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Technical Requirements for Planning, Basic Equipment, Design and Construction Arrangement of Fire Protection Equipment of Buildings, Constructions, and Fire Protection Fixtures.

Valid for: Buildings, Constructions, and their equipment and fixtures

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The latest updated version of this ITS is available on the website „<http://cts.skoda-auto.com/>“, the Company is not obliged to notify its business partners of updates to ITS.

Therefore, we are highly recommending to everybody to regularly review relevant ITS. These documents enter into force on the date of their last update. For concluded contracts, the validity of ITS on the date of order placement is deciding.

Note: In case of any differences between the Czech, English or German language version of this ITS, the Czech version takes priority. The Czech version is available at <http://cts.skoda-auto.com/>.

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Change no.:	Date:	Note:
1.	2010-12-21	Rewritten completely
2.	2016-10-10	ITS rewritten and complemented
3.	2021-03-16	Rewritten completely



1 GENERAL

The purpose of the Internal Technical Standard is to maintain a level of fire protection of building and technological facilities at all ŠKODA AUTO a.s. plants. It is used to maintain an acceptable level of risk and damage that might be caused by an emergency.

The Standard has been created in accordance with current legal regulation and normative requirements by the Department of Fire Protection and Building Fire Safety.

2 LEGEND OF ABBREVIATIONS USED

ATS	Automatic mains power supply and diesel generator switch
ČSN	Czech National Standard
FDS	Fire Detection System
ES	European Standard
CFRS	Company Fire Rescue Service
ITS	– Internal Technical Standard
FSS	Fire Safety Solution
FSB	Fire Safety in Buildings
FSE	Fire Safety Equipment
PFE	Portable Fire Extinguisher
FP	Fire Protection
FS	Fire Shutter
FS	Fire Section
AFFES	Automatic Fixed Fire Extinguishing Systems
AVE	Automatic Ventilation Equipment
UPS	Uninterruptible Power Supply
UPS FP	Uninterruptible Power Supply for FSE
VS	Ventilation System
VdS	Vertrauen durch Sicherheit Test Room
ZDD	Zoning Decisions Documentation
BPD	Building Permit Documentation



3 BASIC

Every intention (including technology projects) and every project documentation in all project stages are submitted for approval to the PPB department – Fire Protection Planning, and the SO/1 department – Company Fire Rescue Service. The documentation submitted in Czech language has to include the following:

for the PPB – Fire Protection Planning department:

- 1x hard copy (drawings and drawing attachments must be in colour) or, upon agreement, digitally;
- 1x CD (text part in the DOC(X) and PDF formats, drawing documentation in the PDF and DWG formats).

for the SO/1 department:

- 1x CD (text part in the DOC(X) and PDF formats, drawing documentation in the PDF and DWG formats).

Statement on the submitted project documentation is issued by the PPB – Fire Protection Planning department on behalf of both departments latest within 14 days if not arranged otherwise.

3.1 Project Proposal

Must include all requisites in accordance with current legal regulations and normative requirements. Included must be also requirements listed in this ITS.

Every project documentation must include the fire safety solution (FSS), including drawings on fire safety of buildings. In case they are considered for the event in question, the project documentation also has to include documentation of fire safety equipment (FDS, AVE, AFFES, etc.), including drawings attached. Last, but not least, a project of marking emergency exits and paths, i.e. proposal for placement warning and exit signs and tables, must be a part of the project documentation.

The designer of the fire safety solution must follow the listed facts in designing fire section boundary areas and its equipment with fire safety equipment:

- Time zones H1 to H3 in accordance with ČSN 73 0802 and ČSN 73 0804 of all objects are defined in Annex no. 5.
- A fire section, or the whole object in question, must be equipped with FSE required by standards, as well as FSEs required by the VW Group Policy, so-called Brandschutz Matrix.** VW Group Policy requirements on specific equipment of individual objects due to their purpose are listed in Annex no. 1, which is an integral part of this ITS.
- FDS must be installed in all newly designed or reconstructed areas** (with the exception of rooms with no risk of fire, such as WC, showers). **The whole fire section, in which the construction or reconstruction takes place, must be equipped with FDS.** The project and its implementation have to be handled in cooperation with the FIO/33 department – FDS System guarantor.
- The internal notification and emergency signalisation system must be installed in all newly designed or reconstructed objects.** All areas affected by construction or reconstruction must be equipped with this system. The project and its implementation have to be handled in cooperation with the SO/1 department – the system guarantor. Scope of installation always has to be defined in cooperation with the SO/1 department – the system guarantor.

In case of designing alterations, extensions, conversion, etc. for current facilities and objects, the FSS Processor must contact the PPB department to establish, whether a complex FSS solution has already been created for the object in question. If yes, then the Fire Safety Solution Processor must base their solution on the complex one, and also ensure, that the designed change of status (FS division, changes in fire resistance, PFE placement, etc.) is included, so that the complex FSS stays current and matches the last issued and approved stage of the project documentation (such as building permit documentation, change of construction before completion). If the Processor fails to do so and the complex FSS does exist, the Processor must ensure update of the complex FSS for the object in question and bear the costs for the update.

Complex FSS of the real situation is handed over for archiving to the PPB – Fire Protection Planning department, as well as to the SO/1 department, in Czech language (in printed and digital copy).

The FSB drawings have to contain all requisites in accordance with the Section 41 of the Ministry of the Interior of the Czech Republic Decree no. 246/2001 Coll. on Fire Safety Notice as amended (as well as the complex FSS, with no exceptions due to the project documentation stage – ZDD, BPD, DBC), and requisites in accordance with the ČSN 01 3495 – Building Drawings.

From the FSS drawing documentation has to be clear division of the object into fire sections (FS), marking fire resistances in accordance with ČSN 73 0810, ČSN 73 0802 and ČSN 73 0804, equipment of the fire sections with FSE, marking emergency escapes (incl. markings such as CHÚC/EEC "B"), direction of escape of people, placement of PFE, placement of FDS notification buttons, placement of emergency lighting luminaires, inner and outer distribution points (evidence that the ČSN 73 0873 requirements are met), placement of fire shutters, placement of fire safety distributors, placement of end elements for switching main power supply off.

3.2 Final Version of Project Documentation

Is subject to approval in writing by the PPB – Fire Protection Planning department before submission to appropriate government institutions.

A part of the final FSS version has to be a scenario of FSE coordination function test submitted to the investor (i.e. the scenario will be submitted separately). The scenario of the FSE coordination function test will be submitted to the PPB, FIO/33 and SO/1 departments latest 14 days before the test takes place.

The project documentation is submitted in Czech language (with content as defined in Section 3).

It has to take into account and add all comments from the project approval process of the PPB – Fire Protection Planning and SO/1 departments.



4 FIRE SAFETY EQUIPMENT

The Fire Safety Equipment (FSE) is designed based on the current normative regulations and requirements listed in this ITS! At the same time, requirements for designing FSE from the MoI Decree no. 224/2015 Coll. on Fire Safety Notice as amended, must be met. The FSE project documentation also has to include instructions and frequency of performing regular FSE inspection and revisions in time periods defined by the MoI Decree no. 246/2001 Coll. or shorter.

Before commissioning the FSE, a coordination function test of these devices has to take place in accordance with the ČSN 73 0875 Point 4.8.2. This test has to take place in presence of all Suppliers of the FSE, related equipment and the FSS Designer. Before the final CFT (coordination final test) is organised, partial function tests of all FSEs have to take place as related to the FDS control (i.e. testing functionality of a specific device from the viewpoint of its connection to the FDS). A protocol has to be created from every partial function test and must be submitted to the investor. The partial function test protocol will be created by the Supplier of the equipment (i.e. the protocol will include confirmation, that the device has been tested for its connection to the FDS). Subsequently, the final KFZ will be set up.

The coordination function test is technically supported by an FDS technician (FIO/33 dptm.) and managed by the FSS Designer. That means, that the CFT itself is run under management of the FSS Designer, the FSS Designer and the FDS Technician make the final decision on the CFT result, the FSS Designer then creates the CFT protocol (if not arranged otherwise by the PPB and SO/1 departments). All connections of the individual FSE will be tested during this test, as assigned by the FSS Designer in the CFT scenario. The function test has to be performed flawlessly, otherwise the flaw(s) must be removed and the function test has to be repeated in its entirety.

Event hand-over will only be commenced upon successful completion of the FSE coordination function tests.

4.1 Equipping Objects with FSE

The object in question has to be fitted with FSE in accordance to the normative and legal regulations. **Furthermore, requirements of the VW Group Fire Protection – see Annex no. 1, which is an integral part of this ITS.**

4.2 AUTOMATIC VENTILATION EQUIPMENT (AVE)

A system of automatic ventilation equipment, which has to meet the below-mentioned conditions, is installed at ŠKODA AUTO a.s. premises as a priority. If it is necessary to use a forced automatic ventilation equipment (as demanded by legislation), the FSS Designer defines the exact procedure.

4.2.1 AVE Project Documentation

Upon designing, the AVE documentation must be based on current version of standards ČSN 73 0802, ČSN 73 0804, ČSN 73 0810 and (ČSN) EN 12101, as applicable also NFPA 204, NFPA 92, VDI 3564 and other legal regulations as amended. Included must be also requirements listed in this ITS.

An integral part of the AVE project documentation is description of intake openings, their connection to other FSE (e.g. FDS controls), as well as detailed description of smoke shutters (and any possible requirements for shutter design, their control, etc.).

4.2.2 Fire Closure Design Requirements

4.2.2.1 Shutter Material

Ventilation shutters must be made solely from non-corroding metallic materials.

Closure base – welded aluminium construction, alloy aluminium AlMg₃.

Closure flat – from extruded alloy aluminium AlMg₃.

The only exceptions in material design are pressure and dust seals and transparent polycarbonate filling of covers.

Every ventilation shutter has to include the following basic components:

- Control cylinders;
- Thermal circuit breaker with activation temperature of 68°C, 93°C, 110°C, 141°C (based on PPB – Fire Protection Planning and SO1 dptm. requirements);
- Pressure vessel with threaded connection M18 x 1.5;
- Pressure switch.

Every shutter flat has to have at least 3 hinges. Required are two-winged devices with multi-chamber polycarbonate filling 16 mm thick, resistant to hail in accordance with the SIA 280 standard, either in colour Opal or clear with UV layer.



Cover fillings may also be either full (two-layered aluminium with interior insulation) or with a glass filling (glass insulation packet).

Control cylinders must be lockable both in the open (in case of fire), and closed positions. Upon pressure loss in the ventilation, the AVE shutters must not close spontaneously. Spring-return shutter, etc. is not permissible. Control cylinders must be in a maintenance-free version – must be fitted with long-lasting grease not requiring maintenance; the piston rod is covered from dirt when in the closed position.

4.2.2.2 Closure Design

Ventilation shutters covers have to be under at least a 6° angle to ensure rainwater and dirt drainage; ventilation shutter profiles must be equipped with built-in grooves for draining water leaking around the polycarbonate sheets.

Equipment lids have to open more than 90° from the device axis. This way the whole geometric area of the shutter will be used both during fire ventilation and standard ventilation.

Jointed cover hinges – made from aluminium alloy with a Teflon-coated insert (maintenance-free version). Every cover will be connected to the base by at least 3 hinges.

Girders for fixing pneumatic pistons (drives) have to be made of at least 4mm thick metal sheet to safely install the pistons (drives) for opening.

Ventilation shutters have to have such a design that it is possible to install them into a skylight with clear width optimally 2.5-3 m.

