

PERMALUX



AMFE AUTOMATIC MINIATURE FIRE EXTINGUISHER

Your partner on land, on water, in the air



AMFE

AUTOMATIC MINIATURE FIRE EXTINGUISHER

BUILT-IN SAFETY

The AMFE (Automatic Miniature Fire Extinguisher) reliably protects devices and equipment in industry, household and consumer electronics such as cabinets, home appliances, televisions, etc. against fire. The AMFE detects and extinguishes the fire inside the device, preventing the spread of a fire.



AMFE & CO₂ cylinder



AMFE & 3M™ NOVEC™ cylinder



S/R-AMFE & 3M™ NOVEC™ cylinder
(with electric signal connections)



I-AMFE
(for redundancy or larger protected volumes - for CO₂ only)

THE ADVANTAGES AT A GLANCE:

- ≡ Easy to use
- ≡ Maintenance-free
- ≡ Easy to install
- ≡ Variety of customer specific operating & releasing temperatures available
- ≡ No water being used (gas)
- ≡ Scalable
- ≡ Robust and shock tolerant
- ≡ 3MTMNOVECTM or CO2 as extinguishing agent
- ≡ Usable in various applications (home, industry, automotive, etc.)
- ≡ Mechanical release; no electric power supply required
- ≡ Release mechanism: qualified in the automotive and sprinkler industry- Robust and shock tolerant

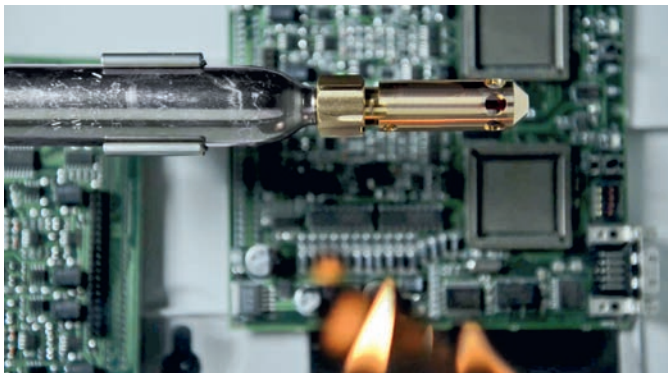
AMFE

AUTOMATIC MINIATURE FIRE EXTINGUISHER

THE CHALLENGE

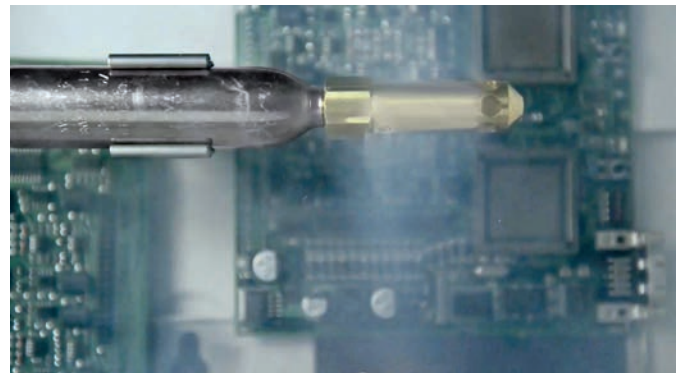
Washing machines, televisions or industrial power supplies – fires in electric devices are a continuously increasing serious threat. And not only at homes damages caused by fires are increasing. There is also a significant risk of fire in the industry and automotive sector. Another example are highly valued collections which are subject to persistent fire hazard. The challenge is to automatically, energy-supply independently, detect and to extinguishing fires already in the early stage, consequently providing more safety. A system is needed, that can extinguish these fires reliably, fast and easily at any time and without external resources inside a housing.

THE FUNCTION



No rarity: A fire in an electric appliance (or on a PCB)

Due to rising heat in a fire scenario the pressure inside the glass bulb increases. After the predetermined operating temperature of the heat sensitive glass bulb is reached, the glass bulb bursts into small fragments and triggers a mechanism that releases the gas from the cylinder.

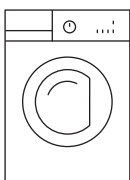


Solution: The AMFE reliably extinguishes a fire

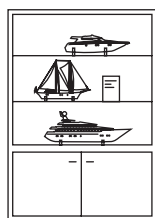
The extinguishing medium is released through the holes in the outlet body and extinguishes the fire when the fire is still in an early stage. The quick operation and the effective extinguishing of the fire prevents further expansion of the fire and helps keeping damage small.

