

DIN EN 1366-10:2011-07 (E)

Fire resistance tests for service installations - Part 10: Smoke control dampers

Contents		Page
Foreword		5
Introduction		6
1	Scope	7
2	Normative references	7
3	Terms and definitions	7
4	Test equipment	11
4.1	General	11
4.2	Connecting duct for multi compartment fire resisting smoke control damper: maintenance of opening test and EN 1366-2 test	11
4.3	Volume flow measuring station for multi compartment fire resisting smoke control damper: maintenance of opening test and EN 1366-2 test	12
4.4	Plenum for High Operating Temperature (HOT) test	12
4.5	Cycling equipment	12
4.6	Condensing unit	12
4.7	Gas temperature measuring devices	12
4.8	Exhaust fan system	13
4.9	Perforated plate	13
4.10	Flow measurement nozzles (fire test)	14
4.11	Ambient leakage measuring device	14
4.12	Pressure sensors for differential pressure control	14
4.13	Welded connecting tube	14
4.14	Extract fan connecting duct	14
4.15	Extraction fan	14
4.16	Thermocouples	15
4.17	Oxygen measuring equipment	15
4.18	Observation windows	15
5	Test specimen	15
5.1	Cross-section	15
5.2	Design	15
5.2.1	General	15
5.2.2	Supporting constructions	15
5.2.3	Inclusion of grilles	16
6	Test methods	16
6.1	General	16
6.2	Initiation regimes for elevated temperature and fire tests	16
6.2.1	Smoke control damper for systems with automatic activation	16
6.2.2	Smoke control damper for systems with manual intervention:	17
6.3	Cycling test requirements (to form part of the sequences of testing defined below)	17
6.3.1	General	17
6.3.2	Smoke control damper to be used in dedicated Smoke control systems, operated only in the case of emergency	17
6.3.3	Differential pressure conditions	18
6.4	Single compartment smoke control dampers mounted on the surface of a duct	18
6.4.1	Sequence	18
6.4.2	Ambient leakage	18

6.4.3	Cycling test	18
6.4.4	Elevated temperature test	18
6.5	Multi compartment fire resisting smoke control dampers	19
6.5.1	Fire resistance test according to EN 1366-2 (for units mounted within or on the face of a compartment structure)	19
6.5.2	Maintenance of opening test (for units mounted within a compartment structure)	20
6.5.3	Horizontal duct test for surface mounted smoke control dampers on a horizontal duct ...	21
6.5.4	Vertical duct test for surface mounted smoke control dampers	22
6.6	Multi compartment fire resisting smoke control dampers (HOT Classification)	23
6.6.1	Fire resistance test (for units mounted within or on the face of a compartment structure)	23
6.6.2	High operating test (HOT 400/30 - cycling and maintenance of opening test)	24
7	Test procedure	24
7.1	Pre-test calibration	24
7.1.1	Oxygen-measuring instrument	24
7.1.2	Perforated plate	24
7.1.3	Leakage measurement at ambient temperature	25
7.2	Fire test	25
7.2.1	Extraction fan	25
7.2.2	Ignition of furnace	25
7.2.3	Furnace conditions	26
7.2.4	Temperatures and pressures	26
7.2.5	Oxygen measurements	26
7.2.6	General observations	26
7.2.7	Reduction of cross-section/ maintenance of opening	26
7.2.8	Leakage calculations	26
7.3	Termination of test	26
8	Test report	28
9	Direct field of application of test results	28
9.1	General	28
9.2	Smoke control damper sizes	28
9.3	Pressure difference	29
9.4	Elevated temperatures	29
9.5	Cycling tests	29
9.5.1	Smoke control dampers meeting the cycling requirements for modulating applications ..	29
9.5.2	Smoke control dampers meeting the cycling requirements for use with combined smoke control and general HVAC applications and for smoke control systems that are cycle checked every day	29
9.5.3	Smoke control dampers meeting the cycling requirements for smoke control dampers that are operated only in the case of emergency	29
9.6	Initiation method	29
9.7	Application to duct constructions other than that tested	30
9.7.1	Single compartment smoke control dampers	30
9.7.2	Multi compartment smoke control dampers	30
10	Duct surface	31
11	Duct surface	32
Annex A (normative) Cycling test		51
A.1	General	51
A.2	Purpose of the test	51
A.3	Method of Application	51
A.3.1	General	51
A.3.2	Smoke Control Damper with single blade	51
A.3.3	Smoke control damper with multi blades of smaller area	53
A.3.4	Report	53
A.4	Background for the torque value (informative)	53
A.4.1	Threshold rates of the working condition of the system	53

A.4.2	Previous experience	54
	Annex B (normative) Leakage calculation from oxygen measurement	55
B.1	General	55
	Annex C (normative) Maintenance of opening calculation	57
C.1	Calculation of the theoretical total mass M_{max} of hot gases during the fire test	57
C.1.1	Basis	57
C.1.2	Method	57
C.1.3	Summary	58
C.2	Calculation of the actual total mass M_{actual} of hot gases during the fire test	60
C.2.1	Basis	60
C.2.2	Method	60
C.2.3	Summary	61
C.3	Graphical representation of typical integral calculation from data	62
	Bibliography	63