Control system has to be adjusted to overcoming pressure force of 500 N/m² and ram force of 1,500 N/m².

The shutter opens for standard ventilation purposes the same way as for its fire function; this way its performance is inspected (for devices installed is requested an appropriate performance of the device in compliance with EN 12101-2 – type B ventilation, Re 1000).

Minimal Performance Requirements for the Biggest Ventilation Closure Dimension:

Re1000, SL500, T(-5) or T(-15) for Vrchlabí, WL3000, B300 as per ČSN EN 12101-2.

4.2.2.3 Wall-Mounted Devices

If applicable, similar requirements as for the AVE roof shutters are required from wall-mounted devices.

4.2.2.4 Closure Installation

The base (edge) under the ventilation shutter may be manufactured from metal sufficiently treated against corrosion (zinc coating, paint coating, komaxit) only in such areas, which are not exposed to surrounding environment. No part of ventilation shutter control may be anchored to the base (the ventilation shutter has to be delivered as a complete assembly from the Supplier and installed to an insulated base as a module).

The ventilation shutters are fixed by screws with washers and sealing every ca 300 mm, but no further apart than every 500 mm.

4.2.2.5 Types of AVE Devices Used at ŠKODA AUTO

Newly installed equipment has to be compatible with the current AVE system, due to maintenance and service reasons.

4.2.2.6 Closure Marking

- Every AVE roof shutter has to be marked in accordance with ČSN EN 12101-2.

4.2.2.7 Other Requirements

Roof and wall-mounted AVE shutters have to conform, besides the above-mentioned requirements, to the harmonised standard EN 12101-2 and a Declaration of Conformity must be issued for them (MPA NRW Dortmund testing lab as per EN 12101-2). If a produce harmonised standard exists for an individual part of the AVE device, the products must conform to the appropriate harmonised standard (especially to the EN 12101 series).

Preparatory standard proposals are taken into account but, if the requirements are not announced in advance, are enforced only in case of set requirements.



The ventilation shutters and their components also must conform to VdS 2159. Meeting the requirements is proven by submitting the appropriate VdS certificate for the product (submitted by the Supplier).

4.2.3 Control and Activation

Opening AVE smoke shutters in the relevant smoke section will not be activated based on fire alarm from FDS notification buttons (only when the alarm is started by automatic FDS detectors in the relevant smoke section).

4.2.3.1 Distributors for AVE Pneumatic Control

The control cabinet will be made of paint-coated sheet metal (RAL 3000). Manual activation switch must be placed under breakable glass in front of valves for individual sections. The distributor cabinet has to be of sufficient size to fit all components inside, including replacement pressure vessels (100% backup).

Distributor type JOFO Pneumatik or Rittal.

The cabinet is fitted with indicator lights showing opening/closing of a section, day ventilation, rain, defect.

An ejector valve for manual opening with a coil for automatic activation by the FDS will be installed for every smoke section. Distributors are equipped for standard day ventilation (requirements are based on performance list). In any case, a push-pull control system is required to allow for both opening and closing the ventilation shutters from the distributor without the need for the Operator to climb to the roof. The fire safety function priority must be ensured over the ventilation function.

Placement of control distributors must be consulted with the PPB – Fire Protection Planning and SO/1 departments.

Every distributor connected to the pressure main must be fitted with a valve for connecting a pressure vessel (max. 1.5 m above the floor).

4.2.3.2 A Distributor for Every Section Contains:

- CO₂ canister for opening the equipment;
- canister for closing the equipment (if the system is not connected to the shop floor pressure air main);
- ejector valve with a coil and screw connection for pressure vessel connection with the thread of M18 x 1.5;
- ventilation valve with a ballast for fire emergency opening and a solenoid for activating the ventilation;
- spare canister for opening and closing the device (100% backup).

The distributor further includes a regulation valve and a basic condensate filtration unit incl. water separator, as well as basic electrical fittings for controlling ventilation from the front side of the distributor (incl. all necessary switches, indicator lights, etc.). Upon disconnection of the distributor from the main power supply, the distributor has to provide non-stop stand-by for the fire safety function for the duration of 72 hours (if defect monitoring is implemented, then for duration of 30 hours).

Volume of filling necessary for opening the shutters from the distributor is dimensioned based on the number of shutters, volume of control cylinders and length of control pipes.

The minimum volume of filling for opening the shutter section from the distributor (in reality the filling volume required may be higher due to canister volume, or lower for slatted devices, the Supplier is responsible for correctness of the information).

Table no. 1: Minimum volume of a CO₂ canister

<i>no. of AVE shutters in the section [pcs]</i>	<i>length of Cu pipelines till [m]</i>	<i>minimum CO₂ canister filling</i>
1	50	60 g
3	100	175 g
5	250	300 g
8	400	500 g
12	600	750 g

Other pressure vessels than those threaded M18 x 1.5 are not permissible for new installation and reconstruction of control, both in the distributors and in the ventilation flaps.

A distributor must be dimensioned for the fire safety function for pressure of 10-12 bar, and for standard day ventilation for pressure of 5.5-10 bar.

Connection of every ventilation section with an FDS device must be done with a signal 24V/0.23A and a feed-back (contact) from the distributor's pressure sensor. Furthermore, every ventilation shutter will be fitted with a sensor



detecting shutter activation upon reaching the opening temperature. Contact from these sensors (received from the pressure end switch placed on every shutter) is led to the AVE distributor location (message to CFRS, ensuring permanent alarm notification from an NC relay).

In case of AFFES installation, upon the first fire detection, the devices opened for standard ventilation first have to be closed by the FDS signal. Then the relation of the AVE and AFFES function has to be evaluated, at least for the scope of thermal circuit breakers activation temperatures. The AFFES or AVE priorities can be proposed by Designers of individual parts/sections. Nevertheless, final and binding definition will be done by the Fire Safety Solution Processor after consultation with the PPB – Fire Protection Planning and SO/1 departments in the project stage for building permit.

AVE distributor must be powered by 230V voltage. In case of using AVE for standard ventilation, pressurised air main has to be led in with at least 6 bar (recommended pressure is ≥ 8 bar).

AVE distributor has to be fitted by (one or more, depending on roof size of the object) wind-rain sensor. For manual opening of sections from the other side of the shop floor than where the distributor for the shop floor is located are used control panels.

4.2.3.3 Control Distribution Lines

Must consist of two soft copper pipes with a diameter of 8/0.8 or 8/1 mm, connected solely by metallic fittings with metallic sealing ring and a tube nut.

Leads to a multi-sectional distributor will be installed in metallic gutters. Distribution lines at the shop floor will be led under the girder sheet or under the roof construction. Connection elements must be primarily placed in locations accessible from work platforms. Along the Cu distribution lines will be installed a notification cable for pressure switches (CFRS notification).

It must be possible to close all devices at once from the ground floor control cabinet.

4.2.3.4 Electric Control Distributors

An electric control system will be used where pneumatic controls cannot be used due to technical reasons (e.g. stairwell ventilation). This is mainly in case when shop-floor pressurised air is not available and the standard ventilation function is required, or for smaller sections inside a single fire section, or for wall-mounted air intake systems. The system of natural AVE control must have its own backup units. A system with control voltage and drives for 24V must be used, 230V drives cannot be used.

4.2.3.5 Auxiliary Ventilation Openings

Size of the auxiliary ventilation openings has to be defined in the PD (project documentation) and verified by calculation of normative requirements for the event in question. The PD also has to include, what will be the design of the auxiliary ventilation openings (wall blinds, windows or gates in external walls).

In case of using wall blinds or windows, no technology may be placed, or material stored within a defined distance from these devices (defined by the AVE part Designer) – restriction of auxiliary ventilation opening function. Distance of barriers has to be no less than $\frac{1}{2}$ of auxiliary ventilation opening width.

In case of using external gates for additional air intake for the AVE system, the gate opening function based on an FDS signal must be ensured continuously (also outside working hours) – the only exception being situation where a service intervention is performed with the gates. To ensure such a function, the control unit has to be equipped as follows:

- **Standard gate control** (foil buttons) – up / stop / down,
- **Lock for (weekend) gate locking** – the gate control is locked by a key. Locking also deactivates other equipment (radar, induction coil, pull sensor, activation photocell, etc.).
- **Emergency gate stop** – an arrestable button used for emergency disconnection of the gate.
- **Lockable main switch** – *used only for service purposes* and disconnects the gate from the power supply. It has to be in the On position for standard operation (also outside the working hours). Key from the lock will be placed in the immediate vicinity of the control unit in a glassed box. In case of emergency the glass will be broken, and key taken.

In case of using external gates for additional air intake, disconnection of ventilation units in the gate area (e.g. sahara) must be solved on the design/project level.

Upon any stop/lock of the gate (with the exception of switching the main switch off) the gates must have power and open upon an FDS signal.

In case the power is disconnected, sending of a defect notification to the CFRS dispatch must be ensured.



4.2.3.6 System Hand-Over and Commissioning

Installation and commissioning of the AVE system will be performed in accordance with the Czech MoI Decree no. 246/2001 Coll. as amended. At the same time the following must be submitted:

- declaration on installation of an AVE fire safety equipment (includes shutters, intake openings, smoke shutters and all control elements and distribution lines);
- initial performance test (§7 CZ MoI Decree no. 264/2001 Coll.); AVE (includes shutters, intake openings, smoke shutters and all control elements and distribution lines);
- authorization for installation from the AVE Manufacturer (includes shutters, intake openings, smoke shutters and all control elements and distribution lines);
- MPA NRW certificate;
- Quality Management System certificate;
- ES Declaration of Conformity;
- shutter VdS certificate (to be submitted by the shutter Manufacturer/Supplier).

Documentation for actual project implementation, operation and inspection log with stated dates of regular inspections, equipment scheme (layout), clear and transparent control distributor scheme have to be submitted with the equipment.

All descriptions on the distributors have to be in the Czech language in a dominant font size.

4.3 AUTOMATED STABLE FIRE EXTINGUISHER

The following AFFES types are used at ŠKODA AUTO a.s. company premises:

- sprinkler AFFES;
- water mist;
- inert gases – CO₂, Inergen, N₂, Ar;
- aerosol AFFES;
- device for decreasing oxygen content in an area;
- air-foam extinguishing system.

Due to the fact, that at ŠKODA AUTO a.s. company premises the most wide-spread type is the sprinkler AFFES, requirements for this type of fire extinguishing follow. Nevertheless, during the event realization (project, installation, repair, etc.) of other AFFES types, it is necessary to proceed in the construction phase also in accordance with the VdS regulations and the event has to be approved by the VdS inspector (in the role of Designer), subsequently the completed work hand-over has to be approved by the VdS inspector (in the role of Supplier) until the flawless state is reached, unless arranged otherwise in cooperation with the PPB – Fire Protection Planning and SO/1 departments. **Only companies certified by VdS for realization may install AFFES at the ŠKODA AUTO company premises.**

Upon implementation of gas extinguishing or mist AFFES, it is necessary to contact the PPB – Fire Protection Planning department for closer specification of requirements and conditions at the very beginning of the event planned. Every installation intention for an aerosol AFFES (e.g. FireJack) must be reported to the PPB – Fire Protection Planning department (both for construction and technological projects).

New installation of CO₂ extinguishing systems is not permissible anymore – the exception being technological extinguishing of machines integrated into the equipment delivery. The PPB – Fire Protection Planning and SO/1 departments have to be informed about these installations during the project stage. In case of adjustment and repairs to the current CO₂ extinguishing system, the PPB – Fire Protection Planning department must be contacted so that it can define further proceedings.

