

Certificate



Product Safety
Functional
Safety

www.tuv.com
ID 0600000000

No.: 968/FSP 1328.01/17

Product tested	Infra-red and ultra-violet flame detector series	Certificate holder	Dräger Safety AG & Co. KGaA Revalstr. 1 23560 Lübeck Germany
-----------------------	--	---------------------------	---

Type designation	Dräger Flame 2000 - IR (FTR0000), Dräger Flame 2100 - UV (FTR0001), Dräger Flame 2350 - UV/IR (FTR0002), Dräger Flame 2370 - UV/IR (Ultra Fast) (FTR0003), Dräger Flame 2500 - IR3 (FTR0004), Dräger Flame 2570 - IR3 (Ultra Fast) (FTR 0006), Dräger Flame 2700 - Multi IR (FTR0005)
-------------------------	---

Codes and standards	IEC 61508 Parts 1-7:2010 EN 54-10:2002 + A1:2005	EN 50130-4:2011
----------------------------	---	-----------------

Intended application	Detection of hydrocarbon based fuel and gas fires, hydroxyl and hydrogen fires as well as metal and inorganic fires. The Dräger flame detectors are suitable for safety-related applications up to SIL 2 in accordance with IEC 61508.
-----------------------------	---

Specific requirements	The safety notes in the User Manuals shall be considered. Details for the use in safety function can be found on the backside of this certificate.
------------------------------	---

Valid until 2020-05-20

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 1328.01/17 dated 2017-05-02.

This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln

Köln, 2017-05-02

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Stephan Häb

Safety function:

The safety function of the Dräger Flame 2xx0 detectors is defined by recognizing of Hydrocarbon-based fuel and gas fires, hydroxyl and hydrogen fires as well as metal and inorganic fires and announces this over the 4 - 20 mA – interface, Analog Output – Interface (only type 2570 – Detector) and/or by opening the alarm-relay-contact.

Characteristics as per IEC 61508:

SIL	2
HFT	0
Device Type	B
Mode of operation	Low demand mode and high demand or continues mode (only 2500; 2700; 2570)
SFF	95% (IR Detectors) 97% (UV Detectors)
Recommended time interval for proof-testing T1	180 days

	PFD _{avg}	PFD (%) of SIL2	PFH (1/h)	PFH (%) of SIL2	λ_{DU} (1/h)	λ_{DD} (1/h)	λ_D (1/h)	λ_S (1/h)
2000								
Variant A	2,4E-04	2,4%	n.a.	n.a.	1,1E-07	1,3E-06	1,4E-06	1,2E-06
Variant B	2,6E-04	2,6%	n.a.	n.a.	1,2E-07	1,1E-06	1,2E-06	1,1E-06
2500								
Variant A	3,1E-04	3,1%	n.a.	n.a.	1,4E-07	1,3E-06	1,5E-06	1,3E-06
Variant B	3,3E-04	3,3%	1,5E-07	15,0%	1,5E-07	1,2E-06	1,3E-06	1,1E-06
2700								
Variant A	3,4E-04	3,4%	n.a.	n.a.	1,6E-07	1,3E-06	1,5E-06	1,3E-06
Variant B	3,6E-04	3,6%	1,6E-07	16,5%	1,6E-07	1,2E-06	1,4E-06	1,2E-06
2100								
Variant A	9,1E-05	0,9%	n.a.	n.a.	3,8E-08	9E-07	9,4E-07	9,6E-07
Variant B	1,1E-04	1,1%	n.a.	n.a.	4,7E-08	7,4E-07	7,9E-07	8,3E-07
2350								
Variant A	2,7E-04	2,7%	n.a.	n.a.	4,9E-08	9,1E-07	9,7E-07	9,9E-07
Variant B	2,9E-04	2,9%	n.a.	n.a.	5,8E-08	7,5E-07	8,2E-07	8,6E-07
2370								
Variant A	2,7E-04	2,7%	n.a.	n.a.	4,9E-08	9,1E-07	9,6E-07	9,9E-07
Variant B	2,9E-04	2,9%	n.a.	n.a.	5,8E-08	7,5E-07	8,1E-07	8,6E-07
2570								
Variant A	3,1E-04	3,1%	n.a.	n.a.	1,4E-07	1,3E-06	1,5E-06	1,3E-06
Variant B	3,3E-04	3,3%	1,5E-07	15,0%	1,5E-07	1,2E-06	1,3E-06	1,1E-06
Variant C	2,9E-04	2,9%	n.a.	n.a.	1,3E-07	8,7E-07	1,0E-06	7,9E-07

Remarks:

- n.a.: not allowed for high demand mode!
- Variant A: Using only the Alarm - relay for Alarming
- Variant B: Using the 4-20 mA - Interface for Alarming
- Variant C: Using the Analog Output - Interface for Alarming in 2570-Detector
- Failure rates of the electronic components as per Siemens SN 29500, calculated based upon an ambient temperature of 55 °C and statistical data of the sensor elements
- The calculation was performed based on a proof-test interval T1 = 180 days.
- Without knowledge of the partly redundant internal structure of the detector a calculation with other proof-test intervals (e.g. 1 year) leads only to an approximate result