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14.December 2023

Huayou Cobalt

BAMO cathode material project

CONCEPT DESIGN

FIRE PROTECTION TECHNICAL DESCRIPTION

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1 Preliminaries

BAMO Technology Hungary Kft. (Investor) committed Óbuda Építész Stúdió Kft. (General Designer) to prepare the basic, permit, tender and construction design documentation of HUAYOU COBALT – BAMO cathode material project locaed at Ács.

1.1 Fire protection authority meeting

During the design, the fire safety document preparer has been involved in the consultations listed below:

Number	Subject	Location	Date
1.	Fire protection authority meeting	Komárom-Esztergom Vármegyei Katasztrófavédelmi Igazgatóság	2023. 10. 06.
2.	Fire protection authority meeting	BM Országos Katasztrófavédelmi Főigazgatóság Hatósági Főigazgató-helyettesi Szervezet Megelőzési és Engedélyezési Szolgálat Tűzmegelőzési Főosztály	2023.11.21.

2 Legislations and standards

ID	Description
54/2014. BM decree	National Fire Protection Handbook modified by 8/2022. (IV. 14.) BM Decree
TvMI 1.5:2022.06.13.	Protection against fire spread
TvMI 2.5:2022.06.13.	Evacuation
TvMI 3.4:2022.06.13.	Protection against heat and smoke spread
TvMI 4.3:2022.06.13.	Ensuring the intervention conditions of firefighting units
TvMI 7.5:2022.06.13.	Electrical installation, lighting protection and protection against electrostatic discharge
TvMI 14.2:2022.06.13.	Risk class classification
TvMI 11.3:2022.06.13.	Fire protection properties for building constructions
MSZ EN 2:1993	Classification of fires
MSZ EN 3	Portable fire extinguishers
MSZ EN 671-1:2013	Fixed firefighting systems. Hose systems. Part 1: Hose reels with semi-rigid hose
MSZ EN 1838:2014	Lighting applications. Emergency lighting
MSZ EN ISO 7010:2020/A3:2022	Graphical symbols. Safety colours and safety signs. Registered safety sign. 3rd modification (ISO 7010:2019/Amd 3:2021)
MSZ EN 13501-1:2019	Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests

ID	Description
MSZ EN 13501-2:2016	Fire classification of construction products and building elements. Part 2: Classification using data from fire resistance tests, excluding ventilation services
MSZ EN 13501-3:2005+A1:2010	Fire classification of construction products and building elements. Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers
MSZ EN 13501-4:2016	Fire classification of construction products and building elements. Part 4: Classification using data from fire resistance tests on components of smoke control systems
MSZ EN 13501-5:2016	Fire classification of construction products and building elements. Part 5: Classification using data from external fire exposure to roofs tests
MSZ EN 13501-6:2019	Fire classification of construction products and building elements. Part 6: Classification using data from reaction to fire tests on electric cables
MSZ EN 50172:2005	Emergency escape lighting systems
MSZ HD 60364	Low-voltage electrical installations
MSZ EN 62305	Protection against lightning

The safety level set in the OTSZ is achievable:

- compliance with a national standard for fire safety
- by applying the technical solutions and calculation methods developed in the technical fire safety directives,
- by using solutions which are partly or completely different from the technical fire safety directives or the national standard, if the same level of safety is demonstrated by the designer

3 Purpose of the document

This fire safety document contains the fire safety specifications, requirements and technical solutions used for the buildings and related structures to be constructed during the establishment of HUAYOU COBALT – BAMO cathode material manufacturing plant located at 2941 Ács, hrsz: 0421/71.

Fire safety documentation preparation work can only be done by a person with appropriate expertise. The responsible general designer shall involve the fire protection designer in the preparation of the fire safety technical specification.

In accordance with the Act XXXI of 1996 on fire control and technical rescue and fire the fire protection documentation is part of the architectural and technical design documentation in the cases specified by law.

4 The conditions for fire safety design

- fire protection solutions for a building must be designed and dimensioned to take account of the damaging effects of a single fire at any point in the building,
- the building is used as intended when the fire occurs,
- the number of persons at risk and their ability to escape are appropriate to the intended use,
- the fire extends to a single fire compartment containing the point of origin
- there is no other simultaneous fire hazard, damage or failure of fire protection systems.

5 Definitions

Basic designated purpose: a classification of units of risk, including independent functional components, by primary purpose of use typical of the unit of hazard so as to differentiate units of risk by designated purpose and to establish related fire protection requirements, such as

- industrial/agricultural: the basic designated purpose of a unit of hazard containing an independent functional unit serving industrial/agricultural purposes,
- community: the basic designated purpose of a unit of hazard containing an independent functional unit serving community purposes,
- residential: the basic designated purpose of a unit of hazard containing homes, recreation units not classified as accommodation and rooms with related functions.
- storage: the basic designated purpose of a unit of hazard containing an independent functional unit serving storage purposes,
- mixed: the basic designated purpose of a unit of hazard containing an independent functional unit serving other purposes.

Risk unit: A building or any part of it with defined borders specified for limiting the propagation of fire, in respect of which the conditions that determine the hazard class are taken into account in the same degree and in the same manner during design.

Risk class: A classification expressing the degree of threat and the severity of the resulting damage or loss in case of fire and the degree of other jeopardy that fire may cause.

- NAK: Very Low Risk
- AK: Low Risk
- KK: Medium Risk
- MK: High Risk

Fire compartment: A specific section of a building, special structure or open-air storage area which is protected from fires spreading from adjacent sections of buildings and areas.

Fire compartment area: The sum of the net floor area of the rooms belonging to the same fire compartment or of the area used for storage in the case of an outdoor storage area in m^2.

Automatic fire detection and fire alarm system: a device authorised for use by the fire prevention authorities located in a fixed location within a building or outdoors and automatically performing early fire detection, alarm and appropriate fire prevention measures

Automatic fire extinguishing system: An automatic, manual or both automatic and manual device authorised for use by the fire prevention authorities located in a fixed location within a building or outdoors intended to extinguish the fire, facilitate intervention, prevent the spread of fire, decrease fire damage, not considered a source of firefighting water

Splintering and splintering/cracking surfaces: Building structures that help release overpressure by opening up, turning or tipping, and have adjustable opening pressure values.

Escape route: The route used by escaping persons, which is designed to ensure the safety of such persons for the time it takes to escape (from a room with numerous occupants along a route taking people to the door used for evacuation) during the second stage of evacuation in case of a fire.

Evacuation: departure or removal of the persons located within or on a building, facility or outdoors in the event of a fire, which starts when a person leaves their location and ends when a person reaches a temporary protected space or a safe space

First stage of evacuation: a part of the escape between a person's actual location and the person reaching the escape route or the transitionally protected or safe area in case a person can be rescued without using the escape route,

Second stage of evacuation: a part of the escape between a person reaching the escape route and accessing the safe or transitionally protected area,

Passive storage: storage and marketing of a stored substance in its unopened, enclosed, factory packaging and container or in a packaging and container certified for transportation

Explosive area: open or enclosed area made up of one or several explosive zones indoors or outdoors

Temporary protected area: a room or group of rooms or an area constructed on an occupied floor level of a building capable of ensuring the security of people escaping or evacuated to that location transitionally until a rescue operation.

6 Introduction of the applied technology

6.1 Plant units

The new plant is composed of the following units:

- Workshop-1 building
- MVR
- Switching station
- 132 kV Substation
- Solid waste and cleaning
- Fire and water pump
- Guard 1
- Guard 2
- Guard 3

6.2 Material Safety Data Sheets

Safety data sheets for hazardous substances appearing on the area of the new plant must be available in Hungarian language.

The given safety data sheet must also include the impact on the environment.

The content of safety data sheets must be verified by a test report issued by an accredited laboratory.

7 Location of the new plant and internal placement

7.1 Legislation rules

In accordance with the relevant legislation, in order for the fire brigade to be able to move and operate, a road and area must be provided to buildings and structures which is suitable for the non-routine movement and operation of fire-fighting vehicles.

7.2 Firefighting access area

Based on the Section 65 Paragraph (1) of the OTSZ fire-fighting access area must be provided in the following cases:

- Buildings with the highest building level above 14 m,
- commercial buildings with a floor area of more than 3,000 m^2 - aggregate per floor - and buildings accommodating such parts of buildings,
- sports buildings with a capacity of 5,000 people or more or an outdoor auditorium,
- educational establishments for minors with a capacity exceeding 300 persons and
- for hospitals and institutions for persons with reduced mobility in excess of 300, including number of beds, number of outpatients and staff,
- industrial, agricultural and storage buildings which contain rooms with large combustion chambers, where the fire performance of the building structures or the permissible size of the fire compartments has been determined taking into account the use of fire extinguishing equipment with increased operational safety.

Since highest building level of Workshop-1 building will be higher than 14 meters so fire fighting access area and fire fighting access road will be established in order to promote the fire fighting intervention.

The fire fighting access area shall be marked in accordance with the relevant fire protection technical guideline (TvMI 4.3:2022.06.13.).

7.2.1 Parameters of sole area of firefighting access area

In accordance with the request of the fire protection authority the sole area must be designed taking into account the following parameters:

- stamp pressure: min. 160 kN
- width: min. 6.5 meters

7.3 Firefighting access road

Firefighting access road shall be established in order to promote the fire-fighting interventions.

In accordance with the requirements of the fire protection authority the load capacity of the parade routes min. It should be 8 tons.

7.4 Internal roads

Roads within the facility are more than 6 meters wide. The load capacity of the roads is suitable for non-regular use of fire trucks.

In accordance with the relevant Fire Protection Guideline (TvMI 4.3:2022.06.13.) at least 4 meter clear height shall be provided for fire trucks.

The current legislation and valid technical requirements do not regulate the minimum radius of firefighting roads.

However, we take into account that the turning radius of the biggest fire truck is about 16 m, accordingly, with the planned road design, we roads are suitable for vehicles with a turning radius between 9 and 16 meters.

According to the relevant legislation, in order to access and operate the fire brigade, buildings and structures must provide roads and areas that are suitable for the non-regular operation and operation of fire brigades.

7.5 Nearest fire department

The nearest professional fire department (Komárom Fire Department, 2921 Komárom, Tűzoltó utca 1.) is approx. 23,5 km distance from the plant.

Access to the facility is possible from the M1 motorway.

8 Risk classification

In accordance with the legislation in force the plant shall be divided into risk units based on the units with designated purpose. The risk unit is a building or any part of it with defined borders specified for limiting the propagation of fire, in respect of which the conditions that determine the hazard class are considered in the same degree and in the same manner during design.

According to § 10 (4) of the OTSZ, the risk unit may include

a) communication passages,

b) storage rooms used for storing items related to the designated purpose,

c) a car parking with a maximum of 4 parking spaces,

d) an electric and a mechanical room,

e) if the basic designated purpose is industrial, agricultural or storage, then a room for social welfare and one related to performing business administration jobs.

8.1 Risk units

The new plant will consist of the following risk units:

- Risk unit 1: Workshop-1 building
- Risk unit 2: MVR
- Risk unit 3: Switching station
- Risk unit 4: 132 kV Substation
- Risk unit 5: Solid waste and cleaning
- Risk unit 6: Fire and water pump
- Risk unit 7: Guard 1
- Risk unit 8: Guard 2
- Risk unit 9: Guard 3
- Risk unit 10: Truck parking area for vendor
- Risk unit 11: Forklift charger

Future risk units:

- Risk unit 12: Workshop-2 building

- Risk unit 13: Lithium pretreatment plant
- Risk unit 14: Ton Bag Repository
- Risk unit 15: Air Separation Unit
- Risk unit 16: Car Parking Area for Visitor & Staff (1)
- Risk unit 17: Car Parking Area for Visitor & Staff (2)
- Risk unit 18: Oxigen Recovery Unit

8.2 Risk classification

8.2.1 Workshop-1 building

Due to the special industrial purpose of the Workshop-1 building planned for the area of the facility, the relevant fire protection technical directive TvMI 14.2:2022.06.13 does not define a risk.

Based on Section 12 (2) of the 54/2014 BM Decree, the risk class is determined by the person responsible for preparing the fire protection documentation based on the characteristics listed in Section 10 (3) of 54/2014 BM Decree and the factors affecting the fire protection situation, as defined in Section 50 (3) by examining the other circumstances listed in relevant section.

The following measures were considered during the determination of risk classification:

- The sprinkler fire extinguishing system designed to protect the building as an extinguishing system with enhanced operational safety.
- An automatic fire alarm system is installed in the whole area of the building. The radius of the circle that can be protected by the sensors is reduced as prescribed in the case of double signal dependency (see fire protection technical guideline TvMI 5.2: 2020.01.22. Section 9.3.1).
- The intensity of the automatic fire extinguishing equipment (sprinkler) provided on a sprinkler head is 24 mm/min instead of 12 mm/min.
- The intensity of the extinguishing water to be provided for firefighting is 6,000 liters/min, which will be provided for 120 minutes.
- The distance between the above-ground fire hydrants to be installed around the Workshop-1 building is 50 meters.
- Hose reel system will be installed inside the Workshop-1 building. An outlet pressure of 600 kPa (6 bar) must be provided for each wall cabinet, which is the least favorable in terms of water extraction, with an outlet cross-section of 200 mm^2. A 52-C size connection option must be provided separately for the firefighting units at each wall fire hydrant of the affected building.
- All the staircases of the Workshop-1 building taken into account for evacuation will be designed as pressurized evacuation staircases.