Other AFFES types are not permissible for use at ŠKODA AUTO a.s. – this concerns mainly chemical gas extinguishing compounds (FM-200®, NOVEC 1230, etc.)

4.3.1 System Proposal

The general concept of a stable fire extinguishing system proposal always must comply with this ITS, requirements of ČSN EN 12845 and the VdS CEA 4001 regulation as amended.

In case of requirement difference between ČSN EN Vs. VdS, the stricter requirement is the one that has to be met. In case of any doubts/contradictions, the PPB – Fire Protection Planning and SO/1 departments have to be contacted.

In accordance to the VdS, the AFFES may be realised in a higher (Class 1) and lower (Class 2) standard:

- Class 1 AFFES: especially with higher requirements for water sources;



- Class 2 AFFES: whole installation area max. 50,000 m²; especially the pressure vessel installation is not required (must be approved by the PPB – Fire Protection Planning and SO/1 departments).

Sprinkler AFFES protection must be implemented in the whole object. In case of the PPB – Fire Protection Planning and SO/1 departments approval, the protection may be omitted from the following areas:

- protected emergency exits separated by a fire wall;
- areas with other extinguishing systems;
- other areas as per VdS CEA 4001 – see point 4.1.

4.3.2 AFFES System Components

The components have to be approved for use in the Czech Republic with PAVÚS/TAZÚS certificates, and at the same time they also have to be VdS-certified and comply with the Annex no. I VdS CEA 4001 as amended.

All components used for the AFFES system must be usable for operation pressure of PN16.

The Supplier must use components of Table no. 2 due to unified service, training, maintenance, and operation reasons.

Exception for individual specific case is possible only with a written approval of the PPB – Fire Protection Planning and SO/1 departments.

Table no. 2: Approved AFFES System Components

Main pumps – aggregates	Speck / Nijhujs / Holzhauser (is not represented in the Czech Republic)
External steel reservoir	Kohimex Type KKL (incl. thermal insulation)
Compressor	Orlík (incl. pressure vessel passport)
Valve stations	Tyco / Fire & Scurity (Grinell)
Flow rate alarm in the engine room	Potter Electric Signal Company LLC
Flow meter	Turbolux (SITRANS F), Kirchener&Tochter (SMB)
Fire and monitoring central switchboard	ESSER (Type:8000 c(m))
Fittings and fixtures connected by a groove connection	Grinell, Victaulic
Suspension system, attachment	Sikla, Hilti
Sprinkler heads and nozzles	Tyco / Fire & Security

4.3.3 Project Documentation

The documentation **must** be handed over in the extent described in the Section 3 and include clear documentation stage marking. Every project documentation stage must include all parts listed in the Table no. 3.

All digital and printed documents, especially the *Installation Certificate*, *Sprinkler List*, *Technical Report* and *Protocols* will be signed by a person responsible and stamped (otherwise they are not valid).

Table no. 3: Individual Documentation Stages Contents

	ZDD/BPD	TD	PID	DRE
Installation Certificate	No	No	No	Yes
Technical protocol incl. basic parameters of the engine room, valve station / preliminary hydraulic calculation	Yes/No	Yes/Yes	Yes/Yes	Yes/No
Layout of the part assessed / as per VdS:	No/No	No/No	Yes/Yes	Yes/Yes
General updated layout / as per VdS:	No/No	No/No	Yes/No	Yes/Yes
Scheme of the part evaluated:	Yes	Yes	Yes	Yes
Complete updated scheme:	No	Yes	Yes	Yes
Complete hydraulic evaluation	No	No	Yes	Yes
Drawing documentation w/o dimensions	Yes	-	-	-
Drawing documentation incl. dimensions and cross-sections	No	Yes	Yes	Yes



Protocols (pressure tests, flushing, performance)	No	No		Yes
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Additional information on documentation:

ZDD/BPD: Zoning Decisions Documentation / Building Permit Documentation

TD: Tendering Documentation, Supplier Selection Documentation:

Has to be within the range and include all requisites in accordance with current regulations of ČSN EN 12845 or as per VdS CEA 4001, incl. basic hydraulic calculations for verification of water engine parameters, sprinkler engine room pump output, which by the project parameters must meet the Investor's requirements for planned use of the areas protected, including also possibility of possible change of use of partial areas.

Hydraulic calculations have to include description and analysis of calculation output (the most advantageous and disadvantageous area from the pressure and water volume viewpoint), description of requirements, effective areas for individual valve stations, points under the curve – in compliance with ČSN EN and incl. diagram description – performance characteristics of pumps proposed.

PID: Project Implementation Documentation:

Latest before the installation is commenced, the implementation project has to be approved by the PPB – Fire Protection Planning and SO/1 departments. At the same time, a flawless VdS protocol has to be ensured.

DRE: Documentation of the Real Execution:

A flawless protocol of VdS inspector inspection has to be submitted for the executed work.

Approval of the project documentation by VdS inspectors is within the competences of the project documentation Author. Financial expenses for the VdS inspector verification and issue of appropriate protocol are for the execution/implementation stage charged to the AFFES technology Supplier.

The PPB – Fire Protection Planning department is the ŠKODA AUTO a.s. contact partner for the VdS organization.

Every planned hand-over of the AFFES devices has to be reported to the PPB – Fire Protection Planning or SO/1 departments.

List of Documentation for Work Hand-Over:

- initial performance test (§7 CZ MoI Decree no. 264/2001 Coll.);
- installation notification (in case of a certified Supplier);
- installation certificate / see point 3.4.2.; VdS CEA 4001 as amended;
- detailed list of sprinklers;
- Declaration of Conformity to a Standard – ČSN EN and VdS,
- document on performing pressure test and flushing of wet branches (separately for every control valve);
- document on performing pressure test and flushing of dry branches (separately for every control valve);
- document on performing pressure test and flushing of ground line;
- protocol on training the operators;
- AFFES Supplier hand-over protocol;
- AFFES system inspection log;
- AFFES system user manual;
- user and maintenance manuals from Manufacturers of individual components the AFFES system consists of;
- documentation for the whole AFFES monitoring system (BPD, initial el. device inspection, certificates and attestations of individual components);
- AFFES system electro-installation documentation (BPD, initial partial component inspections, certificates and attestations of individual components).

Pump(s):

- pump data sheet(s) with a curve and the VdS number;
- protocol on pump test operation (90 min) incl. pump performance measuring protocol;
- pump: Type and VdS number of the pump distribution cabinet.

Pressure vessel:

- pressure vessel construction and pressure test protocol;
- initial pressure vessel inspection protocol.



Hydraulic calculations conforming to ČSN EN and VdS as amended from an approved or recommended software:

- has to be within the range and include all requisites in accordance with current regulations of ČSN EN 12845 or as per VdS CEA 4001, incl. basic hydraulic calculations for verification of water engine parameters, sprinkler engine room pump output, which by the project parameters must meet the Investor's requirements for planned use of the areas protected, including also possibility of possible change of use of partial areas;
- hydraulic calculations have to include description and analysis of calculation output (the most hydraulically advantageous and disadvantageous area from the pressure and water volume viewpoint), description of requirements, effective areas for individual valve stations, points under the curve – in compliance with ČSN EN and VdS incl. diagram description – performance characteristics of pumps proposed;
- calculations will be submitted incl. legible isometry, table of equivalent lengths and pipeline dimensions;
- hydraulic calculations hand-over – submitting hydraulic outputs in sequence of nodes from a pump / to a pump.

Drawings:

- a clear AFFES scheme (max. A2 format) will include:
All parts of the equipment (dry, wet valve stations, incl. equipment, flow alarms, anti-freeze system).
- pipeline plans of all levels with inclusion of the most and least advantageous area with hydraulic values (real area, intensity, sprinkler K-factor); legibly – 1:50, 1:100, 1:150, 1:200.
- axonometry
- the drawing documentation must include a layout with representation of maximum storage height allowed as per type of material stored, i.e. incl. tables for derivation based on category and type in relation to sprinkler protection intensity.

4.3.4 Design Proposal Criteria

Proposal criteria (classification, intensity, effective area, min. pressure to a sprinkler cap, etc.) must conform to ČSN EN 12845, VdS CEA 4001 as amended.

Table no. 4: Orientational Classification of Materials Stored

Types of Materials, Semi-Finished Products, or Generally Assessed Parts incl. Packaging Mass:	BG / Fire Hazard Class
1) single-layer plastic PP/PE/PS – flow-through with calorific value < 25 MJ/kg	Cat IV or HHS4
2) plastic PP/PE/PS – non-flow-through, multi-layered with calorific value ≥ 25 MJ/kg	Cat IV or HHS4 + Annex K7 (VdS CEA 4001)

In all areas intended for storage with AFFES system installed always must be taken into account the highest HHS4 category classification to keep the option of changing the type of goods stored with no need to adjust the AFFES (provided the rack layout is kept). All logistic areas are to be designed for the 30mm/m².min intensity, to allow for max. storage height of block storage. Ceiling anchoring above logistic areas with racks are to be designed with the same pipeline dimensions as the areas without rack anchoring. Hydraulic parameter reduction will be reached only by using sprinklers with lesser K-factor.

(Example: a K160 sprinkler will be replaced by a K80 sprinkler above the racks).

Sprinkler Cap Protection inside Racks

. When planning installation of sprinklers into racks, sprinkler rack protection against mechanical damage must be addressed in detail. I.e. detailed drawing of sprinkler protection inside racks already in the project stage, and subsequently the solution must be approved by ŠKODA AUTO representatives (Logistics, Fire Protection Planning). It is also necessary for the specific solutions of individual cases to be discussed with VdS before starting the realisation itself.

Conditions for proposal parameters effectivity are listed in Table no. 5:

- 1) The goods/material classification in question conforms to limit heights defined by the table.
- 2) Latest in the project stage – BPD the max. storage height has to be discussed, especially for the storage areas, with rack height and type taken into account. The Project Documentation Supplier is responsible for proposal intensity within the concept.

4.3.5 Selecting Water and Power Supply Type



Selection of water and power supply type has to conform to ČSN EN 12845 and VdS CEA 4001 as amended.

Note: proposal example: for VdS CEA 4001 Class 1 as follows: Equipment with 5,000 to 30,000 sprinklers: 2x pumps (E+D), 2x backup reservoir + 1x pressure tank.

4.3.6 Engine Room and Valve Stations Rooms

Intention to build a new SFE engine room and new valve station rooms always must be reported to the PPB – Fire Protection Planning and SO/1 department, which will be the guarantors for such an investment intention.

The ceiling construction has to be designed to allow suspension technology and pipeline distribution necessary from the ceiling construction.

Must be ensured: sufficient ventilation, lighting incl. emergency lights, protected vehicle entry (CFRS units mobile technology can drive right up to the object entrance, vehicle and pedestrian entry into the object may not be located in areas with fire hazard, etc.), engine room and VS room entrances must use the general key used by the CFRS unit (must be included in the planned event for the investments).

4.3.6.1 AFFES Engine Room / Pump Station Requirements

- the engine room has to be designed as a separate fire section with fire resistance at min. EI 60 with access from the outside, has to be protected by sprinklers;
- install heating in the engine room – +15°C, ensure air exchange in the engine room, ensure heating monitoring (connection to the CFRS dispatch by the FDS system)
- install current laminated scheme of the whole system in appropriate scale (update upon system extension);
- install current well-legible plan of the whole device (update upon extension);
- keep replacement sprinklers of every type used in amount as per ČSN and VdS standards;
- ensure sewer drainage;
- if the engine room is located underground with no direct ventilation option, a forced ventilation of the area has to be ensured with temperature and humidity monitoring.

