

# PERFEKT FORDÍTÓIRODA

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Certified translation from Hungarian to English-----  
language.-----

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File number: 35001/668-2/2018.ált-----

Subject: test of PROTENG (4.9m) fire extinguisher tube-----

**Test report**-----

**1.1 The aim of the test:** the test of the fire extinguishing capability of the 4.9m long member of a fire extinguisher line that has been allowed for distribution by the regulation with the general number BM OKF 350000/11645-1/20217. The test was carried out at the request of the customer.-----

**1.2 The subject of the test:**-----  
**PROTENG BUS-TIR 4900mm HD** type fire extinguisher (two consecutive fire extinguishing tests)-----  
external diameter of tube: 18mm, marking of the tube: "HEAVY DUTY"-----

serial numbers of test samples: 18020011, 18020012,

18020013.-----

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**2. Customer:** Sc. Agchem Srl. (str Morii 230/A, Cetariu,  
417165, Romania)-----

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**3.1 The date of the test:** 11<sup>th</sup> 4 2018.-----

**3.2 Site:** The site of the Disaster Management Research  
Institute (1033, Budapest, Laktanya Str. 33)-----

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**4 The specifications of the test model:**-----

As the performance requirements of the fire  
extinguisher are not regulated by technical  
specifications, the chosen model of fire extinguishing  
for its test is in line with the models used during the  
fire extinguishing test of the shorter versions of the  
extinguisher line (see test report no. 2017-Effectis-  
R000223) and with the recommendations of usage provided  
by the manufacturer.-----

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**4.1 Volume of the protected space:** A chamber of nominal  
free volume of 2m<sup>3</sup>, in which an electric oil radiator  
with a surface temperature of approx. 70 °C raised the  
air temperature of the chamber to a value of 40-42 °C.-

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**4.2 Applied extinguisher device** and its position:  
PROTENG "HEAVY DUTY", fire extinguisher, approx. 4.9m  
long, equipped with electric operation indicator.-----  
Position: mounted to a steel frame suspended in the  
upper third of the chamber.-----

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**4.3 Description of the model fire:** a steel tray of a  
diameter of Ø350mm (a surface of 0.1m<sup>2</sup>), the used  
combustible material: a mixture of 1dl of gasoline and  
2.5dl of diesel on a layer of water. The thickness of  
the combustible material was approx. 30-35mm. The  
length of the free burn out of the model fire > 150s.-

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**4.4 Starting preliminary burning, extinguishing:** manual ignition by torch.-----

The extinguisher device was activated by the flame of the model fire (after 35-40s).-----

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**4.5 The extinguishing process:** the start is immediate, the release of the extinguishing agent < 1s-----

Nominal proportion of extinguishing agent: 0.475 and 0.500kg/m<sup>3</sup>-----

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**4.6 Results:** the flame combustion ceased, the model fire was extinguished. Waiting time until the chamber was opened: > 60s.-----

After both test an amount of combustible liquid remained. (>15mm)-----

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**5. Observations, results:**-----

The following table summarizes the environmental and quantitative data related to the extinguishing tests.-----

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1B Tray: the tray was a steel container of a diameter of Ø 350mm - height of its walls was 150mm.-----

The quality of the combustible material: mixture of 1dl 95 motor gasoline and 2.5dl diesel			
<b>Class "B"</b>			
Identification	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>
Protected volume (capacity)	2m <sup>2</sup> free volume (area: 90cm x 191cm /average height 116cm		
Size of the test unit fire	1B	1B	-B
Sample identification (serial nr.)	3-18020013	2-18020012	1-18020011
Position of extinguisher (tube)	Installed in a steel frame suspended under the roof of the chamber (see photo		-

