

**Economic Commission for Europe**

**Inland Transport Committee**

18 January 2018

English

**Working Party on the Transport of Dangerous Goods**

**Joint Meeting of Experts on the Regulations annexed to the  
European Agreement concerning the International Carriage  
of Dangerous Goods by Inland Waterways (ADN)  
(ADN Safety Committee)**

**Thirty-second session**

Geneva, 22-26 January 2018

Item 4 (b) of the provisional agenda

**Implementation of the European Agreement concerning the International  
Carriage of Dangerous Goods by Inland Waterways (ADN):  
special authorizations, derogations and equivalents**

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**Request for a derogation for tank vessel "Marconi"**

**Transmitted by the Government of Serbia**



No. 2486-1/2017

ECE TRANSPORT DIVISION N° 128	
Received on :	18 SEP 2017
Seen by :	d. Kavelle
Passed to for:	
Action	<input checked="" type="checkbox"/>
Discussion	<input type="checkbox"/>
Information	<input type="checkbox"/>

The Permanent Mission of the Republic of Serbia to the United Nations Office and other international organizations in Geneva presents its compliments to the Sustainable Transport Division of the United Nations Economic Commission for Europe and wishes to enclose herewith the letter, with supporting documentation, of Deputy Prime Minister and Minister of Construction, Transport and Infrastructure of the Republic of Serbia Ms. Zorana Mihajlović regarding the request of the competent authority of Serbia to the Administrative Committee to allow the use of the dry aerosol generating fire extinguishing system on board the tank vessel „Marconi“.

The Permanent Mission of the Republic of Serbia to the United Nations Office and other international organizations in Geneva avails itself of this opportunity to renew to the Sustainable Transport Division of the United Nations Economic Commission for Europe, the assurances of its highest consideration.



Geneva, 12 September 2017

United Nations Economic Commission for Europe  
Sustainable Transport Division  
Palais des Nations CH-1211 Geneva 10  
Switzerland

Република Србија  
Потпредседница Владе  
Министарство  
грађевинарства, саобраћаја  
и инфраструктуре  
Немањина 22-26  
11000 Београд



Republic of Serbia  
Deputy Prime Minister  
Ministry of construction,  
transport and infrastructure  
22-26, Nemanjina Str.  
11000 Belgrade  
Serbia

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Tel: +381 (0)11 3617 632 \* Fax: +381 (0)11 3621 526 \* <http://www.mgsi.gov.rs/>

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Courtesy Translation  
Belgrade, August 24, 2017

Dear Sirs,

During reconstruction of the tank vessel "Marconi" under supervision of classification society Bureau Veritas, it came to their attention that a dry aerosol generating fire extinguishing system (Fire Pro) on board does not comply with 9.3.1.40.2.1. of the Regulation annexed to ADN.

On 26<sup>th</sup> November 2013, the CCNR issued a recommendation which allows the pushing vessel "Donau", under strict conditions, to use this dry aerosol generating fire extinguisher system as the permanently fixed fire-extinguishing agent in the machinery room.

In the January 2016 UNECE session, the competent authority of the Netherlands submitted a proposal for a temporary derogation for the same fixed fire extinguishing system as installed in the tank vessel "Chemgas 851".

In the August 2016 UNECE session, the competent authority of the Belgium submitted a proposal for a temporary derogation for the same fixed fire extinguishing system as installed in the pusher vessel "Donau".

The Administrative Committee decided in both cases that vessels may deviate until 31<sup>st</sup> December 2018 from the requirement of the Regulation annexed to ADN.

In accordance with the last sentence of 9.3.1.40.2.1 of the Regulation annexed to ADN, competent authority of Serbia requests from the Administrative Committee to allow on board the tank vessel „Marconi“, the use of the dry aerosol generating fire extinguishing system. The documentation for fire extinguishing system (Fire Pro) is in annex.

Kind regards,

Professor Zorana Z. Mihajlović, PhD

**UN Economic Commission for Europe  
Sustainable Transport Division  
Inland Transport Committee Working Party on the Transport of Dangerous Goods,  
Joint meeting of experts on the Regulations annexed to the European Agreement  
concerning the International Carriage of Dangerous Goods by Inland Waterways  
(ADN)  
Palais des Nations  
CH - 1211 Geneva 10  
Switzerland**



## Vessel "Marconi" Terminal Belgrade

# Main project of the stable installation of the fire alarm and firefighting system

### SUBJECT:

Vessel type	tanker
Nationality of the vessel	Republic of Serbia
Name or code	"MARCONI"
Dock registration	Belgrade
Engine effective power	728 kW
Length over all	Loa = 104,81m
Length on VL	Lvl = 103,75m
Maximum width	Bmax = 9,50m
Hull width	Br = 9,45m
Construction width	
Height of the highest fixed point	Hmax = 2,90m
Height up to the shipboard	
weight	680t
Year and place of the construction	1974, WROCLAWSKA STOCZNIA RZECZNA, POLAND
<b>Buyer</b>	<b>COMPANY LAĐAR TRANSPORT LTD, Belgrade</b>
<b>Place of construction</b>	<b>VESSEL MARCONI, TERMINAL BELGRADE</b>
<b>Contract number</b>	
<b>Documentation number</b>	<b>01/16</b>

#### BUREAU VERITAS Section ..31726M..

Examined within the General Conditions of Marine Branch of BUREAU VERITAS in order to check the compliance with the applicable requirements of  
BV Rules for Inland Navigation NR217.....  
European Directive 2006/67/EC.....  
ADN Rules.....

*All particulars not shown on this document are assumed to be as per the requirements of the aforesaid texts, mainly constructional details.  
The examination of this document gives rise to remarks in red.*

Antwerp, 28-Nov-2016

[Electronic document]  
The plan approval office

See letter: TN/DNI/6426/NMA/STH



VESSEL MARCONI

MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

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Book number:

1/1

MANAGER

*Miloš Adamović*

Miloš Adamović  
Belgrade, 09. 2016.

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MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM


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### LIST OF CHANGES

Number	Date	Description of amendments	Signature of the responsible designer
0	09. 2016.	Starter edition of the documentation	

	<p style="text-align: center;">VESSEL MARCONI</p> <p style="text-align: center;">MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</p>	<p>NOTES</p>	<p>PAGE</p> <p style="text-align: right;">1.4</p>
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**INVESTITORS APPROVAL WITH THE TECHNICAL DOCUMENTATION**


We hereby direct the following investment and technical documentation created in IPON SYSTEM, ZEMUN, ZLATIBORSKA Street No.31:

<b>INVESTOR:</b>	<b>COMPANY LAĐAR TRANSPORT Ltd, Belgrade</b>
<b>INVESTMENT FACILITY:</b>	<b>MARCONI VESSEL, TERMINAL BELGRADE</b>
<b>PLACE OF THE CONSTRUCTION:</b>	<b>MARCONI VESSEL, TERMINAL BELGRADE</b>
<b>PROJECT NAME:</b>	<b>MAIN PROJECT OF THE STABLE INSTALLATION OF THE ALARM AND FIREFIGHTING SYSTEM</b>
<b>SUBJECT OF THE PROJECT:</b>	<b>STABLE INSTALLATION OF THE FIRE ALARM SYSTEM STABLE INSTALLATION OF FIRE EXTINCTION WITH AEROSOL</b>
<b>PROJECT NUMBER:</b>	<b>01/16</b>
<b>BOOK NUMBER</b>	<b>1/1</b>

Date  
September, 2016.

INVESTOR:




	<p style="text-align: center;">VESSEL MARCONI</p> <p style="text-align: center;">MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</p>	<p>NOTES</p>	<p>PAGE</p> <p style="text-align: center;">1.5</p>
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## LIST OF THE DESIGNERS

On the preparation of the documentation under the contract number:

<b>INVESTOR:</b>	<b>COMPANY LAĐAR TRANSPORT Ltd,</b> Belgrade
<b>INVESTMENT FACILITY:</b>	<b>MARCONI VESSEL, TERMINAL</b> <b>BELGRADE</b>
<b>PLACE OF THE CONSTRUCTION:</b>	<b>MARCONI VESSEL, TERMINAL</b> <b>BELGRADE</b>
<b>PROJECT NAME:</b>	<b>MAIN PROJECT OF THE STABLE</b> <b>INSTALLATION OF THE ALARM AND</b> <b>FIREFIGHTING SYSTEM</b>
<b>SUBJECT OF THE PROJECT:</b>	<b>STABLE INSTALLATION OF THE FIRE</b> <b>ALARM SYSTEM</b> <b>STABLE INSTALLATION OF FIRE</b> <b>EXTINCTION WITH AEROSOL</b>
<b>PROJECT NUMBER:</b>	<b>01/16</b>
<b>BOOK NUMBER</b>	<b>1/1</b>
<b>DESIGNERS RESPONSIBLE FOR THE</b> <b>STABLE FIRE ALARM SYSTEM:</b>	<b>Nikola BAJIĆ, Bachelor of electrical</b> <b>engineering, license no. 353 E998 07</b> <b>Milivoje ĐERKOVIĆ, electrical engineer</b>
<b>DESIGNERS RESPONSIBLE FOR THE</b> <b>STABLE FIRE EXTINCTION SYSTEM:</b>	<b>Dragan Cvetković, Bachelor of mechanical</b> <b>engineering, license no. 353 E998 07</b>

Belgrade,  
09. 2016.

Manager:

  
Miloš Adamović







VESSEL MARCONI

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MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

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Numer  
16/09/20 date  
09.2016.  
Belgrade

According to the Law on Planning and Construction ("Official Gazette of the Republic of Serbia", No. 72/09, 81/09- correction, 64/10 – decision of the Constitutional Court, 24/11 and 121/12, 42/13 – decision of the Constitutional Court, 50/13 – decision of the Constitutional Court, 98/13 – decision of the Constitutional Court, 132/14 and 145/14), I hereby issue

#### A DECISION ON APPOINTMENT OF THE RESPONSIBLE DESIGNERS

For creation of the following technical documentation, Contract no.

<b>INVESTOR:</b>	<b>COMPANY LADAR TRANSPORT Ltd, Belgrade</b>
<b>INVESTMENT FACILITY:</b>	<b>MARCONI VESSEL, TERMINAL BELGRADE</b>
<b>PLACE OF THE CONSTRUCTION:</b>	<b>MARCONI VESSEL, TERMINAL BELGRADE</b>
<b>PROJECT NAME:</b>	<b>MAIN PROJECT OF THE STABLE INSTALLATION OF THE ALARM AND FIREFIGHTING SYSTEM</b>
<b>SUBJECT OF THE PROJECT:</b>	<b>STABLE INSTALLATION OF THE FIRE ALARM SYSTEM STABLE INSTALLATION OF FIRE EXTINCTION WITH AEROSOL</b>
<b>PROJECT NUMBER:</b>	<b>01/16</b>
<b>BOOK NUMBER</b>	<b>1/1</b>

	<b>VESSEL MARCONI</b> <b>MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</b>	NOTES	PAGE 1.7
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BUREAU VERITAS

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I hereby appoint as:

**DESIGNERS RESPONSIBLE FOR THE STABLE FIRE ALARM SYSTEM:**

**Nikola BAJIĆ, Bachelor of electrical engineering, license no. 353 E998 07**

**DESIGNERS RESPONSIBLE FOR THE STABLE FIRE EXTINCTION SYSTEM:**

**Dragan Cvetković, Bachelor of mechanical engineering, license no. 353 E998 07**

The above appointed responsible designers meet the requirements of the Article 128 of the Law on Planning and Construction ("Official Gazette of the Republic of Serbia", No. 72/09, 81/09 – correction, 64/10 – decision of the Constitutional Court, 24/11 and 121/12, 42/13 – decision of the Constitutional Court, 50/13 – decision on the Constitutional Court, 98/13 - decision on the Constitutional Court, 132/14 and 145/14).

To be delivered to:

- The appointed.



VESSEL MARCONI

MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

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BUREAU VERITAS

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(Coat of arms of Serbian Chamber of Engineers)

## SERBIAN CHAMBER OF ENGINEERS

# LICENSE

---

of a responsible designer

---

On the basis of the Law on Planning and Construction and  
the Statute of the Serbian Chamber of Engineers

### Management Board of Serbian Chamber of Engineers

Certify that

**Nikola B. Bajić**

a bachelor of electrical engineering  
Personal ID number 0504956710136

Is a responsible designer of  
Telecommunication networks and systems

License number

353 E998 07



In Belgrade  
July, 5, 2007.