APPLICATION VARIETY

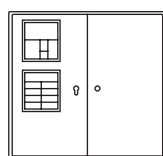
The application spectrum of the AMFE is diverse: It ranges from technical household appliances, exhibits and collections to solutions in a vast variety of applications, both at home and in the industry.



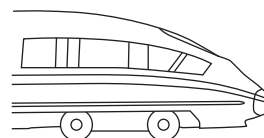
Appliances



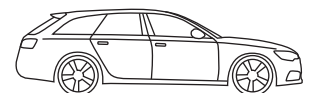
Valuable collections



**Electrical cabinets
or devices**



Rail



Automotive

AMFE AUTOMATIC MINIATURE FIRE EXTINGUISHER

TECHNICAL SPECIFICATIONS

Design Help / Configuration

Sizing the AMFE, (the necessary quantity of extinguishing agent) has to be carried out in accordance with locally relevant standards (e.g. NFPA 12, NFPA 2001, VdS 2093, EN 15004)

- Dimensions (without cylinder):
Ø 16 mm x 64 mm/0,63" x 2,52"
- Minimum installation depth: 20 mm/0,79" (w/o cylinders)

- Activation temperature:
57°C - 260°C/134,6° F - 500° F
- Extinguishing agents: 3M™ NO-VEC™, CO₂,
- Lifetime: 9 years + (for the cylinders)
- Maintenance free
- Lifetime: ∞ for release mechanism (see manual for details)



Physical Dimensions Cylinder					Mounting Brackets Recommended brackets [DIN 3016-1]	3M™ NOVEC™ as fire extinguishing agent			CO ₂ as fire extinguishing agent	
Size	Size Diameter x Length [mm]	Size Diameter x Length [inch]	Volume [Liter]	Volume [floz]		NOVEC™ Content NOVEC Volume [ml]	Protected volume [m ³]* with NOVEC™ Class A[E] fire (4,2% NFPA 2001) Class B fire (5,9% NFPA 2001)		CO ₂ Weight [kg]	Protected free volume [m ³]** with CO ₂ (NFPA 12, class A fire)
#0	22x128	x 5.04	0,026	0,81	RGSS 22	24	0,06	0,04	n.a.	n.a.
#1	35x154	1 x 6.06	0,080	2,70	RGSS 35	72	0,19	0,14	0,035	0,037
#2	40x186	1 1/8 x 7.32	0,133	4,50	RGSS 40	120	0,32	0,23	0,060	0,075
#3	51x251	2 x 9.88	0,267	9,00	2x RSGU 56	241	0,64	0,46	0,135	0,084
#4	51x356	2 x 14.02	0,400	13,50	2x RSGU 56	360	0,96	0,69	0,200	0,124
#5	60x380	2 3/8 x 14.96	0,670	22,60	2x RSGU 63	603	1,61	1,15	0,350	0,217

*) Protected volumes are estimates. NFPA2001 (2012) standard formulas have been applied. P.E.R. Thermo Bulbs GmbH is not responsible for sizing.

***) Protected volumes are estimates. NFPA12 (2012) standard formulas have been applied. P.E.R. Thermo Bulbs GmbH is not responsible for sizing.

⚠ Only for reference. The actual sizing is the responsibility of the customer.

Parts

The parts below are available as standard. Other sizes and temperatures are available upon request.

AMFE

Part	Name	Description
TL-AMFE- 0001	AMFE SR3 68	AMFE, with P.E.R. 68°C/155°F bulb
TL-AMFE- 0002	AMFE SR3 79	AMFE, with P.E.R. 79°C/175°F bulb
TL-AMFE- 0003	AMFE SR3 93	AMFE, with P.E.R. 93°C/200°F bulb

S-AMFE

Part	Name	Description
TL-AMFE- 0006	S-AMFE SR3 68	AMFE, with P.E.R. 68°C/155°F bulb and sensor connection
TL-AMFE- 0007	S-AMFE SR3 79	AMFE, with P.E.R. 79°C/175°F bulb and sensor connection
TL-AMFE- 0008	S-AMFE SR3 93	AMFE, with P.E.R. 93°C/200°F bulb and sensor connection