	appendix)		
Environmental temperature °C	24°C	26°C	-
The initial temperature of the test area in 2 points (height of measurement point from the floor of the chamber)			
T <sub>1</sub> - (85cm)	42	43	-
T <sub>2</sub> - (20cm)	31	30	-
The maximum temperature of the test area in 2 points (height of measurement point from the floor of the chamber)			
T <sub>1</sub> - (85cm)	187°C	180°C	-
T <sub>2</sub> - (20cm)	97°C	100°C	-
The quantity of combustible material	3.5dl	3.5dl	-
Storage before test (24h, 20±5°C)	yes	yes	yes/no
Content weight (nominal)	1.0kg FM200		
Gross weight	1.680kg	1.735kg	-kg
Weight after extinguishing	0.730 kg	0.734 kg	-kg
The length of the used extinguisher device (tube) - flexible part	4.81m	4.83m	-m
The amount of the extinguishing agent	0.95kg	1.00kg	
The density of the extinguishing agent	0.475kg/m <sup>3</sup>	0.500kg/m <sup>3</sup>	-
Developed nominal extinguishing agent concentration*	6.2-6.4 tf%	6.5-6.7tf%	
The process of fire-extinguishing			
Ignition of test fire t <sub>1</sub>	0s	0s	0s
The beginning of the release of extinguishing agent t <sub>2</sub>	36.2s	38.7s	-s
The end of the release of extinguishing agent t <sub>3</sub>	37.9s	41.6s	-s
Signalling	38s	41s	-s

The extinguishing device activated	yes	yes	yes/no
The end of the flaming of the model fire $t_5$	37.5s	40.0s	-s
The thickness of the residue of the combustibile material (min. 5mm)	>15mm	>15mm	-mm
Waiting time until the chamber was opened	>60s	>60s	-
The result of the fire-extinguishing:	successful	successful	successful/unsuccessful

\*Calculated on the basis of table MSZ EN 15004-5:2008 no 3., with an environmental temperature of 25°C.-----

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**DMRI observation:** on each of the tested extinguisher tubes a burst of approximately 3cm in diameter formed, which proved to be large enough for the extinguishing agent to be released into the protected space immediately, in <1s, and fully. The loss of gas in the chamber was insignificant. In both cases the tubes burst in the section directly exposed to the flames.---  
The electric signal connected to the tube activated in the moment of the release. Both the sound and light signals were activated.-----  
Figure 1 and 2 of the appendix show the changes of the internal temperature of the chamber during the tests.-

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**6. The summary of the results of the fire extinguishing test:-----**  
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The fire extinguishing test of 2pcs of 4.9m long "PROTENG BUS-TIR 4900MM HD" extinguisher tube, filled

with FM200 was performed in a chamber of 2m<sup>3</sup> volume, with two consecutive experiments. In both cases the flaming, class "B" liquid fire **was successfully extinguished.**-----

On contact with the flames of the model fire and due to the temperature in the chamber, the extinguisher tube burst, its load was completely released into the chamber and extinguished the created model fire. The release of the extinguishing agent was immediate, it occurred in (1.5-3s). The nominal density of the extinguishing agent applied during the extinguishing test corresponded to the recommendation of the manufacturer: 0.475-0.500 kg/m<sup>3</sup>.-----

The ID electric signal activated in the moment of the release. It produced both a sound and light signal.-----

Budapest, 19<sup>th</sup> April, 2018-----

Attila Szabó Lt. Col.-----

Head of the DMRI-----

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**Photo appendix**-----

To test record gen. no. 35001/668-2/2018-----

**Samples received for testing**-----

Photo no. 1 (3 PROTENG extinguisher tubes, with electric signals, with the receiver in the foreground)-----

No. 2 The extinguishing chamber-----

No. 3 The position of the extinguisher tube - ignition tray and "preheater" radiator in the chamber-----

Photos No 4. and 5. Burning model fire and the PROTENG tube coming in contact with the flame-----

Photo no. 6. The burst extinguisher tube after the fire-extinguishing test. (Inset photo shows the burst from a different angle.)-----  
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Diagram no. 1. The changes in internal temperature and results of the first extinguishing test.-----

Diagram captions:-----

1<sup>st</sup> test - Proteng 4.9m/FM200, Protected volume 2m<sup>3</sup>-----

Temperature (°C)-----

Time (s)-----  
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Diagram no. 2. The changes in internal temperature and results of the second extinguishing test.-----

Diagram captions:-----

2<sup>nd</sup> test - Proteng 4.9m/FM200, Protected volume 2m<sup>3</sup>-----

Temperature (°C)-----

Time (s)-----  
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I hereby certify that this translation fully-----  
corresponds to the attached Hungarian official-----  
document.-----

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Our office registers this translation under no.:-----

\_\_\_\_\_/2018.-----