(Round seal of Serbian Chamber  
of Engineers)

President of Serbian Chamber of  
Engineers  
(duly signed, signature illegible)  
Phd Dragoslav Šumarac  
graduate architecture engineer



VESSEL MARCONI

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MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

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BUREAU VERITAS

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(Coat of arms of Serbian Chamber of Engineers)

## SERBIAN CHAMBER OF ENGINEERS

# LICENSE

of a responsible designer

On the basis of the Law on Planning and Construction and  
the Statute of the Serbian Chamber of Engineers

### Management Board of Serbian Chamber of Engineers

Certify that

**Nikola B. Bajić**

a graduate engineer of electricals  
Personal ID number 0504956710136

Is a responsible designer of  
Telecommunication networks and systems

License number

353 E998 07

In Belgrade  
July, 5, 2007.

(Round seal of Serbian Chamber  
of Engineers)

President of Serbian Chamber of  
Engineers

(duly signed, signature illegible)  
Phd Dragoslav Šumarac  
graduate architecture engineer





VESSEL MARCONI

MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

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Number: 12-02/227279

Belgrade, July 5, 2016

(On the right-hand side: Coat of arms of Serbian Chamber of Engineers)

Pursuant to Article 75 of the Statute of the Serbian Chamber of Engineers ("Official Gazette of the Republic of Serbia", No. 88/05 and 16/09), and upon a personal request of a member of Serbian Chamber of Engineers issues

## CERTIFICATE

stating that Nikola B. Bajić, bachelor of electrical engineering  
license number  
**353 E998 07**

responsible designer of telecommunication networks and systems

on the day of the issuance of this certificate is a member of Serbian Chamber of Engineers, has paid the membership fee to Serbian Chamber of Engineers until July 5, 2007 as well as to certify that the issued license was not revoked by the decision on the Court of honor.

(locus sigili)

(hexagon seal of Serbian Chamber of Engineers)

President of Serbian Chamber of Engineering  
(duly signed, signature illegible)  
Phd Miroslav Damnjanović  
graduate architecture engineer





VESSEL MARCONI

MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

NOTES

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(Coat of arms of the Republic of Serbia)

REPUBLIC OF SERBIA  
MINISTRY OF INTERIOR

**LICENSE**

For design and construction of specific systems and measures for fire protection

Bachelor of electrical engineering

1. Project development of fixed fire extinguishing systems and operation of these systems
2. Project development of fixed fire alarm systems and operation of these systems
3. Project development of fixed systems for the detection of the explosive gases and vapors and operation of these systems.

Issued pursuant to Article 32. and 38. of the Law on Fire Protection and Article 13. of the Rules on licensing exams and requirements for obtaining the licenses and authorizations and the main design of the fire protection systems and special fire protection systems.

NIKOLA (BOJAN) BAJIĆ  
April 5, 1956, Drvar, B&H  
License number  
07-152-291/12


In Belgrade, January 14, 2016

President of the  
Commission  
(duly signed, signature  
illegible)

(locus sigili)  
(Round seal of the  
Ministry of Interior of the  
Republic of Serbia)

Minister:  
(duly signed, signature  
illegible)



	<p style="text-align: center;">VESSEL MARCONI</p> <p style="text-align: center;">MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</p>	<p>NOTES</p>	<p>PAGE</p> <p style="text-align: center;">1.12</p>
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BUREAU VERITAS

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Pursuant to Article 126, 127 and 128 of the Law on Planning and Construction ("Official Gazette of the Republic of Serbia", No. 72/09, 81/09 – correction, 64/10 – decision of the Constitutional Court, 24/11 and 121/12, 42/13 – decision of the Constitutional Court, 50/13 – decision of the Constitutional Court, 98/13 - decision of the Constitutional Court, 132/14 and 145/15) the following declaration is being issued:

### DECLARATION OF MUTUAL CONFORMITY


With which I confirm that the final project has been agreed with all the installations in the facility.

Belgrade

09. 2016.

Responsible designer:  
 Nikola Bajić, bachelor of electrical  
 engineering  
 License number: 353 E998 07



	<p style="text-align: center;">VESSEL MARCONI</p> <p style="text-align: center;">MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</p>	<p style="text-align: center;">NOTES</p>	<p style="text-align: center;">PAGE</p> <p style="text-align: center;">1.13</p>
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According to the Law on Planning and Construction ("Official Gazette of the Republic of Serbia", No. 72/09, 81/09 – correction, 64/10 – decision of the Constitutional Court, 24/11 and 121/12, 42/13 - decision of the Constitutional Court, 50/13 decision of the Constitutional Court, 98/13 - decision of the Constitutional Court, 132/14 and 145/15) the following declaration is being issued:

### DECLARATION

Of the responsible designers.

Hereby we declare that the technical documentation for

<b>INVESTOR:</b>	<b>COMPANY LAĐAR TRANSPORT Ltd, Belgrade</b>
<b>INVESTMENT FACILITY:</b>	<b>MARCONI VESSEL, TERMINAL BELGRADE</b>
<b>PLACE OF THE CONSTRUCTION:</b>	<b>MARCONI VESSEL, TERMINAL BELGRADE</b>
<b>PROJECT NAME:</b>	<b>MAIN PROJECT OF THE STABLE INSTALLATION OF THE ALARM AND FIREFIGHTING SYSTEM</b>
<b>SUBJECT OF THE PROJECT:</b>	<b>STABLE INSTALLATION OF THE FIRE ALARM SYSTEM STABLE INSTALLATION OF FIRE EXTINCTION WITH AEROSOL</b>
<b>PROJECT NUMBER:</b>	<b>01/16</b>
<b>BOOK NUMBER</b>	<b>1/1</b>

**HAS BEEN MADE IN 3 (THREE) IDENTICAL COPIES**

Belgrade


09. 2016.

Responsible designer:  
Nikola Bajić, bachelor of electrical  
engineering

License number: 353 E998 07





	<p style="text-align: center;">VESSEL MARCONI</p> <p style="text-align: center;">MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</p>	<p>NOTES</p>	<p>PAGE</p> <p style="text-align: center;">1.14</p>
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## DECLARATION

### OF THE RESPONSIBLE DESIGNER OF THE CONFORMITY OF THE PROJECT WITH THE LAW REGULATIONS


Herby I declare that upon the creation of the main project of the stable installation of the fire alarm and fire extinguishing systems for MARCONI vessel, TERMINAL BELGRADE, I followed the Law, rules, regulations and standards set out in the list that follows, and which are the integral part of this declaration. The declaration is provided pursuant to the Law on Planning and Construction.

Belgrade

09. 2016.

Responsible designer:  
Nikola Bajić, bachelor of electrical  
engineering  
License number: 353 E998 07



	<p style="text-align: center;">VESSEL MARCONI</p> <p style="text-align: center;">MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM</p>	<p style="text-align: center;">NOTES</p>	<p style="text-align: center;">PAGE</p> <p style="text-align: center;">1.15</p>
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BUREAU VERITAS

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## LIST OF THE LAWS, REGULATIONS, RULES, STANDARDS AND LITERATURE

### A. Laws:

1. Law on Planning and Construction ("Official Gazette of the Republic of Serbia", No. 72/09, 81/09 – correction, 64/10 – decision of the Constitutional Court, 24/11 and 121/12, 42/13 - decision of the Constitutional Court, 50/13 - decision of the Constitutional Court, 98/13 - decision of the Constitutional Court, 132/14 and 145/14)
2. Law on Fire Protection ("Official Gazette of the Republic of Serbia", No. 111/09 and 20/2015)
3. Law on Workplace Safety and Health ("Official Gazette of the Republic of Serbia", No. 101/05)
4. Law on Environmental Protection ("Official Gazette of the Republic of Serbia", No. 132/04)
5. Law on Spatial Planning of the Republic of Serbia ("Official Gazette of the Republic of Serbia", No. 44/95)
6. Law on Spatial Planning and Organization ("Official Gazette of the Republic of Serbia", No. 44/95)

### B: Regulations and recommendations

1. Rules on technical norms for stable installation for fire alarm ("Official Gazette of the Republic of Serbia" No.87 / 93).
2. Rules on the technical requirements for fire-extinguishing systems with pyrotechnic generated aerosols ("Official Gazette of the Republic of Serbia", No. 58/99)
3. European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)
4. Rules on measures and standards of occupational safety at work tools ("Official Gazette of the Republic of Serbia", No. 18/1991)
5. Regulation on devices of personal protection at work and personal protection equipment ("Official Gazette of the Republic of Serbia" No. 35/69.
6. Rules for the construction of inland vessels, Volume I and II, published in 1994.

### C: Standards:

1. Regulations defined by the standards of the Republic of Serbia:
  - SRPS N. N6. 170-179
  - SRPS N. N6. 501-504
  - BSI-A.1-3.46-560436

### E: Literature:

1. Collection of the electrical regulations published by "Official Gazette of the Republic of Serbia" in 1989.
2. Catalogues and brochures of electrical equipment
3. Technical catalog of the aerosol generator manufacturer.





VESSEL MARCONI

MAIN PROJECT OF THE STABLE INSTALLATION OF THE FIRE ALARM AND FIREFIGHTING SYSTEM

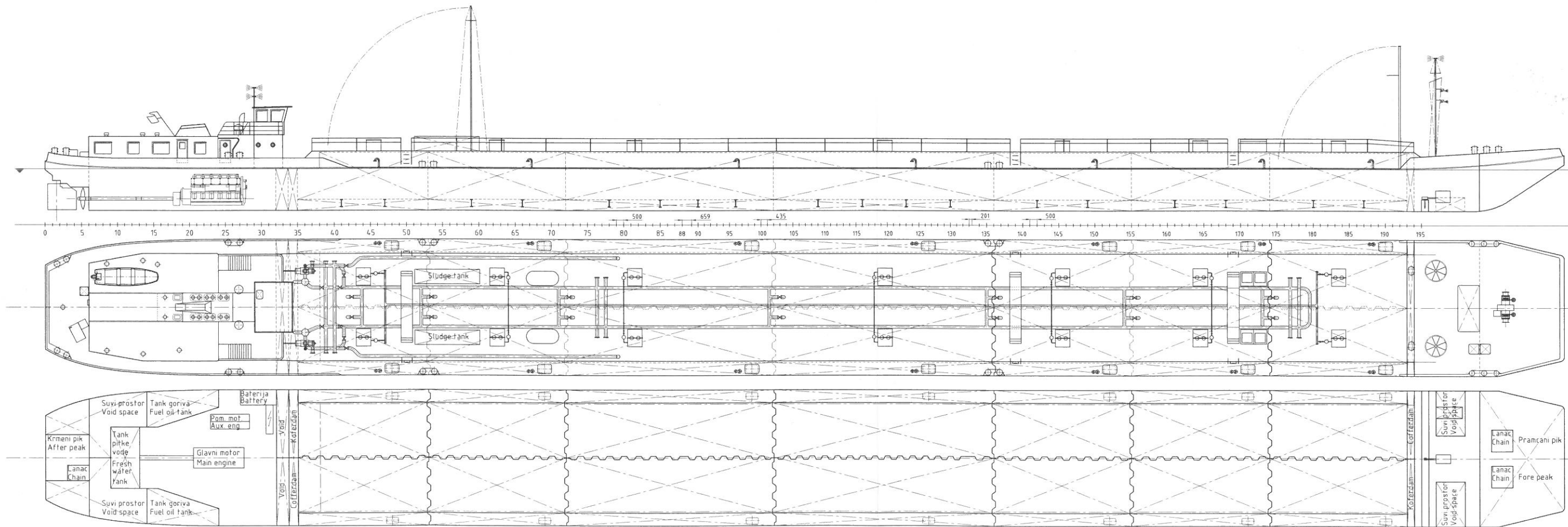
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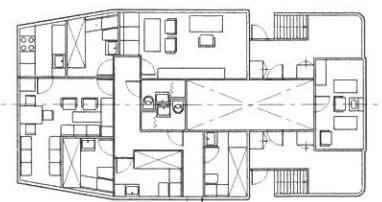
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**GLAVNE DIMENZIJE / MAIN DIMENSIONS**  
 Class 1 - HULL \* MCS IN(0.6) Z ADN Tanker Double Hull Type N  
 Duzina preko svega / Length over all 104.81 m  
 Duzina izmedju PerP / Length between PerP 103.75 m  
 Sirina, na rebrima / Breadth moulded 9.45 m  
 Sirina, najveca / Breadth maximum 9.50 m  
 Visina / Hight 2.90 m  
 Teretni prostor / Cargo hold 1999 m<sup>3</sup>  
 Block coefficient 0.82 -  
 Main engine power 728 kW  
 Draft 2.82 m