8.2.1.1 Standard Risk Class of Workshop-1 building

The standard risk class of Workshop-1 building is KK.

8.2.2 MVR

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
MVR	Max 5 people	±6,50 m	±0,00 m	escaping individually	Industrial purpose	KK

8.2.2.1 Standard Risk Class of MVR

The standard risk class of MVR building is KK.

8.2.3 Switching station

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Switching station	Max 5 people	±0,00 m	±0,00 m	escaping individually	Industrial purpose	AK

8.2.3.1 Standard Risk Class of Switching station

The standard risk class of Switching station building is AK.

8.2.4 132 kV Substation

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
132 kV Substation	Max 5 people	±0,00 m	±0,00 m	escaping individually	Industrial purpose	KK

8.2.4.1 Standard Risk Class of 132 kV Substation building

The standard risk class of 132 kV Substation building is KK.

8.2.5 Solid waste and cleaning

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Solid waste and cleaning	0 people	±0,00 m	±0,00 m	escaping individually	Storage	KK

8.2.5.1 Standard Risk Class of Solid waste and cleaning building

The standard risk class of Solid waste and cleaning building is KK.

8.2.6 Fire and water pump

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Fire and water pump	Max 5 people	±0,00 m	±0,00 m	escaping individually	Industrial	AK

8.2.6.1 Standard Risk Class of Fire and water pump

The standard risk class of Fire and water pump building is AK.

8.2.7 Guard 1

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Guard 1	Max 1 people	±0,00 m	±0,00 m	escaping individually	Industrial	NAK

8.2.7.1 Standard Risk Class of Guard 1

The standard risk class of Guard 1 building is NAK.

8.2.8 Guard 2

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Guard 2	Max 2 people	±0,00 m	±0,00 m	escaping individually	Industrial	NAK

8.2.8.1 Standard Risk Class of Guard 2

The standard risk class of Guard 2 building is NAK.

8.2.9 Guard 3

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Guard 3	Max 1 people	±0,00 m	±0,00 m	escaping individually	Industrial	NAK

8.2.9.1 Standard Risk Class of Guard 3

The standard risk class of Guard 3 building is NAK.

8.2.10 Truck parking area for vendor

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Truck parking area for vendor	Max 5 people	±0,00 m	±0,00 m	escaping individually	Storage	AK

8.2.10.1 Standard Risk Class of Truck parking area for vendor

The standard risk class of Truck parking area for vendor is AK.

8.2.11 Forklift charger

Risk Unit	Room with the biggest capacity	Height of the top level of the risk unit	Height of the last floor of the risk unit,	Escape ability of persons inside the risk units	Activity description	Risk class
Forklift charger	Max 5 people	±0,00 m	±0,00 m	escaping individually	Industrial	KK

8.2.11.1 Standard Risk Class of Forklift charger

The standard risk class of Forklift charger is KK.

9 Fire distance

An appropriate fire distance shall be provided between buildings, structures and technological units in order to restrict the spread of fire, ensure the conditions for firefighting intervention and the protection for escaping people.

9.1 Fire distance requirements between buildings as per OTSZ Annex 3 Table 1.

Risk class of building „A”	Fire distance requirement (meter) between building „A” and „B” if the risk class of building „B” is			
	NAK	AK	KK	MK
NAK	3	5	6	7
AK	5	6	7	8
KK	6	7	8	9
MK	7	8	9	10

9.2 Fire distance requirements between buildings and open storage units as per OTSZ Annex 3 Table 2

Properties of the material stored inside the open storage unit	Fire distance between building and the open storage unit if the risk class of the building is			
	NAK	AK	KK	MK
Only flammable and explosive materials which amount is above 3000 litres	10	10	12	14

10 Fire compartments

10.1 Workshop-1 building

The following table lists the fire compartments of Workshop-1 building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
FC1	1225	KK	yes	yes	32.000 m^2
FC2	8980	KK	yes	yes	32.000 m^2
FC3	24844	KK	yes	yes	32.000 m^2
FC4	3537	KK	yes	yes	32.000 m^2
FC5	30080	KK	yes	yes	32.000 m^2
FC6	20754	KK	yes	yes	32.000 m^2
FC7	12152	KK	yes	yes	32.000 m^2
FC8	3322	KK	yes	yes	32.000 m^2
FC9	3586	KK	yes	yes	32.000 m^2
FC10	2221	KK	yes	yes	32.000 m^2
FC11	108	KK	yes	yes	32.000 m^2
FC12	105	KK	yes	yes	32.000 m^2
FC13	95	KK	yes	yes	32.000 m^2
FC14	95	KK	yes	yes	32.000 m^2
FC15	128	KK	yes	yes	32.000 m^2
FC16	114	KK	yes	yes	32.000 m^2
FC17	108	KK	yes	yes	32.000 m^2
FC18	90	KK	yes	yes	32.000 m^2
FC19	44	KK	yes	yes	32.000 m^2
FC20	61	KK	yes	yes	32.000 m^2
FC21	1348	KK	yes	yes	32.000 m^2
FC22	118	KK	yes	yes	32.000 m^2
FC23	1507	KK	yes	yes	32.000 m^2
FC24	1338	KK	yes	yes	32.000 m^2
FC25	1325	KK	yes	yes	32.000 m^2
FC26	70	KK	yes	yes	32.000 m^2

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
FC27	291	KK	yes	yes	32.000 m^2
FC28	1108	KK	yes	yes	32.000 m^2
FC29	480	KK	yes	yes	32.000 m^2

10.2MVR

The following table lists the fire compartments of MVR building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
MVR-1	2404,76 m^2	AK	no	yes	15.000 m^2

10.3Switching station

The following table lists the fire compartments of Switching station building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
ST-1	598 m^2	AK	no	yes	15.000 m^2

10.4132 kV Substation

The following table lists the fire compartments of 132 kV Substation building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
SST-1	1088 m^2	KK	no	yes	15.000 m^2

10.5Solid waste and cleaning

The following table lists the fire compartments of Solid waste and cleaning building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
SWST-1	3406 m^2	KK	no	yes	12.000 m^2
SWST-2	1490 m^2	KK	no	yes	15.000 m^2

10.6Fire and water pump

The following table lists the fire compartments of Fire and water pump building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
FW-1	649 m^2	AK	no	yes	15.000 m^2

10.7Guard 1

The following table lists the fire compartments of Guard 1 building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
GH-1	23,76 m^2	NAK	no	yes	15.000 m^2

10.8 Guard 2

The following table lists the fire compartments of Guard 2 building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
GH-2	56,16 m^2	NAK	no	yes	15.000 m^2

10.9 Guard 3

The following table lists the fire compartments of Guard 3 building.

ID	Floor area	Risk class	Built-in fire extinguishing system	Built-in fire alarm system	Maximum size as per OTSZ
GH-3	23,76 m^2	NAK	no	yes	15.000 m^2

11 Fire protection characteristic of building structures

11.1 General requirements

The standard risk class of the buildings (structures) determines the fire resistance parameter of the load-bearing structures based on: the floor height of the building's highest and lowest used level; the number and evacuation ability of the occupants; in some cases the function of the building.

If the building has more risk units, the load bearing structures of the building shall be constructed in accordance with the requirements relating to the standard risk unit, the other structures shall be performed according to the risk class of the risk unit.

11.2 Fire resistance parameters of building structures

The classification of the applied building materials is based on the MSZ EN 13501-1 standard.

The harmonized European Fire Standards are a set of test standards that have been accepted by all countries within the European Economic Community. This allows manufacturers to produce or import products that have been tested to a common standard without the need to test in each member state.

Testing to these standards is now accepted in all EEC countries. Compliance with the European standards and regulations is mandatory.

11.3 Fire protection class and fire protection performance requirements for the new building structures

11.3.1 Workshop-1

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	A2 REI 60	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	A2 R 60	● **A1 R 60** ● **A1 R 60**
	Basement level weight-bearing walls and bracings **unplanned**	A2 REI 60	-
	Basement pillars and bracings **unplanned**	A2 R 60	-
	Roof slab above basement level **unplanned**	A2 REI 60	-
	Inter-floor and attic floor slab ● **monolithic reinforced concrete structure**	A2 REI 60	● **A1 REI 60**
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 30	A2 REI 30
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building ● **reinforced concrete structure**	R 60	A1 R 60
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 180	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 30	A2 EI 30
			Fireproof wall ● **gypsum board with declaration of performance** ● **sandwich panel with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 60	● **A2 EI 60** ● **A2 EI 60** ● **A2 REI 90**
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 60	● **A1 REI 60** ● **A2 REI 60**
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	● A2 EI_2 60-C5 ● A2 EI_2 90-C5
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems ● **fireproof gap-filling, gap-closing systems with certification**		Same fire resistance performance as the structure passed through, but at most EI 90	EI 60
		Fireproof linear gap fillers ● **fireproof linear gap filling systems with certification**		Same fire resistance performance as the connecting structures, but at most EI 90	EI 60
		Fireproof closing element ● **fireproof closing element with declaration of performance**		EI 60	EI 60
Building structures used on escape routes	Wall covering **unplanned**			B-s1,d0	-
	Floor covering ● **ceramic floor covering**			B_{fl}-s1	A1
	Subceiling, ceiling covering **unplanned**			B-s1,d0	-
	Subfloor **unplanned**			A2 REI 60	-
	Heat and sound insulation, without covering or behind covering **unplanned**			A2-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.1.1 Fireproof wall structures

Between fire compartments fireproof wall be installed which fire resistance rate is min. A2 EI 60.

Inside electrical rooms there will be no installed sprinkler fire extinguishing system. According to the Section 5.3 of MSZ EN 12845: 2015, the areas protected by sprinklers shall be separated from the unprotected spaces by fireproof structure, the minimum fire resistance of the fireproof wall and doors is 60 minutes. Doors which close automatically or in the event of fire shall be used. As stated above, rooms protected by sprinkler system are separated from other rooms which are not protected by sprinkler extinguishers by A2 EI 60 fire resistant fireproof structures.

Note: For spaces protected by a gas extinguishing system, fire separation is not required.

The fire protection resistance requirement for separating wall between transformer rooms (which will be inside the electrical rooms) is min. A1 REI 90.

The electrical rooms shall be separated from the other premises with fireproof wall structures, whose fire protection resistance requirement is min A2 EI 60.

Process areas where flammable liquids are processed or used are separated from adjacent rooms by fire barriers.

In accordance with Section 33 Paragraph (5) of the OTSZ, the extinguishing center room of the built-in fire-fighting system must be separated from the adjacent rooms by building structures with a fire resistance performance at least equal to the prescribed duration time of the system. The expected operating time of the extinguishing device protecting the building is min. 60 minutes, therefore the Sprinkler substation room will be separated from adjacent areas by structures with a fire resistance of 60 minutes (A2 EI 60).

11.3.1.2 Fireproof roof structures

The electrical rooms shall be separated from the other premises with fireproof roof structures, whose fire protection resistance requirement is min A2 EI 60.

According to § 33 (5) of the OTSZ, the roof structure of the fire extinguishing equipment control center shall be designed as a fire-resistant roof structure with a fire resistance performance rating of A2 EI 60.

In accordance with clause 5.3 of standard EN 12845:2015, the spaces protected by sprinklers and unprotected spaces shall be separated by fire separation in accordance with the requirements of the competent authority, but with a fire resistance limit of at least 60 minutes. Automatic or fire-closing doors shall be provided. As above, spaces protected by sprinkler fire extinguishing systems shall be separated from spaces not protected by sprinkler fire extinguishing systems by slab constructions with a fire resistance rating of A2 EI 60.

11.3.1.3 Fireproof doors and gates

A2 EI_2-60–C fireproof door with automatic closing mechanism will be installed in doors and gates to be installed in fireproof walls

Door closing cycle

The recommended grade for heavy-duty doors is C5

Doors with support magnet, the recommended grade: C1

For rarely used doors (e.g. electrical rooms), the C3 is also suitable.

11.3.1.4 Fireproof penetration closing system

According to the OTSZ Section 27 Paragraph (1) where the law specifies a fire resistance performance value for the building structure concerned, the spread of fire between the cable (or pipe) and the structure must be prevented until the fire performance requirement for the structure affected by the penetration is exceeded.

There are no qualified firestop closures in steel plate-armed, core-insulated sandwich panels meeting the requirements for firestop walls; these are due to the significant thermal movement and deformation of the sandwich panels due to fire exposure, which can cause mechanical damage to the firestop closures within the duration of their fire performance characteristics. A fire stopping performance in these sandwich panel wall assemblies that complies with the applicable codes and test results can be achieved by replacing the sandwich panel wall assembly in the vicinity of mechanical and electrical penetrations with masonry (gypsum board) or reinforced concrete construction, in which the penetrations can be constructed to meet the code and their rating.

