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Test Report
No.: 142400002/314 en

Test name:	TEST of WORMANSHIP, MECHANICAL, FUNCTIONAL AND OPERATIONAL PROPERTIES
Test subject - name:	**POWDER FIRE EXTINGUISHING MODULE MPH**
Type - marking:	MPH-065, MPH-2, MPH-4, MPH-5, MPH-6, MPH-9, MPH-10, MPH-10st, MPH-24
Manufacturer:	Sapfir s.r.o., Záhradná 19, 900 24 Veľký Biel, Slovak Republic
Applicant:	Sapfir s.r.o., Záhradná 19, 900 24 Veľký Biel, Slovak Republic
Application no:	O04/14/0011/11 (TSUS, n.o., Bratislava) of 27.01.2014
Test performed in:	TSÚ Piešťany, š.p.
Test method - procedure:	TNI CEN/TR 15276-1: 2009, EN 3-7: 2004+A1: 2007
Test performed on:	April 03rd, 2014 – June 19th, 2014
Date of issue:	June 24th, 2014

Testing and Test Report made by:

Ing. Jozef Chrapka

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-314/1-

Responsible and approval person:

Peter Summer
Head of Testing Lab TZBaS

1. PRODUCT DESCRIPTION:

Powder fire extinguishing module MPH-065, MPH-2, MPH-4, MPH-5, MPH-6, MPH-9, MPH-10, MPH-10st and MPH-24 is a spherical storage tank, welded from steel plates in which is the extinguishing powder (the number on the label indicates fill level of powder in kg) and the generator of discharge gas (generátor chladného plynu), which is initiated either manually or automatically from electric current.

The module is equipped by a outlet nozzle which is closed by a metal diaphragm. When the medule starts, the diaphragm is released by overpressure of discharge gas and powder is thrown on the fire place.

Operating temperatures of the modules is from - 50 ° C to 50 ° C, respectively. to + 90 ° C in a special version. The module can be fixed on the base with screws in a horizontal, vertical or inclined position and the nozzle of the module shall be directed to a likely place of fire. It can be used for local and volume extinction in accordance with the instructions for use of the product.
Powder fire extinguishing module MPH is designed for fire protection of buildings and technological equipment against fires class A, B, C and E and can work in automatic or manual mode.
Discharge gas generator is ADR classified in Class 9, UN number 3363.
Modules in a kit with appropriate control and monitoring components can be installed in fixed fire extinguishing systems.