AMFE & S-AMFE are also available in stainless design

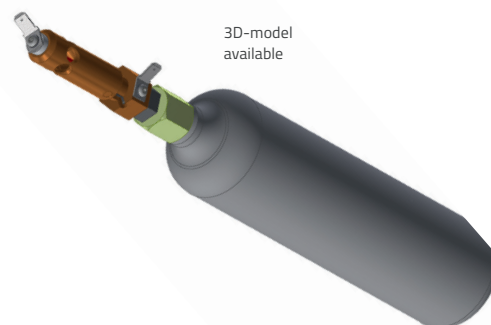
CO₂ Cylinders

Size	Part	Name
#0	n.a.	n.a.
#1	10945	CO2 35g/100°C
#2	10946	CO2 60g/100°C
#3	10947	CO2 135g/100°C
#4	10948	CO2 200/100°C
#5	10949	CO2 350g/100°C

3M™ NOVEC™ Cylinders

Size	Part	Name
#0	TL-AMFE- 0009	Cylinder NOVEC™ 24ml
#1	TL-AMFE- 0010	Cylinder NOVEC™ 72ml
#2	TL-AMFE- 0011	Cylinder NOVEC™ 120ml
#3	TL-AMFE- 0012	Cylinder NOVEC™ 241ml
#4	TL-AMFE- 0013	Cylinder NOVEC™ 360ml
#5	TL-AMFE- 0014	Cylinder NOVEC™ 603ml

For R & I-AMFE, please contact P.E.R.



3D-model available

Marking / Traceability

Each AMFE is marked with a label which, in addition to the type, production date and article number, also includes a batch number. This batch number guarantees a 100 % traceability of all used components. Thus, not only information about the components being used can be retrieved, but also details about the executed quality tests during production.

AMFE SR3 79°C
PIN: 10900
Date 16 JAN 2017
Batch No. AMFE: 046809

Name plate Example AMFE with batch number

AMFE

AUTOMATIC MINIATURE FIRE EXTINGUISHER



In control cabinets, fire can quickly lead to a disaster. The AMFE extinguishes reliably and precisely.

ADDITIONAL AMFE MODEL VARIANTS

S-AMFE – AMFE with sensor connections

The AMFE not only releases the extinguishing gas but also signals that it has. In installations where accessibility is limited, the AMFE can be connected to a monitoring system by two connectors for reading a signal. Permanently controlling if the AMFE has been initiated (e.g. line control through a PLC or monitoring device) allows for precise knowledge about the status of whether and where a fire might have started in an otherwise hard to reach installation. The S-AMFE is rated for typical PLC signals of 24V/48V and 1000mA. The connectors are standardized (6,3mm blade terminals), but customizations are possible.

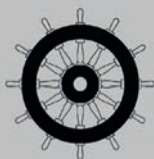
I-AMFE - Two simultaneously triggering connections

I-AMFE provides redundant provision of the extinguishing agent with simultaneous triggering of two connected cylinders. Alternatively, increasing the protected volume acc. to NFPA 12/NFPA 2001 is possible by installing the I-AMFE with two cylinders. It is also possible to connect two cylinders with different extinguishing agents for applications with other, very specific, fire extinguishing requirements. In certain countries, the largest possible

CO₂ cylinder size which can be used without a special authorization is limited; cases where I-AMFE can still be used for maximizing the possible protected volume.

R-AMFE - AMFE which can additionally be triggered remotely

The R-AMFE works like a conventional AMFE, releasing the extinguishing gas when the thermobulb bursts after the activation temperature has been reached by heat (as in a sprinkler). Additionally, the R-AMFE can be remotely triggered by activating a current signal into the R-AMFE causing a fast and precise increase of the heat at the bulb, ultimately resulting in a burst of the thermobulb assembled and release of the extinguishing gas. R-AMFE can also work much faster than a traditional AMFE if controlled by a monitoring device which also reads e.g. smoke detector signals and, upon the early detection of smoke, initiates the signal to release the R-AMFE even before significant enough heat buildup. The applied current defines the time until the R-AMFE is initiated. As application requirements for the R-AMFE are customer specific, consulting the manufacturer is required to define electrical and mechanical details to guaranty reliable and sufficient operation.



ISO 9001
BUREAU VERITAS
Certification



EN 9100
BUREAU VERITAS
Certification



P.E.R. Flucht- und Rettungssysteme GmbH

Am Hopfenbach 3
22926 Ahrensburg
Germany

Phone: +49 (0) 4102-4667-40

Fax: +49 (0) 4102-4667-99

E-Mail: info@permalux.com

Internet: www.permalux.com