In the case of fireproof wall or fireproof partition wall penetrations, the use of fireproof sealing shall be permanently marked on both sides of the structure affected by the passage, with the exception of the internal surface of the electrical and mechanical shafts. The markings must include the closure applied in Hungarian language:

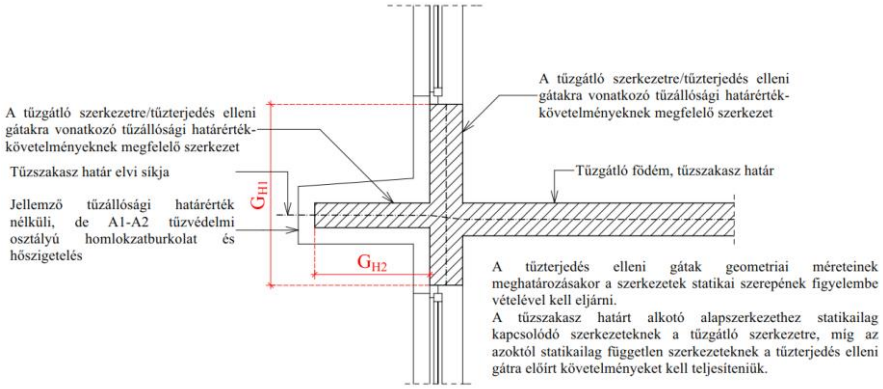
- name
- fire protection features,
- the identification certificate or declaration of performance,
- the name of the company executing the work
- date of execution and
- warning of the need for recovery in case of disruption.

11.3.1.5 Façade fire spread limit value

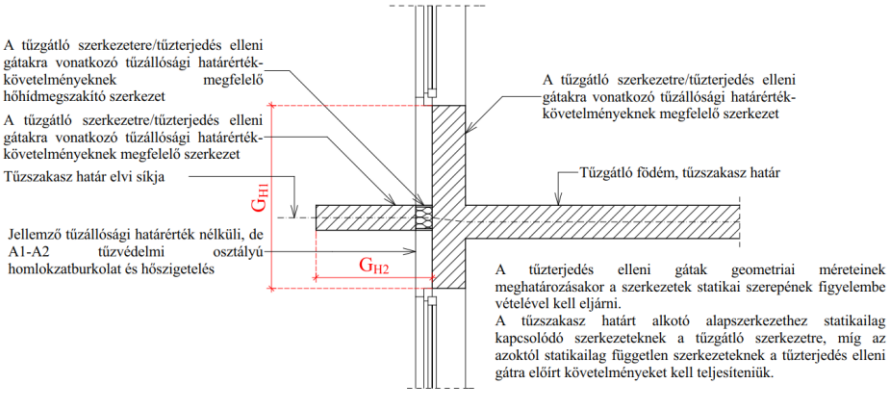
According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 45 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.1.6 Protection against vertical façade fire spread

The requirements for protection against vertical façade fire spread must be ensured. The vertical distance between facade openings is greater than 1.30 meters.



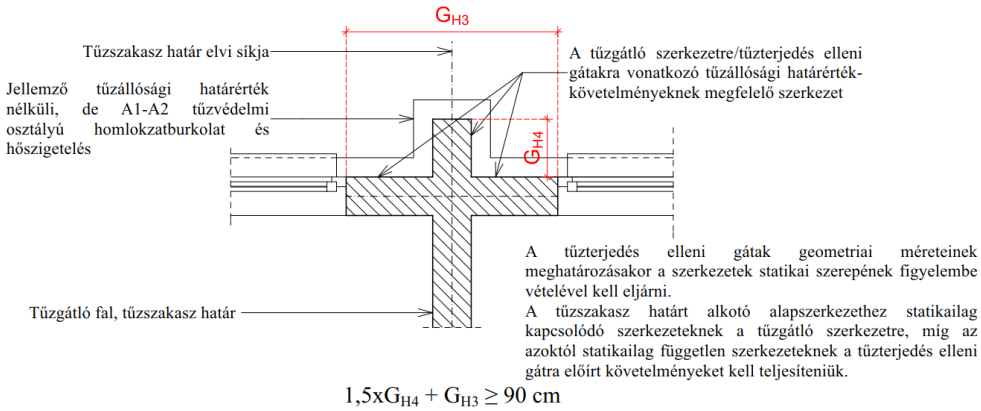
$1{,}3xG_{H2} + G_{H1} \geq 1{,}30$ m



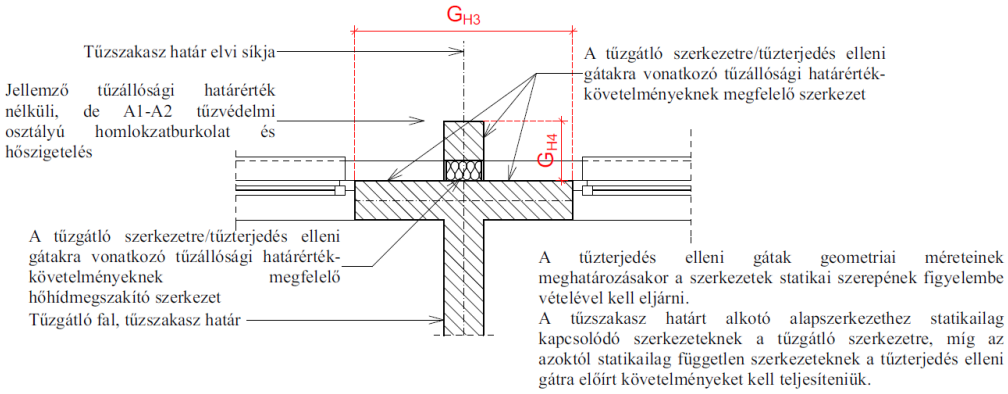
$1{,}3xG_{H2} + G_{H1} \geq 1{,}30$ m

11.3.1.7 Protection against horizontal façade fire spread

In the adjacent fire sections, the requirements for preventing horizontal façade fire spread must be ensured. The distance between adjacent openings in the adjacent fire section shall be greater than 90 cm, and the min. designed fire resistance performance value of the min 90 cm boundary wall structure between the openings is A2 EI 30.



$1{,}5xG_{H4} + G_{H3} \geq 90$ cm



$1{,}5xG_{H4} + G_{H3} \geq 90$ cm

11.3.1.8 Protection against roof fire spread

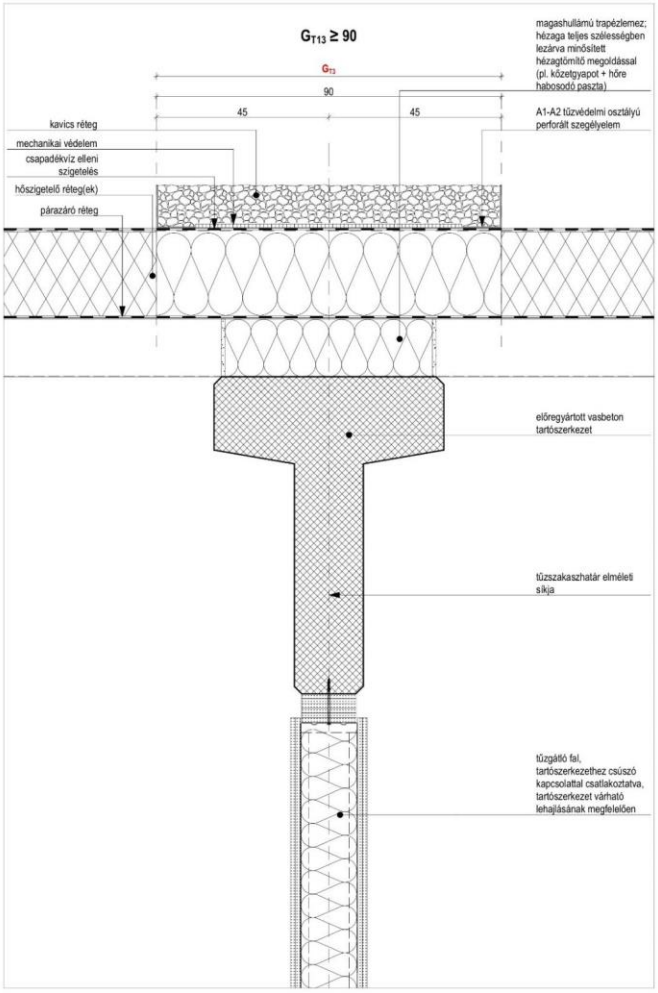
In the adjacent fire sections, the requirements for preventing roof fire spread must be ensured.

The planned protection against roof fire spread along the boundaries of the fire section will be in accordance with the Fire Protection Technical Guideline on the Protection against Fire Spread (TvMI 1.5:2022.06.13.). Concrete paving slabs have been used instead of the gravel pavement shown in Figure F8 of the Guideline.

A specific example of the design of fire spread barriers itself is given in Annex F of TvMI 1.4:2020.07.20. According to point 1.3 of TvMI 1.4:2020.07.20, the "Notes", "Annexes" and "Examples" in the TvMI contain guidance and explanations, and deviation from them does not mean that the designer has deviated from the § 3/A (3) c) of the TvMI.

Notwithstanding the above, the declaration of the responsible technical manager - pursuant to § 7 (1) of Government Decree No.275/2013 (16.VII.) - is required to confirm in the construction log-book that the planned installation of the construction product complies with the provisions of § 41 of the Construction Act.

The responsible technical manager may also use the assistance of an expert or expert institution for the certification.



11.3.1.9 External boundary wall structure

The outer walls of the building part are made of mineral wool panel.

11.3.1.10 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.1.11 Elevators

Given that the structure of the lifts to be installed in buildings will be made of non-combustible materials, the standard MSZ EN 9113:2003 (2005) (Installation of lifts. Building fire performance requirements for lifts), the fire resistance requirement for lift shafts is 60 minutes, the requirement for shaft doors is E30, according to point 2.3.4.

11.3.2 MVR

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	D REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	D R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	A2 REI 60	-
	Basement pillars and bracings **unplanned**	A2 R 60	-
	Roof slab above basement level **unplanned**	A2 REI 60	-
	Inter-floor and attic floor slab **unplanned**	A2 REI 60	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 30	A2 REI 30
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 60	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 180	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 30	-
			Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 60	● **A2 EI 60** ● **A2 REI 90**
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 60	● **A1 REI 60** ● **A2 REI 60**
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	● A2 EI_2 60-C5 ● A2 EI_2 90-C5
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems ● **fireproof gap-filling, gap-closing systems with certification**		Same fire resistance performance as the structure passed through, but at most EI 90	EI 60
		Fireproof linear gap fillers ● **fireproof linear gap filling systems with certification**		Same fire resistance performance as the connecting structures, but at most EI 90	EI 60
		Fireproof closing element ● **fireproof closing element with declaration of performance**		EI 60	EI 60
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			C REI 30	-
	Heat and sound insulation, without covering or behind covering **unplanned**			B-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.2.1 Fireproof wall structures

The electrical rooms shall be separated from the other premises with fireproof wall structures, whose fire protection resistance requirement is min A2 EI 30.

The fire protection resistance requirement for separating wall between transformer rooms (which will be inside the electrical rooms) is min. A1 REI 90.

Areas where flammable liquids are stored shall be separated from adjacent rooms by fire fireproof walls.

11.3.2.2 Fireproof roof structures

The electrical rooms shall be separated from the other premises with fireproof roof structures, whose fire protection resistance requirement is min A2 EI 30.

11.3.2.3 Fireproof doors and gates

A2 EI_2-60–C fireproof door with automatic closing mechanism will be installed in doors and gates to be installed in fireproof walls

Door closing cycle

The recommended grade for heavy-duty doors is C5

Doors with support magnet, the recommended grade: C1

For rarely used doors (e.g. electrical rooms), the C3 is also suitable.

11.3.2.4 Fireproof penetration closing system

According to the OTSZ Section 27 Paragraph (1) where the law specifies a fire resistance performance value for the building structure concerned, the spread of fire between the cable (or pipe) and the structure must be prevented until the fire performance requirement for the structure affected by the penetration is exceeded.

In the case of fireproof wall or fireproof partition wall penetrations, the use of fireproof sealing shall be permanently marked on both sides of the structure affected by the passage, with the exception of the internal surface of the electrical and mechanical shafts. The markings must include the closure applied in Hungarian language:

- name
- fire protection features,
- the identification certificate or declaration of performance,
- the name of the company executing the work
- date of execution and
- warning of the need for recovery in case of disruption.

11.3.2.5 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.2.6 External boundary wall structure

The outer walls of the building part are made of mineral wool panel

11.3.2.7 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.3 Switching station

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	D REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	D R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	A2 REI 30	-
	Basement pillars and bracings **unplanned**	A2 R 30	-
	Roof slab above basement level **unplanned**	A2 REI 30	-
	Inter-floor and attic floor slab **unplanned**	A2 REI 30	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 30	A2 REI 30
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 30	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 120	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 15	-
			Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 30	● **A2 EI 30** ● **A2 REI 90**
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 30	● **A1 REI 30** ● **A2 REI 30**
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	● A2 EI_2 30-C5 ● A2 EI_2 90-C5
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems ● **fireproof gap-filling, gap-closing systems with certification**		Same fire resistance performance as the structure passed through, but at most EI 90	EI 30 EI 90
		Fireproof linear gap fillers ● **fireproof linear gap filling systems with certification**		Same fire resistance performance as the connecting structures, but at most EI 90	EI 30 EI 90
		Fireproof closing element ● **fireproof closing element with declaration of performance**		EI 30	EI 60
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			C REI 30	-
	Heat and sound insulation, without covering or behind covering **unplanned**			B-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.3.1 Fireproof wall structures

The fire protection resistance requirement of walls separating electrical rooms from other premises is min. A2 EI 30.