Fig. No. 1: MPH-065

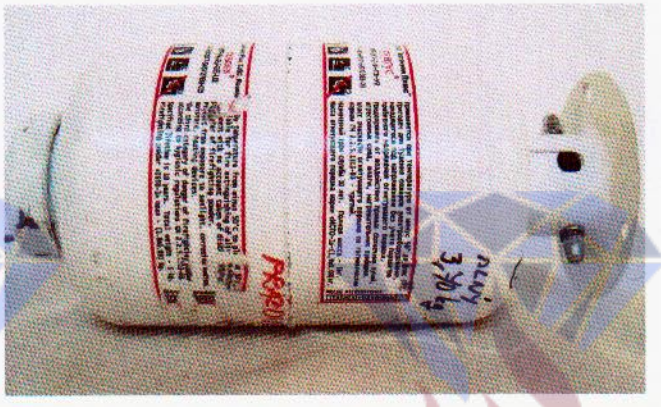


Fig. No. 2: MPH-2

Fig. No. 3: MPH-4

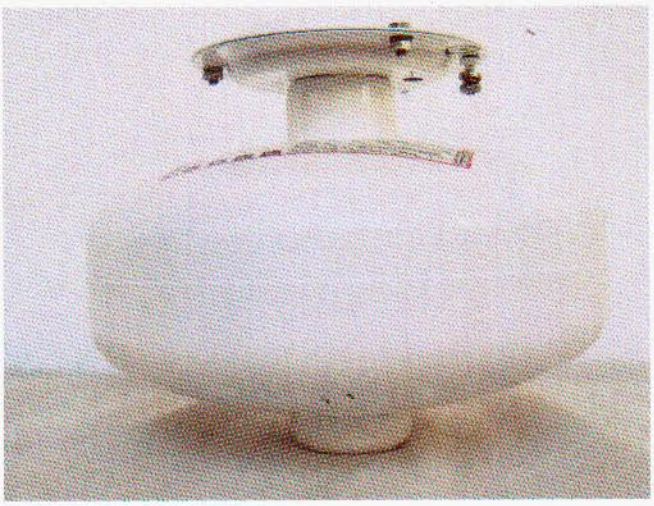


Fig. No. 4: MPH-6

Fig. No. 5: MPH-9

Fig. No. 6: MPH-10st

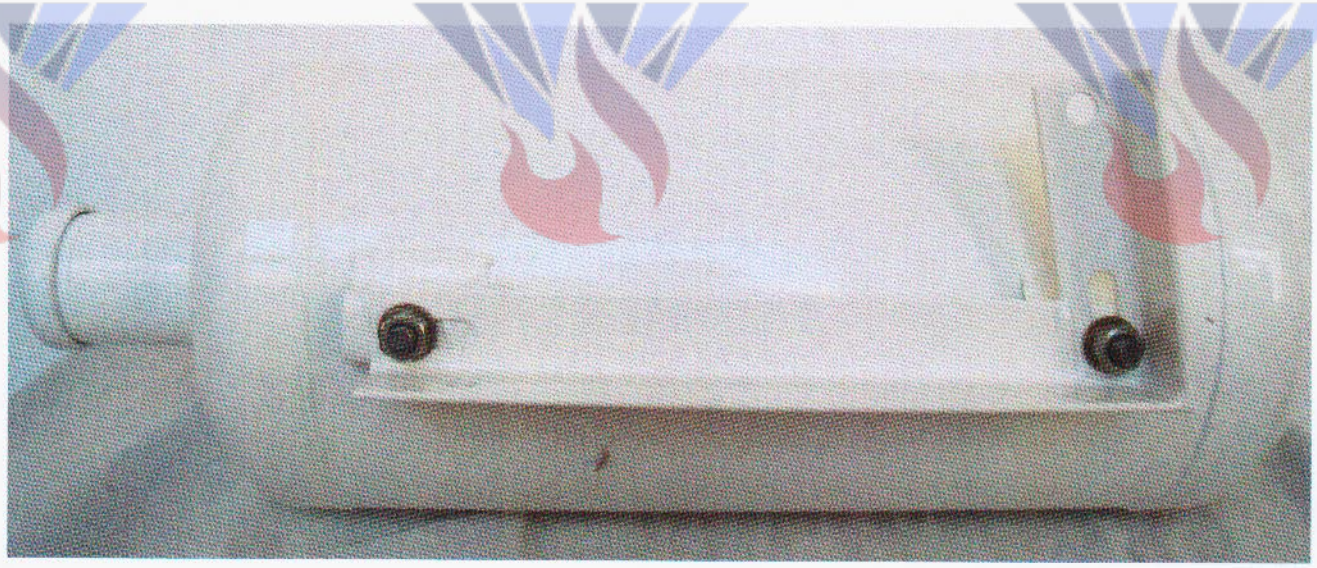


Fig. No. 7: MPH-24

2. TESTING SAMPLES

Sample registration number : 314/664/14/X/Y
X – module size (type)
Y – sample sequence number

Samples number :

MPH-065	.... 3 pcs
MPH-2	.... 3 pcs
MPH-4	.... 9 pcs
MPH-6	.... 3 pcs
MPH-9	.... 9 pcs
MPH-10st	.... 3 pcs
MPH-24	.... 1 pc.

Date of receipt of the samples : 03.04.2014 – submitted by the applicant

Test method acc. to CEN/TR 15276-1	Number of samples MPH module for each test								
	065	2	4	5	6	9	10	10st	24
7.3 Conformity	1	1	1	—	1	1	—	1	1
7.6 Time of: - discharge - delay	—	—	2	—	2	2	—	—	—
7.16.5 Mass of - residual agent - total agent	—	1	2	—	2	2	—	—	—
7.7.2 Functionality in operational range of temp. and humidity	—	—	2	—	2	—	—	—	—
7.7.3 Low temperature resistance	—	—	2	—	—	—	—	—	—
7.8 Ageing resistance	—	—	2	—	—	—	—	—	—
7.9 Corrosion resistance	—	—	—	—	2	—	—	—	—
7.13 Impact resistance	—	—	2	—	—	—	—	—	—
Test method acc. to EN 3-7									
6.4.2 Extinguishing efficiency for class A fires	—	—	3	—	3	3	—	—	—
6.4.3 Extinguishing efficiency for class B fires	—	—	3	—	3	3	—	—	—
Number of samples required	**3**	**1**	**9**	**—**	**7**	**6**	**—**	**1**	**1**

3. SEQUENCE of TESTS and SAMPLES NUMBER

4. TEST and FINDING RESULTS

4.1 Conformity – acc. to CEN/TR 15276-1: 2009, clause 7.3

The module must be as described in the technical documentation	Module MPH sample / sample no.						
	065	2	4	6	9	10st	24
- dimension	+	+	+	+	+	+	+
- description of funktion	+	+	+	+	+	+	+
- operating instructions	+	+	+	+	+	+	+
- installation instructions	+	+	+	+	+	+	+

+ = in conformity with requirements

4.2 Discharge time of extinguishing agent – acc. to CEN/TR 15276-1: 2009, clause 7.6