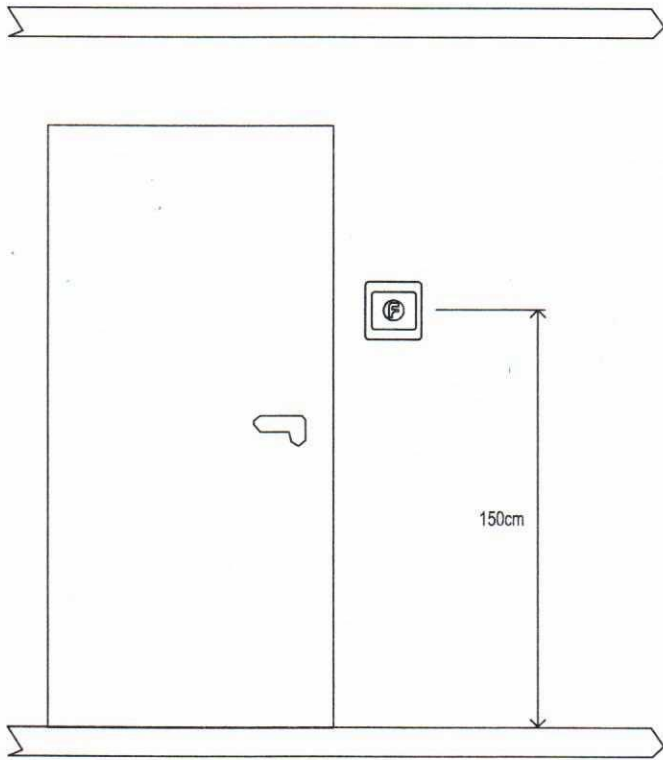


BUREAU VERITAS Section ...31728M...  
 VU avec observations  
 Answer: 15-May-2017  
 (Bureau Veritas document)  
 The plan approval office  
 See letter: TN/DNE/813/MAS/NMA/JRH/KSO

Dizajnirao/Designed: S. Djordjevic 03.2016. Crtao/Drawn: N. Todorovic 03.2016. Pregledao/Checked: S. Djordjevic 03.2016. Odobrio/Approved: S. Djordjevic 03.2016.	Kopija/Copy: [ ] Klasa/Class: [ ] Sva prava zadržana/All rights reserved.	Skala/Scale: Razmera Br. crteza/Drawing No.: 1.1-1-R3	Narucilac/Purchaser: Ladjar Transport Ime/Nativ: Generalni plan Opis/Description: General arrangement plan	Objekat/Design: Marconi
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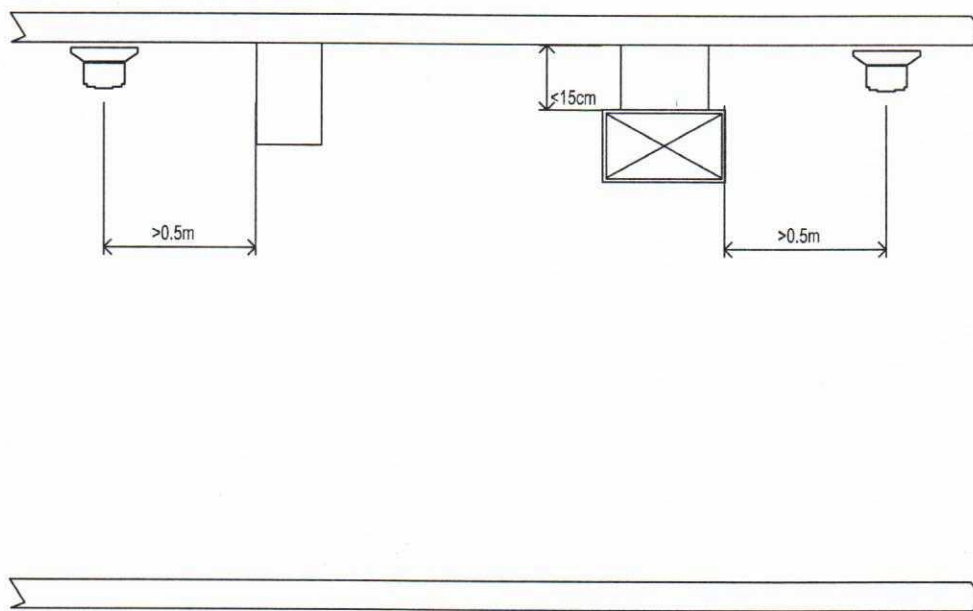


	naziv crteža	odg. projektant Nikola Bajić, die	datum	crtež broj
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BUREAU VERITAS

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Rastojanje između detektora i zidova, nameštaja ili uskladištene robe ne sme biti manje od 0,5m osim ukoliko se ne radi o hodnicima, kanalima ili sličnim delovima objekta čija je širina manja od jednog metra. Ukoliko na tavanici postoje grede ili ventilacioni kanali koji su od tavanice udaljeni ne više od 0,15m i sl. onda bočna udaljenost do javljača mora biti najmanje 0,5m.



naziv crteža

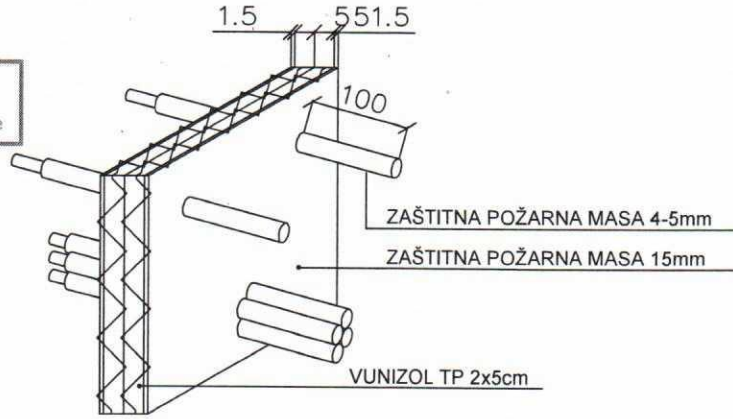
odg. projektant  
Nikola Bajić, die

datum

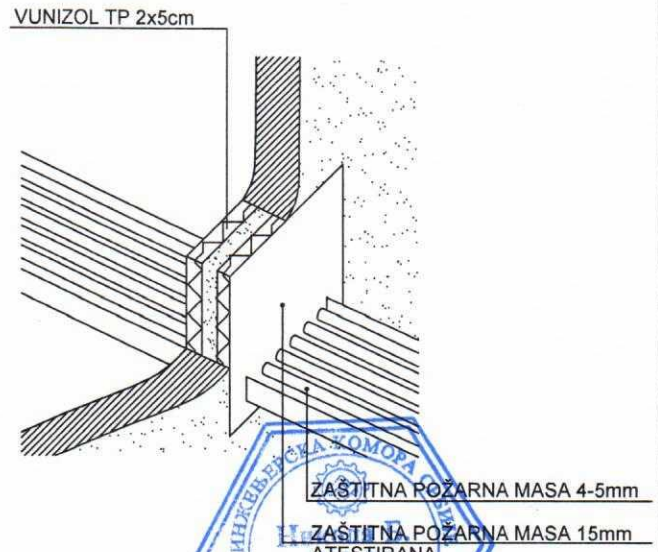
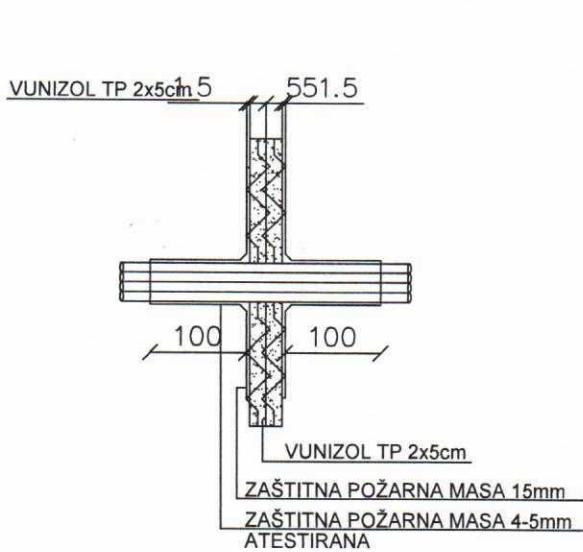
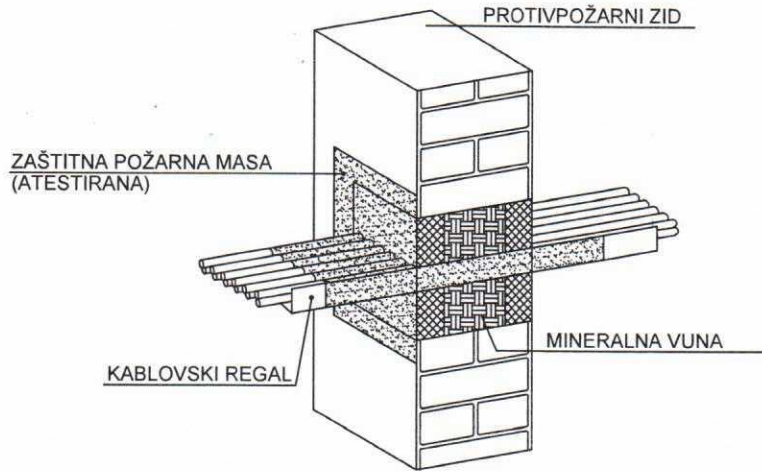
crtež broj

DETALJ PROLASKA KABLA  
KROZ PP MONTAŽNI ZID

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DETALJ PROLASKA KABLA  
KROZ PP ZID OD OPEKE



	naziv crteža	odg. projektant Nikola Bajić, die	datum	crtež broj
		projektant		



## TECHNICAL DESCRIPTION

### 1. Stable installations for fire alarm

A stable fire alarm system is designed for the purpose of the early detection of a fire in an area.

This system consists of a control panel unit automated optical smoke detectors, automatic combination (optical / heat) detectors, automatic thermal heat detectors, manual call point, parallel light indicator, alarm with strobe flash, warning panels with light inscription "GAS", button to manually start the fire fighting and associated cabling.

Modern conventional microprocessor (fire station headquarters) for the detection and fire alarm systems, maximum capacity 8 zones (fait line) that can bind up to 20 automatic or manual call is foreseen in the break room of the crew of the vessel, on the wall, at a height of 1.5 m from the floor. It is supplied from a source of 220V and the embedded rechargeable batteries in case of power supply voltage failure. On the front side of the switchboard there is a control keypad and a LED display programmed from the control keypad on the control panel unit or with the auxiliary computer. All fire stations memorize the changes within a system that they cover and thus these changes can be read out at any time.

Anticipated conventional automatic detectors are optical smoke detectors, combined (optical smoke / thermal heat) and thermal heat and are mounted in the base-footer at the ceiling. Knowing that the said bases are low and the cables are kept in the ceiling itself, there are additional bases for the introduction of the OG laid cables. They are linked in the independent zones to the control panel unit.

with max. 20 detectors in it. The detectors are to be aligned with the schedule of lights and other equipment taking into account the allowed distance from them.

Conventional Manual Call Point is designed for wall mounting at a height of 1.5m from the floor to the bottom edge detectors and on the evacuation outlet. It is connected to the independent zone on the control panel unit.

In each end detector call point within the zone, the end resistor is installed.

Parallel light indicators are designed for light status indication of the excited automatic detectors in areas where they are not directly visible from a communication space. They are connected in parallel with said detectors and are mounted on a wall above the door.

