

Certificate



Product Safety
Functional
Safety

www.tuv.com
ID 060000000

No.: 968/EZ 348.04/16

Product tested	Infra-red and ultra-violet flame detector series	Certificate holder	Spectrex Inc. 218 Little Falls Road Cedar Grove, NJ 07009 USA
-----------------------	--	---------------------------	--

Type designation	Sharpeye 40/40 - R, I, M, UB, LB, L4B, UFL, UFI
-------------------------	--

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 Sharpeye 40/40R, I, M, UB, LB, L4B, UFL, UFI flame detectors are suitable for safety-related applications in accordance with IEC 61508 up to SIL 2.
-----------------------------	---

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 2021-05-20

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/EZ 348.04/16 dated 2016-05-20.

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, 2016-05-20

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Heinz Gall

www.fs-products.com
www.tuv.com

TÜVRheinland
Precisely Right.

Safety function:

The safety function of the *Sharpeye 40/40* 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 UFI – 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 4040I; 4040M)
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)
4040R								
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
4040I								
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
4040M								
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
4040UB								
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
4040UV/IR								
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
4040UFL								
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
4040UFI								
Variant A	3,1E-04	3,1%	n.a.	n.a.	1,4E-07	1,3E-06	1,5E-06	1,3E-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 UFI-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