Time of discharge of the extinguishant shall not exceed:	Module MPH sample / sample no.					
	4		6		9	
	4/5	4/6	6/3	6/4	9/1	9/2
- required value [s]	90					
Meassured value [s]*)	< 3	< 3	< 3	< 3	< 3	< 3
Conformity with requirement	yes		yes		yes	

(yes/no)						

*) read from a video record

4.3 Delay time of extinguishing agent discharge – acc. to [7], [8] and [9]

Delay time of extinguishant shall not exceed a time given by the manufacturer:	Module MPH sample / sample no.					
	4		6		9	
	4/5	4/6	6/3	6/4	9/1	9/2
- required value [s]	4 ÷ 10		1 ÷ 10		3 ÷ 10	
Meassured value [s]*)	6,0	6,0	5,0	6,0	6,0	6,0
Conformity with requirement (yes/no)	yes		yes		yes	

*) read from a video record

4.4 Residual mass of extinguishing agent – acc. to CEN/TR 15276-1: 2009, cl. 7.6 and acc. to [7], [8] and [9]

Residual mass of extinguishant shall not exceed value in % of nominal mass acc. to:	Module MPH sample / sample no.					
	4		6		9	
	4/5	4/6	6/3	6/4	9/1	9/2
- CEN/TR 15276-1: 2009, cl. 7.6	5 %					
- acc. to docs [7], [8] and [9]	15 %		15 %		15 %	
Nominal mass of extinguishant [kg]	4 ± 0,2		6 ± 0,3		8,6 ± 0,3	
Measured residual mass [kg]	0,12	0,46	0,88	0,86	0,48	0,56
Residual mass in %	3,0	11,2	14,6	14,3	5,5	6,5
Measured total mass of extinguishant [kg]	4,02	4,28	6,04	6,36	8,98	9,00
Conformity with requirement (yes/no)	yes		yes		yes	

4.5 Total mass of extinguishing agent – acc. to CEN/TR 15276-1: 2009, cl. 7.16.5 and acc. to [7], [8] and [9]

Deviation of the total mass of the extinguishant shall not exceed the value according to [7], [8] and [9]	Module TUNGUS sample / sample no.					
	4		6		9	
	4/5	4/6	6/3	6/4	9/1	9/2
Nominal mass of extinguishant acc. to the manufacturer [kg]	4 ± 0,2		6 ± 0,3		8,6 ± 0,3	
Measured total mass of extinguishant [kg]	4,02	4,28	6,04	6,36	8,98	9,00
Toleranted deviation from the nominal mass [%]	5 %					
Measured deviation from the nominal mass [%]	0,0	+ 1,9	+ 0,1	+ 0,9	+ 0,8	+ 1,1
Conformity with requirement (yes/no)	yes		yes		yes	