Conventional alarm with strobe flash is designed for outdoor wall mounting under the eaves. It is activated on the pulse of any of the detectors within the alarm. It is connected directly to the control panel unit.

The warning light panel with the inscription "GAS" is intended for outdoor wall mounting under the eaves and at the entrance to the machine room. It is activated on the pulse of any detectors within the alarm. It is linked in parallel to the alarm with strobe flash.

Button to manually start the extinguishing is designed for wall mounting at a height of 1.5 m from floor level to the axis of the detectors and at the entrance of the machine room. It is located in a plastic cabinet for outdoor installation. It binds directly on the control panel unit, at a steady power source. It is activates after the initiative of thermal detectors in the engine room, the departure of trained persons in the same room and verification of the extent of the fire. The above mentioned person takes a key from the said cabinet (located in the outer casing on the side of the cabinet), opens it, and then presses the button to activate the generator (gas aerosol) attached to said taster and then the shutdown begins.

Upon the occurrence of fire in any part of the building, the alarm siren with strobe flash and warning light panel with the inscription "GAS" are activated. Cable installation is utilizes cables J-H (St) H 1x2x0,8mm and JE-H (St) H 2x2x0,8 mm - FE180 / E30. The aforementioned cables creep into pipes or boxes between 2 peak in the tube provided for the new systems of low power.





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All forced ventilation systems in the space which are to be protected must be turned off the very moment when the fire-extinguishing system is activated.

On all the holes in an area that must be protected and which allow the entry of air or gas leakage, must be attached devices that provide a quick closing. The difference between open and closed positions of these openings must be clearly visible. The upper level of the engine room at the ceiling level contains 6 ventilation openings, their automatic closing in case of fire detection up by the fire alarm system is envisioned. Closing is done as an executive function of the control panel unit, acting on the main electrical cabinet.

The project has been made in accordance with the applicable regulations.

The organization of the alarm plan is as follows:

When there is already a duty face in the room where the control panel unit is located, the system operates in the regime of "DAY". In this case, upon the automatic activation of the detectors, there is an internal alarm at headquarters (sound and light). A person on duty turns off the audible alarm by pressing "BUZZER OFF" within 20 seconds from the beginning of the alarm ("TIME PRESENCE"). By pressing the "CHECK" button, the "SCOUTING TIME" starts to run which in this case lasts for 5 min. During this time, the person on duty goes to the site of the fire, extinguishes it if it is a smaller fire, returns to the control panel and resets it so that there is no general alarm and executive commands. If the fire is stronger the person on duty presses the first manual call point thus breaking the "SCOUTING TIME" and sending a general alarm (the planned executive functions are activated). If after the expiry of the "SCOUTING TIME" panel is not reset, the "DRIVE ALARM" is activated. By activating the signal "ALARM" with the manual call point, the "DRIVE ALARM" is immediately activated.

When there is no person in the building, the system operates in the "NIGHT" regime. In this case, if the automatic detector is activated, the drive alarm is immediately activated (foreseen executive functions are activated).

Belgrade

09, 2015.

Responsible designer  
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## 2. STABLE INSTALLATIONS FOR AEROSOL FIRE EXTINGUISHING

### MEANS OF EXTINCTION

Aerosol was selected to be a mean of extinguishing the fire. Aerosol is a fire extinguishing agent which consists of a very fine solid phase (particles) and a supporting gas phase. Condensed aerosol particles and gases that are discharged from the module for fire extinguishing are create in an exothermic reaction inside the formation of aerosols. The mechanism of aerosol fire extinguishing is a chemical reaction with free radicals in the flame, thus preventing the burning process. Aerosols contain particles of potassium carbonate ( $K_2CO_3$ ), which are formed by thermal decomposition of the filling thus forming aerosol and which contains potassium nitrate ( $KNO_3$ ) – Permanganate as an oxidizer. When the aerosol reaches the flame, its particles absorb heat, decompose and release highly reactive potassium ions ( $K^+$ ) with the unpaired electron. Potassium ions react with hydroxyl ( $OH^-$ ), hydrogen (H) and oxygen ( $O^{2-}$ ) free radicals that maintain the combustion process, producing harmless compounds of potassium hydroxide and water, which do not burn.

### AEROSOL APPLICATION FOR FIRE EXTINGUISHING

Aerosols extinguish fires of class A, B, C, and fires that occur in electrical installations according to SRPS ISO 3941.

#### Aerosol can extinguish fires within:

- The production areas and machine halls,
- Transformer and generator rooms,
- Distribution cabinets
- Cable tunnels,
- Mills and silos,
- Garages,
- Fires of organic liquids (oil, petroleum, gasoline, organic solvents)
- Fires of solid particles (wood, insulation and plastic materials, etc.).
- Stores,
- Electronic and computer centers,
- Places with raised floors and suspended ceilings,
- Business and residential buildings,
- libraries and valuable stores.

Aerosol fire-extinguishing systems are used for fire-extinguishing on electrical installations devices that are under voltage up to 10 kV.

#### Aerosol protection can be twofold:

- a) Local,
- b) Protection of the room or the protected area.

Protection of the room or the protected area with the three-dimensional effect is done by aerosol generators. All the rooms that are protected with the  $CO_2$  gas, inert gas or argon, can be protected by the aerosol generator.

Quenching experiments found that the necessary quantities of aerosols are the lowest in comparison to all other extinguishing agents.

**Selection of activation.** Activation of the fire extinguishing system is performed , manually.

According to the method of extinguishing there are two ways of activating: automatic and manual, as follows:

- via auto-power pulse-contact and via cords
- by hand-remote, electrical contact through the keys to manually start the extinguishing.



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***In this case, for the generators AGN (3) (machine room) was chosen a method of the electrical contact operation over the keys to manually start the extinguishing. For generator AGE of 0,88m<sup>3</sup> (electrical cabinet) was chosen mode of activation through thermal actuators from + 79 °C.***

After extinguishing the fire it is recommended that the protected area is not opened for another 10 minutes to prevent the possibility of re-ignition.

Removing the aerosol particles of solid phase after quenching is carried out with a damp cloth.

## **AEROSOL GENERATORS AGN (2) TYPE FP-2000 AGN (3) TYPE FP-3000 AGE AND TYPE FP-100S**

### **PURPOSE**

Aerosol generator for fire extinguishing is a tool for regional fire extinguishing and is intended for localization and extinguishing fires in flammable and combustible liquid (gasoline and other oil products, organic solvents, etc.) and hard materials (timber, insulation materials, plastics et al.), machine halls, as well as electrical equipment (strong current devices and high voltage devices, devices in industry and households, etc.), including those that are under the voltage up to 10 kV.

Generators are not used for extinguishing fire-base and base soils, as well as substances which burn without access of air.

### **THE WORKING PRINCIPLE**

The working principle of the generator is based on the inhibition of chemical processes that occur in flames high-dispersion particles (aerosols), alkali metal salts, which are extracted during combustion charge formed by aerosol, and which are able to remain in a balanced state for a long period of time.

When generator starts to operate, the concentration of the oxygen in the protected area almost does not even change. Aerosol which settles practically departs from various surfaces by wiping, vacuuming, or is washed off with water.

### **FP-2000 TECHNICAL INFORMATION**

<b>Weight (gross):</b>	15,5 kg
<b>Net mass of forming aerosol agent:</b>	2 kg
<b>Discharge length:</b>	3,5 m
<b>Utilization factor of certain types of generators:</b>	0,64
<b>Operational discharge time:</b>	15-20 seconds
<b>Dimensions (excluding holder)</b>	300 mm x 300 mm x 185 mm
<b>Terms of use:</b>	
<b>Operating temperatures:</b>	-50 °C + 50 °C
<b>Relative humidity at 25°C</b>	Maximum -98%
<b>Useful life:</b>	5 years



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**Operational period**

10 years (After the first 5 years, it is necessary to review and service the generator after which the useful life is extended for another 5 years).

**Features:****Activation mechanism:**

Thermal electrical 6-36V DC. 0,8A in 3-4 sec

**Activator type:**

Heating element with 2,3  $\Omega$  resistance

**Tested at:**

0,005A

**FP-3000 TECHNICAL INFORMATION****Weight (gross):**

16,3 kg

**Net mass of forming aerosol agent:**

3 kg

**Discharge length:**

4 m

**Utilization factor of certain types of generators:**

0,63

**Operational discharge time:**

15-20 seconds

**Dimensions (excluding holder)**

300 mm x 300 mm x185 mm

**Terms of use:****Operating temperatures:**

-50°C + 50 °C

**Relative humidity at 25°C**

Max. -98%

**Useful life:**

5 years

**Operational period**

10 years (After the first 5 years, it is necessary to review and service the generator after which the useful life is extended for another 5 years).

**Features:****Activation mechanism:**

Thermal electrical 6-36V DC, 0,8A in 3-4 sec

**Activator type:**

Heating element with 2,3  $\Omega$  resistance

**Tested at:**

0,005A

**FP-100S TECHNICAL INFORMATION****Weight (gross):**

1,37 kg

**Net mass of forming aerosol agent:**

0,1 kg

**Discharge length:**

1 m

**Utilization factor of certain types of generators:**

0,64



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<b>Operational discharge time:</b>	5-10 seconds
<b>Dimensions (excluding holder)</b>	1555 mm x 84 mm
<b>Terms of use:</b>	
<b>Operating temperatures:</b>	-50°C + 50 °C
<b>Relative humidity at 25°C</b>	Max. -98%
<b>Useful life:</b>	5 years
<b>Operational period</b>	10 years (After the first 5 years, it is necessary to review and service the generator after which the useful life is extended for another 5 years).
<b>Features:</b>	
<b>Activation mechanism:</b>	Thermal actuator from +79 °C

Belgrade,

09. 2015.

Responsible designer:

**Dragan Cvetković, Bachelor of electrical engineering**

License number: **353 E998 07**





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**RECHARGEABLE BATTERY CAPACITY ESTIMATION**

**1. Input:**

- 1. requested operation time  $t_n$  ( h )
- 2. quiescent current of connected devices  $I_n$  ( mA )
- 3. alarm current of connected devices  $I_a$  ( mA )
- 4. quiescent current exchange  $I_{cn}$  ( mA )
- 5. fire station alarm current  $I_{ca}$  ( mA )
- 6. required operation time of the alarm (0.5h)  $t_a$  ( h )
- 7. safety factor  $F$  (1.1 .. 1.3)

The required battery capacity is calculated as follows:

$$B_k = x ((t_n \times (I_n + I_{cn}) + t_a \times (I_a + I_{ca}))$$

ELEMENTS	quiescent current (mA)	alarm current (mA)	Number of elements (piece)	Total quiescent current(mA)	Total alarm Current (mA)
Automatic fire detectors	0.1	15	21	2.1	17.1
Manual fire detector	0.1	15	1	0.1	15.1
Parallel indicator	-	5	1	-	5
Alarm with strobe light		38	5	0	190
Panel "GAS"		70	2	0	140
Control panel unit	70	100	1	70	100
<b>total:</b>			<b>mA</b>	<b>72.2</b>	<b>467.2</b>
Required time : quiescent regime (h) alarm	72	Capacity in: quiescent regime (mAh)		<b>5198.4</b>	
(h)	0.5	alarm (mAh)		<b>233.6</b>	

Total required capacity:	<b>5432.0 (mAh)</b>
Safety factor:	1.25

**TOTAL rechargeable battery capacity: 6.790 (Ah)**

The required capacity of rechargeable battery is 6,7 Ah, and thus the provided 7Ah batteries meet the set requirements.

The preliminary estimation is presented for the consumption of all system components in the normal regime and in the case of fire station, automatic and manual detectors, parallel indicator, 5 sounders and 2 "GAS" alarm panels .

Belgrade,  
 09, 2016.

