product specific requirements .....	35
6.3.4	Initial inspection of factory and FPC .....	36
6.3.5	Continuous surveillance of FPC .....	36
6.3.6	Procedure for modifications .....	36
6.3.7	One-off products, pre-production products, (e.g. prototypes) and products produced in very low quantities .....	37
 7	 Classification and designation .....	37
 8	 Marking, labelling and packaging .....	37
 Annex A (normative)	Bench for response value measurements .....	39
A.1	Technical characteristics of the attenuators .....	39
A.2	Measuring bench .....	40
 Annex B (normative)	Fire test room .....	41
 Annex C (normative)	Smouldering (pyrolysis) wood fire (TF2) .....	43
C.1	Fuel .....	43
C.2	Hotplate .....	43
C.3	Arrangement .....	43
C.4	Heating rate .....	44
C.5	End of test condition .....	44
C.6	Test validity criteria .....	44
 Annex D (normative)	Glowing smouldering cotton fire (TF3) .....	46
D.1	Fuel .....	46
D.2	Arrangement .....	46

D.3	<b>Ignition</b> .....	46
D.4	<b>End of test condition</b> .....	47
D.5	<b>Test validity criteria</b> .....	47
<b>Annex E (normative) Flaming plastics (polyurethane) fire (TF4)</b> .....		49
E.1	<b>Fuel</b> .....	49
E.2	<b>Arrangement</b> .....	49
E.3	<b>Ignition</b> .....	49
E.4	<b>End of test condition</b> .....	49
E.5	<b>Test validity criteria</b> .....	49
<b>Annex F (normative) Flaming liquid (n-heptane) fire (TF5)</b> .....		51
F.1	<b>Fuel</b> .....	51
F.2	<b>Arrangement</b> .....	51
F.3	<b>Ignition</b> .....	51
F.4	<b>End of test condition</b> .....	51
F.5	<b>Test validity criteria</b> .....	51
<b>Annex G (normative) Apparatus for stray light</b> .....		53
G.1	<b>Installation</b> .....	53
G.2	<b>The light source</b> .....	54
<b>Annex H (informative) Information concerning the requirements for the response to slowly developing fires</b> .....		56
<b>Annex I (informative) Data supplied with line detectors using an optical beam</b> .....		60
<b>Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation</b> .....		61
<b>Bibliography</b> .....		71