4.6 Functionality in oper. range of temperature and humidity – acc. to CEN/TR 15276-1: 2009, cl. 7.7.2

The module must remain functional at ambient temperatures and humidity laid down by the manufacturer according to [7], [8] and [9]	Module MPH sample / sample no.					
	4		6		9	
	4/1	4/2	6/1	6/2		
Specified range of operational temper. [°C]	- 50 °C ÷ + 50 °C					
Specified max. operational relative humidity [%]	(95 ± 3) %					
Temperature range during the test	- 40 °C*) ÷ + 50 °C					
Relative humidity	(95 ± 3) %					
Number of cycles	2					
Cycle according to	EN 60068-2-30, variant 1					
Mechanical damage after the test (yes/no)	no	no	no	no		
Damage description						
Modul is functional after the test (yes/no)	yes	yes	yes	yes		
Conformity with requirement (yes/no)	yes		yes			

*) Temperature range of the climatic chamber is from – 40 °C to + 180 °C

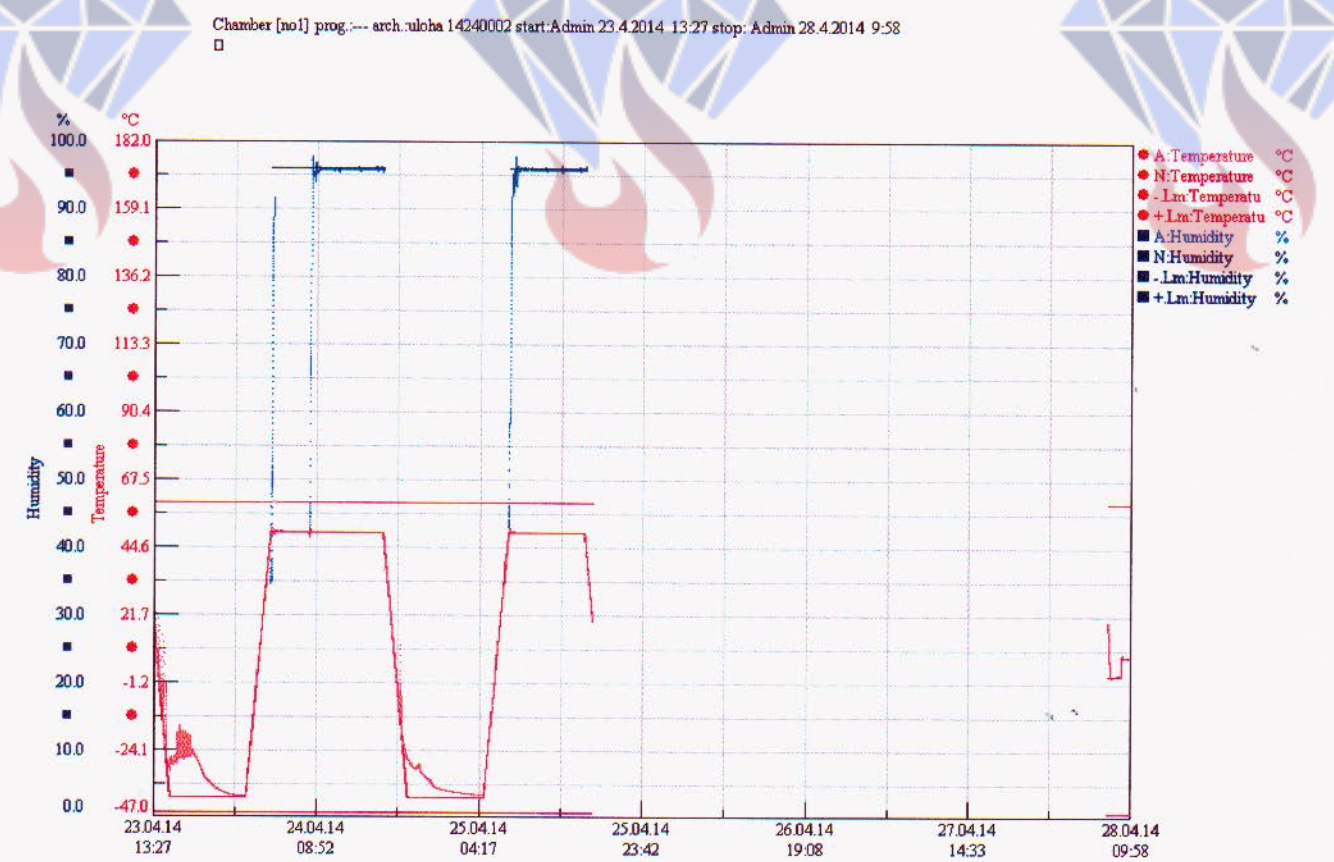


Fig. No. 8: The course of temperature and humidity with respect to time during the test acc. to 4.6

Fig. No. 9 and 10: The module samples in the climatic chamber during the test acc. to 4.6.

4.7 Low temperature resistance – acc. to CEN/TR 15276-1: 2009, clause 7.7.3

The module must remain functional after 2,5 hrs test under min. temperature laid down by the manufacturer according to [7], [8] and [9]	Module MPH sample / sample no.					
	4		6		9	
	4/3	4/4				
Specified min. temperature [°C]	- 50 °C					
Temperature during the test [°C]	- 40 °C ± 2 °C*)					
Test duration [h]	2,5					
Mechanical damage after the test (yes/no)	no	no				
Damage description						
Modul is functional after the test (yes/no)	yes	yes				
Conformity with requirement (yes/no)	yes					