The fire protection resistance requirement for separating wall between transformer rooms (which will be inside the electrical rooms) is min. A1 REI 90.

11.3.3.2 Fireproof roof structures

The electrical rooms shall be separated from the other premises with fireproof roof structures, whose fire protection resistance requirement is min A2 EI 30.

11.3.3.3 Fireproof doors and gates

A2 EI_2-60–C fireproof door with automatic closing mechanism will be installed in doors and gates to be installed in fireproof walls

Door closing cycle

The recommended grade for heavy-duty doors is C5

Doors with support magnet, the recommended grade: C1

For rarely used doors (e.g. electrical rooms), the C3 is also suitable.

11.3.3.4 Fireproof penetration closing system

According to the OTSZ Section 27 Paragraph (1) where the law specifies a fire resistance performance value for the building structure concerned, the spread of fire between the cable (or pipe) and the structure must be prevented until the fire performance requirement for the structure affected by the penetration is exceeded.

In the case of fireproof wall or fireproof partition wall penetrations, the use of fireproof sealing shall be permanently marked on both sides of the structure affected by the passage, with the exception of the internal surface of the electrical and mechanical shafts. The markings must include the closure applied in Hungarian language:

- name
- fire protection features,
- the identification certificate or declaration of performance,
- the name of the company executing the work
- date of execution and
- warning of the need for recovery in case of disruption.

11.3.3.5 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.3.6 External boundary wall structure

The outer walls of the building part are made of mineral wool panel

11.3.3.7 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.4 Solid waste and cleaning

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	A2 REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	A2 R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	A2 REI 30	-
	Basement pillars and bracings **unplanned**	A2 R 30	-
	Roof slab above basement level **unplanned**	A2 REI 30	-
	Inter-floor and attic floor slab **unplanned**	A2 REI 30	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 15	A2 REI 15
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 30	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 180	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 30	-
			Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 30	● **A2 EI 30** ● **A2 REI 30**
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 30	● **A1 REI 30**
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	● A2 EI_2 30-C5
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems ● **fireproof gap-filling, gap-closing systems with certification**		Same fire resistance performance as the structure passed through, but at most EI 90	EI 30
		Fireproof linear gap fillers ● **fireproof linear gap filling systems with certification**		Same fire resistance performance as the connecting structures, but at most EI 90	EI 30
		Fireproof closing element ● **fireproof closing element with declaration of performance**		EI 60	EI 30
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			A2 REI 30	-
	Heat and sound insulation, without covering or behind covering **unplanned**			A2-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.4.1 Fireproof wall structures

The fire protection resistance requirement of walls separating electrical rooms from other premises is min. A2 EI 30.

Between fire compartments fireproof wall be installed which fire resistance rate is A2 EI 30.

The fire protection resistance requirement for separating wall between transformer rooms (which will be inside the electrical rooms) is min. A1 REI 90.

11.3.4.2 Fireproof roof structures

The electrical rooms shall be separated from the other premises with fireproof roof structures, whose fire protection resistance requirement is min A2 EI 30.

11.3.4.3 Fireproof doors and gates

A2 EI_2-60–C fireproof door with automatic closing mechanism will be installed in doors and gates to be installed in fireproof walls

Door closing cycle

The recommended grade for heavy-duty doors is C5

Doors with support magnet, the recommended grade: C1

For rarely used doors (e.g. electrical rooms), the C3 is also suitable.

11.3.4.4 Fireproof penetration closing system

According to the OTSZ Section 27 Paragraph (1) where the law specifies a fire resistance performance value for the building structure concerned, the spread of fire between the cable (or pipe) and the structure must be prevented until the fire performance requirement for the structure affected by the penetration is exceeded.

In the case of fireproof wall or fireproof partition wall penetrations, the use of fireproof sealing shall be permanently marked on both sides of the structure affected by the passage, with the exception of the internal surface of the electrical and mechanical shafts. The markings must include the closure applied in Hungarian language:

- name
- fire protection features,
- the identification certificate or declaration of performance,
- the name of the company executing the work
- date of execution and
- warning of the need for recovery in case of disruption.

11.3.4.5 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.4.6 External boundary wall structure

The outer walls of the building part are made of mineral wool panel

11.3.4.7 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.5 Fire and water pump

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	D REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	D R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	A2 REI 30	-
	Basement pillars and bracings **unplanned**	A2 R 30	-
	Roof slab above basement level **unplanned**	A2 REI 30	-
	Inter-floor and attic floor slab **unplanned**	A2 REI 30	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 15	A2 REI 15
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 30	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 120	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 15	-
			Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 30	● **A2 EI 30** ● **A2 REI 90**
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 30	● **A1 REI 30** ● **A2 REI 30**
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	● A2 EI_2 30-C5 ● A2 EI_2 90-C5
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems ● **fireproof gap-filling, gap-closing systems with certification**		Same fire resistance performance as the structure passed through, but at most EI 90	EI 30 EI 90
		Fireproof linear gap fillers ● **fireproof linear gap filling systems with certification**		Same fire resistance performance as the connecting structures, but at most EI 90	EI 30 EI 90
		Fireproof closing element ● **fireproof closing element with declaration of performance**		EI 30	EI 60
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			C REI 30	-
	Heat and sound insulation, without covering or behind covering **unplanned**			B-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.5.1 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.5.2 External boundary wall structure

The outer walls of the building part are made of mineral wool panel

11.3.5.3 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.6 Guard 1

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	D REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	D R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	D REI 30	-
	Basement pillars and bracings **unplanned**	D R 30	-
	Roof slab above basement level **unplanned**	D REI 30	-
	Inter-floor and attic floor slab **unplanned**	D REI 30	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 15	**A2 REI 30**
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 30	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 120	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 15	-
			Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 30	-
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 30	-
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	-
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems **unplanned**		Same fire resistance performance as the structure passed through, but at most EI 90	-
		Fireproof linear gap fillers **unplanned**		Same fire resistance performance as the connecting structures, but at most EI 90	-
		Fireproof closing element **unplanned**		EI 30	-
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			D REI 15	-
	Heat and sound insulation, without covering or behind covering **unplanned**			B-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.6.1 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.6.2 External boundary wall structure

The outer walls of the building part are made of mineral wool panel.

11.3.6.3 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.7 Guard 2

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	D REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	D R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	D REI 30	-
	Basement pillars and bracings **unplanned**	D R 30	-
	Roof slab above basement level **unplanned**	D REI 30	-
	Inter-floor and attic floor slab **unplanned**	D REI 30	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 15	**A2 REI 30**
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 30	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure	Firewall **unplanned**		A1 REI 120	-
	Fireproof basic structure	Fireproof partition wall **unplanned**		EI 15	-
		Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**		A2 (R)EI 30	-
		Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**		A2 REI 30	-
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	-
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems **unplanned**		Same fire resistance performance as the structure passed through, but at most EI 90	-
		Fireproof linear gap fillers **unplanned**		Same fire resistance performance as the connecting structures, but at most EI 90	-
		Fireproof closing element **unplanned**		EI 30	-
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			D REI 15	-
	Heat and sound insulation, without covering or behind covering **unplanned**			B-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.7.1 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.7.2 External boundary wall structure

The outer walls of the building part are made of mineral wool panel.

11.3.7.3 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

11.3.8 Guard 3

Building structure		Requirement	Designed
Load-bearing building structures	Load-bearing walls and bracings, except for basement level **unplanned**	D REI 30	-
	Load-bearing pillars and bracings, except for basement level ● **reinforced concrete pillars** ● **steel wind grid structure with fireproof coatings**	D R 30	● **A1 R 30** ● **A1 R 30**
	Basement level weight-bearing walls and bracings **unplanned**	D REI 30	-
	Basement pillars and bracings **unplanned**	D R 30	-
	Roof slab above basement level **unplanned**	D REI 30	-
	Inter-floor and attic floor slab **unplanned**	D REI 30	-
	Load bearing structure of roof slabs, bracings ● **reinforced concrete beams structure** ● **steel wind grid structure with fireproof coatings**	REI 30	● **A1 R 30** ● **A1 R 30**
	Partition structure of roof slab ● **trapezoidal sheet + mineral wool insulation + PE waterproofing layer**	REI 15	**A2 REI 30**
	Roof structure **unplanned**	A2	-
	Supporting structures of stairs and stair rest areas and supporting structures of their walking surfaces, qualifying as an escape route within the building **unplanned**	R 30	-
	Support structure of entrance stairs on an escape route **unplanned**	A2	-

Spread of fire barrier building structures	Basic fire break structure		Firewall **unplanned**	A1 REI 120	-
	Fireproof basic structure		Fireproof partition wall **unplanned**	EI 15	-
			Fireproof wall ● **gypsum board with declaration of performance** ● **Fireproof wall structure with declaration of performance**	A2 (R)EI 30	-
			Fireproof roof ● **monolithic reinforced concrete structure** ● **Fireproof roof with declaration of performance**	A2 REI 30	-
	Fireproof closure	Fireproof door	Firewall **unplanned**	EI_2 90-C	-
			Fireproof wall ● **fireproof door with declaration of performance**	EI_2 60-C	-
			Elevator shaft door **unplanned**	according to the relevant standard-	-
		Fireproof gap-filling, gap-closing systems **unplanned**		Same fire resistance performance as the structure passed through, but at most EI 90	-
		Fireproof linear gap fillers **unplanned**		Same fire resistance performance as the connecting structures, but at most EI 90	-
		Fireproof closing element **unplanned**		EI 30	-
Building structures used on escape routes	Wall covering **unplanned**			D-s1,d0	-
	Floor covering **unplanned**			D_{fl} -s1	-
	Subceiling, ceiling covering **unplanned**			D-s1,d0	-
	Subfloor **unplanned**			D REI 15	-
	Heat and sound insulation, without covering or behind covering **unplanned**			B-s1,d0	-

The values in the table are determined by taking into account existing ratings and manufacturer's design guides.

The fire protection parameters of the building structures to be built must be proved in a credible manner during the use procedure.

The certification of the compliance of structures will be according to the 275/2013 Government Decree during the detailed design and the installation of the construction product into the structure.

11.3.8.1 Façade fire spread limit value

According to Section 26 (3) (a) of the OTSZ, the facade fire spread limit value requirement for the external partition wall is 15 minutes in this case, therefore an external partition wall construction is installed that meets the expected requirement.

11.3.8.2 External boundary wall structure

The outer walls of the building part are made of mineral wool panel.

11.3.8.3 Roof insulation against heat and rainwater:

A Broof(t1) roof insulation system has been designed above the roof slab.

12 Evacuation

12.1 Legislation rules

The designed buildings in the new plant must be constructed in such a way that during a fire event the people inside:

- can leave their location through an adequate number of installed exits, through an adequate capacity to exit, and an appropriately located exit door,
- are able to exit to an escape route, safe area, or temporary protected area within the allowed access distance from the location of stay.

In case of NAK (Very Low Risk) risk class building the fire compartments protected by built-in fire alarm system, the norms to be taken into account in the calculation of evacuation of are as follows:

t_{1meg} = 1,2 min

t_{2meg} = 6 min

In case of AK (Low Risk) risk class building the fire compartments protected by built-in fire alarm system, the norms to be taken into account in the calculation of evacuation of are as follows:

t_{1meg} = 1,7 min

t_{2meg} = 8 min

In case of AK (Low Risk) risk class building the fire compartments protected by built-in fire alarm system and built-in fire extinguishing system, the norms to be taken into account in the calculation of evacuation of are as follows:

t_{1meg} = 1,9 min

t_{2meg} = 8 min

In case of KK (Medium Risk) risk class building the fire compartments protected by built-in fire alarm system and built-in fire extinguishing system, the norms to be taken into account in the calculation of evacuation of are as follows:

t_{1meg} = 1,9 min

t_{2meg} = 8 min

In case of KK (Medium Risk) risk class building the fire compartments protected by built-in fire alarm system, the norms to be taken into account in the calculation of evacuation of are as follows:

t_{1meg} = 1,7 min

t_{2meg} = 8 min

12.2Strategy

12.2.1 Workshop-1 building

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.2 MVR

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.3 Switching station

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.4 Solid waste and cleaning

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.5 Fire and water pump

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.6 Guard 1

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.7 Guard 2

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.2.8 Guard 3

Full evacuation, simultaneous evacuation.

Simultaneous evacuation is a method in which persons in the building are not expected to remain in the fire-affected area for as little time as possible. Here we take into account not only the physical effects of the fire, but also the psychological and social reactions of the occupants.

12.3 Numbers

12.3.1 Operator’s statements

A separate operator's statement is required

- relating to the total number of persons staying in the given building,
- relating to the number of people staying in the premises of the given building,
- relating to the number of persons with limited mobility and capacity to be accommodated in the given room.

Note: Rooms for the accommodation of persons with limited mobility and ability to act must be marked on the architect's floor layouts.

12.4 Gathering point

Regarding the determination of the gathering point, the routes of the movement of vehicles and people within the facility must be conidered.

12.5 Technical solutions for safe evacuation

12.5.1 Workshop-1 building

Safety lighting and escape route signage will be installed inside the whole building.

The evacuation ability of the building within the first phase of evacuation is verified by computer simulation. The staircases inside the building will be constructed as smoke free staircases.