4.3.6.2 AFFES Valve Station Rooms Requirements

- The valve station room has to be a separate fire section with minimum resistance EI 60, access from outside the building in accordance with above-mentioned standards;
- install current laminated scheme of the system and scheme of areas protected – well-arranged plan in appropriate scale (mark the local part) – see Fig. P3.1 and P3.2 in Annex no. 3. Including marking of maximum storage heights, sprinkler caps intensity, classification in regard to storage and danger, number of sprinkler outlets installed.
- ensure sewer drainage;
- install heating +15°C, ensure air exchange in the valve room, ensure heating monitoring (connection to the CFRS dispatch by the FDS system)
- if the valve room is located underground with no direct ventilation option, a forced ventilation of the area has to be ensured with temperature and humidity monitoring.

4.3.6.3 Backup Sprinkler Reservoirs

To operate a sprinkler extinguishing system, such an amount of extinguishing medium has to be provided that is sufficient for operation time defined in accordance with the above-mentioned standards. It is necessary to take into account a possible connection of a hydrant system or water screens to the AFFES system.

In case of construction of a new equipment, it is necessary to thoroughly discuss with the Investor all possibilities of future expansions and anticipated max. design sprinkling intensity. Only full-volume reservoirs are installed!

a) Technical Parameters:

The reservoir volume is defined based on hydraulic calculations with added reserve allowing for future AFFES system expansion.

Always at least 2 inexhaustible sources have to be implemented with regards to the possible future expansion. Every inexhaustible should not be smaller than:

- 810 m³ without connection to external hydrants;
- 1,026 m³ (810+216) with connection of external hydrants to the AFFES engine room;
- other cases need to be discussed with the PPB – Fire Protection Planning and SO/1 department.

b) Type:

- Underground reservoirs
- Above-ground reservoirs

Underground reservoirs

An underground reservoir with a suction sump and effective volume based on the implementation project documentation may be installed as a water source. The filling water must meet water quality as per Class I 6 in accordance with ČSN 757221 with permissible impurity content of 0.5% of the content volume and with hard particles diameter under 0.5 mm. No additives influencing physical and chemical characteristics of the water may be mixed into the water. Ensuring of water cleanliness at the source must comply with ČSN 752411. No anti-freeze additives may be mixed into the water. Volume of requested water reserve has to be renewable within the 36 hours.

The reservoir is fitted with climbing irons or a ladder with an anticorrosive coating reaching the very bottom of the reservoir. The reservoir must be fitted with a removable lid for revision purposes, dimensions min. 800 x 800 mm. The lid must prevent entry of daylight, leaks, or other operational fluids and further contaminants. Reservoirs must be equipped with ventilation and a safety spillway with a minimum area of 125 cm². The safety spillway must be fitted min. 5 cm above the highest reservoir level.

The minimum required water level and its overlap and draw-down in the tank must be monitored. Water level detection sensors will be placed inside the reservoir. The reservoir will be filled automatically using water level sensors. Automatic filling will be provided through shut-off fittings with electric drive. The reservoir may be filled manually by opening the shut-off closure DN 100.

Draining the reservoir may be performed by the means of the drainage pipes led to the existing sewer system by gravity or forced flow.

Above-ground Reservoirs

Above-ground segment all-metal without an insert or inner lining(), with an external mineral insulation under the casing. The AFFES Supplier delivers the reservoirs in assembly: the reservoir with complete equipment, incl. the starter strips the reservoir is sealed onto. **The baseplate made of impermeable (waterproof) concrete is not a part of the Supplier's technology.**

The minimum water level above the bottom must be 0.3 m and the maximum water level under the ceiling of the reservoir must be at least 0.5 m while also under the level of the installed inspection platform.

All discharge or spillway pipes from the reservoirs must be led into a constructed shaft (individually for each reservoir) inside the engine room with minimum dimensions 0.5 x 0.5 x 0.5m with grating and with discharge sewer pipes of at least DN150. An anti-odour siphon must be assembled from the pipeline fittings DN150 (alternatively, it is possible to use an anti-odour damper – this must be discussed first with the PPB – Fire Protection Planning and SO/1 departments). Filling must be performed with the use of float valves – alternatively, manually (approval of the PPB – Fire Protection Planning and SO/1 departments necessary).

Volume of requested water reserve has to be renewable within the 36 hours.

c) Casing Specification:

Reservoir casing must be identical from the interior as well as from the exterior, incl. roof casing (see Fig. 2). The casing has to be manufactured as follows:

- painted trapezoidal Al plate (waves in the vertical direction,
- thermal insulation - hydrophobized Rockwool of minimum thickness 100 mm.

Details concerning plating of the reservoir insulation will be approved by the Investor before installation (colour will be defined by the Investor according to the current ŠKODA AUTO a.s. graphic manual by the RAL shade – the current standard is RAL 9006; the Ordering Party may request a combination of several colours).



Fig. 2 – Reservoir Plating Sample

d) Equipment:

Each AFFES supply reservoir must be equipped as follows:

- Roof platform + inspection opening;
- Ladder from the roof of the engine room to the roof of the reservoir (usually around 3000 mm);
- Inspection entrance from a level of $\pm 0.000\text{m}$ (from the engine room);
- Reservoir spillway brought down to the engine room min. DN 150;
- Inspection platform;
- Monitoring – water level, temperature etc. (transmitted to the CFRS).

The components listed in this section (except for monitoring) must be made of surface-treated steel – hot-dip galvanisation.

e) Heating:

Heating of the AFFES supply reservoirs must be performed by a hot water electric boiler.

Permanent heating V1 will be performed individually for each reservoir from the central hot-water pipeline on the premises. Hot-water heating outlet will be terminated by an end cap at the AFFES engine room. The heating will be provided by a heating loop placed at the bottom of the tank (stainless steel braided bellows hose), supplied with hot water from the central distribution point.

Assembly V1: performance determined by the reservoir size

- stainless steel braided bellows hose BHC, type KBN1 U1 – 16 / , PN 97, external \varnothing ca 35-38, terminated by a compression nut with internal thread;
- support structure of the heating hose (included in the drawing documentation);
- electrically operated shut-off fitting, including a control system and necessary components to ensure proper operation of the heating unit (safety valves, cabling, thermo-regulator, temperature sensors etc.).

In case of heating failure or shutdown from the central pipeline source, a backup electric reservoir heating will be used V2a/b (individually for each reservoir):

V2a:

The electric heating will be installed using heaters fitted in the flow boiler with forced water circulation by the circulation pump. The boiler will be separate for each reservoir and located inside the engine room.

Assembly V2a:

- exchanger / flow boiler, $\varnothing 300$, height 1,000 mm (min. hot-dip galvanisation);
- el. spirals (X kW – based on the heat balance calculation, for each insulated reservoir);
- circulation pump
- distributor with regulation and a switch (switching on at $+6^{\circ}\text{C}$ and off at $+10^{\circ}\text{C}$);



- emergency thermostat, safety valve, pipeline, and shut-off fittings.

V2b:

Electric boiler PZP Prima. Heating performance will be designed based on casing thermal loss balance calculation. The boiler will be separate for each reservoir and located inside the engine room.

Assembly V2b:

- compact electric boiler PZP Prima complemented by an additional circulation pump (supplier KSB) (X kW – based on the heat balance calculation, for each insulated reservoir).

4.3.6.4 Pressure Reservoirs

Pressure reservoirs are required for Classes 1 and 2 and in designing the AFFES (see point 4.3.1). Minimum volume of one pressure reservoirs: 25 m³ (at least 15 m³ of which is water). The following supply must be provided: of air – 18 m³/h (min. DN 20) and water – 6 m³/h (min. DN 40).

Upon every new proposal and every expansion, the pressure reservoir has to be re-evaluated, whether the operational pressure is sufficient.

10,000 sprinklers require automatic refill of pressure reservoir. The requirement is defined in the sense of automatic refill of the pressure reservoir with water; air refills are not necessary.

A "series" connection is required when two pressure reservoirs are installed.

All discharge or spillway pipes from the reservoirs must be led into a constructed shaft (individually for each reservoir) inside the engine room with minimum dimensions 0.5 x 0.5 x 0.5m with grating and with discharge sewer pipes of at least DN150. An anti-odour siphon must be assembled from the pipeline fittings DN150 (alternatively, it is possible to use an anti-odour damper – this must be discussed first with the PPB – Fire Protection Planning and SO/1 departments).

4.3.6.5 Main Pumps

Main AFFES pumps must be in the effectivity class IE 3,4 as per the VW Group standard.

Pump size is defined by hydraulic calculation for the most disadvantageous area in the whole system. This preliminary hydraulic calculation incl. ISOMETRY must be already part of the documentation no later than at the BPD stage

Pump activation is triggered by pressure drop on two pressure switches (manostats, range 1-16 bar). The first pumping device must automatically activate when pressure in the system drops down to at least $0.8 \cdot P$, where P is the pump pressure into the closed valve. If two pumping devices are installed, the second pump must be activated before the pressure drops to the value of at least $0.6 \cdot P$. after activation, the pumps must stay in operation until the moment of MANUAL shutdown on the distributor of the pump in question.

Inlet disposition, electric- or diesel-powered pumps are used.

Cooling of the diesel generator must be controlled by a servo drive with a return spring.

Leaks from the pump and cooling water outlet must be led into a constructed shaft (individually for each reservoir) inside the engine room with minimum dimensions 0.5 x 0.5 x 0.5m with grating and with discharge sewer pipes of at least DN150. An anti-odour siphon must be assembled from the pipeline fittings DN150 (alternatively, it is possible to use an anti-odour damper – this must be discussed first with the PPB – Fire Protection Planning and SO/1 departments).

a) Pumps with electric engines:

Electric power supply must be ensured at all times, i.e. the connection must be linked before the main electric circuit disconnection switch (DEON). At the same time, each element between this connection and the pump distributor must be marked in accordance with the requirements of the above-mentioned regulations:

"ELECTRICITY SUPPLY FOR THE SPRINKLER PUMP ENGINE – DO NOT SWITCH OFF IN CASE OF FIRE"

b) Pumps with diesel engines:

Fuel supply must last at least for 6 hours of operation.

Exhaust pipes to the diesel pumps must be installed with damping and thermal insulation (max. temperature of the pipe is usually around 570°C) + insulation plating with Al sheets. Other parts of the exhaust pipe must be coated with a special anti-burn paint.

c) Technical parameters (in detail, in accordance with the above-mentioned regulations):

Minimum number: 2x sprinkler pump (main and 100% redundancy).



Minimum pump output: $Q = 9,000 \text{ l/min} \sim H = 90 \text{ m}$

Main sprinkler pumps with new installations must not send a higher output into a closed system more than 11 bar, i.e.:
 $Q = 0 \text{ l/min} \sim P_{\text{MAX}} = 11,0 \text{ bar}$

d) Refuelling – pumping stations:

Refilling the fuel tanks for diesel pumps must be performed by a pump located on the pump assembly or in its close proximity. It must be provided individually for each pump and must be accessible from the floor level of the engine room. The diesel generator is to be equipped with an inflow filling pipe with the throat for a filler gun.

The fuel tank of the diesel generator must be equipped with a fuel level indicator located on the diesel generator assembly so that the indicator is visible when refuelling.