*) Temperature range of the climatic chamber is from – 40 °C to + 180 °C

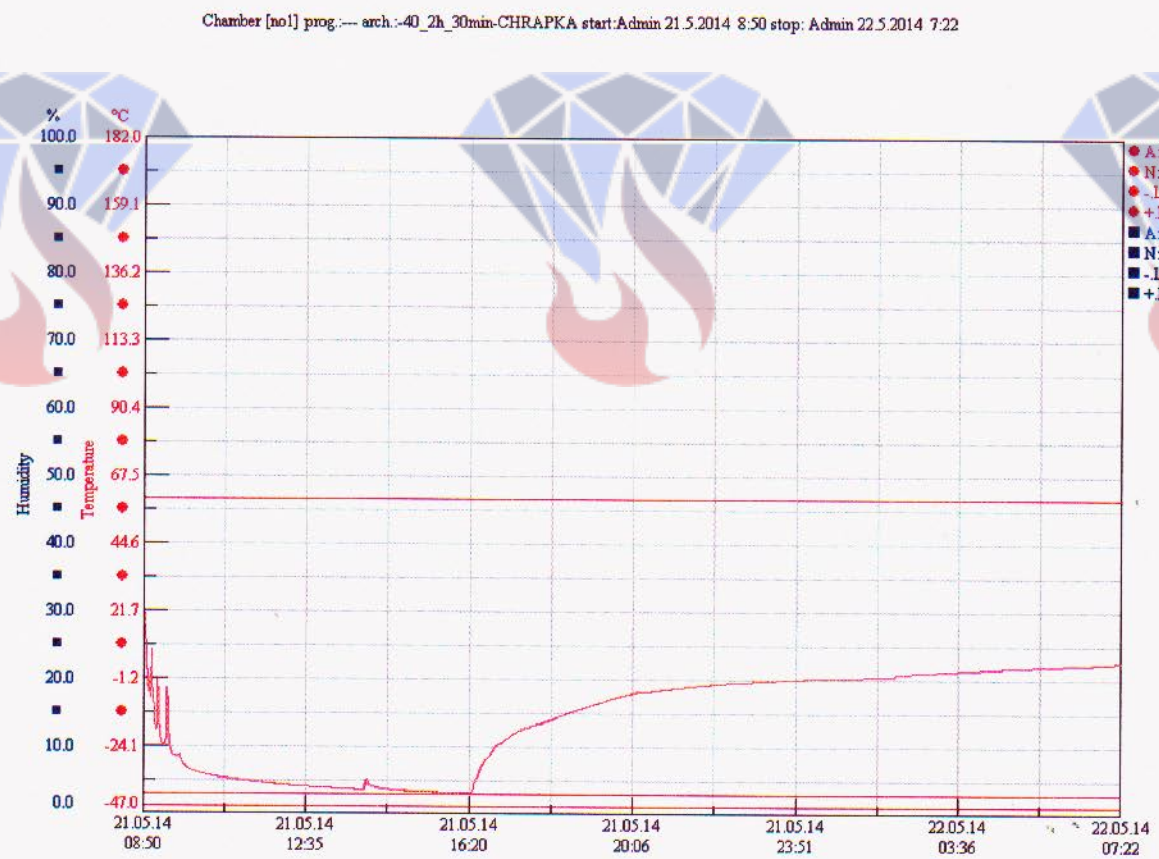


Fig. No. 11: The course of temperature with respect to time during the test acc. to 4.7.

4.8 Ageing resistance – acc. to CEN/TR 15276-1: 2009, clause. 7.8

The module must remain functional after accelerated aging for operational lifetime laid down by the manufact. acc. to [7], [8] and [9]	Module MPH sample / sample no.					
	4		6		9	
	4/5	4/6				
Required lifetime	10 years (5 years)					
Specified max. operational temperature [°C]	+ 50 °C (+ 90 °C)					
Test temperature t_2	+ 90 °C + 5 °C*)					
Expected operational temperature t_1	20 °C					
Test duaration [days]	10*)					
Calculated lifetime	5 years					
Mechanical damage after the test (yes/no)	no	no				
Damage description						
Modul is functional after the test (yes/no)	yes	yes				
Conformity with requirement (yes/no)	yes					

*) The temperature during the test and its duration was determined as the modules with the highest operational temperature of + 95 ° C.