RESPONSIBLE DESIGNER:  
 Nikola Bajić, Bachelor of electrical engineering.  
 License number: 353 E998 07





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## 2. CHOOSING A STABLE FIRE EXTINGUISHER

### Volumes of the protected areas

1. The total volume of the engine room 1 - stern peak- protected upper level:

$$P_1=6.6 \text{ m}^3 \quad V_1=14,5\text{m}^3,$$

$$P_2=7.3 \text{ m}^3 \quad V_2=16,1\text{m}^3$$

$$P_3=12.1 \text{ m}^3 \quad V_3=26,6\text{m}^3$$

$$V_u= V_1 +V_2 + V_3 = 57,2 \text{ m}^3.$$

2.The total volume of the engine room 1 – stern peak– lower protected level:

$$P=64.25\text{m}^3, \quad V=141.35\text{m}^3.$$

3.The total volume of the engine room 2 – protected bow peak:

$$P=40.48 \text{ m}^2, \quad V= 90.7 \text{ m}^3.$$

#### **The required number of aerosol generators for machine room 1 - stern peak - upper level:**

In accordance with the certificate number BSI-A.1-3.46-560436, the total mass of the filling substance that forms aerosol during combustion, necessary for extinguishing a fire in a room of known volume and hermetic, is determined by the formula:

$$W = V \times q / f$$

wherein:

W - total weight (g) filling substance formed by combustion aerosol, V - volume (m3) engine room to be protected = 57.2 m3 q- projected density-aerosol concentration = 120 g / m3 f - utilization factor of certain types of generators = 0,63 Total fill weight:

$$W = V \times q / f = 57.2 \times 120 / 0,63 = 57.2 \times 190,5 = 10896\text{g}$$

Given the specificity of the protected area and suitable sites for the generator as well as their dimensions, total number of generators needed are- 1 generator (type FP-3000, 3000g) and 4 generators (type FP-2000, 2000g) which characteristics are given in the technical part of the description.

#### **The required number of aerosol generators for machine room 1 - stern peak - lower level:**

In accordance with the certificate number BSI-A.1-3.46-560436, the total mass of the filling substance that forms a combustion aerosol, necessary for extinguishing a fire in a room known volume and hermetic, is determined by the formula:


$$W = V \times q / f$$

wherein:

W - total weight (g) filling substance formed by combustion aerosol, volume V (m3) of the protected engine room = 141,35 m3 q- projected density-aerosol concentration = 120 g / m3 f - utilization factor of certain types of generators = 0,63 (type FP-2000, 2000g) f - utilization factor of certain types of generators = 0.63 (type FP-3000, 3000g). The total mass of filling:

$$W = V \times q / f = 141.35 \times 120 / 0.63 = 141.35 \times 190.5 = 26924\text{g}$$

In relation to the configuration of the protected area and suitable sites for the generator as well as their dimensions, a total number of needed generators are- 7 generators (type FP-3000, 3000g)) and 3 generators (type FP-2000, 2000g), which characteristics are given in the technical part of the description .

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**The required number of aerosol generators for machine room 2 - bow peak:**

In accordance with the certificate number BSI- A.1-3.46-560436, the total mass of the filling substance that forms a combustion aerosol, necessary for extinguishing a fire in a room known volume and hermetic is determined by the formula:

$$W = V \times q / f$$

wherein:

W - total weight (g) filling substance formed by combustion aerosol, V - volume (m<sup>3</sup>) of the protected engine room = 90.7 m<sup>3</sup> q- projected density-aerosol concentration = 120 g / m<sup>3</sup>, f - utilization factor of certain types of generators = 0.64 Total fill weight:

$$W = V \times q / f = 90,7 \times 120 / 0,63 = 90,7 \times 187,5 = 17277g$$

In relation to the configuration of the protected area and suitable sites for the generator and their dimensions, there will be needed a total of 4 generators (type FP-3000, 3000g)) and 3 generators (type FP-2000, 2000g), which characteristics are given in the technical part of the description.

**Note:**

For extinguishing the electrical cabinet of the approximate volume of 1m<sup>3</sup> (with a reduction of 0,5m<sup>3</sup>) within the engine room, there was selected the aerosol generator (AGE) type FP-100S, 100g weight of filling xq  $W = V / f = 0.5 \times 120 / 0.64 = 0.5 \times 187.5 = 93,75g$  which covers the mentioned area, so that the weight of 100g (which is the weight of the selected generator) meets the needs of the said area.

Belgrade  
09, 2015

Responsible designer  
Dragan Cvetković, Bachelor of mechanical engineering  
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BROD MARCONI, PRISTANIŠTE BEOGRAD

GLAVNI PROJEKAT STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA

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## GENERAL TECHNICAL INSTALLATION CONDITIONS

### General information:

1. These technical requirements make an integral part of the project and the contractor is obliged to comply with them.
2. During the construction, adhere to the SRPS existing regulations, collection electrical regulations and the rules of protective measures at work, as well as all other requirements defined in the project.
3. For any changes to the project or deviation from the project due to the application of other types of materials, the approval of the project organization that developed this project must be obtained.
4. Before starting the work, the Contractor shall be thoroughly familiar with the project and all objections, if any, shall be timely provided to the supervisory authority.
5. During the works, the Contractor is required to enter in the project any discrepancies in and to display them graphically in red ink.
6. The material to be installed has to be of the prime quality.
7. All equipment and materials needed for the project should be certified.
8. During the works, the Contractor is obliged to keep a log and sill in all the required data.
9. All requests and reports, both by the supervisory authority and by the Contractor must be placed through the log.
10. Upon completion of the works, the Contractor is obliged to submit to the Investor a built design.
11. The warranty period for all the works is 2 years.
12. When performing these installations there must be taken into account in particular that other installations are not damaged. If damage occurs, the Contractor is obliged to solve it at his own expense.
13. Anything that is not covered by these technical conditions, the Contractor is obliged to do in accordance with the existing regulations on execution of these types of installations.

### Internal installation of telecommunication and signal installations

1. Distribution cabinets shall be installed in separate rooms or in the areas for electrical installations.
2. A nameplate with the tag type of installation shall be set at each distribution cabinet.
3. Each distribution cabinet shall be connected to a tape or Cu rail of the common ground.
4. Any branching or separating installation of lines shall be made only in junction boxes with lids.
5. Cables and wires must be routed so that there should not occur:
  - Torsion bending and fixtures (creating eights)
  - Pushing the cable, which would deform the cross section (cable must be freely laid or secured only by the appropriate cable clamps, or laid under plaster or in the corresponding PVC pipes)
  - Damage from the means of transport; If the cables and wires are crossing over the means of transport, additional safeguards against falling cables shall be taken.
6. The cables and wires must be routed so that the entire length shall be accessible to control and possible interventions at all times.
7. The distance between more parallel laid cables must be at least equal to the diameter of the adjacent thicker cable. The cable must not be attached to the items of equipment that are exposed to shocks or are moved frequently.
8. The cables which pass through the floors, walls and the like, must be protected with the fireproof materials to prevent the penetration of fire and smoke.
9. The signal cables must be at least 10 cm away from the power cables and wires, while the telecommunication cables must be at least 10 cm away from the signal cables and 20 cm from the power cables and wires.



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10. The junction boxes shall be installed in the hallways, and not anyhow in the rooms, thus providing easier and faster maintenance.
11. In the event of a merging or connecting individual wires and cables, joints must be interconnected permanently and securely attached. The wires may be connected only by the compound which ensures that there is no leakage of harmful influence factors. Safe and secure connection can be done with screws, rapping or soft soldering.
12. Connecting or jointing spot of the cable wires or wires must have the same conductivity and insulation as the cable or line. The lead of the cord or the connecting site must not be damaged, nor its cross-section reduced.
13. Connections or joints must be made so that the distance between the conductor as well as the other parts without the power supply, is sufficient and permanently secured.
14. When assembling and installing equipment it is needed to comply with the installation plans and technical descriptions.
15. All signaling devices shall be installed and mounted so as to fit into the planned layout of the electrical equipment. In case of some major changes of the place of installation in respect to those given in the project, it is necessary to consult the responsible designer.
16. Upon the completion of the installation, all the installations shall be tested in the galvanic insulation and conductivity.

Belgrade,  
09, 2016.

Responsible designer:

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### INSTALLATION OF THE STABLE FIRE EXTINGUISHER

Project and assembly works, commissioning and exploitation in connection with the systems for aerosol fire extinguishing must be carried out by specialized organizations that are licensed to perform such work.

Calculation of the number of the generators required to protect a given volume is carried out by the methods set out in the relevant normative documents.

The generators should be mounted so as to ensure quick and uniform charging of the entire volume of the room protected by the aerosol fire extinguisher.

Thus:

Generators should be installed, if possible evenly, over the entire surface of the room.

The distance between the axes in the group should therefore be min. 0.5 m.

The distance between the groups of generators must not be greater than 20 m.

The installation of generators and the direction of nozzle holes should be chosen so as to ensure the expansion of the freest flow of the aerosol that is being discharged from the charger.



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Layout of the generators in the protected areas shall be determined taking into account the following requirements:

The distance from the generator to the perimeter structure must be min. 50 mm.

The distance from the side surface of the generator to the equipment, stored materials, property, electrical equipment, electrical distribution and the like must not be less than 300 mm.

In a limited area of a radius of 0.2 m from the axis of the generator and a length of 2.0 m from the corner in the direction of the aerosol charger, there should not be fence construction, facilities, equipment, materials and the like.

Generator mounting is not allowed on the combustible surfaces.

There shall be the possibility of access to mounted generators in order to facilitate control, records and prevention.

When using several generators for protection of one volume there must be provided their commissioning at the same time.

When using generators with electrical devices, before commissioning, all forced ventilation in the protected area must be shutdown prior to putting the generator into operation.

#### CHECKS

The user must carry out a constant check of automatic aerosol fire-extinguishing system at least every 6 months.

A detailed overview and checks of all the components of automatic aerosol fire-extinguishing system is conducted every five years.

Belgrade,  
09, 2016

Responsible designer  
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BROD MARCONI, PRISTANIŠTE BEOGRAD

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GLAVNI PROJEKAT STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA

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## SPECIAL ANNEX RELATED TO THE LAW ON WORKPLACE SAFETY AND HEALTH

In terms of the Law on Workplace Safety and Health ("Official Gazette of the Republic of Serbia" no. 101/05) and the Law on Fire Protection (Official Gazette of the Republic of Serbia No. 111/09)

### A. The dangers and harmful effects that can occur when using electrical installations and equipment:

#### A1. Risk of short circuit

#### A2. Risk of overloading

#### A3. Risk of over-voltage touch and steps

#### A4. The risk of accidental contact with live parts

#### A5. Illegal voltage drop

#### A6. Danger from moisture, water, dust, explosive and flammable materials and chemical influences

#### A7. The impact and the dangers of static electricity

#### A8. The influence of electromagnetic and electric fields

#### A9. Risk of sudden power failure

#### A10. arson

### B. The measures to prevent the danger and harmfulness

#### B.1. Risk of short circuit

This danger does not exist in the projected telecommunications installations.

#### B.2. Risk of overloading

The protection is carried out by proper selection of voltage and current protection fuse in all central telecommunication devices (switchboard, secretarial suites) so that there can be no overload of the cables nor the devices.

#### B3. Risk of over-voltage touch and steps

Protection against excessive contact voltage is resolved through the whole system of protective measures: zeroing system with a system of protecting line, low voltage system 24V, and the like. Central ground facility is provided via grounding strip, to which all the cables and metal parts of an object that does not belong to the circuits and all the central facilities of telecommunication installations (switchboard, secretarial suites) are attached.

#### B4. The risk of accidental contact of parts that are live

This protection is provided by a choice of equipment, devices and cables, as well as their placement in suitable enclosures, pulling into the pipes, separating with the safety nets, separating with the protective fences and the like, as well as with the suitable locating so that the equipment is not exposed to mechanical damage.

Construction of telephones, fire alarms, timers, sound sources and the like, prevent accidental contact between parts that are energized.

#### B5. Protection against excessive voltage drop

Protection against excessive voltage drop is provided by the correct dimensioning of the power supply cables (the main power supply cables as well as cable copies for individual customers). The estimation and cross section of the cables, as well as voltage drops make a part of the project documentation.



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**B6. Protection against moisture, water, dust, explosive and flammable materials and chemical influences.**

Protection is performed by a proper selection of equipment, distribution cabinets and a central accommodation unit.

**B7. The risk of static electricity**

The risk of static electricity is eliminated by performing grounding.