12.5.2 MVR

Safety lighting and escape route signage will be installed inside the whole building.

12.5.3 Switching station

Safety lighting and escape route signage will be installed inside the whole building.

12.5.4 Solid waste and cleaning

Safety lighting and escape route signage will be installed inside the whole building.

12.5.5 Fire and water pump

Safety lighting and escape route signage will be installed inside the whole building.

12.5.6 Guard 1

Safety lighting and escape route signage will be installed inside the whole building.

12.5.7 Guard 2

Safety lighting and escape route signage will be installed inside the whole building.

12.5.8 Guard 3

Safety lighting and escape route signage will be installed inside the whole building.

12.6 Safety signals

12.6.1 Warning signs, safety signs colour and shape

Safety lighting and escape route signage will be provided at walkways, stairwells, evacuation routes, at all exit and emergency exit doors and at doors opening onto the escape route in rooms with a capacity of more than 50 people.

At least one safety sign indicating the escape route shall be visible at all times on the evacuation route of buildings.

Every exit and emergency exit door which may be used for escape shall be marked by a safety sign above the door or, if there is no other possibility, to the right and left of the door, pointing to the door. A safety sign indicating the direction of escape shall not be fitted on the door.

Doors fitted with panic locks shall be marked with a safety sign indicating their operating mechanism.

For stairwells, all flights of stairs and their surroundings, at least the first flight of stairs in the direction of escape shall be provided with a safety sign indicating the direction of escape, and the number of the relevant floor in each staircase shall be indicated by a backlit or illuminated sign.

All normal (non-safety) lifts in the building shall have a safety sign "DO NOT USE LIFT IN CASE OF FIRE" on all levels.

Safety signs indicating the direction of escape must be provided:

- all crossings of corridors from all directions,
- all changes of direction,
- any change of level,
- mandatory emergency exits; and
- the last exit to the open air (also from the outside for emergency services, which external marking may be omitted at the main entrance to the building).

In all cases, escape routes must be marked by illuminated (backlit or electrically operated) safety signs capable of emitting light for at least 30 or 60 minutes respectively.

The installation of a safety sign indicating the direction of escape is prohibited on the safety light in order to ensure that the light is sufficiently bright.

Electrically operated escape route luminaires shall operate from their own or a central uninterruptible power supply for at least the period specified in the relevant technical requirement.

The functionality of electrically powered escape route safety signs shall be checked regularly, but at least once every three months, by means of a test and an inspection logbook shall be kept. Defective batteries (battery, fluorescent tube) must be replaced immediately.

For safety signs installed at height, signs shall be fixed at a height of at least 1,8 m up to the upper limit of the smoke-free air layer. Safety signs installed at a height shall be visible from a medium (10 m) and long (30 m) distance. Safety signs indicating the direction of escape at such heights shall be placed above the exit doors and at all points of change of direction along the escape route.

When installing, care must be taken to ensure that at least one sign is visible at any point on the escape route of the building.

In the case of safety signs installed at medium height, the signs shall be installed between the high and low installed signs. The installation height of signs installed in this manner shall be a maximum of 1,8 m, normally at eye level or as required by the hazard.

Safety signs installed at medium height should be installed primarily on traffic routes and in rooms where, in the event of a fire, no or little smoke is likely to be generated by the materials and equipment stored, installed or located there.

Where exit doors are marked, the safety sign shall be installed 2 to 2,5 m above the doors in the case of an escape route system to be installed at a height.

The recommended mounting height for safety signs in traffic corridors is 1,7-2,0 m.

On the staircase and mezzanine staircases, on the corridors, in the rooms and at the entrances to the common rooms (storage, mechanical rooms, etc.), as well as at the exits of the building, we plan to install 100 x 200, 150 x 300 or 200 x 400 mm backlit signs and direction indicator lights with 24-hour backlighting, as described above.

The detailed allocation of the backlit signs / direction indicator lamps will be carried out according to a separate design plan, specifying the detection distances and sign sizes. The illumination of the backlighting signs will be provided by the safety lighting.

12.6.2 Signs for Fire safety equipment

Fire extinguishers, fire hydrants, manual fire alarm stations must be permanently marked with safety signs (illuminated or photo-luminescent) according to the valid legislations and technical requirements.

Safety signs indicating the locations of fire protection equipment must be placed at least 1,8 m higher than the equipment or the accessories, but no higher than 2,5 m, and in such a way that the signs are recognizable even if it is temporarily hidden.

In the case of fire extinguishers, the type of extinguisher must be marked next to the extinguisher, depending on the type.

The shape shall be rectangular or square.

The appearance should be white pictogram on a red background

In rooms, what are protected by built-in fire-extinguishing equipment, with the exception of sprinkler equipment, will be indicated.

The elements of built-in fire alarm equipment must be marked for clear identification.

The placement of safety signs will be based on the OTSZ.

13 Heat and smoke extraction system

13.1 General requirements

According to the OTSZ section 88 heat and smoke extraction must be installed into rooms of the building with floor area greater than 1200 m^2 and where required by law or by fire protection authority, to ensure human safety or improving the effectiveness of fire service intervention.

Heat and smoke extraction may be provided:

- through natural means with a heat and smoke extraction device,
- through mechanical means with a heat and smoke extraction equipment, or
- through a combination of a natural and mechanical solution.

13.2 Heat and smoke extraction of premises which floor space is greater than 1200 m^2

13.2.1 Workshop-1 building

The following rooms have a floor area of more than 1200 m2, therefore must be protected against heat and smoke:

ID	Name	Floor space	Type of heat and smoke extraction system
P-011	Intermediate library I.	1589,83 m^2	natural extraction + mechanical air supply
P-013a	Kiln area	4090,33 m^2	mechanical extraction + natural air supply
P-013b	Kiln area	3943,43 m^2	mechanical extraction + mechanical air supply
P-015	Production area	1212,72 m^2	mechanical extraction + natural/mechanical air supply
P-016	Corridor	1390 m^2	mechanical extraction + natural/mechanical air supply
P-018a	Kiln area	4647,31 m^2	mechanical extraction + mechanical air supply
P-018b	Kiln area	4764,49 m^2	mechanical extraction + mechanical air supply
P-058	Intermediate library II.	1245,88 m^2	natural extraction + mechanical air supply
P-210a	Kiln area	3710,90 m^2	mechanical extraction + mechanical air supply
P-210b	Kiln area	3863,77 m^2	mechanical extraction + mechanical air supply
P-216	Production area	1287 m^2	mechanical extraction + mechanical air supply
P-220	Corridor	1379,4 m^2	mechanical extraction + mechanical air supply
P-223	Production area	2531,63 m^2	mechanical extraction + mechanical air supply
P-224	Production area	1498,38 m^2	mechanical extraction + mechanical air supply
P-225a	Kiln area	4595,92 m^2	mechanical extraction + natural/mechanical air supply

ID	Name	Floor space	Type of heat and smoke extraction system
P-225b	Kiln area	4664,40 m^2	mechanical extraction + mechanical air supply

13.2.1.1 Heat and smoke extraction from P-011 Intermediate library I.

Floor area: 1589,83 m^2

Average ceiling height: 27,8 m

Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S1 Smoke section

Smoke section floor area: 1298,72 m^2
Due to the ceiling height of the room, the necessary effective opening for smoke and heat extraction will be determined by a fire simulation.

13.2.1.2 Heat and smoke extraction from P-013a Kiln area

Floor area: 4090,33 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S5 Smoke section
Size: 1248 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

S6 Smoke section
Size: 1327 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

S7 Smoke section
Size: 1533 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S5+S6/3+S7/3 = 144000 m^3/h

13.2.1.3 Heat and smoke extraction from P-013b Kiln area

Floor area: 3943,43 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S8 Smoke section
Size: 1553 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S9 Smoke section
Size: 1327 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S10 Smoke section
Size: 1533 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S8+S9/3+S10/3 = 144000 m^3/h

13.2.1.4 Heat and smoke extraction from P-015 Production area

Floor area: 1355,72 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S11 Smoke section
Size: 667 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S12 Smoke section
Size: 688 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are two smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other section.

S11+S12/3 = 115200 m^3/h

13.2.1.5 Heat and smoke extraction from P-016 Corridor area

Floor area: 1390 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S13 Smoke section
Size: 684 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S14 Smoke section
Size: 705 m^2

Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

Air supply

Type of air supply: Mechanical

As there are two smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other section.

S13+S14/3 = 115200 m³/h

13.2.1.6 Heat and smoke extraction from P-018a Kiln area

Floor area: 4647,31 m²
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S20 Smoke section
Size: 1624 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,1 = 13,2 m²
Mechanical capacity of heat and smoke extraction: 13,2*2*3600 = 95040 m³/h

S21 Smoke section
Size: 1679 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,1 = 13,2 m²
Mechanical capacity of heat and smoke extraction: 13,2*2*3600 = 95040 m³/h

S22 Smoke section
Size: 1635 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,1 = 13,2 m²
Mechanical capacity of heat and smoke extraction: 13,2*2*3600 = 95040 m³/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S21+S20/3+S22/3 = 158400 m^3/h

13.2.1.7 Heat and smoke extraction from P-018a Kiln area

Floor area: 4764,49 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S23 Smoke section
Size: 1715 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,2 = 14,4 m^2
Mechanical capacity of heat and smoke extraction: 14,4*2*3600 = 103680 m^3/h

S24 Smoke section
Size: 1752 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,2 = 14,4 m^2
Mechanical capacity of heat and smoke extraction: 14,4*2*3600 = 103680 m^3/h

S25 Smoke section
Size: 1569 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S24+S23/3+S25/3 = 22 m^2
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2
Geometric dimensions of air supply door: 1000 x 4000 mm

Effective opening of air supply door: 2,8 m^2

Total planned effective opening for air supply: 28 m^2

13.2.1.8 Heat and smoke extraction from P-058 Intermediate library II.

Floor area: 1245,88 m^2

Average ceiling height: 27,8 m

Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S4 Smoke section

Smoke section floor area: 1245,88 m^2
Due to the ceiling height of the room, the necessary effective opening for smoke and heat extraction will be determined by a fire simulation.

13.2.1.9 Heat and smoke extraction from P-210a Kiln area

Floor area: 3710,90 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S46 Smoke section
Size: 1240 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S47 Smoke section
Size: 1319 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S25 Smoke section
Size: 1166 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S47+S46/3+S48/3 = 144000 m^3/h

13.2.1.10 Heat and smoke extraction from P-210b Kiln area

Floor area: 3863,77 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S49 Smoke section
Size: 1465 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S50 Smoke section
Size: 1319 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S51 Smoke section
Size: 1094 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S49+S50/3+S51/3 = 144000 m^3/h

13.2.1.11 Heat and smoke extraction from P-216 Production area

Floor area: 1287 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S58 Smoke section
Size: 636 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S59 Smoke section
Size: 650 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are two smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other section.

S58+S59/3 = 115200 m^3/h

13.2.1.12 Heat and smoke extraction from P-220 Corridor area

Floor area: 1379,4 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S60 Smoke section
Size: 685 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S61 Smoke section
Size: 695 m^2

Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

Air supply

Type of air supply: Mechanical

As there are two smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other section.

S60+S61/3 = 115200 m^3/h

13.2.1.13 Heat and smoke extraction from P-015 Production area

Floor area: 1498,38 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S65 Smoke section
Size: 706 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

S66 Smoke section
Size: 696 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

Air supply

Type of air supply: Mechanical

As there are two smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other section.

S65+S66/3 = 115200 m^3/h

13.2.1.14 Heat and smoke extraction from P-225a Kiln area

Floor area: 4595,92 m^2
Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S71 Smoke section
Size: 1504 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

S72 Smoke section
Size: 1661 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,1 = 13,2 m^2
Mechanical capacity of heat and smoke extraction: 13,2*2*3600 = 95040 m^3/h

S73 Smoke section
Size: 1503 m^2
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m^2
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m^3/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S72+S71/3+S73/3 = 21,2 m^2
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

Remaining necessary effective opening for air supply: 10 m^2
Mechanical capacity of air supply: 72000 m^3/h

13.2.1.15 Heat and smoke extraction from P-225b Kiln area

Floor area: 4595,92 m^2

Average ceiling height: 7,8 m
Design group (according to point 14.3 of the relevant Technical Directive on Fire Safety): 4

S74 Smoke section
Size: 1559 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

S75 Smoke section
Size: 1734 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12*1,2 = 14,4 m^2
Mechanical capacity of heat and smoke extraction: 14,4*2*3600 = 103680 m^3/h

S76 Smoke section
Size: 1438 m²
Ceiling height: 7,8 m
Height of smoke free air section: 4,0 m
Necessary effective opening for extraction: 12 m²
Mechanical capacity of heat and smoke extraction: 12*2*3600 = 86400 m³/h

Air supply

Type of air supply: Mechanical

As there are three smoke sections in the room, the smoke ventilation of the section with the highest smoke ventilation rate should be increased by 1/3 of the smoke ventilation rate of the other two sections.

S75+S74/3+S76/3 = 161280 m^3/h

13.3Smoke test procedure

In the case of rooms where mechanical heat and smoke removal and/or air replacement is installed, the adequacy of the implemented heat and smoke removal system must be verified with a smoke test during the commissioning procedure.