4.3.6.6 Valve Stations

a) Valve Station Types

All valve stations must in their design comply with requirements of the point 4.3.1. In order to ensure the AFFES compatibility, the valve stations must be of the GRINNELL Manufacturer (Tyco Fire Suppression & Building Products).

The following valve stations may be used:

- wet valve station with a delay chamber;
- dry valve station with an accelerator or rapid deaerator (combination is not possible);
- any other system / valve station type must be consulted with the PPB – Pre-series planning and SO/1 departments.

Each valve station will be equipped with a flash alarm and a fire bell.

It is recommended to install additional shut-off fittings over the valve stations for easier maintenance as well as economy of time and expenses related to draining the valve stations.

b) Valve Station Size

The maximum area protected by one wet control valve, including all the sprinklers in a subordinate set extension, must not be larger than:

- Moderate risk, including all the slight risk sprinklers: $12,000 \text{ m}^2$
- Severe risk, including all the moderate and slight risk sprinklers: $9,000 \text{ m}^2$

The total size of all new and modified or extended valve stations, including shelves, will be defined in the AFFES technical report. Recalculation must correspond to requirements in the point 4.3.1 of this ITS.

c) Wet Valve Station

In case of installing a part of the pipeline in areas, where the temperature cannot be guaranteed to stay above 4°C all year round, pipeline heating is used.

Installation conditions must correspond to requirements in the point 4.3.1 of this ITS.

d) Dry Valve Station

Dry valve station will be assembled in accordance with Manufacturer's instructions.

The longest period for test fittings of the dry system and the water jet must be shorter than 60 seconds.

Components for supplying the valve stations with air:

- compressor: min. power $6 \text{ m}^3/\text{hour}$;
- reverse closure and safety fitting;
- 1.5 mm bypass curtain.

For dry systems distribution must be used air supply from the air-supply main (if located in the object) with backups using a compressor installed in the area of dry valve stations.

Use of glycol for irrigated systems under roof is not allowed at ŠKODA AUTO a.s. due to groundwater protection.

e) Marking the Valve Stations:

Each valve station has to be marked with a designation label, which has to include basic data, i.e.



- valve station number, type (wet, dry);
- protected area (must comply with the position plan);
- position plan installed at every valve station;
- fire classification;
- number of sprinklers installed/countable, or alternatively total area of the valve station;
- Test sprinkler K-factor.

f) Drip/Sewage Sump under the Valve Stations Distributor:

The sewage sump will always be waterproof from homogeneous polypropylene boards, or it will be made of bricks with a water-resistant coating up to the tank height.

Drainage from the drip sump must be led by a sewage pipeline DN 150. An anti-odour siphon must be assembled from the pipeline fittings DN150 (alternatively, it is possible to use an anti-odour damper – this must be discussed first with the PPB – Fire Protection Planning and SO/1 departments).

4.3.6.7 Flow Alarms

Flow alarms must be installed at every place where the valve station protects more than one floor or an otherwise separated area. Every flow meter will be installed incl. testing assembly accessible from the floor level, and at the same time also from the valve stations room (remote control).

It is possible to transmit the flow meter signal:

- signal monitors the FDS and is then forwarded to the AFFES monitoring system;
- signal monitors the AFFES monitoring system and then transmits it to the FDS system.

The execution of the signal scanning and its transmission will be defined by the PPB – Fire Protection Planning and SO/1 departments.

4.3.6.8 AFFES Monitoring

The AFFES in the buildings of ŠKODA AUTO a.s. must be automatically monitored according to the requirements in point 4.3.1 of this ITS.

The monitoring of faulty states and the transmission of fire signals will be carried out within the ESSER fire alarm systems (Type: IQ8 Control C/M incl. a control panel) in a circular network.

A monitoring switchboard must be placed into each engine room and valve station area in the most convenient way for the operator (as close to the entrance to the engine room as possible) or as required by the PPB – Fire protection planning and SO/1 departments.

Cables and conductors used must comply with the prescribed fire resistance, including clips and cable trays – according to the requirement in point 4.3.1 of this ITS.

The Supplier of the monitoring system will hand over programming tables incl. access codes to the SO/1 department.

Reference list of the required monitored states (as per point 4.3.1):

a) Shut-off fitting monitoring (SOF):

- filling of a reduced reservoir;
- for pump intake;
- for pump displacement;
- for pressure vessel displacement;
- for pressure vessel displacement;
- for pump test pipeline;
- for a bell pipe;
- before (or after) a valve station;
- for the fuel inlet into the pump diesel engine;
- monitoring of cooling.

b) Fluid level monitoring (FL):

- in a supply reservoir;
- in a pressure reservoir;
- in the watering tank of the pump (only during suction);



- in the fuel tank for the diesel pump.

c) Operating pressure monitoring (OP):

- in the pressure system;
- in the dry system;
- in the system.

d) Other monitoring:

- temperature and flooding	- engine room and valve stations
- outage	- pump distributor voltage (E-/D)
	- monitoring switchboards
- shut down	- pumps
- cable break / short circuit	- for starting the pumps
	- the fire pressure switches
	- the flow alarms
- temperature in main tanks	- engine rooms

e) Synoptic operator panel:

An up-to-date digital visualisation scheme must be placed in the sprinkler engine room and VS room. The design of the panel must always be approved by the SO/1 and PPB (Fire Protection Planning) departments in advance. – based on a proposal, which must be approved by SO/1.

f) The following signals must be transmitted to the control room with non-stop attendance:

- fire from each valve station – individually;
- fire from each flow alarm – individually;
- operation of main and backup pump – individually;
- collective fault of main and backup pumps – jointly;
- summary fault of the AFFES.

Fire at each valve station must be signalled by a complementary flashlight or beacon located over the valve station.

In order to transmit the signal to the SO/1 dispatch centre, it is possible to carry out a preparation or connection to the ESSER NET according to the requirement of the PPB – Fire protection planning and SO/1 departments.

4.3.6.9 Electric Wiring

In case of using solely pumps with electric engines to supply the AFFES, their function must be maintained from two mutually independent sources.

Cables and conductors used must comply with the prescribed fire resistance, including adaptors and cable trays – according to the requirement in point 4.3.1 of this ITS. Cable wiring for pump switches must be monitored for short circuit and breaks. All the AFFES cable wiring must be placed into separate cable trays. The only exception is the connection to the end devices themselves with the max. length of 0.5 m.

Electric distributor cabinets have to allow installation of the synoptic operator panel. The main distributor must be fitted with a voltage meter and a current meter in all phases.

The electric cabinets have to be made accessible to SO/1 before commissioning.

4.3.6.10 Fire Technology Filling Point

The system will allow for emergency power supply using FRS mobile technology through at least 2 B75 connector pieces. Every connector has to be separated from the collector by a closure to allow simultaneous connection of several hoses. The collector must have drainage options. It is also necessary to maintain a free space around the caps, so it is possible to tighten a hose to the connector with a spanner (at least 30 cm around each connection). Position and direction of connectors must be designed in such a way that connected hoses under pressure do not fold. A shut-off slide valve and a reverse damper with a DN 75 bypass will be placed in the engine room.

4.3.7 Pipeline System

All pipeline parts and components used for the AFFES system must be usable at the operation pressure of 16 bar (PN16).

4.3.7.1 Ground Distribution



Requirements for the ground distribution pipeline between the AFFES engine room and valve stations inside the object:

- underground pipes from ductile cast iron DN 300, incl. fittings, transitional flanges;
- shut-off fittings (slide valves, shutters) DN 300;
- each valve station must be supplied from two sides (DN 300);
- underground pipe connections must comply with the requirements of Directive EN545.

The whole length of the pipeline must be situated in non-freezing depth. All bends and joints must be secured against dislocation by concrete footing.

During the PID stage, a ground pipework project will be submitted either as a separate supplement or by integration into the AFFES documentation. The project will clearly define the route, material, placement depth and pipeline dimensions.

Individual implementation stages of laying and backfilling the ground pipeline must be carried out according to the requirements of the PPB – Fire protection planning and SO/1 departments and in compliance with the ČSN and VdS CEA 4001 standards as amended.

Pressure and impact tests are performed in compliance with the VdS CEA 4001 standard as amended.

4.3.7.2 Valve Station Rooms Connections

Each AFFES valve station room connected with the AFFES engine room must be always supplied by two pipelines of the same dimension. Inlet pipes from the engine rooms must be supplied by the valve station distributor, always from two different sides. Each inlet pipeline must be brought to the valve station room from a different direction (placed in a different ditch).

In the case of placing both main ground distribution pipelines into one ditch, the pipes must be installed side by side with a minimum distance of 0.5 m – approval by the PPB – Fire Protection Planning and SO/1 departments is mandatory.

The distributor located in the valve station must be equipped with a shut-off fitting, so that it is possible to shut down only a part of the distributor when needed. According to the VW Group Fire Protection requirements, the distributor has to be separated into no more than 5 valve stations. In the case of a simultaneous occurrence of both ceiling and shelf protection on a specific protected area, it is necessary to place the valve stations, so in case of shutting down a part of the distributor with the ceiling protection, the valve stations of the shelf protection of the protected area are in operation – applies also vice versa.

When implementing more than 10 valve stations on a distributor, it is necessary to maintain the division by the maximum of 5 valve stations, whereas it is necessary to adjust the power supply of the distributor from the inlet ground pipeline, so it is possible to shut down any part of the distributor while maintaining the function of the remaining part – more supply points. Specific solution needs to be discussed with the PPB – Fire Protection Planning and SO/1 departments.

Connecting individual parts of the AFFES in the valve station rooms must be done as follows:

- inlet pipeline x distributor – flange;
- distributor x shut-off fitting (damper, slide valve) – flange;
- shut-off fitting x valve station – flange;
- valve station x main pipeline – flange.

The distributor must be brought to the construction site already welded in one piece (in a certified workshop, as per ISO 9001). If this cannot be met, the distributor may be assembled in the valve station room. In this case, it must be connected by flanges that will be welded onto the distributor in a certified workshop before bringing it to the construction site.

4.3.7.3 Above-Ground Distribution Pipeline

At all times during the transportation to the construction site until its physical installation and connection to the closed system, the pipeline must be fitted with plugs on all branches and outlets and stored in such a way that the pipeline does not lie directly on the ground.

a) Pipeline Specification and Connection

Main and distribution pipeline in dimension (> DN 50):

- seamless steel pipeline connected by couplings (by splining) or flanges;

Distribution pipeline (< DN 65):

- seamless steel pipeline connected by couplings (by splining) or threaded;

Branches from standardised pipeline must be connected:

- by welding;



- by saddle clamps and spline pipe T-fittings.

b) Marking

Every bifurcation of an inlet pipeline must be visibly and indelibly marked (labelled) describing which valve station supplies the pipeline.

c) Pipeline surface finish:

Wet distribution pipeline

- baked powder coating.

Note: A synthetic coating may be used for repairs and additional connections (1x primer, 2x top coat).

Dry distribution pipeline

- hot-dip galvanisation without any further modifications from the internal and external sides of the pipeline.

Note: For repairs may be used a zinc paint.

d) Technical Specification:

Ceiling distribution lines must be prefabricated – manufactured in a prefab workshop in advance.

For AFFES installation, standardized pipes must be used.

For the main distribution line (DN65-DN300) are considered as baseline the values as per standard ČSN EN 10220, and values as per ČSN EN 10255+A1 for the auxiliary distribution lines (DN25-DN50). The minimum values must be in compliance with conditions stipulated by manufacturers of hydraulic splined couplings. A deviation from the manufacturer can be only into positive values with respect to the pipeline thickness.