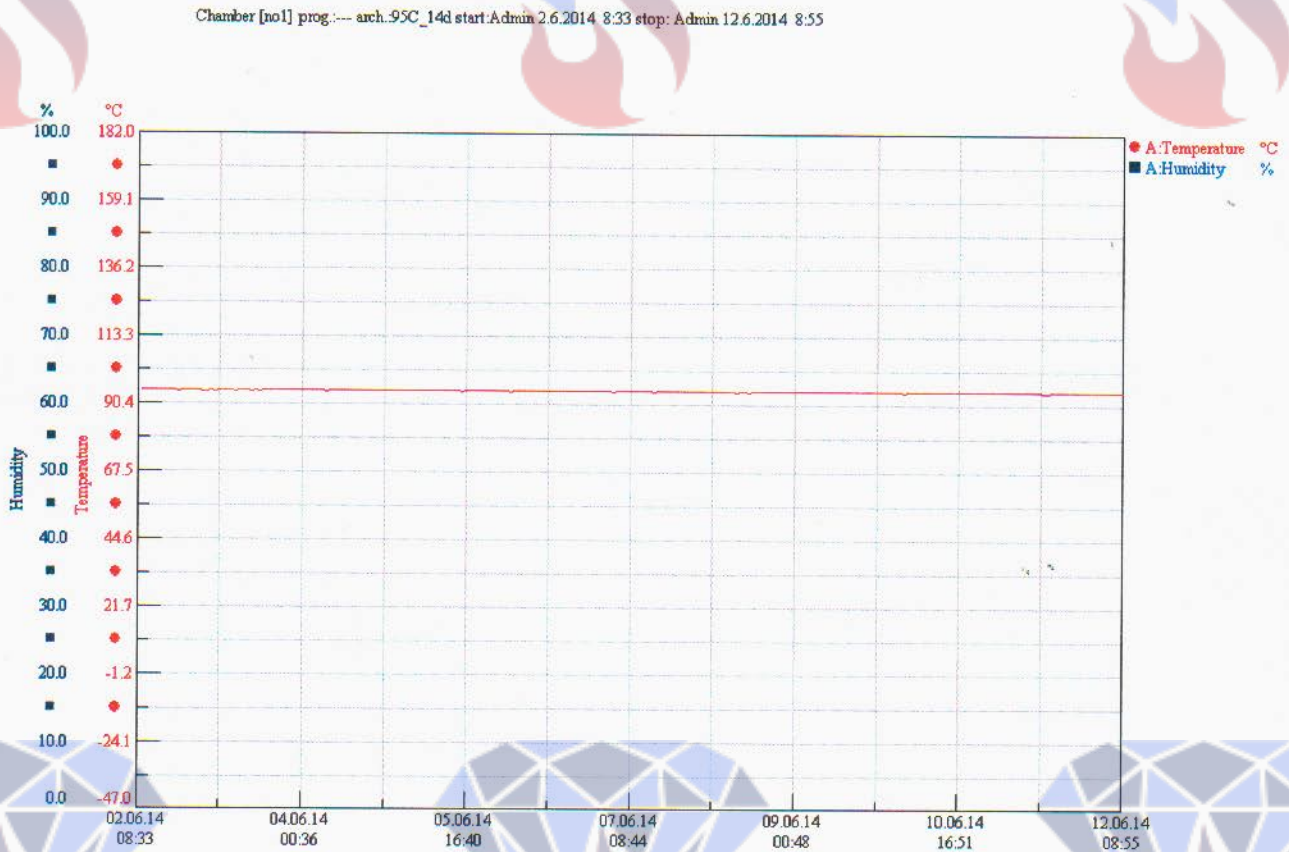


Fig. No. 12: The course of temperature with respect to time during the test acc. to 4.8.

4.9 Corrosion resistance – acc. to CEN/TR 15276-1: 2009, clause 7.9

The module must remain functional at ambient temperatures and humidity laid down by the manufacturer according to [7], [8] and [9]	Module MPH sample / sample no.					
	4		6		9	
			6/3	6/4		
Test according to	EN ISO 9227: 2012, method NSS					
Required test duration [h]	240					
Real test duration [h]			240 (from 25.4.2014 to 5.5.2014)			
Mechanical damage after the test (yes/no)			no	no		
Damage description						
Modul is functional after the test (yes/no)			yes	yes		
Conformity with requirement (yes/no)			yes			

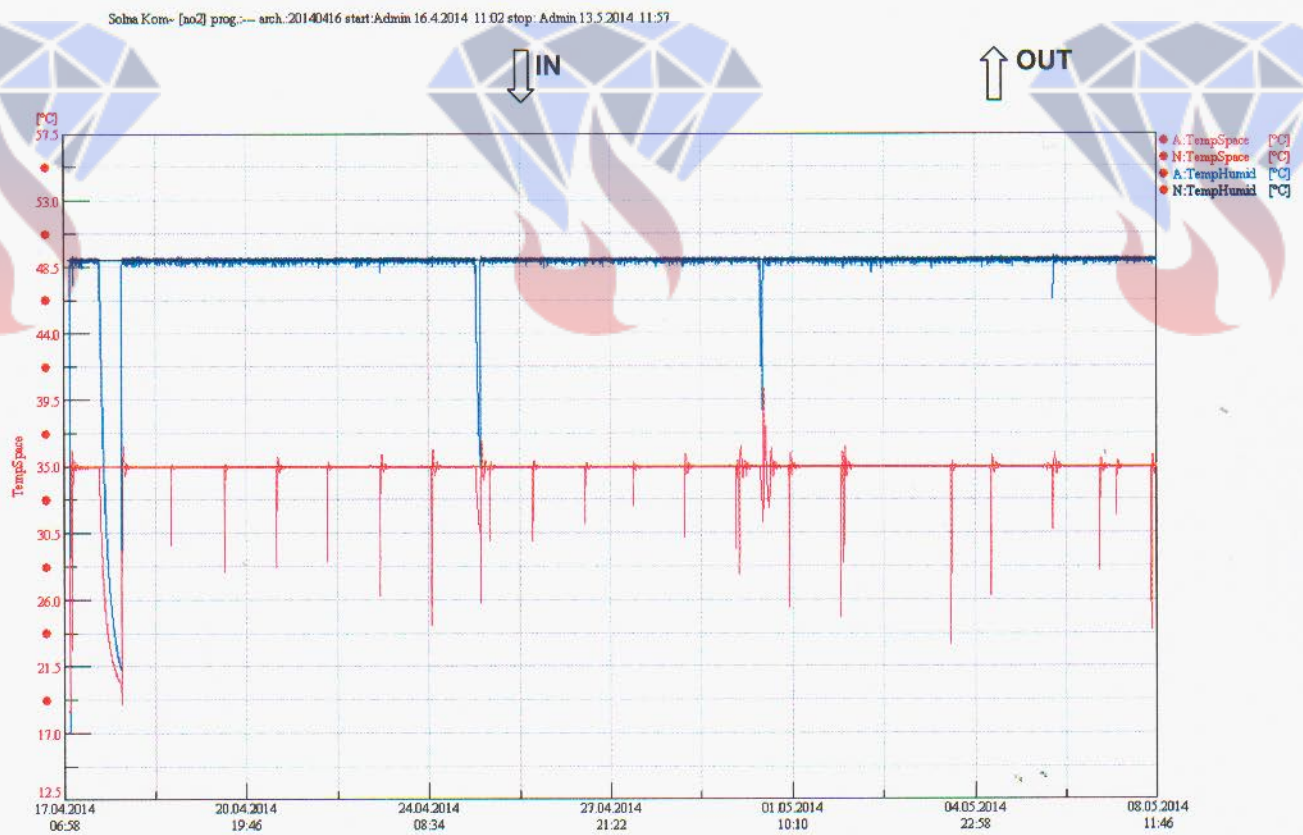


Fig. No. 13: The course of temperature with respect to time during the test acc. to 4.9.