During the smoke testing, the following aspects must be taken into account:

- hot smoke should be used,
- a smoke test must be planned.
- false activation of the extinguishing system must be prevented.

Note: In the event that the adequacy of the planned heat and smoke removal in the space protected by the heat and smoke removal system is verified by computer simulation, the authority does not request that a smoke test be held during the commissioning procedure.

13.4 Heat and smoke extraction of enclosed corridors considered as escape routes

Enclosed corridors in Workshop-1 building exceeding 40 m in length, classified as escape routes, which must be protected by heat and smoke extraction systems.

ID	Megnevezés	Alapterület [m^2]	A hő- és füstelvezető rendszer típusa
P-012	Corridor	666,92 m^2	mechanical extraction + mechanical air supply
P-023	Foyer	109,43 m^2	mechanical extraction + natural air supply
P-028	Corridor	324,56 m^2	mechanical extraction + mechanical / natural air supply
P-039	Corridor	401,79 m^2	mechanical extraction + mechanical air supply
P-047	Corridor	159,20 m^2	mechanical extraction + mechanical / natural air supply
P-064b	Corridor	44,89 m^2	mechanical extraction + mechanical air supply
P-066a	Production area	124,13 m^2	mechanical extraction + mechanical air supply
P-066b	Production area	670,02 m^2	mechanical extraction + mechanical air supply
P-206	Corridor	548,72 m^2	mechanical extraction + mechanical / natural air supply
P-217	Corridor	870,64 m^2	mechanical extraction + mechanical / natural air supply
P-232	Corridor	869,66 m^2	mechanical extraction + mechanical / natural air supply
P-269a	Airlock	15,3 m^2	mechanical extraction + mechanical air supply
P-269b	Corridor	166,68 m^2	mechanical extraction + mechanical air supply
P-316	Corridor	455,91 m^2	mechanical extraction + mechanical / natural air supply
P-337	Corridor	421,46 m^2	mechanical extraction + mechanical / natural air supply
P-3M07d	Corridor	640,05 m^2	mechanical extraction + mechanical / natural air supply
P-3M07a	Corridor	327,62 m^2	mechanical extraction + mechanical / natural air supply

13.4.1.1 Heat and smoke extraction from P-012 Corridor area

Floor area: 669,92 m^2

S1 Smoke section
Size: 201,22 m^2
Necessary effective opening for extraction: 2,01 m^2
Mechanical capacity of heat and smoke extraction: 2,01*2*3600 = 14472 m^3/h
Mechanical capacity of air supply: 14472 m^3/h

S2 Smoke section
Size: 199,69 m^2
Necessary effective opening for extraction: 1,99 m^2
Mechanical capacity of heat and smoke extraction: 1,99*2*3600 = 14328 m^3/h
Mechanical capacity of air supply: 14328 m^3/h

S3 Smoke section
Size: 317,74 m^2
Necessary effective opening for extraction: 3,17 m^2
Mechanical capacity of heat and smoke extraction: 3,17*2*3600 = 22842 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

13.4.1.2 Heat and smoke extraction from P-023 Foyer area

Floor area: 109,43 m^2

S15 Smoke section
Size: 109,43 m^2
Necessary effective opening for extraction: 1,09 m^2
Mechanical capacity of heat and smoke extraction: 1,09*2*3600 = 7848 m^3/h
Geometric dimensions of air supply gate: 1830 x 2100 mm
Effective opening of air supply gate: 3,843 m^2
Total planned effective opening for air supply: 7,686 m^2

13.4.1.3 Heat and smoke extraction from P-028 Foyer area

Floor area: 324,56 m^2

S16 Smoke section
Size: 106,26 m^2
Necessary effective opening for extraction: 1,06 m^2
Mechanical capacity of heat and smoke extraction: 1,06*2*3600 = 7632 m^3/h
Mechanical capacity of air supply: 7632 m^3/h

S18 Smoke section
Size: 115,82 m^2
Necessary effective opening for extraction: 1,15 m^2
Mechanical capacity of heat and smoke extraction: 1,15*2*3600 = 8280 m^3/h
Mechanical capacity of air supply: 8280 m^3/h

S19 Smoke section
Size: 126,30 m^2
Necessary effective opening for extraction: 1,26 m^2
Mechanical capacity of heat and smoke extraction: 1,26*2*3600 = 9072 m^3/h
Geometric dimensions of air supply gate: 1830 x 2100 mm
Effective opening of air supply gate: 3,843 m^2
Total planned effective opening for air supply: 7,686 m^2

13.4.1.4 Heat and smoke extraction from P-039 Corridor area

Floor area: 401,79 m^2

S26 Smoke section
Size: 171,63 m^2
Necessary effective opening for extraction: 1,71 m^2
Mechanical capacity of heat and smoke extraction: 1,71*2*3600 = 12312 m^3/h
Mechanical capacity of air supply: 12312 m^3/h

S27 Smoke section
Size: 134,37 m^2
Necessary effective opening for extraction: 1,34 m^2
Mechanical capacity of heat and smoke extraction: 1,34*2*3600 = 9648 m^3/h
Mechanical capacity of air supply: 9648 m^3/h

S28 Smoke section
Size: 94,20 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

13.4.1.5 Heat and smoke extraction from P-047 Corridor area

Floor area: 159,20 m^2

S29 Smoke section
Size: 159,20 m^2
Necessary effective opening for extraction: 1,59 m^2
Mechanical capacity of heat and smoke extraction: 1,59*2*3600 = 11448 m^3/h

Geometric dimensions of air supply gate: 1830 x 2100 mm
Effective opening of air supply gate: 3,843 m^2
Total planned effective opening for air supply: 7,686 m^2

13.4.1.6 Heat and smoke extraction from P-064b Corridor area

Floor area: 45,35 m^2

S30 Smoke section
Size: 45,35 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

13.4.1.7 Heat and smoke extraction from P-066a Corridor area

Floor area: 124,13 m^2

S36 Smoke section
Size: 124,13 m^2
Necessary effective opening for extraction: 1,24 m^2
Mechanical capacity of heat and smoke extraction: 1,24*2*3600 = 8928 m^3/h
Mechanical capacity of air supply: 8928 m^3/h

13.4.1.8 Heat and smoke extraction from P-066b Corridor area

Floor area: 670,02 m^2

S31 Smoke section
Size: 94,17 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S32 Smoke section
Size: 131,72 m^2
Necessary effective opening for extraction: 1,31 m^2
Mechanical capacity of heat and smoke extraction: 1,31*2*3600 = 9432 m^3/h
Mechanical capacity of air supply: 9432 m^3/h

S33 Smoke section
Size: 82,09 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S34 Smoke section
Size: 237,49 m^2
Necessary effective opening for extraction: 2,37 m^2
Mechanical capacity of heat and smoke extraction: 2,37*2*3600 = 17064 m^3/h
Mechanical capacity of air supply: 17064 m^3/h

S35 Smoke section
Size: 124,16 m^2
Necessary effective opening for extraction: 1,24 m^2
Mechanical capacity of heat and smoke extraction: 1,24*2*3600 = 8928 m^3/h
Mechanical capacity of air supply: 8928 m^3/h

13.4.1.9 Heat and smoke extraction from P-206 Corridor area

Floor area: 548,72 m^2

S52 Smoke section
Size: 206,38 m^2
Necessary effective opening for extraction: 2,06 m^2
Mechanical capacity of heat and smoke extraction: 2,06*2*3600 = 14832 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S53 Smoke section
Size: 156,05 m^2
Necessary effective opening for extraction: 1,56 m^2
Mechanical capacity of heat and smoke extraction: 1,56*2*3600 = 11232 m^3/h
Mechanical capacity of air supply: 11232 m^3/h

S54 Smoke section
Size: 193,25 m^2
Necessary effective opening for extraction: 1,93 m^2
Mechanical capacity of heat and smoke extraction: 1,93*2*3600 = 13896 m^3/h
Mechanical capacity of air supply: 13896 m^3/h

13.4.1.10 Heat and smoke extraction from P-217 Corridor area

Floor area: 870,64 m^2

S40 Smoke section
Size: 165,18 m^2
Necessary effective opening for extraction: 1,65 m^2
Mechanical capacity of heat and smoke extraction: 1,65*2*3600 = 11880 m^3/h
Mechanical capacity of air supply: 11880 m^3/h

S41 Smoke section
Size: 173 m^2
Necessary effective opening for extraction: 1,73 m^2
Mechanical capacity of heat and smoke extraction: 1,73*2*3600 = 12456 m^3/h
Mechanical capacity of air supply: 12456 m^3/h

S42 Smoke section
Size: 156,33 m^2
Necessary effective opening for extraction: 1,56 m^2
Mechanical capacity of heat and smoke extraction: 1,56*2*3600 = 11232 m^3/h
Mechanical capacity of air supply: 11232 m^3/h

S43 Smoke section
Size: 202,08 m^2
Necessary effective opening for extraction: 2,02 m^2
Mechanical capacity of heat and smoke extraction: 2,02*2*3600 = 14832 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S44 Smoke section
Size: 87,29 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S45 Smoke section
Size: 121,05 m^2
Necessary effective opening for extraction: 1,21 m^2
Mechanical capacity of heat and smoke extraction: 1,21*2*3600 = 8712 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

13.4.1.11 Heat and smoke extraction from P-232 Corridor area

Floor area: 869,66 m^2

S62 Smoke section
Size: 285,38 m^2
Necessary effective opening for extraction: 2,85 m^2
Mechanical capacity of heat and smoke extraction: 2,85*2*3600 = 20520 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S67 Smoke section
Size: 152,77 m^2
Necessary effective opening for extraction: 1,52 m^2
Mechanical capacity of heat and smoke extraction: 1,52*2*3600 = 10944 m^3/h
Mechanical capacity of air supply: 10944 m^3/h

S68 Smoke section
Size: 148,52 m^2
Necessary effective opening for extraction: 1,48 m^2
Mechanical capacity of heat and smoke extraction: 1,48*2*3600 = 10656 m^3/h
Mechanical capacity of air supply: 10656 m^3/h

S69 Smoke section
Size: 111,6 m^2
Necessary effective opening for extraction: 1,11 m^2
Mechanical capacity of heat and smoke extraction: 1,11*2*3600 = 7992 m^3/h
Mechanical capacity of air supply: 7992 m^3/h

S70 Smoke section
Size: 179,43 m^2
Necessary effective opening for extraction: 1,79 m^2
Mechanical capacity of heat and smoke extraction: 1,79*2*3600 = 12888 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

13.4.1.12 Heat and smoke extraction from P-269a Airlock area

Floor area: 15,3 m^2

S57 Smoke section
Size: 15,3 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

13.4.1.13 Heat and smoke extraction from P-269b Corridor area

Floor area: 166,68 m^2

S55 Smoke section
Size: 115,63 m^2
Necessary effective opening for extraction: 1,15 m^2
Mechanical capacity of heat and smoke extraction: 1,15*2*3600 = 8280 m^3/h
Mechanical capacity of air supply: 8280 m^3/h

S56 Smoke section
Size: 54,23 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

13.4.1.14 Heat and smoke extraction from P-316 Corridor area

Floor area: 455,91 m^2

S77 Smoke section
Size: 157,23 m^2
Necessary effective opening for extraction: 1,57 m^2
Mechanical capacity of heat and smoke extraction: 1,57*2*3600 = 11304 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S78 Smoke section
Size: 143,37 m^2
Necessary effective opening for extraction: 1,43 m^2
Mechanical capacity of heat and smoke extraction: 1,43*2*3600 = 10296 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S79 Smoke section
Size: 70,40 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S80 Smoke section
Size: 101,78 m^2
Necessary effective opening for extraction: 1,01 m^2
Mechanical capacity of heat and smoke extraction: 1,01*2*3600 = 7272 m^3/h
Mechanical capacity of air supply: 7272 m^3/h

13.4.1.15 Heat and smoke extraction from P-337 Corridor area

Floor area: 421,46 m^2

S81 Smoke section
Size: 255 m^2
Necessary effective opening for extraction: 2,55 m^2

Mechanical capacity of heat and smoke extraction: 1,57*2*3600 = 18360 m^3/h
Geometric dimensions of air supply gate: 4000 x 4000 mm
Effective opening of air supply gate: 11,2 m^2

S82 Smoke section
Size: 76,40 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S83 Smoke section
Size: 90,44 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

13.4.1.16 Heat and smoke extraction from P-337 Corridor area

Floor area: 470,53 m^2

S87 Smoke section
Size: 72,05 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S88 Smoke section
Size: 248,27 m^2
Necessary effective opening for extraction: 2,48 m^2
Mechanical capacity of heat and smoke extraction: 2,48*2*3600 = 17856 m^3/h
Geometric dimensions of air supply gate: 3000 x 4000 mm
Effective opening of air supply gate: 8,4 m^2

S89 Smoke section
Size: 100,17 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S90 Smoke section
Size: 66,67 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

13.4.1.17 Heat and smoke extraction from P-3M07d Corridor area

Floor area: 640,05 m^2

S84 Smoke section
Size: 420 m^2
Necessary effective opening for extraction: 4,20 m^2
Mechanical capacity of heat and smoke extraction: 4,20*2*3600 = 30240 m^3/h
Mechanical capacity of air supply: 30240 m^3/h

S85 Smoke section
Size: 90,59 m^2
Necessary effective opening for extraction: 1,00 m^2
Mechanical capacity of heat and smoke extraction: 1,00*2*3600 = 7200 m^3/h
Mechanical capacity of air supply: 7200 m^3/h

S86 Smoke section
Size: 153,83 m^2
Necessary effective opening for extraction: 1,53 m^2
Mechanical capacity of heat and smoke extraction: 1,53*2*3600 = 11016 m^3/h
Mechanical capacity of air supply: 11016 m^3/h

13.5 Smoke free staircases

In the Workshop-1 building all staircases considered for evacuation shall be constructed as smoke free staircase.