The Investor has the right to return the whole delivery of pipelines (dispatched on the same day) if they discover deficiencies in the above-mentioned requirements during a spot check.

e) Protection of driveways and passageways:

Driveways and passageways into buildings must be protected by an appropriate type of the AFFES.

If the driveways and passageways are located near shelters with dry branches of the AFFES, they will be connected to this distribution line.

Otherwise the driveways and passageways must be protected by an open drencher system in combination with a local fire detector (located in the passageway) and an electromagnetic valve located on the water-filled pipeline in a tempered area of the building (shop floor).

4.3.7.4 Suspension Systems

Must be designed in compliance with ČSN and VdS as amended.

The main and distribution pipelines must have a sufficient number of fixed points for capturing axial forces – at least one per a straight section – made of a bracket console and a round/hose clamp.

Specific installations of sprinkler pipelines with regards to dynamic forces in the pipes always must be discussed in detail during the project implementation pipelines.

A suspension system must consist of components from a single system Manufacturer/Supplier certified by VdS. A suspension system must comply with the requirements of the point 4.3.1.

4.3.7.5 Sprinkler Caps

In order to ensure the AFFES compatibility, the sprinkler caps must be of the GRINNELL Manufacturer (Tyco Fire Suppression & Building Products). Sprinkler heads with the K-factor 80, 115, 160 are used.

The ceiling protection must have one level lower RTI sensitivity than the sprinkler caps in the racks.

4.3.7.6 Fittings

Freely accessible fittings must be secured against unauthorised manipulation!

Every fitting (i.e. all end elements) must be marked with numbers of the appropriate valve station.

a) Flush fittings:



Every free end of the main and distribution pipelines > DN 50 must be terminated with a flush fitting of at least DN 50, from which no other manifold may be connected.

b) Discharge and deaerator fittings:

Install appropriate number of discharge and deaerating fittings.

Discharge fittings always have to be terminated in a tempered area. Every discharge fitting must be equipped with an ending for hose connection (e.g. C52) with a cap and be brought down to the height at least 1.8 m above the floor level. In cases where this cannot be implemented (collision with production technology, etc.), an approval of the SO/1 department is necessary.

c) Testing fittings:

Is must be possible to perform tests of the whole AFFES equipment, incl. all partial components.

These include mainly:

- valve stations and flow alarms test;
- main and backup pump test (dimensioned for 120% of max. flow rate);
- system monitoring;
- pressure and float switches functionality;
- flow rate test of an individual fire group (K-factor of the smallest sprinkler);

Every control valve circuit has to include at least 1 testing fitting with a K-factor fitted in accordance with the sprinkler caps installed.

d) Condensation fittings:

Condensation drainage from the dry systems must be always terminated in a **tempered area**; pipeline for draining the condensation must have a sufficient downward angle and be dimensioned with regard to its length.

4.4 FIRE SHUTTERS

Note: It is not possible to use water curtain as a fire shutter at ŠKODA AUTO and sprinkling of fire shutters is not allowed either.

4.4.1 FS Types

a) Conveyor

The FS position is monitored through the FDS – positions “OPEN” and “CLOSED” are detected as necessary in connection to conveyors.

b) Manned – FS position not monitored.

- Gravitation;
- Motor-operated;
- Manually operated.

4.4.2 Automatic Fire Shutter Closing

The FS closing must be signalled visually by an orange flashing light and acoustically by a siren (different tone than the FDS siren).

For single leaf sliding telescopic fire shutters, the visual signalisation must be placed in the upper half of the inner door frame on the end side.

For extensible, roll-up, two-leaf, sectional, roller fire shutters the visual signalisation must be placed on both sides of the fire partition construction.

If there are safety elements installed on the fire shutter (e.g. photocell, safety rail), these devices must not have any impact to the fire shutter function.

4.4.3 Technical Requirements of Detection Sensors Design for the Fire Shutter Automatic System

The autonomous detection sensor function must not be impacted by any other device (air ventilation, sahara, etc.)

The sensors are always installed in pairs – a visual smoke sensor and a thermal sensor. The sensors must be placed on both sides of the fire partition construction (fire shutter).

a) Visual smoke sensor

Must be placed as close to the ceiling construction as possible (max. distance between the sensor and the ceiling construction may be max. 2.5m).

b) Thermal sensor

Must be placed very closely to the construction opening for the fire shutter.

4.4.4 Manual Control of Fire Shutter

Every fire shutter has to allow for its manual closing and emergency manual opening (for engine-driven opening) using a button with the appropriate text under glass – e.g. button Lites MHA (or MHU) 904 (Fig. 5).



Fig. 5: MHA 904 button

After use of the emergency opening button, the FS must open, stay in the open position max. 5 s and then close again.

Buttons for fire shutter manual control must be placed on both sides of the fire partition construction in the below-defined design.

Bottom edge of the button must be place min. 1.2 m from the floor, upper edge of the button in the max. height of 1.5 m from the floor.

4.4.4.1 Control Elements Colour Design

The control elements colour design must not be mistaken for the FDS alarm button, i.e. must not be in red.

a) Emergency fire shutter closing – blue colour.

When the button is used to **close**, the button will be in blue and under the glass will be indelible text with the min. font size 5 mm: "FIRE SHUTTER CLOSING" ("UZAVŘENÍ POŽÁRNÍHO UZÁVĚRU").



Fig. 6: Closing button colour design

b) Emergency fire shutter opening – green colour.

When the button is used to **open**, the button will be in green and under the glass will be indelible text with the min. font size 5 mm: "EMERGENCY FIRE SHUTTER OPENING" ("NOUZOVÉ OTEVŘENÍ POŽÁRNÍHO UZÁVĚRU").



Fig. 7: Opening button colour design

4.4.5 Power Supply and Back-Up

Fire shutter buttons energy supply must be by a backed-up power supply:

Version 1:

- accumulator with capacity of at least 5 cycles (1 cycle = opening and closing) or for 2 hours of standby.

Version 2:

- connection to the central UPS.

4.4.6 Fire Shutter Marking

Markings in accordance with Sec. 5 of Decree no. 202/1999 Coll., which defines technical conditions of fire doors, smoke-proof doors, and smoke-proof fire doors, as amended.

On fire shutters in production and storage objects must be a marking "FIRE SHUTTER, KEEP CLOSED" („POŽÁRNÍ UZÁVĚR, ZAVÍRAT"). The marking will be designed as a simple sticker with dimensions 200 x 100 mm (see Fig. 8).



Fig. 8: Marking on a manually controlled FS

The following FS parts must be marked with an appropriate fire resistance:

- door wings;
- doorframe;
- door fittings;
- automatic closing system.

The marking must be done in an indelible and unremovable manner on a metallic label or stamped on individual FS components directly.

4.4.7 Ensuring Operability



If there is a risk of damage to the FS or to any of its functional parts due to the regular operation, features that will protect the FS against operational mechanical damage (for example protective posts) must be installed.

Blocking a fire shutter with a key may be performed only in the closed position – provided that no emergency escape passes through the fire shutter.

A service intervention from a specialised company for the conveyor system FS must be initiated within 2 hours from the notification. The provision must be guaranteed by the company in writing prior to its selection as the shutter Supplier.

If, for operational reasons, it is requested to secure the door fire shutter in the open position, it is necessary to design holding magnets connected to the FDS or to an autonomous sensor.

4.4.8 Fire Shutter Documentation Must Contain (for acceptance)

- original FS documentation;
- declaration of conformity of the installed device;
- protocol on the operability check with all requirements as per Art. 7 Par. 8 of Decree no. 246/2001 Coll., establishing the fire safety conditions and the administration of the governmental fire supervision (on fire prevention), as amended;
- Supplier's declaration that the periodic check of FS operability can also be performed by another authorised company / person.

4.4.9 Conveyors

If a conveyor passes through a fire separating partition, **the fire shutter installation must be always addressed in relation to the conveyor system and their interconnection**. For the fire equipment to work correctly, an immediate evacuation of the area under the fire shutter (clearing the area out by an automatic control system) must be ensured even in case of a **power outage** or conveyor breakdown must be ensured. Interrelations and coordination of the whole system is defined by the designer in FSS.

4.4.10 FTS Logistics, Automatic Logistic System AGV and Other Automatic Logistic Systems Moving Along Fixed Routes

When designing automatic logistic systems moving along fixed routes (e.g. automatic trucks following fixed magnetic strips and marks), it is necessary to proceed in accordance with the established terms of fire safety in buildings, and it is necessary to take into account the device installation by the FSS Designer. When designing automatic log. systems, **evacuation of people must not be negatively impacted in any way** (emergency escapes and exits always have to be kept free), nor should be fire-fighting intervention; when the automatic log. truck passes through different fire shutters, **it is necessary to take fire shutter operation into account and handle their interrelation**.

4.5 Fire Water Supply

Proceeding in compliance with ČSN 73 0873 and below-mentioned requirements is required for designing security of individual events.

4.5.1 Internal Supply Points

When designing area coverage of fire water, it is based only on the length of the hose – the discharge range of 10 m is not included in the area coverage. This dimension (design) method includes a margin for dispositional changes, layout of material, vehicles, advertising boards etc. (i.e. the hose length is calculated for the actual route, which cannot be precisely determined in the design stage).

In areas with substances for which water as an extinguisher is unsuitable or less effective, it is necessary to install internal supply points with means to add a suitable wetting agent (solid cartridge + hose nozzle e.g. POK ¾ - GHT – see Fig. 9) – consultation for a suitable design with the SO/1 department.

4.5.1.1 Internal Supply Point Cabinet Components Must Include:

- form-stable hose of 30 m minimum length wound on a drum, with hose nozzle DN 25;
- FDS fire alarm button (if the system is installed in the object);
- PFE storage place;
- means for admixing a suitable wetting agent (solid cartridge) – see the condition above;
- photo-luminescent informative signs on an aluminium base, dimension 150 x 150 mm, about the stored FP material supplies and the FSE components (e.g. the FDS button).



The hydrant cabinet is fitted so that the drum axis is in a height of 1.1-1.3 m above the floor. They must be placed in easily accessible locations.

The FDS alarm button must be located on the hydrant cabinet in the height of min. 1.2 m (bottom edge) to 1.5 m (upper edge) above the floor. Same placement height applies with FDS alarm button location on any vertical construction.

In case of restricted or limited orientation in regard to components installed, an appropriate visibly placed fire protection sign is used to mark them – a photo-luminescent one sprayed on aluminium base with dimensions min. 200 x 200 mm.

4.5.2 External Supply Points

Only above-ground fire hydrants are used on the premises of ŠKODA AUTO a.s. The right type of aboveground hydrants must be selected according to the dimension of the fire water distribution pipeline (potable/industrial):

- \geq DN 200 – above-ground hydrant DN 100 with outlets 2xB75, 1xA110,
- $<$ DN 200 – above-ground hydrant DN 80 with outlets 2xB75.

Shear bolts hydrants placed above the modified terrain must be installed in case of necessary replacement (may only be covered with gravel).

In case an above-ground fire hydrant cannot be used, an underground fire hydrant DN80 must be used – **using an underground fire hydrant always must be approved by the PPB – Fire Protection Planning and SO/1 departments!**



5 EMERGENCY ESCAPES

5.1 Designing and Planning

Unless stated here otherwise, planning and designing emergency escapes is based on appropriate provisions of current standards of the ČSN 73 08xx series.