Fig. No. 14: The module sample after the corrosion test according to 4.9

4.10 Impact resistance – according to CEN/TR 15276-1: 2009, clause 7.13

The module must remain functional aftre the impact resistance test	Module MPH sample / sample no.					
	4		6		9	
	4/7	4/8				
Required drop height [m]	2,0					
Real drop height [m]	2,0					
Mechanical damage after the test (yes/no)	yes	yes				
Damage description	bent module holder	bent module holder				
Modul is functional after the test (yes/no)	yes	yes				
Conformity with requirement (yes/no)	yes					

4.11 Extinguishing efficiency for class A fires – according to EN 3-7: 2004+A1: 2007, clause 15.2

The module must extinguish the fire class A whose size is determined by the manufact. according to [3]	Module MPH sample / sample no.			
	4	6	9	
			9/1	9/2
Fire size			8A	
Requiered moisture of test fire wood [%]	10 až 15			
Moisture of test fire wood: measured average [%]			10,6	
Fire was extinguished (yes/no)			yes	yes
Conformity with requirement (yes/no)			yes	

Fig. No. 15: The wooden crib of fire 8A burning during the test according to 4.11.

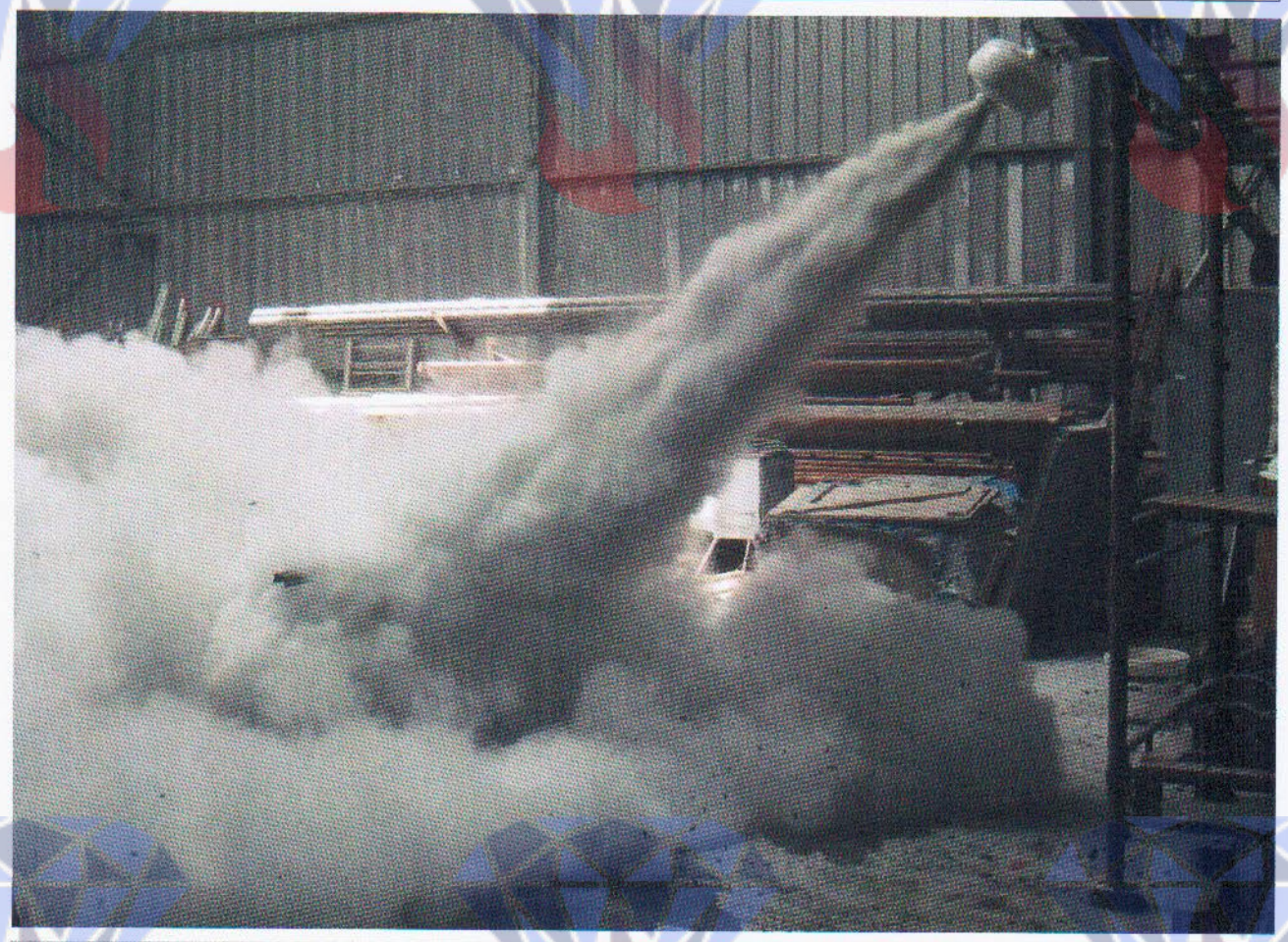
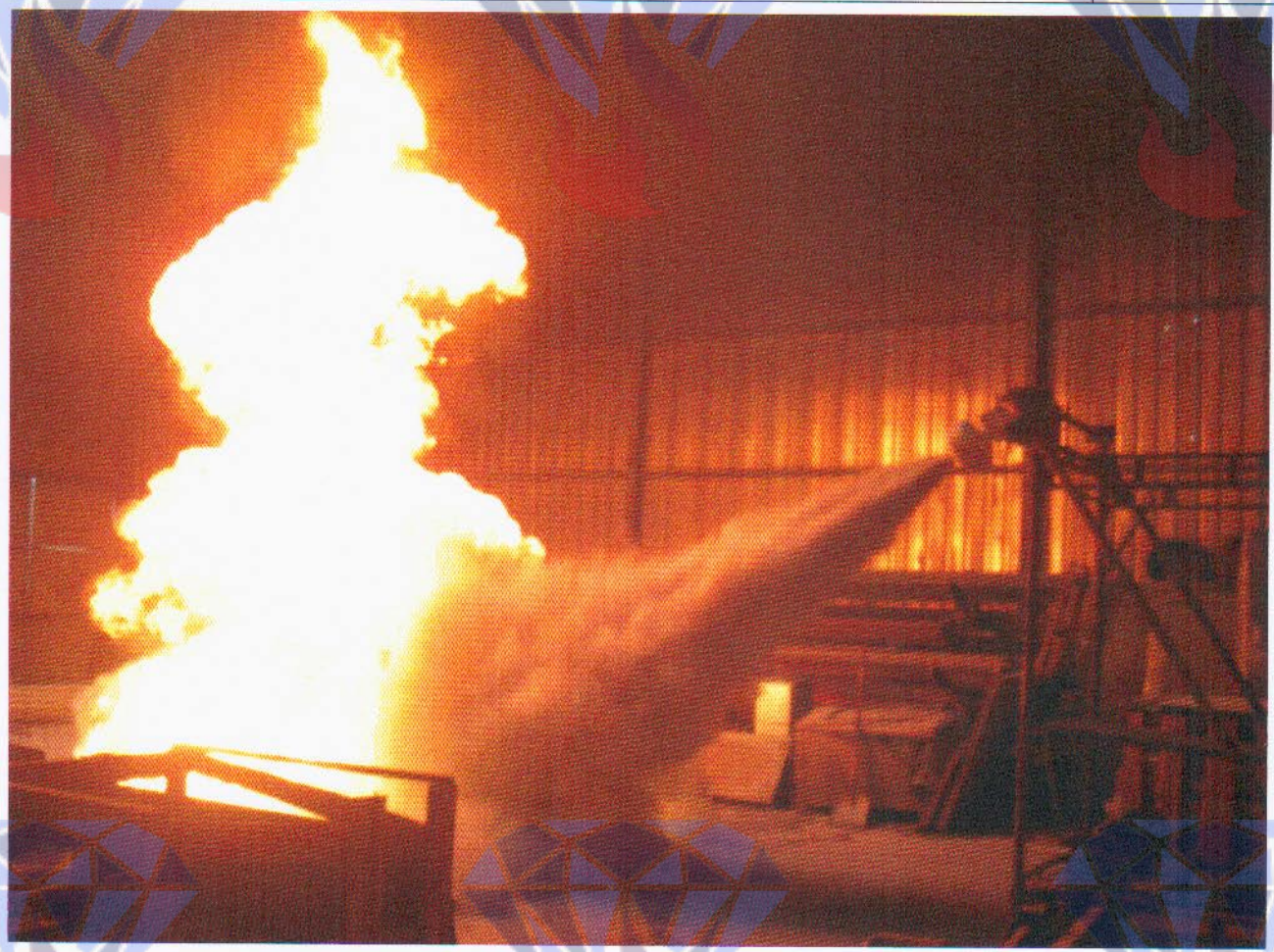