If air intake close to the ground for architectural reasons is not possible, then the blower will be located at the top level of the staircase.

According to the TvMI 3.4:2022.06.13. point 11.6.5.

- the smoke-free staircase's air intakes from two different facades or roof surfaces of the building;
- air intake points are at least 15 m apart,
- switching between air intake points - to the duct sensor in the air ducts involved - is controlled by the fire detection system.

By introducing the intake air into the staircase, the smoke-free staircase machine, starting from system activation, begins to build up the appropriate staircase pressure within 3 seconds compared to the exterior spaces.

For smoke-free staircases, the design of the doors is such that they can normally be opened up to 100 N.

The designed pressurized smoke-free staircases provide the following parameters:

- 50 Pa - 10% relative overpressure in the closed condition of all staircase doors
- 10 Pa overpressure for an open staircase door
- In the case of open doors with staircase doors defined in TvMI 3.4:2022.06.13., an air flow of at least 1 m / s in the cross section of the open doors

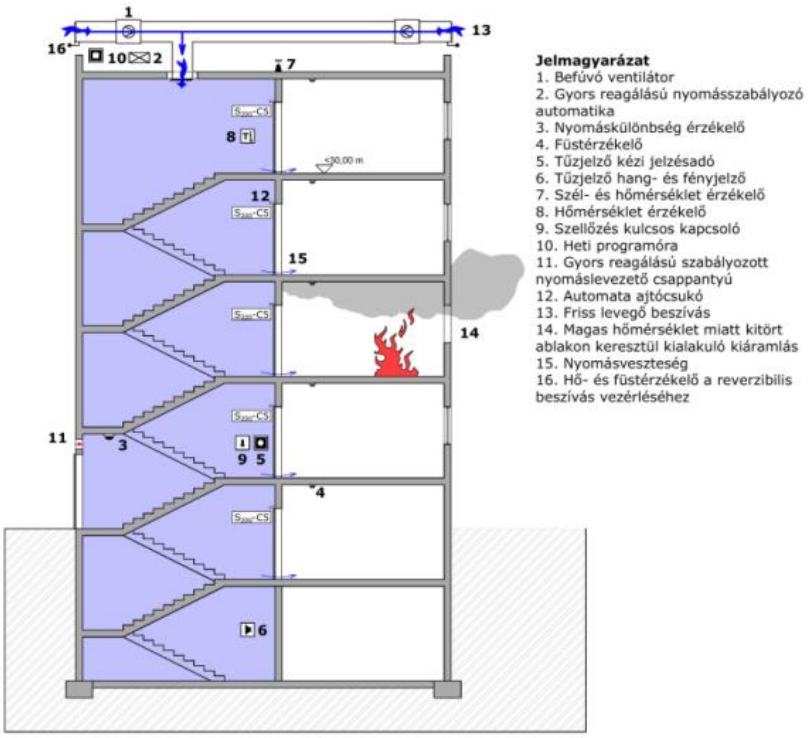
For the staircase dimensioning, an additional level of open staircase and anteroom doors at level 4 on the exit level and on the staircase should be assumed.

The design of the mechanical system of the pressurized staircase is included in the engineering plans.

Manual (switching) start-up must be provided for smoke-free staircase pressurized blowing. Manual operation is possible in the following ways:

- in smoke-free staircases with local switches at all levels,
- fire and smoke desktop at the fire fighting command centre.

The adequacy of the pressure of the smoke-free staircase shall be demonstrated by a test report in accordance with the TvMI 3.4:2022.06.13 during the commissioning procedure.



H-4. ábra: Példa túlnyomásos füstmentes lépcsőház tetőszinti frisslevegő beszívásának lehetőségére

14 Fire detection system

In accordance with the relevant legislations, standards and guidelines a built-in automatic fire detection system will be installed in the new buildings and outdoor technology units of the new plant.

In the event of a hazardous situation being detected, the system will initiate protective actions and predetermined alarms to warn personnel within the zone of a fire incident.

The operator will be informed by the complete surveillance system.

The fire alarm systems will continuously monitor all building and process areas for abnormal conditions. In the event of a hazardous situation being detected, the system will initiate protective actions and predetermined alarms to warn personnel within the zone of a fire incident.

In case of event alarming shall be provided for operators clearly indicating the place of that event.

Complete overvoltage protection shall be provided for all fire detection loops.

The Fire Alarm Control Panel is placed in Guard 2. The power for the Fire Alarm Control Panel is supplied by a UPS for 24 hours of standby operating status and alarm mode for an additional 30 minutes as minimum.

The graphic surveillance system for the fire detection system will be located in Guard 2. Purpose of the graphic surveillance system is to indicate alerts on a map view and log the events.

The designed plans and the installation of a fire detection system shall be permitted by the fire protection authority.

An audible warning device must be installed within the facility to alert the resident in case of danger. This system can be part of the fire detection system.

14.1 Wokshop-1 building

In the whole area of the building an automatic fire alarm system will be installed. In order to verify the Medium Risk Classification of Workshop-1 building the radius of the circuit can be protected by the sensors is reduced as required for double signal dependence (see TvMI 5.3:2022.06.13. Fire Protection Technical Guideline Section 9.3.4. point a.).

15 Fire fighting

In accordance with the request of the fire protection authority a separate room list shall be prepared which list the room where water cannot be used as a fire-fighting media. Where it is not possible to extinguish with water, an alternative extinguishing method must be determined.

The amount of combustible materials and their fire safety properties must be examined.

If necessary, in addition to the legal requirement, it is required to keep additional extinguishing material and equipment ready. (e.g. in case of oil transformers are installed, a foaming agent must be kept ready in the area of the installation).

15.1 Fire water

According to the OTSZ Section 72 the fire water supply must be ensured continuously, to the standard fire compartment of the facility, depending on the risk category of the risk unit of the standard fire compartment.

The size of the standard fire section in the new Plant is 30.740 m^2.

According to the OTSZ Annex 8 the required extinguishing water intensity is max. 6000 liters / min. During the design the Section 72 Paragraph (7) will be not considered.

The risk class of the risk unit of the standard fire section is KK, so according to Section 72 Paragraph (3) of the OTSZ the extinguishing water intensity must be provided for at least one and a half hour so the required amount of fire water is 540 m^3. In order to verify the Medium Risk Classification of Workshop-1 building the stored is net 720 m^3.

An underground fire water network will be installed for the fire protection of the new plant. As part of the underground fire water network, above ground hydrants will be installed around the buildings, structures within 100 meters. In case of Workshop-1 building, the above ground hydrants will be installed within 50 meters.

The presence of the prescribed quantity of fire water must be verified during the entry into service procedure of buildings and structures, with a flow measurement report, taken of the water output of hydrants, at least six months

before the submission of the application, performed at the least favorable period of consumption. The measurement must be performed with simultaneous operation of the fire hydrants within 50 m perimeter in case of Workshop-1 building, and 100 m perimeter of the other buildings or structures.

In accordance with the request of the fire protection authority a redundant fire water supply must be ensured for the facility's continuous fire-fighting water supply. An accepted solution is the installation of an additional extinguishing water tank and related pumping equipment, or an external utility connection that can provide the necessary extinguishing water intensity..

15.2Hose reels

15.2.1 Workshop-1 building

According to the Section 79. § Paragraph (1) point c) of the OTSZ in the areas of the building – except for electrical rooms – wall fire hydrant network will be installed in accordance with the relevant technical requirements and legal requirements.

Considering that the main function of the building is industrial and the top floor height is more than 14 meters, therefore, according to Annex 8 Table 2 of the OTSZ, the flow rate of the wall hydrants is 150 liter/min/fire hose and the simultaneity is 3.

The wall hydrants are equipped with a 30 m long rigid hose. The placement of wall-mounted fire hydrant cabinets shall be negotiated with the competent fire authority during detailed design.

According to the OTSZ, at least 200 kPa (2 bar) outlet pressure should be provided at 200 mm2 outlet cross-section at the least favourable wall hydrant, but standard requires 6 bar outlet pressure.

A separate 52-C connection shall be provided at each wall hydrant in the Workshop-1 building for firefighting units.

A wall pressure gauge will be installed at the most unfavourable position for controlling the outflow pressure.

The wall hydrant will be marked with safety sign in accordance with the relevant legislations and technical requirements.

Based on the Paragraph (3) Section 79 of OTSZ wall hydrant can not be established in fire compartments where the usage of water is dangerous for life, could cause fire or explosion or promote the spread of fire.

Based on the above mentioned in the electrical room, there will be not established wall hydrant network, 50 kg powder fire extinguisher will be placed instead of every fire hose reel cabinet.

15.2.2 MVR

According to the Section 79. § Paragraph (1) point c) of the OTSZ in the areas of the building – except for electrical rooms – wall fire hydrant network will be installed in accordance with the relevant technical requirements and legal requirements.

Considering that the main function of the building is industrial and the top floor height is not more than 14 meters, therefore, according to Annex 8 Table 2 of the OTSZ, the flow rate of the wall hydrants is 150 liter/min/fire hose and the simultaneity is 2.

The wall hydrants are equipped with a 30 m long rigid hose. The placement of wall-mounted fire hydrant cabinets shall be negotiated with the competent fire authority during detailed design.

According to the OTSZ, at least 200 kPa (2 bar) outlet pressure should be provided at 200 mm2 outlet cross-section at the least favourable wall hydrant, but standard requires 6 bar outlet pressure.

A wall pressure gauge will be installed at the most unfavourable position for controlling the outflow pressure.

The wall hydrant will be marked with safety sign in accordance with the relevant legislations and technical requirements.

Based on the Paragraph (3) Section 79 of OTSZ wall hydrant can not be established in fire compartments where the usage of water is dangerous for life, could cause fire or explosion or promote the spread of fire.

Based on the above mentioned in the electrical room, there will be not established wall hydrant network, 50 kg powder fire extinguisher will be placed instead of every fire hose reel cabinet.

15.2.3 Switching station

According to the Section 79. § Paragraph (3) wall fire hydrant network can not be installed in fire compartments where the use of water may cause danger to life.

In accordance with the above mentioned in the Switching station wall fire hydrant network will be not installed.

15.2.4 Solid waste and cleaning

According to the Section 79. § Paragraph (1) point c) of the OTSZ in the areas of the building – except for electrical rooms – wall fire hydrant network will be installed in accordance with the relevant technical requirements and legal requirements.

Considering that the main function of the building is storage and the top floor height is not more than 14 meters, therefore, according to Annex 8 Table 2 of the OTSZ, the flow rate of the wall hydrants is 150 liter/min/fire hose and the simultaneity is 2.

The wall hydrants are equipped with a 30 m long rigid hose. The placement of wall-mounted fire hydrant cabinets shall be negotiated with the competent fire authority during detailed design.

According to the OTSZ, at least 200 kPa (2 bar) outlet pressure should be provided at 200 mm2 outlet cross-section at the least favourable wall hydrant, but standard requires 6 bar outlet pressure.

A wall pressure gauge will be installed at the most unfavourable position for controlling the outflow pressure.

The wall hydrant will be marked with safety sign in accordance with the relevant legislations and technical requirements.

Based on the Paragraph (3) Section 79 of OTSZ wall hydrant can not be established in fire compartments where the usage of water is dangerous for life, could cause fire or explosion or promote the spread of fire.

Based on the above mentioned in the electrical room, there will be not established wall hydrant network, 50 kg powder.

15.2.5 Fire and water pump

According to the Section 79. § Paragraph (1) point c) there is no need to install wall fire hydrant network in Low Risk Class (AK) fire compartments which size is smaller than 1000 m^2.

Wall fire hydrant network will be not installed in the building since the total area of the building is smaller than 1000 m^2.

15.2.6 Guard 1

According to the Section 79. § Paragraph (1) point c) there is no need to install wall fire hydrant network in buildings which risk class is Very Low Risk Class (NAK).

Wall fire hydrant network will be not installed in the building since the risk class of the building is NAK (Very Low Class).

15.2.7 Guard 2

According to the Section 79. § Paragraph (1) point c) there is no need to install wall fire hydrant network in buildings which risk class is Very Low Risk Class (NAK).

Wall fire hydrant network will be not installed in the building since the risk class of the building is NAK (Very Low Class).

15.2.8 Guard 3

According to the Section 79. § Paragraph (1) point c) there is no need to install wall fire hydrant network in buildings which risk class is Very Low Risk Class (NAK).

Wall fire hydrant network will be not installed in the building since the risk class of the building is NAK (Very Low Class).

15.3 Built-in extinguishing system

15.3.1 Legislation, requirements

15.3.1.1 Annex 14 of OTSZ

With regard to buildings, structures and equipment planned on the site of the establishment, Annex 14 to the OTSZ does not require the installation of a built-in extinguishing system.