For protected emergency escapes from constructions with forced, pressurised or combined ventilation, it is necessary to perform verification of function for the protected emergency escape ventilation in accordance with the Ministry of Interior and General Headquarters of the Fire Rescue Services of the Czech Republic methodology before commissioning the object: "[Metodický postup pro ověřování funkčnosti požárního odvětrání](#)" (Methodical procedure for verifying the fire ventilation functionality) from 15 May 2010. Thusly performed test must be proved by a performance protocol with appropriate stamps and signatures that states, that the designed protected emergency escape ventilation is functional. Financial expenses for performing this test (or tests) are to the debit of the Construction Supplier until all deficiencies are removed and a positive functionality report is issued.

5.2 Marking Emergency Escapes

Escape routes from buildings to the open space must be designated by safety signs, tables etc. according to the applicable series of standards ČSN 73 08xx. Placement of safety signs and tables must conform to the normative requirements. The implementation of these signs and tables must be carried out as per ČSN ISO 3864 and must be photo-luminescent on an aluminium base (see Fig. 10) with the minimum dimension 200 x 100 mm (administrative buildings) or 300 x 150 mm (production and warehouse areas). May be also designed as a luminaire (ideally two-sided).

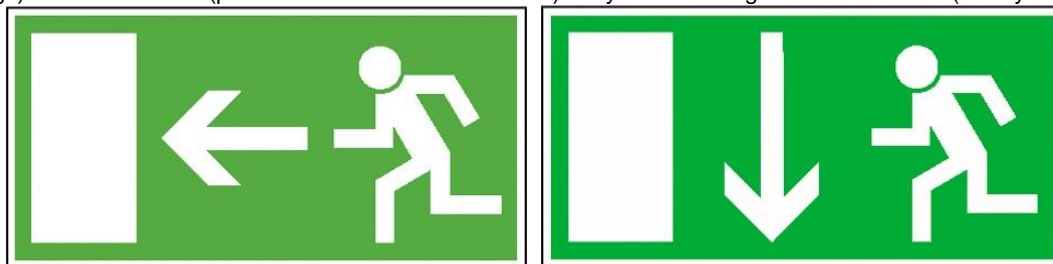


Fig. 10: Example of an emergency escape and exit marking

In the case of the text designation for the exit from the escape route to the open space, the text must be written in Czech as "ÚNIKOVÝ VÝCHOD" ("EXIT" sign is not permissible).

5.3 Emergency Escape Exits

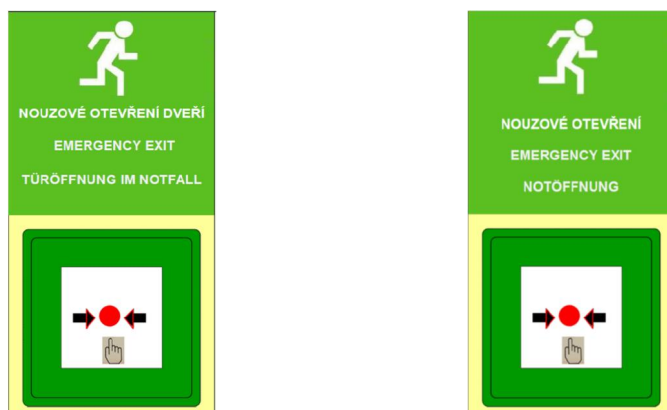
All emergency exits from buildings which are regularly locked electronically (i.e. also the exits that are/will be equipped with a device for checking the entry and exit – card readers) must automatically open after the fire alarm (FDS) has been raised or during a power outage. At the same time, manual opening using a button under a protective glass must also be enabled (see Fig. 11a).

In case when turnstiles or card gates are planned on emergency escapes from the object in the construction designed (e.g. entrance halls) their emergency opening design must comply with ČSN 73 0810. At the same time, manual opening using a button at the reception desk or a button under a protective glass placed on the turnstiles construction must also be enabled (see Fig. 11b).

For opening gates and turnstiles will be used a green button Lites MHA 904.

The button will be placed on a photo-luminescent safety pane with the text and pictograph on an aluminium base.

The button will directly interrupt the power supply of the magnetic lock (signal path through the control unit is not possible).



a) for opening doors

b) Turnstiles and gates opening button

Fig. 11. Buttons for opening emergency escape routes

All devices influencing proper system function (of the emergency escape) become a fire safety equipment (FSE) exclusively. I.e., more requirements apply to them – freely laid cables and cable trays must conform to the fire reaction class requirements (as per Commission Decision no. 2006/751/EEC), requirements for surface spreading of flames, cable circumference integrity as per ČSN IEC 60331, cable and cable load-bearing construction functionality class for FSE power supply, as well as requirements for cable resistance during fire – for small diameter cables (as per ČSN EN 50200). Everything is also included in ČSN 73 0848 – Fire Safety of Buildings – Cable network.

All parts of the system from the cable distribution through control units till the end electromagnetic locks must be certified for such use as well as for the requested uptime no less than for the whole duration of escape (all requirements must be a part of and given to the FSS).

Doors leading from escape routes to the open space, which are mechanically locked during the regular operation, must be equipped with a panic bar fitting (e.g. panic bar fitting of type A as per ČSN EN 179) which enables their opening from the inside even when locked.

Motor-controlled doors or gates also must allow for manual opening from the side in direction of escape.

5.4 Emergency Lighting

All emergency escapes, protected or not, in production and non-production objects must be fitted with emergency lighting. Design of emergency lighting must be based on ČSN EN 1838 standard, ITS 2.00.

A drawing of emergency lighting must be a part of the project documentation.



6 FIRE-FIGHTING INTERVENTION EQUIPMENT

Their design is based on the appropriate standard ČSN 73 0802 or ČSN 73 0804 and possible other requirements stated below.

6.1 Arrival Areas and Entrances to Objects

Arrival areas must be established beside all production objects designed in compliance with ČSN 73 0804, and from these arrival areas entrance for fire protection mobile technology into the objects must be ensured, in accordance with requirements of the VW Group Fire Protection Policy (see Annex no. 1). Minimum dimensions of entrance gates and driveway in the object must be min. 4.0 x 4.5 m (w x h).

When designing an object in compliance with ČSN 73 0802, establishing the arrival area must be consulted with the PPB – Fire protection planning and SO/1 departments.

6.2 Intervention Routes

6.2.1 External Fire-Fighting Routes – Fire Ladders, Fire Pipeline and Dry Risers

All fire ladders must be fitted with empty fire pipeline “B 75” (dry riser) reaching above roof of the object. Individual dry risers led over the object facade also have to use the fire pipeline “B 75”. Both dry riser ends must be fitted with fire half-couplings and caps “B 75”. FFS drawings must include fire ladders, incl. dry risers. Dry riser on an object must be physically marked with a white letter “S” on a red background.

Every dry riser must be fitted at the connection point for fire technology with a pressure relief one-way valve with drainage or with a ball closure.

If more than one dry risers are installed on an object, it is necessary to handle detailed marking of connection and outlet points (i.e. colour markings, graphic signs, schemes installed, etc.).

6.2.2 Internal Fire-Fighting Routes – Route Design, Fire Pipeline and Dry Risers

Fire pipeline led through the interior of the object must be installed in a way protected against fire effects (i.e. led through the interior fire intervention protected route), incl. points for connecting mobile technology (outside the PFE). Connection is established at every floor/level, including roofs, for “C 52” water hose. Both ends and all places for water hose connection on the dry riser must be fitted with outlet valves, fire half-couplings with a “C 52” cap. Dry riser outlets on individual floors are preferred outside the PEE – project solution designed must always be approved by SO/1 and PPB.

If the PEE is used as FRS unit access route to the roof, FRS unit access to this corridor must be ensured. The PEE access will be provided using a card or a key, inside a key safe or key depository of fire protection, which must be placed on the wall next to the PEE entrance doors.

A cabinet with material fire protection supplies must be placed on the roof by the ladder or PEE exit.

Every fire protection material supplies roof cabinet must include:

- 3x water hose PH B75;
- 3x water hose PH C52;
- 1x distributor with a ball closure B – CBC;
- 1x transition piece C52/B75;
- 2x couplings and fittings wrench 110/75;
- 2x hose nozzle C52 TURBO TAJFUN.

Roof cabinets with fire protection material supplies do not have to be installed in justified cases. Placement of a roof cabinet with fire protection material supplies must always be consulted with the SO/1 department.

6.3 Portable Fire Extinguishers

Only portable fire extinguishers from manufacturers listed in the Annex no. 4 may be used at ŠKODA AUTO a.s.

The SO/1 department technicians have authorization to perform regular inspections as per Section 9 MoI CZ Decree no. 246/2001 Coll. only on portable fire extinguishers listed in the Annex no. 3.

Table no. 5: Types of extinguishers based on selected shop floors (the FSS Processor is responsible for selecting proper types of extinguishers)

Type of operation space	Fire extinguisher type
Paint shop - main production area	CO ₂



<ul style="list-style-type: none">- workplaces for surface preparation, spray-on and other operations- body magazines	
Painting boxes <ul style="list-style-type: none">- rework- Kosmonosy service- Vocational school- R&D - Česana	CO ₂ , dry foam, mobile
EI. switchboards, transformer stations	CO ₂
LAN technical rooms, server rooms, data centres	clean extinguishing medium
Cafeterias, preparation kitchens	CO ₂
Ško-Energo power plant area <ul style="list-style-type: none">- coaling (wood chips)- pellets – wagon unloading, pellet funnel- coal crushing- upper part of coaling in the coal power plant	water
Electromobility <ul style="list-style-type: none">- battery production- battery assembly workplace- warehouses- quality centres, Pilot Hall	dry foam, mobile



7 FIRE SHUTTERS AND WALL PARTITIONS

Fire shutters must be installed with a power assistance, which will allow their return into initial position.

Ventilation system shutters must be controlled solely by the FDS.

Fire shutters and wall partitions must be marked in the graphic part of the project documentation (responsibility of the FSS Designer).

8 GAS AND FLAMMABLE VAPOUR LEAK DETECTION

A system for detection of gas and flammable liquid vapours must be designed with at least two-level signalisation and powered from two mutually independent power supplies.

Upon reaching the 1st level (10% of the lower explosiveness threshold) the system will signal (visually and acoustically) and start emergency ventilation.

Upon reaching the 2nd level (20% of the lower explosiveness threshold) the signal will be transmitted to the CFRS dispatch and electric wiring without required covers will be shut.

The FSS Processor must define priorities or connections between the detection system and FDS system.

9 FIRE-FIGHTING DOCUMENTATION

Necessity to create documentation will be consulted with the SO/1 department upon assigning the intention. In case of confirmation of the requirement, it will be included into project activities of the PD Processor. Methodical guiding and guarantorship will be provided by the SO/1 department.

10 USING NON-FLAMMABLE INSULATION MATERIALS FOR OBJECT INSULATION

For thermal insulation of object only non-flammable insulation materials may be used – rock-wool based (both for horizontal and vertical constructions).

11 CENTRAL STOP and TOTAL STOP – Powering Off Electricity

Design is always in accordance with ČSN 73 0848. The cable routes are designed so as to ensure safe shutting (disconnection) of the electricity in the building, thereby allowing the efficient and safe intervention of the fire brigade units.

See Annex no. 4 – detailed solution.

ITS 5.05 must also be respected during design.

12 ADDITIONAL REQUIREMENTS

Upon designing roof skylights for ŠKODA AUTO a.s., no skylights, which drip or fall off during fire, may be used.

At ŠKODA AUTO is not allowed to use fire-proof coating and fire-proof paint to protect building elements and constructions. Construction protection must be done by fire-proof plating or other appropriate method proposed by the FSS Designer and consulted with the PPB – Fire Protection Planning department.