**B8. Risk of influence of electromagnetic and electric fields**

The said danger is eliminated by the proper selection of the distance between power, signal and telecommunication lines, as well as by a selection of electrostatic and electromagnetic protection inside and outside the lines.

**B9. Risk of sudden power failure**

Danger is eliminated by using backup power and the proper selection of autonomous or external rechargeable batteries necessary for the operation of telecommunication devices in the facility, which allows you to work in terms of legal provisions.

**B10. arson**

The proper choice of fire-fighting equipment as well as a proper and prescribed maintenance during the operation ensures that the fire cannot be caused. Going through fire walls, openings are closed flamastic mortar while the installation is sprayed on the left and right sides with the flamastic-mixture resistant to burning. Based on the position of fire walls and other obstacles, the building is divided into fire sectors that have an independent alarm via automatic and manual fire detectors.

**C. General considerations and obligations**

All electrical equipment and materials provided by the project must comply with all applicable Yugoslav (Serbian) technical regulations and standards.

The contractor is required to complete a special study on the construction site and work on the construction site. Manufacturer of tools for work on mechanical drive is required to deliver a user manual for the safe operation of the tools and to confirm that the said tool complies with the prescribed measures and norms of protection at work. He shall also provide a certificate of applied safety regulations.

Work organization is required to notify the competent authority of the labor inspectorate about the beginning of works 8 days prior to starting the work.

Work organization is required to develop normative acts in the field of safety at workplace, a program for training and education of workers in the field of protection, Rules on inspections, testing and maintenance of tools, equipment and tools, a Program of measures and improvements of the the protection at workplace and others.

Work organization is obliged to train workers in matters of safety at workplace and educate the workers about the conditions of work, dangers and hazards related to the work and validate the ability of workers for independent and safe operation.

Work organization is required to establish jobs with special working conditions, if such places exist.

Work organization in which deal with the explosive mixtures must have Rules on the handling of electrical installations, which are explosive protected, as well as records of works, repair and maintenance of these facilities, and the deadlines for these checks- knowing that they cannot be longer than one year.

When purchasing work tools and equipment from the documentation attached to the work tools and equipment, they must obtain the information on the acoustic characteristics from which it will be seen that the noise in the workplace and in work areas shall not exceed the permissible value. If some special and additional measures are required in order to fulfill the conditions for the permitted values (silencer, elastic yielding and the like) the above mentioned documents must contain the said measures as well. During construction or repair of plant and equipment, be sure to set the warning tables in terms of:

- on/off state



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- prohibition
- other notes for the operator

When handling and working in the plant, the application of the protective equipment is required.

Belgrade,  
09, 2016.

Responsible designer:  
**Nikola Bajić, Bachelor of electrical  
engineering**  
License number: **353 E998 07**

### AEROSOL GENERATORS SAFETY MEASURES

When dealing with generators and devices and before putting them in action, one shall keep in mind that they consist of compounds that are highly flammable.

In the process of assembling the electrical device prior to commissioning, the ends of electrical wires should be short-circuited. Their connection to the terminals on the battery charger is made after completion of the complex of works on commissioning of the entire control system for fire.

Electrical equipment of the rooms, facilities and buildings in which are mounted generators with an electrical device for commissioning should comply with the requirements of the electrical regulations.

When designing electrical lines to release the generator in operation, the measures that exclude the occurrence of electric currents that can lead to unsanctioned commissioning of generators shall be provided.

Upon the occurrence of fire and the activation of the generator, persons within the protected area must quickly leave it and, if possible, they shall close doors tightly and not to take any action in connection with the fire-fighting except calling the fire brigade.

The use of generators is not recommended in the automatic aerosol fire extinguishers and within the areas which people cannot leave before the activation of the generator.

In case of inability to quickly leave the protected area during the discharging of the system one shall protect the respiratory system from the impact of aerosol particles using gauze or cloth.

It should be noted that at the time of generator's discharging, at the output of the charger current temperature of aerosol can reach 400°C at a distance of 0.1 to 0.25 m, at a distance of 1.5 m - up to 200°C and at a distance of more than 1.5 m - to 75°C.

#### IT IS FORBIDDEN TO:

- \* To use the generators for the manual fire extinguishing;
- \* Perform work on welding or other works with a flame at a distance of less than 2 m from the generator;
- \* Use generators having mechanical damage; \*
- \* Remove the generator.



BROD MARCONI, PRISTANIŠTE BEOGRAD  
GLAVNI PROJEKAT STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA

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Opening the door to the room is done 10 minutes after the activation of the generator.  
Entering the room is allowed only after the ventilation of the room and after establishing visibility in the room. Wet cloth is used for removing the aerosol particles of solid phase from the room. Damaged appliances must be disposed of by incineration in the open air.

Belgrade,  
09, 2016

RESPONSIBLE DESIGNER:  
**Dragan Cvetković, Bachelor of mechanical  
engineering,**  
License number: 353 E998 07





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### SPECIFICATION, ESTIMATE AND PRO FORMA INVOICE

for the MAIN PROJECT of the stable INSTALLATION OF FIRE ALARM AND FIRE FIGHTING for the VESSEL MARCONI, terminal BELGRADE GENERAL

All the works should be carried out in compliance with the technical documentation, accepted and certified by the Investor.

All the positions of this specification include supply, delivery and installation of all necessary materials and equipment, with connecting to both ends, testing and putting into proper operation, and all in accordance with the approved drawings, technical specifications and contractual regulations in force for this type of installation.

Beside the costs of delivery and transport of the materials, the cost also includes their storage on site, as well as the delivery, maintenance and use of all equipment and tools needed for the operations, delivery and use of assistive devices (scaffolding, etc.) And all supporting works.

It also includes the costs of organizing construction sites and energy consumption, waste disposal from the site, installation tests, certificates, and proper commissioning.

Billing is done on the designated unit of measure.

#### Stable installation of fire detection and fire fighting

1	Conventional modular fire panel similar to J408, Bentel capacity of 8 conventional zones (lines) with 32 detectors per zone. Relay outputs for alarm and disturbance, 2 monitored sounder outputs with adjustable delay (0-10 minutes), 24VDC output of the operator, test mode with auto-reset function in the housing for wall mounting. EN 54-2, 4 standard.				
	Supply, delivery, installation, connection to cable installation and programming.	set	1	31,687.50	<b>31,687.50</b>
2	Spare rechargeable batteries capacity 12V / 7Ah power supply in case of power supply voltage.				
	Supply, delivery, installation and connection to cable installation.	piece	2	2,100.00	<b>4,200.00</b>
3	Conventional optical smoke detector, offsetting the impact of dust, protection against ingress of dust and insects similar to type DOD-220, DETNOV, in set with base similar to Z-200, DETNOV and with the additional base. EN 54-7 standard.				
	Supply, delivery, installation and connection to cable installation.	set	7	2,085.00	<b>14,595.00</b>





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4	Conventional optical smoke detector, offsetting the impact of dust, protection against ingress of dust and insects, similar to type DOD-220, DETNOV in set with base similar to Z-200, DETNOV with end resistor embedded and an extra base. EN 54-7 standard.				
	Supply, delivery, installation and connection to cable installation.	set	2	2,520.00	<b>5,040.00</b>
5	Conventional optical / high Temperature (58°C) / thermal differential fire detector, offsetting the impact of dust, protection against ingress of dust and insects similar to type DOTD-230 DETNOV in set with base similar to Z-200, DETNOV with end resistor embedded and an extra base. EN 54-5, 7 standard.				
	Supply, delivery, installation and connection to cable installation.	set	1	2,820.00	<b>2,820.00</b>
6	Conventional thermal maximal 78°C / thermal differential detector similar to the type DTD-215, DETNOV in set with base similar to Z-200, DETNOV and additional base. EN 54-5 standard.				
	Supply, delivery, installation and connection to cable installation.	set	8	2,370.00	<b>18,960.00</b>
7	Conventional thermal maximal 78°C / thermal differential detector similar to the type DTD-215, DETNOV in set with base similar to Z-200, DETNOV with end resistor embedded and an extra base. EN 54-5 standard.				
	Supply, delivery, installation and connection to cable installation.	set	2	2,820.00	<b>5,640.00</b>
8	Conventional manual call point for wall mounting similar to PCD-100 DETNOV incorporating the end resistor. EN 54-11 standard.				
	Supply, delivery, installation and connection to cable installation.	piece	1	2,235.00	<b>2,235.00</b>
9	Conventional siren sounder with flash for outdoor or indoor use similar to PSC-27, klaxon. IP65, Operating voltage 24VDC, consumption 38mA, 103dB, 124x130x100mm.				
	Supply, delivery, installation and connection to cable installation.	piece	5	6,150.00	<b>30,750.00</b>
10	Parallel light sensor for automatic detectors similar to type PAD-10, DETNOV.				



BROD MARCONI, PRISTANIŠTE BEOGRAD

GLAVNI PROJEKAT STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA

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	Supply, delivery, installation and connection to cable installation.	piece	5	1,500.00	<b>7,500.00</b>
11	The warning light panel with the inscription "GAS", operating voltage 12VDC / 24VDC, consumption 70mA, IP65, dim. 110x285x68mm, possibility to print labels with text similar to type of AMD-PG1, Amadeo.				
	Supply, delivery, installation and connection to cable installation.	piece	2	5,100.00	<b>10,200.00</b>
12	Button to manually start the extinguishing, yellow, wall mount, similar to GLT-CP3 / Y, ZETA.				
	Supply, delivery, installation and connection to cable installation.	piece	3	1,800.00	<b>5,400.00</b>
13	Plastic distribution boxes for outdoor installation to activate shut down, with lock and key (set in the outer casing on the side of the cabinet). Mounted in front of the machine room.				
	Supply, delivery and installation.	set	3	3,300.00	<b>9,900.00</b>
14	Aerosol generator similar to type FP-100S, FirePro® with lighter and bracket.				
	Supply, delivery, installation and connection to cable installation.	set	1	18,000.00	<b>18,000.00</b>
15	Aerosol generator similar to type FP-2000 FirePro® with lighter and bracket.				
	Supply, delivery, installation and connection to cable installation.	set	10	120,000.00	<b>1,200,000.00</b>
16	Aerosol generator similar to type FP-3000 FirePro® with lighter and bracket.				
	Supply, delivery, installation and connection to cable installation.	set	12	150,000.00	<b>1,800,000.00</b>
17	Signal cable type J-H (St) H 1x2x0,8mm.				
	Supply, delivery and laying into pipes or boxes.	m	300	65.63	<b>19,687.50</b>
18	Signal cable type JE-H(St)H 2x2x0,8 mm - FE180/E30.				
	Supply, delivery and laying into pipes or boxes.	m	400	187.50	<b>75,000.00</b>
19	Halogen-free aerosol generator junction box with built-in regular terminals.				
	Supply, delivery, installation and connection to cable installation.	piece	25	500.00	<b>12,500.00</b>
20	HF ribbed tube diameter-16mm.				
	Supply, delivery and installation of the wall-ceiling.	m	150	50.00	<b>7,500.00</b>



BROD MARCONI, PRISTANIŠTE BEOGRAD  
 GLAVNI PROJEKAT STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA

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21	Halogen-free box, 20x17mm self-extinguishing.				
	Supply, delivery and installation of the wall-ceiling.	m	60	330.63	19,837.50
22	Delivery of material and making breaches between the fire-protecting sectors using filling fire protection mass- type CP 615 and firestop foam type Hilti CP 620 manufacturer-Galeb group or the like.	kg.	1.00	12,218.75	12,218.75
23	The final electrical measurements on cables (insulation resistance, listening and testing pairs on termination and short-circuit).	lump sum			3,125.00
24	Final inspection of the installation and commissioning of the equipment by the supplier. Issuing appropriate certificates, user training, commissioning proper operation.	lump sum			31,250.00
25	Creating label for each detector on the paper placed in a permanent coating through which the address is visible, attached to each detector, approximate dimensions 5x2cm.	lump sum			1,250.00
26	Other unforeseen works and small supplies (HF clamps, plugs...).	lump sum			12,500.00
27	Supervision of the works by a designer	lump sum			21,875.00
28	Project development of the facility	lump sum			43,750.00
Total					3,427,421.25

Belgrade,  
 09, 2016.