15.3.1.2 239/2011 Government Decree

The Annex 2 of 239/2011 (XI. 18.) Gov. Decree determines the minimum staff of industrial fire service based on the fire load and the size of the fire section:

Annex 2 of the 239/2011. (XI. 18.) Gov. decree

The rules for the establishment of industrial fire service

The minimum staff number of industrial fire service

The calculated fire load of fire section of the plant	*1001–3000 m^2*	*3001–5000 m^2*	*5001–8000 m^2*	*above 8000 m^2*
Area of the fire section				
501–1000 MJ/m^2	–	–	–	*4 persons*
1001–1500 MJ/m^2	–	–	*4 persons*	*8 persons*
1501–2000 MJ/m^2	–	*4 persons*	*8 persons*	*12 persons*
over 2000 MJ/m^2	*4 persons*	*8 persons*	*12 persons*	*16 persons*

Pursuant to § 20 (1) (c) of Government Decree 239/2011 (XI. 18.), it is not necessary to establish a fire brigade in the premises if the entire area of the fire compartment justifying the establishment of a fire brigade is protected by a built-in extinguishing system.

T the fire authority will examine the obligation to establish a fire brigade for the planned facility after the occupation process of the extension buildings.

15.3.2 Designed technical solution

In order to verify the Medium Risk Classification of Workshop-1 building the water flow rate of the automatic fire extinguishing equipment (sprinkler) is increased from 12 l/min to 24 l/min with the same operating time.

In order to create the maximum size of fire compartment allowed by law enhanced operational safety fire extinguishing system will be designed in the Workshop-1 building. The fire extinguishing system will satisfy the requirement of relevant fire protection technical guideline (TvMI 6.4:2022.06.13.) Section 7.1.1.

15.4 Portable and mobile extinguisher

Portable and mobile extinguishers will be placed according to OTSZ.

Extinguishing capacities of extinguishers are shown in Table 1 of Annex 16.

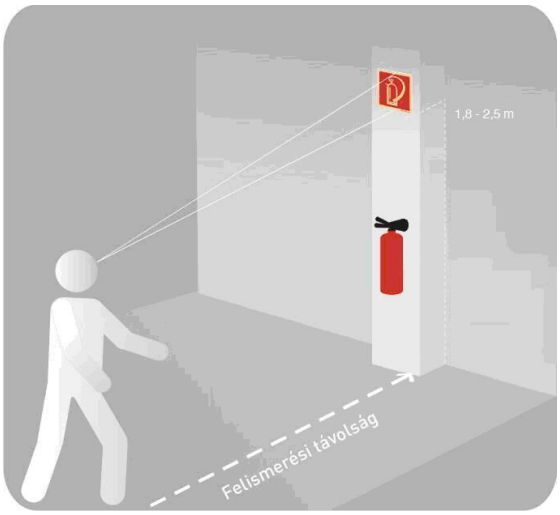
OTSZ Annex 16 Table 1			
Extinguishing Unit [EU]	Fire class according to MSZ EN 3-7 standard		Fire class according to MSZ EN 1866 standard
	A	B	
1	5A	21B	
2	8A	34B	
3		55B	
4	13A	70B	
5		89B	
6	21A	113B	
9	27A	144B	
10	34A		
12	43A	183B	
15	55A	233B	
16			I B
17			II B
18			III B
19			IV B

Fire extinguishers should be kept on store:

a) at least on each elevation floor in a separate destination unit,
b) where the regulation requires
c) and specified cases in the law according to table 2 of Annex 16.

OTSZ Annex 16 Table 2		
Standalone destination unit or until outdoor floor place m^2	In the general case	Storage of Explosive Material
50	2	6
100	3	9
200	4	12
300	5	15
400	6	18
500	7	21
600	8	24
700	9	27
800	10	30
900	11	33
1.000	12	36
any further 250	+2	+6

Fire extinguisher shall be placed on a well-recognizable place with standard marking. The installation placement of the fire protection sign is between 1,8 - 2,5 meters.



16 Electrical systems

16.1 General requirements

The electrical installations of the planned buildings will be designed in accordance with the relevant standard.

Lighting equipment will be located in buildings so as not to present an ignition hazard to combustible materials present.

The electrical installations of the buildings, including uninterruptible power sources, will be designed to be both centrally and intermittently disconnected.

The wiring system passing through several fire compartments shall be designed in such a way that the firefighter involved in the fire compartment affected by the fire disconnection is not at risk of electric shock.

The first ('0') inspection of new electrical installations, in accordance with the relevant standard, shall be carried out before the building is put into service.

16.2 Emergency lighting, evacuation route indicator system

In the planned new buildings and in the areas of the plant emergency lighting and evacuation route indicator system shall be designed according the MSZ EN 1838 and the MSZ EN 50172 where it is technologically necessary, in the evacuation route in order to promote the evacuation (corridors, central corridors, staircases), on the premises of the alarm receiving centre and whereby the applied technology requires.

16.3 The functionality of emergency electrical system

The capacity of high-voltage and low-voltage cable systems that ensure the fire safety equipment can operate (for indicator measurements, operation, and data transfer) must be ensured for 30, 60 or 90 minutes.

16.3.1 Workshop-1 building

- Emergency lighting system: 60 min
- Evacuation indicator system: 60 min
- Mechanical heat and smoke extraction and air supply: 60 min
- Natural heat and smoke dissipation and air supply: 60 min
- Wall hydrant network booster pump: 60 min

16.3.2 MVR

- Emergency lighting system: 30 min
- Evacuation indicator system:30 min
- Wall hydrant network booster pump: 60 min

16.3.3 Switching station

- Emergency lighting system: 30 min
- Evacuation indicator system: 30 min

16.3.4 Solid waste and cleaning

- Emergency lighting system: 60 min
- Evacuation indicator system: 60 min
- Wall hydrant network booster pump: 60 min

16.3.5 Fire and water pump

- Emergency lighting system: 90 min
- Evacuation indicator system: 90 min

16.3.6 Guard 1

- Emergency lighting system: 30 min
- Evacuation indicator system: 30 min

16.3.7 Guard 2

- Emergency lighting system: 90 min
- Evacuation indicator system: 90 min

16.3.8 Guard 3

- Emergency lighting system: 30 min
- Evacuation indicator system: 30 min

16.4 Emergency fire shutdown of electrical equipment

New electrical installations on the site shall be designed to be separable by building and by fire compartment within the building. The possibility of central disconnection in the fire brigade intervention center shall be provided.

The disconnection of electrical installations in the event of a fire in the premises will be provided both centrally (by buildings). To ensure this, it is necessary to provide a fire control panel.

The fire control panel will be located in Guard 2, where it will be permanently accessible (0-24 hours).

From the fire panel the following disconnections can be made:

- Normal intake per fire compartments
- Uninterrupted intake
- Full shutdown (all)

16.5 Transformer equipment

In the case of transformer equipment, a continuous supply of ventilation must be ensured in the event of a fire or fire alarm elsewhere inside the building and thus the ventilation systems of the building are shut down for fire alarm.

As described above, the transformer will be naturally ventilated to ensure continuous ventilation of the room. If natural ventilation is not possible to create then mechanical ventilation shall be ensured (or air conditioner device).

17 Lightning protection

Protection of buildings against the effects of any strokes of lightning must be ensured from the perspective of the risk of loss of human life and deficiencies in public service. Lightning strike protection is adequate under the following conditions:

a) If the determined lightning protection risk assessment projects a one-year risk factor for loss of human life as smaller than 10-5 and the risk factor for loss of public service and loss of cultural heritage as smaller than 10-4;

b) If the structures have adequate lightning protection as specified in the OTSZ Annex 12

c) If the measures taken for lightning protection for temporary buildings meets the specifications outlined in OTSZ Section 143.

The lightning protection designer and the explosion protection designer must consult each other on the technical solutions envisaged.

The lightning protection shall be designed in accordance with the above mentioned.

18 Explosion protection

18.1 Documentation

In accordance with the fire protection authority the following documents shall be prepared during the design:

- Determining the degree of explosion risk according to the Appendix B of the Fire Protection Technical Directive TvMI 13.3: 13.06.2022.
- Preparation of zoning documentation (containing the extension of explosion zones) based on the provision of Section 99 Paragraph (2) of 54/2014. (XII. 5.) BM Decree
- Preparation of explosion protection documentation in accordance with Chapter 5.1.1. of Fire Protection Technical Directive TvMI 13.3: 13.06.2022.

18.2 Protection against electrostatic charge and discharge

Having regard to the explosive dangerous technology documented protection measures must be implemented in order to protect against electrostatic ignition during planning and implementation and the electrostatic risk must be determined. The determination of this is took place in special explosion protection documentation.

During the electrical planning and implementation, electrostatic grounding of adequate safety and quality must be ensured for antistatic coatings and the electrostatic equipotential bonding in all places where electrostatic discharge is unacceptable.

Protection against electrostatic charging of new plant shall be achieved by connection of all exposed and extraneous conductive (methal) parts to the equipotential bonding system according to EN- 60079-14 and IEC 60364.

Equipotential bonding system is a part of the Earthing system of the plant.

Taking into account the relevant technical requirements protection against electrostatic charging must be ensured in zones, rooms, and facilities for zones 0, 1 and 2, according to IEC 60079.

In order to ensure the relevant technical requirements of protection against electrostatic charging in the new plant within the explosion hazardous zones, concrete pavement shall be executed of spark-free concrete, with lime stone crushing aggregate.

Steel structures, pipe racks, shall be connected to ground networks for lightning protection. Lightning rods shall be applied as required.

18.3 Explosion zones

The following documentations shall be prepared:

- Determining the degree of explosion risk according to TvMI 13.3: 13.06.2022. based on Appendix B of the Fire Protection Technical Directive
- Zoning documentation based on Section 99, Paragraph (2) of 54/2014. (XII. 5.) BM Decree.
- Explosion protection documentation based on the Fire Protection Technical Directive (TvMI 13.3: 2022.06.13.) Section point 5.1.1.

If the hazardous area classification determines that within a given room the extent of the explosive area exceeds 40 % of the floor area of the room, building structures corresponding to the MK risk class must be used for the given room

19 Mechanical systems

The technical solutions related to the heating of the building are included in the separate technical documentation.

The central ventilation system supplying the area protected by the built-in fire alarm system must be stopped by the built-in fire alarm system without delay in the event of a fire being detected.

20 Ensuring the access into the building

Based on the Section 83 point a) of the OTSZ, in case of the present building, it shall be be provided with non-destructive access of fire-fighting units.

Note: According to Section 11 of 4.3:2022.06.13., non-destructive access can be provided by a continuous reception, security or other service with constant supervision, if the following requirements are met.

- *the number of staff in the reception and security service is at least two at the same time,*
- *they do not have a task the performance of which requires all persons performing the service to leave the place of supervision at the same time,*
- *the monitoring site is located near the exit of the fire brigade.*

The proposed solution is not to install a fire brigade key safe. A single key system will be planned for areas of the buildings. The "king key" will be located in Guard 2, where a continuous (0-24) concierge service with a minimum of 2 persons will be provided.

21 Unified key system

In order to ensure the effective opening of doors/gates that are normally closed in case of fire, it is recommended to use the unified key system.

22 Fire fighting radio amplifier

Based on the Section 85 Paragraph (1) of the OTSZ, the radio distribution conditions of the services cooperating during the intervention must be examined prior to the commissioning procedure of the building.

In the following cases shall be investigate the necessity of fire fighting radio amplifier:

a) In the case of a building for which a fire fighting parade area must be provided.

b) In the case of a building that has at least two levels below ground level, and the total net floor area of its rooms below ground level is over 1,000 m2.

c) In the case of a building from which access to the safe space is not ensured in the first phase of the evacuation.

The test must be carried out when the building is ready for construction. During the construction, it is necessary to make several on-site measurements (with a licensed contractor), on the basis of which the need for the equipment can be decided.

If, in the professional opinion of the investigator, radio distribution is not or not adequately provided in the facility, a radio amplifier or other equipment shall be installed.

According to Section 85 of the OTSZ, the installation of the equipment must be ensured by the owner of the building.

23 Fire fighting intervention center

To support the firefighting tasks, a fire brigade intervention centre will be set up in Guard 2 building.

An overview drawing of the operation of the heat and smoke extraction systems in the building shall be installed in the fire-fighting intervention centre.

The planned solution is to install a fire control panel, graphic display, heat and smoke extraction control panel in the fire-fighting intervention centre.

24 Fire fighter elevator

There is no legal requirement for a firefighting lift for the Workshop-1 building, therefore no firefighting lift is planned.

25 Fire Protection Technical Compliance Certificate

In accordance with the section 13 Paragraph (3) of Act XXXI of 1996, it is possible to install a device, machine, or equipment with a fire or explosion hazard only if it has a fire protection compliance certificate, or if its compliance is determined in the manner specified in the fire protection and safety requirements for the product, failing which the manufacturer , certified by a declaration of conformity based on an examination of a distributor, importer or authorized representative.

In the case of fire or explosive devices, machines and equipment that are required to obtain a fire protection compliance certificate, test operation is also not permitted until the fire protection compliance certificate is available.

If the fire protection authority determines during the on-site inspection that an equipment is in operation, the authority will request the presentation of the fire protection compliance certificate.