Fig. No. 16 and 17: The fire 8A during extinguishing and put out within the test according to 4.11

4.12 Extinguishing efficiency for class fires B – according to EN 3-7: 2004+A1: 2007, clause 15.3

The module must extinguish the fire class B whose size is determined by the manufact. according to [3]	Module MPH sample / sample no.						
	4		6			9	
	4/1	4/9	6/3	6/6	6/7	9/3	9/4
Fire size	34B		70B			113B	
Flammable substance	industrial heptane , bp 98 °C at 1.013 hPa						
Fire was extinguished (yes/no)	yes	yes	no	yes	yes	yes	yes
Conformity with requirement (yes/no)	yes		yes			yes	

Fig. No. 18: The tray of fire 113B before ignition during the test according to 4.12



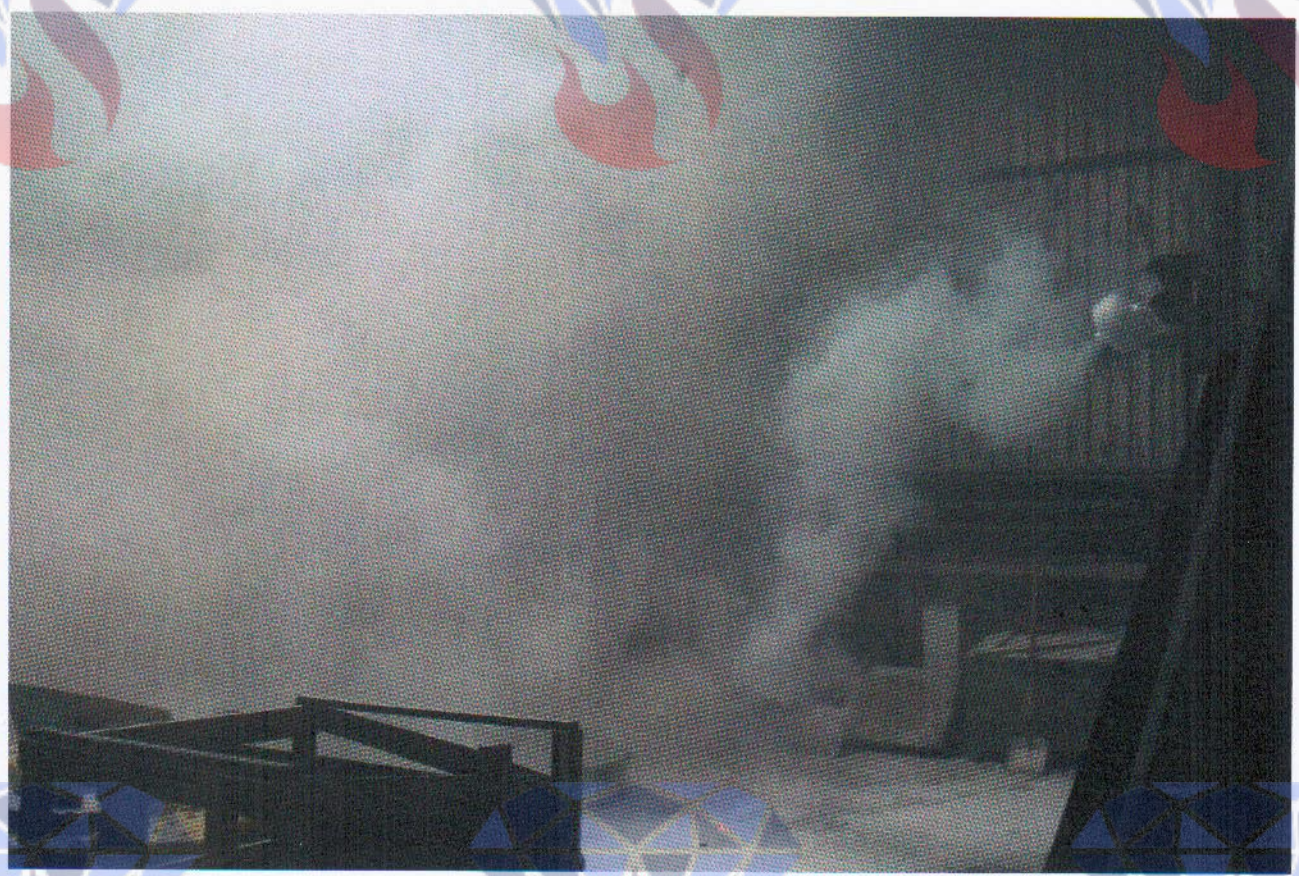


Fig. No. 19 and 20: The fire 113B during extinguishing and put out within the test according to 4.12

5. Documentation – according to CEN/TR 15276-1: 2009, clause 5.16

Requirement:	MODULE	065	2	4	5	6	9	10	10st	24
The manufacturer must prepare documentation, which must include at least:	Module description in general (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Technical specification for module use (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Installation manual (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Operational manual (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Maintenance manual (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes

6. Marking – according to CEN/TR 15276-1: 2009, clause 6

Requirement	MODULE	065	2	4	5	6	9	10	10st	24
Each module shall be marked with data:	Name of product (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Manufacturer name (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Extinguishant mass (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Date of production (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Temperature range (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes
	Life tieme (yes/no)	yes	yes	yes	—	yes	yes	—	yes	yes

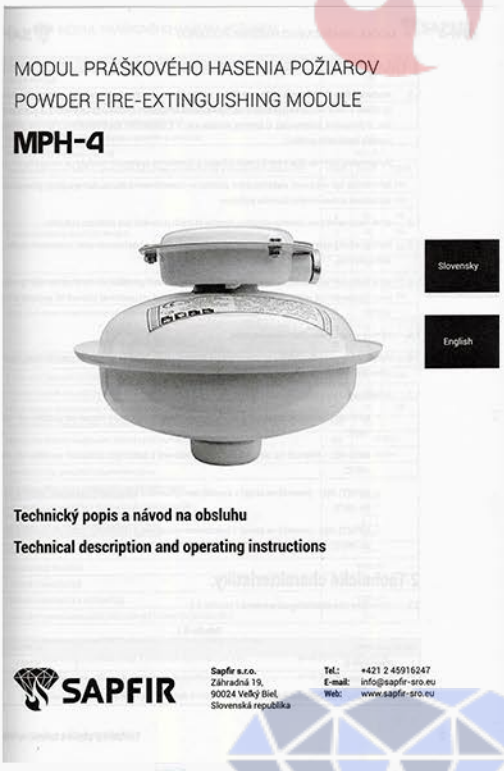


Fig. No. 21 and 22: The cover page of „Pasport" - manuals for installation, maintenace and use + module label.

7. List of used measures and equipment

Measure / equipment	Identif. code	Accurancy/Uncertiny	Validity verification to:
Weight ALYA (0,4÷60) kg	serial. No. 235/96 identif. code SM 314/137	20g	13.12.2016
Stop watch SECCO type SST834R/8	inv. No. 7378 identif. code SM 314/179	0,01 s	20.10.2016
Elektronical hygrometer for wood, (4÷30)%, type Hydromette H35	serial No. 03-96729 identif. code SM 314/162	1,5%	13.12.2016
Clima chamber VT 4100 (-40 ÷ 180)°C	inv. No. 1593 identif. code SM 314/018	± 0,5 K	20.12.2016
Clima chamber WEISS (- 40 ÷ 180) °C, (10 ÷ 98) % R.H.,	serial No. 58226114740010 identif. No. 140-210-077	± 0,5 K	07.12.2014
Compaction machine	inv. No. 1674	---	---
Salt spray chamber SC 1000	inv. No. 1504 identif. code SM 314/016	---	---

8. List of used documentation:

[1] Sampling report of 03.04.2014.

[2] Program a metóda požiarnej skúšky modulov práškového hasenia požiaru MPH-4, MPH-6, MPH-9 v súlade s podmienkami európskej normy EN 3 – 7:2004 (Program and method of fire tests of powder fire extinguishing modules MPH-4, MPH-6, MPH-9 according to the standard EN 3-7: 2004 requirements, date of issue 17.06.2014.

[3] Powder fire-extinguishing module MPH-4. Technical description and operating instruction. Issued by the manufacturer Sapfir s.r.o., Velky Biel, Slovakia.

[4] Powder fire-extinguishing module MPH-6. Technical description and operating instruction. Issued by the manufacturer Sapfir s.r.o., Velky Biel, Slovakia.

[5] Powder fire-extinguishing module MPH-9. Technical description and operating instruction. Issued by the manufacturer Sapfir s.r.o., Velky Biel, Slovakia.

[6] Modul práškového hasenia požiaru MPH-4. Technické podmienky.SA-3004 02122013. Issued by the manufacturer Sapfir s.r.o., Velky Biel, Slovakia.

[7] Modul práškového hasenia požiaru MPH-6. Technické podmienky.SA-3009 02122013. Issued by the manufacturer Sapfir s.r.o., Velky Biel, Slovakia.

[8] Modul práškového hasenia požiaru MPH-9. Technické podmienky. SA-3011 02122013. Issued by the manufacturer Sapfir s.r.o., Velky Biel, Slovakia.

[9] Supplement No. 1 to the Test Report No. 142100021/314 of 24.06.2014 Slovak language version. Issued by TSÚ Piesšťany, š.p., Piešťany, Slovak Republic.

Test report ends here.