RESPONSIBLE DESIGNERS:

**Nikola Bajić, Bachelor of electrical engineering**, license number: 353 E998 07

**Dragan Cvetković, Bachelor of mechanical engineering**, license number: 353 E998 07





BROD MARCONI, PRISTANIŠTE BEOGRAD

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GLAVNI PROJEKAT STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA

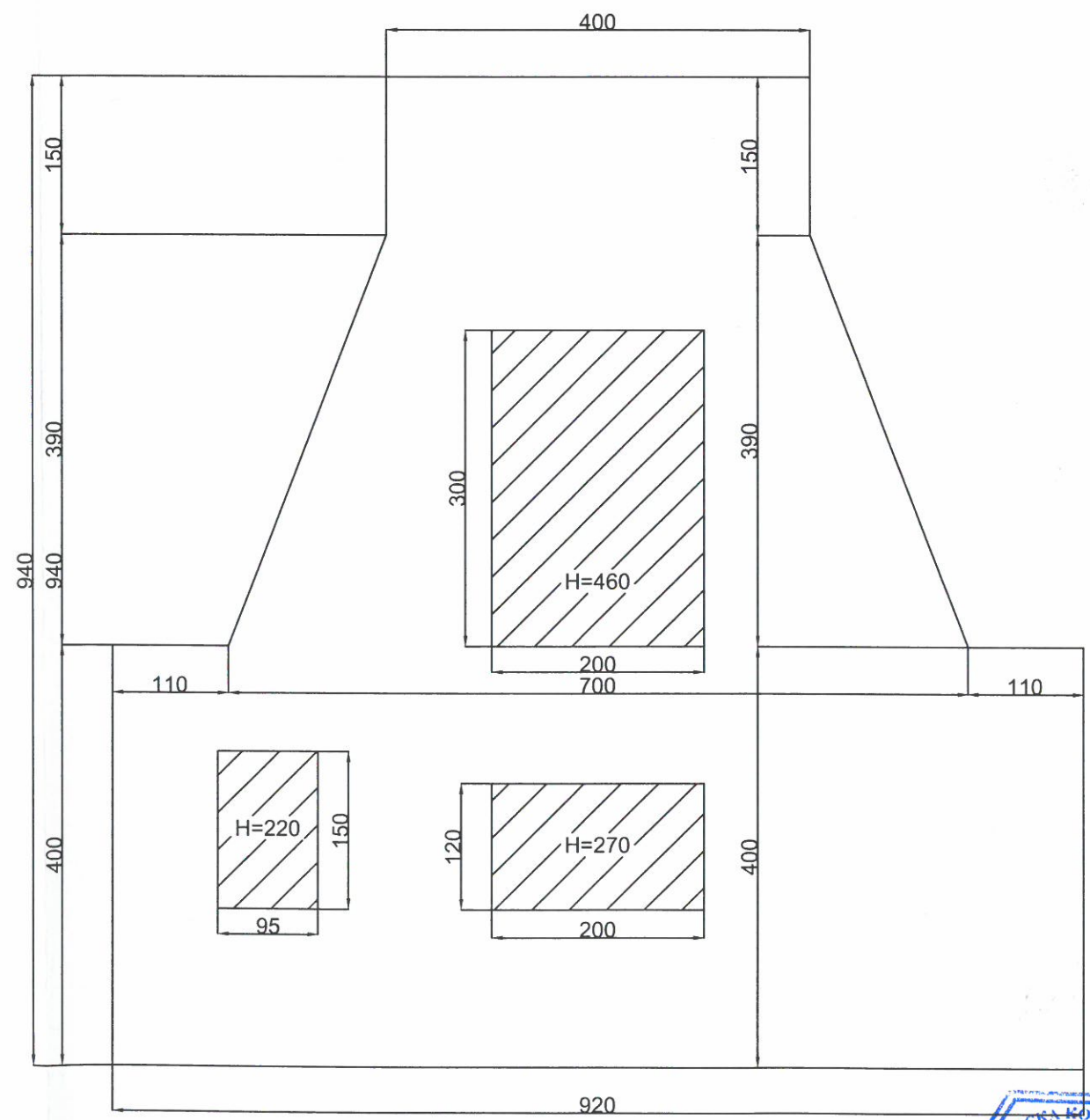
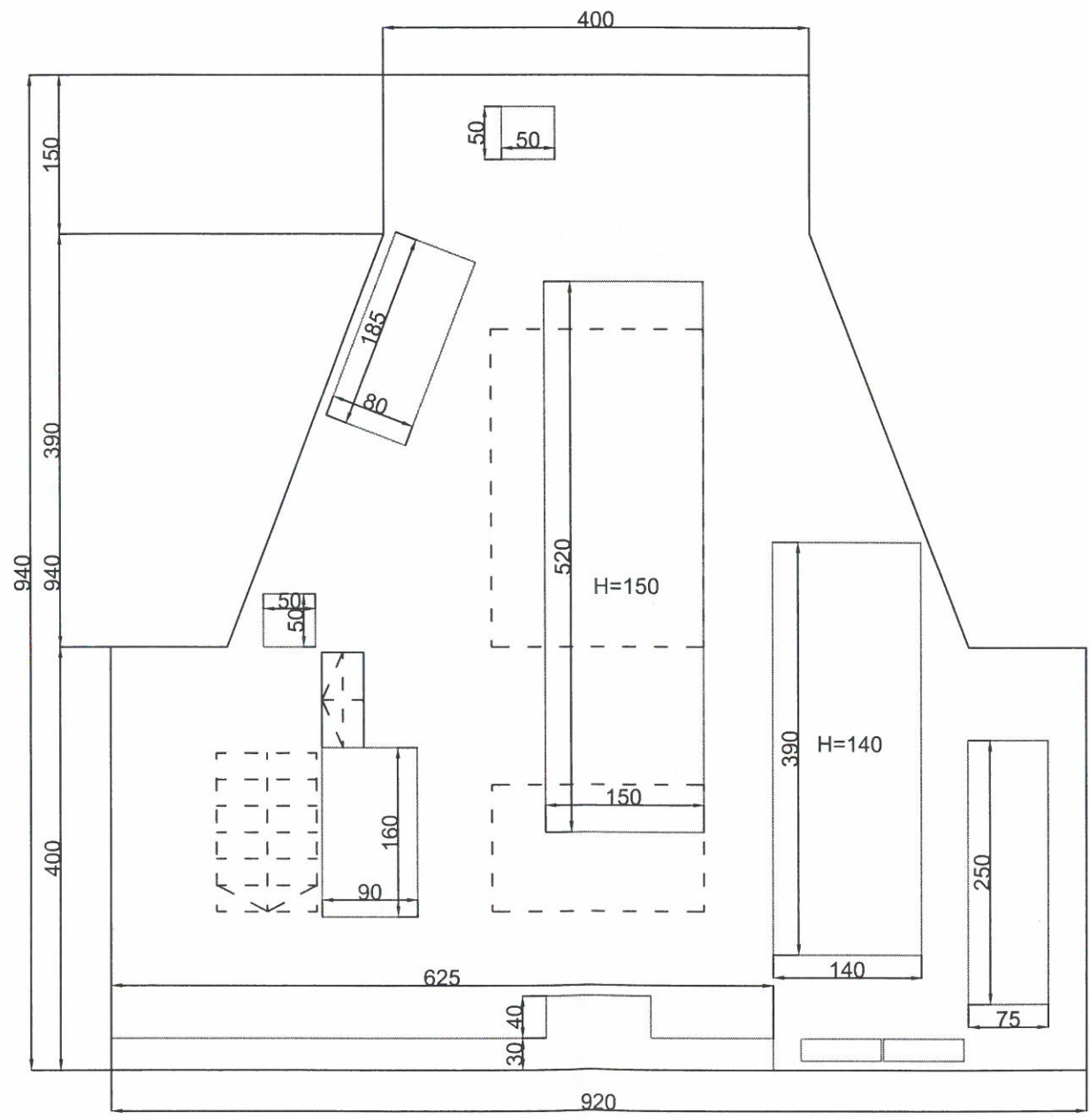
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### GRAPHIC DOCUMENTATION

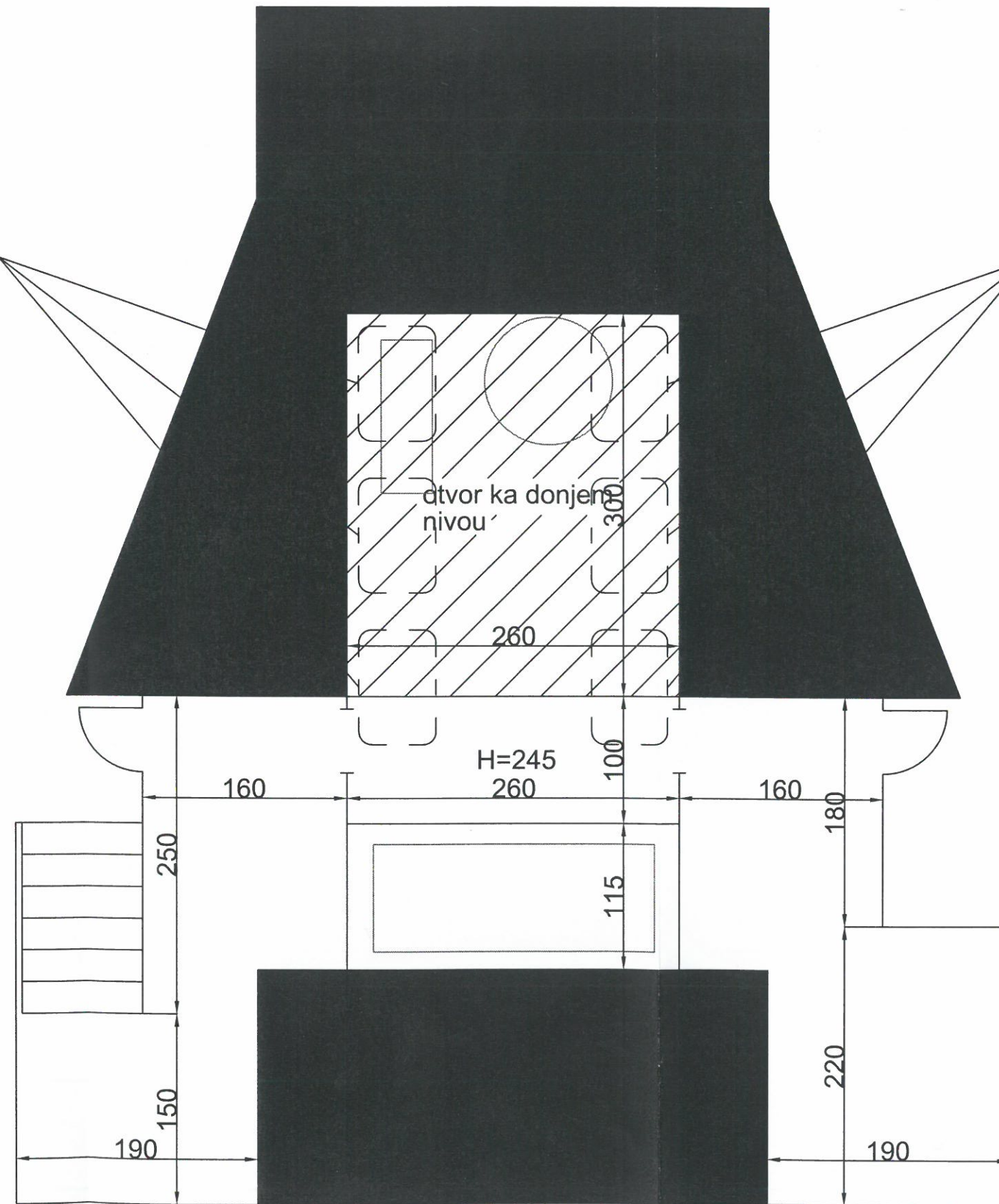
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1. LEGEND	01/16.01
2. INSTALLATION PLAN	01/16.02
3. CABLE DISTRIBUTION SCHEME	01/16.03
4. ALARM PLAN	01/16.04
5. DETAILS OF MOUNTING MANUAL CALL POINT	01/16.05
6. DETAILS OF MOUNTING AUTOMATIC FIRE DETECTORS	01/16.06
7. DETAILS OF CABLES PASSING THROUGH A FIRE-PROTECTION WALL	01/16.07



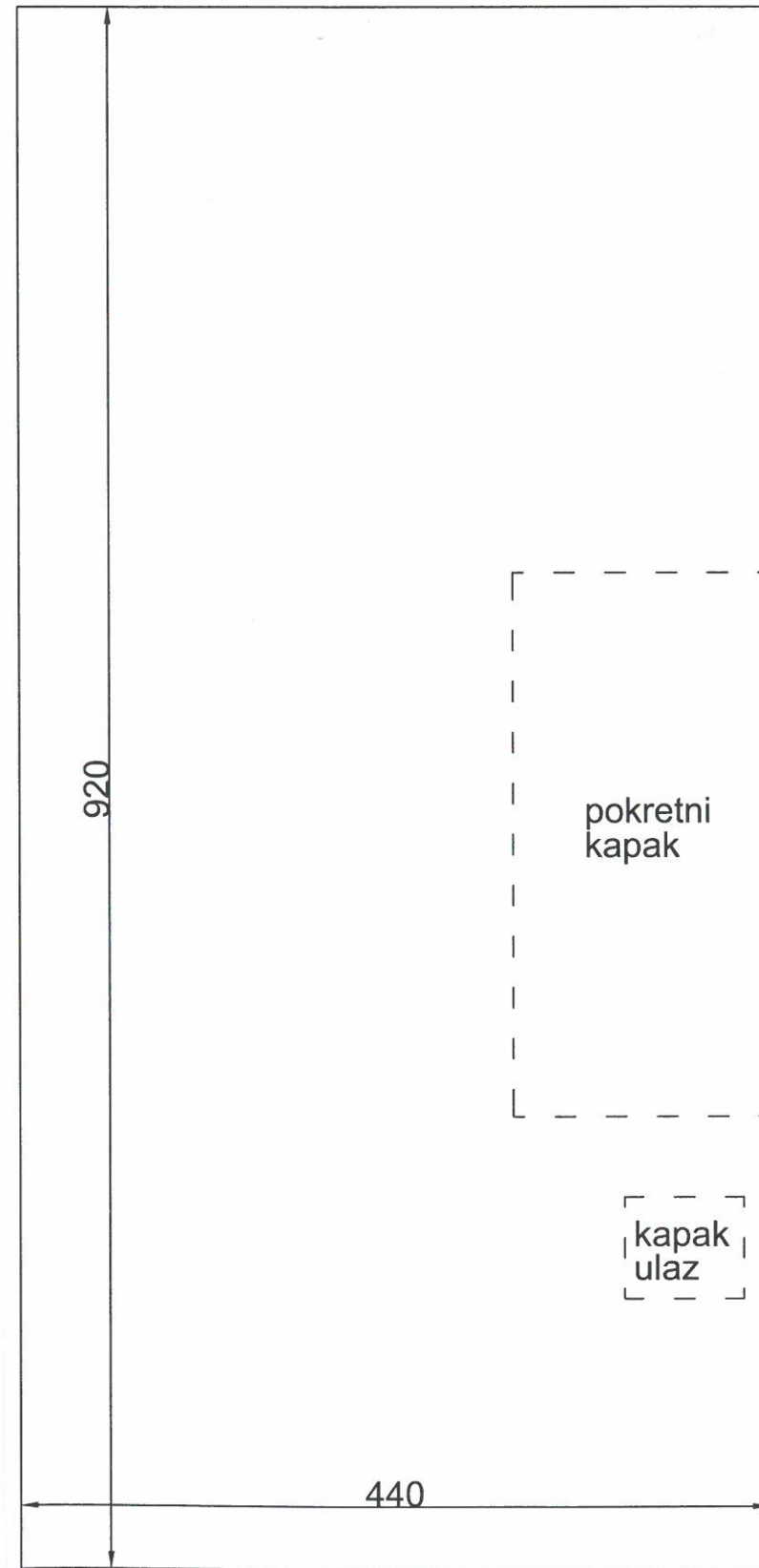
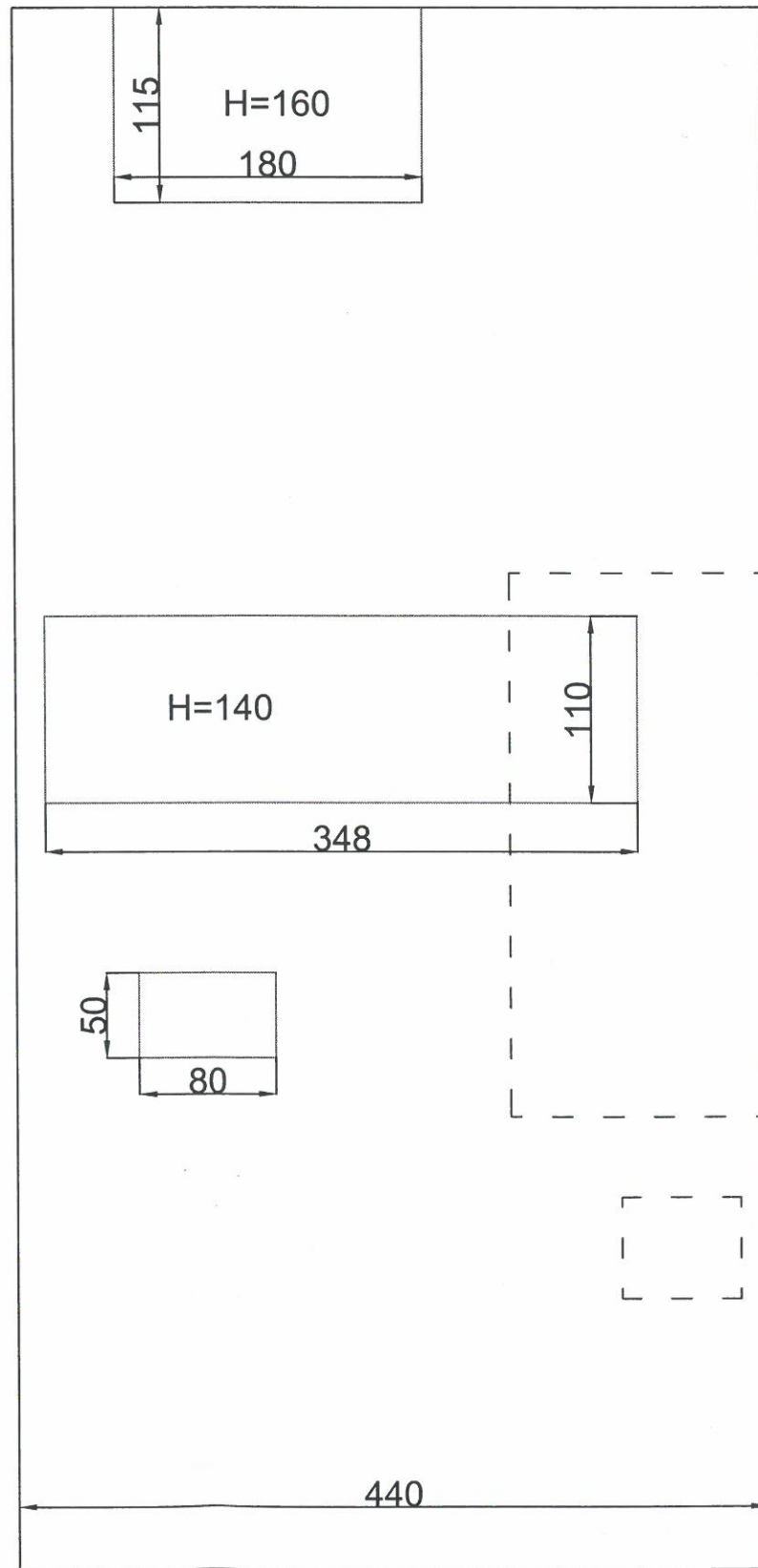
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ОПШТИНА ПРОЈЕКТАНТ

krovni otvori 90x60

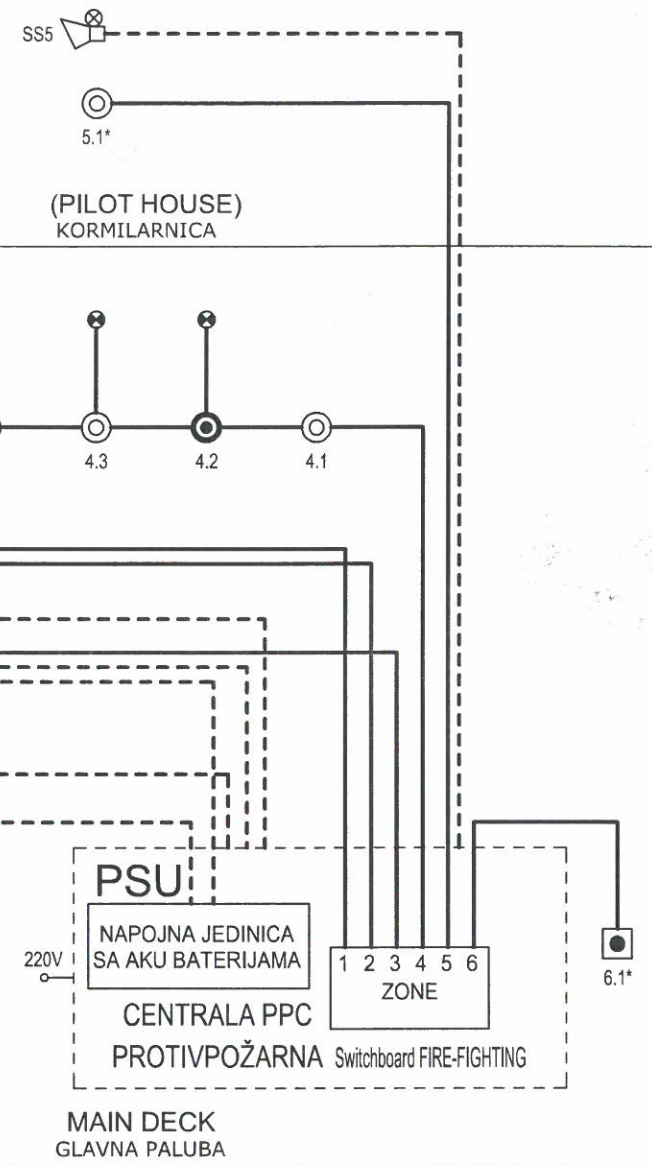
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 <b>IPON SISTEM d.o.o. DRUŠTVO ZA PROJEKTOVANJE I MONTAŽU PROTIVPOŽARNIH SISTEMA</b> Beograd/Zemun, Zlatiborska br. 31 tel: (011) 2104-778; 2106-668 e-mail: administracija@iponsistem.com	
<b>OBJEKAT I MESTO GRADNJE:</b> BROD MARCONI, PRISTANIŠTE BEOGRAD	
<b>INVESTITOR:</b> LAĐAR TRANSPORT DOO, Beograd	<b>BROJ UGOVORA</b>
<b>ODGOVORNI PROJEKTANT:</b> Nikola Bajić, dipl.inž.el.	<b>DATUM:</b> septembar 2016.god.
<b>PROJEKTANT:</b> dr Dragan Cvetković, inž.el.maš.	<b>RAZMERA</b>
<b>PROJEKTANT:</b> Milivoje Đerković, inž.el.	<b>POVRŠINA</b>
<b>DOKUMENTACIJA:</b> STABILNE INSTALACIJE ZA DOJAVU I GAŠENJE POŽARA	<b>GLAVNI PROJEKAT</b> SVESKA/BROJ CRTEŽA 1/1 01/16.03
<b>SISTEMI:</b> STABILNA INSTALACIJA ZA DOJAVU POŽARA STABILNA INSTALACIJA ZA GAŠENJE POŽARA AEROSOLOM	
<b>NAZIV CRTEŽA:</b>	<b>ŠEMA RAZVODA</b>

(MACHINE ROOM 2)  
 MAŠINSKI PROSTOR 2 - PRAMČANI PIK

MAŠINSKI PROSTOR 1 - DONJI NIVO - KRMENI PIK  
 (MACHINE ROOM 1) lower level - stern pixels