All fire safety equipment inspections (incl. fire ladders and dry risers) are organised by the owner of the equipment in question (facility manager or technology manager – see ON 1.050).

Fire protection of machinery and equipment using flammable cutting liquids, gases, vapours or any other compounds created or used in technical equipment (or when such equipment treats products and semi-finished products made of flammable materials) is handled and defined in detail in ITS 2.10 Technology-Integrated Fire Protection.

Safety signs and tables for marking interior hydrant systems, dry risers, fire ladders, portable fire extinguishers, direction of escape, FDS alarm buttons must be in a photo-luminescent design sprayed on an aluminium base.

In construction alterations and new construction intentions for halls, columns (axial system) must be thoroughly marked at least from two sides. Marking with dimensions of min. 40 x 40 cm matching the project documentation, visibly placed with regard to future use of the building (material storage, technology, etc.).

For multi-storey objects, appropriate marking of the floor in question in accordance with FSS must be on every floor (i.e. as defined by the FSS Designer as per ČSN 73 0802).



In case of planned placement (location) of flammable liquids at workplaces, these compounds must be placed outside the work area at specifically designated places – in fire cabinets, flammable liquid storages, etc. If the flammable liquids are stored in fire cabinets, then these cabinets must be designed with fire resistance of 90 minutes and must be ventilated.

Separately placed containers, cells, technology, transformer stations, switchboards, etc. must be equipped with the FDS system.

Electric distributor cabinets must be freely accessible and may not be plated by or installed within flammable materials.

13 TRACTION LI – ION BATTERY

FSS for individual object must be designed with regard to presence of Li-Ion batteries and electro vehicles – see Annex no. 4.

Charging Stations

Charging Stations must always be evaluated in relation to a specific shop floor FSS.

An EPO (Emergency Power Off) button must be installed for all charging stations or charging station groups to create voltage-free condition of a charging station or a charging station group, including the charging station inlet power cable. After pressing the button, a circuit breaker is activated in a distributor, which supplies power to the charging station or group of charging stations in question.

An accessible EPO button installation is its fixed placement to a close construction (ca 5 m) or to the charging stand itself, always in a safe close area of the charging station being powered off. An inaccessible EPO button installation is its placement directly on the charging stations. EPO buttons will be visibly marked as "EMERGENCY CHARGING STATION (GROUP OF CHARGING STATIONS) POWER OFF" (NOUZOVÉ VYPNUTÍ NABÍJECÍCH STANIC (SKUPINY NABÍJECÍCH STANIC)).

Design of charging stations with input of 50 kW and higher, which will be placed in interior, must be always approved by the PPB – Fire Protection Planning and SO/1 departments. Charging station location must be in compliance with the current External Impacts Definition Protocol. These charging stations will be powered off by FDS, permanently monitored by thermal cameras, powered off by the EPO buttons, and other conditions will be met, always based on specific fire safety evaluation of the object.

14 PHOTOVOLTAIC POWER PLANTS

Design and realization of photovoltaic power plants must always be evaluated as a part of a specific FSSS of an object; this is done in compliance with the Methodical Guideline issued by the FRS of the Central Bohemia Region on Photovoltaic Power Plants.

It is necessary to mainly meet conditions for design of roof casing (BroofT3), static load capacity of the object, fire resistance of load-bearing constructions of the object, PPP Power Off, dividing PPP into sections, evaluating distances from the skylights, safe intervention of fire protection units, equipping the object with FDS, etc.

15 LIST OF RECOMMENDED SUPPLIERS

It is listed in the Annex no. 5, which is an integral part of this ITS

If, due to technical reasons, would have to be selected a Supplier who is not on the list, an approval in writing by the PPB – Fire Protection Planning and SO/1 departments is mandatory in the form of approval of an exception as per form ITS 1.03 – approved by the ITS Guarantors.

16 APPROVAL OF EXCEPTIONS

Approval of exception from this ITS is done in accordance with the ITS 1.03.

Annex no. 1: Equipping Objects with FSE

		Press shop	Body shop	Paint shop	Assembly	Foundry	Mechanical production	Assembly of components	Welding	Plastic parts production	Component paint coating	Tool shop	Logistic storages with fire risk /	Petrol stations / fuel storage	Container areas	Parking area for new	Media supply	Administration	Technical centres
1	Automatic ventilation equipment with central control	3	3	2	2	2	3	3	3	2	2	3	2				2	2	2
1	Fire partition construction with min. 90 minutes resistance	2	2	2	2	2		2		2	2	2	2	2			2	2	2
1	Fire shutters (gates, VS, conveyors)	2	2	2	2	2		2		2	2	2	2				2	2	2
1	Fire sections of individual production areas	(3)	(3)	(3)	(3)	(3)		(3)	(3)	(3)	(3)	(3)							(3)
1	Technical electrical rooms with electric fire alarms separated by fire partitions	3/2	3/2	3/2	3/2	3/2	3/2	3/2	3/2	3/2	3/2	3/2	3/2				3/2	3/2	3/2
2	Sprinkler fixed fire extinguishing system	FSS E		1	1		()	1	()	1	(1)	()	1						1
2	Interior hydrant cabinets with fire alarm buttons	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1
2	Fire detection system (FDS)	2	2	3	3	2	2	3	()	3	3	3	3				2	2	3
2	Technological fire extinguishing technology, e.g. Ar (IT centre), CO2, Inergen, pressurized mist devices)			1	()	()	()	()	()	()	()	()					()	()	()
2	Dry risers and roof cabinets with FP material supplies	2	2	2	2	2	2	2	2	2	2	2	2				2	2	2
2	Distributors detected by fire detection system	3	3	3/1	3	3	3	3	3	3	3	3	3	3			3	3	3
3	Portable Fire Extinguishers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1
3	Approval/regulation of private electric appliances by the Plant Protection (Fire Security)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Trash in non-combustible trashcans																		
3	Smoking ban	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Company Fire Rescue Service / ensuring fire protection	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Approval (acceptance) of extinguishing system technology			1	1	1	1	1	1	1	1	1	1				1	1	1
4	Local fire-fighting technology arrival areas and arrival roads	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	Fire-fighting technology and rescue services entrance routes at the shop floors	2	2	2	2	2	2	2	2	2	2	2	2				()		2
4	External supply points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	Emergency and fire/intervention plans (FFD; fire-fighting documentation)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Priorities (3,2,1,()) are valid only for construction adjustment of existing objects

Highlights are valid for newly built objects!!!

(*) This must be ensured for the paint shop including manipulation areas by the elevators (paint

	W/o standard, depends on circumstances
	Group FS requirement, part of the project
1 2 3	Priority
3/2	Priority 3 or 2 (depends on circumstances)
(3)	Possibly

FSSE	Semi-fixed foam extinguishing device in the basement (oil supply)
	Preventive fire protection of buildings
	Preventive fire protection of technology
	Organizational and operating fire protection
	CFRS

Annex no. 2: Switching off electric power supply – CENTRAL STOP and TOTAL STOP

CENTRAL STOP

In case of fire, a central disconnection of electrical devices, function of which is not necessary during fire, in the object and their backup power supply must be available, but at the same time, power supply for fire safety equipment and other equipment, which must stay functional during fire, must be maintained with **two mutually independent sources** (disconnection must be executed in such a manner, that the power supply (power mains) can still power the FSE).

TOTAL STOP

If necessary, disconnection of all equipment in an object or its part, including fire safety equipment and its backup supply, must be available (after activating the TOTAL STOP disconnection, no live HV or LV wiring may remain in the object (UPS disconnection will be done directly at the output)).

CENTRAL STOP and TOTAL STOP devices must stay functional even upon power supply outage and must not activate upon main power supply outage. The device must be protected against unauthorized or unintentional use. Cable trays must comply with functional integrity cable trays requirements.

FSE power supply and power disconnection principles

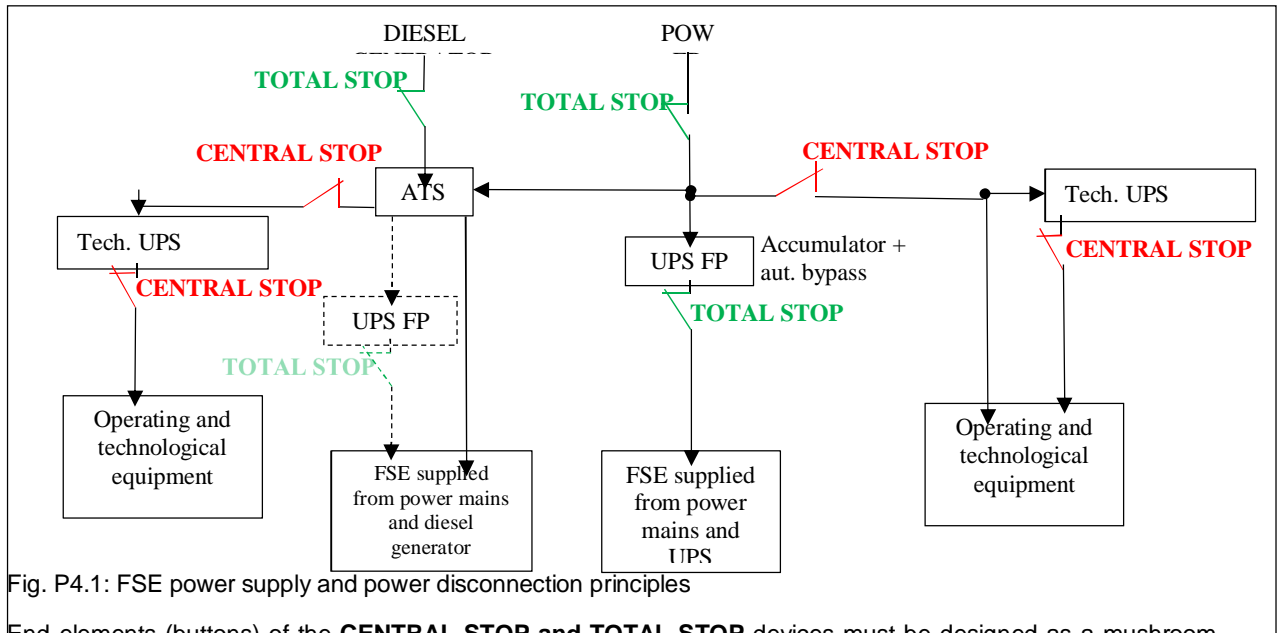


Fig. P4.1: FSE power supply and power disconnection principles

End elements (buttons) of the **CENTRAL STOP and TOTAL STOP** devices must be designed as a mushroom buttons with type lock as per Fig. P4.2 and P4.3 and must be placed separately, or in the key safe or depository, equipped with a key DIRAK 1242E (see also ITS 5.05). Final design and placement of the end elements must be approved by the SO/1 department.



Fig. P4.2: End elements



Fig. P4.3: Key depository

Annex no. 3: List of Recommended Suppliers

PORTABLE FIRE EXTINGUISHERS:

- HASTEX and HASPR s.r.o. Pardubice
- KODRETA MYJAVA s.r.o.,
- KODRETA ŠTEFANOV s.r.o.,
- PYROKONTROL s.r.o. Bratislava,
- TEPOSTOP spol. s.r.o, Přelouč,

FIRE SHUTTERS (not doors)

- JAP – JACINA s.r.o.,
- SCHUPKE s.r.o.,
- STAVOKONSTRUKCE Český Brod a.s.,
- STÖBICH BRANDSCHUTZ s.r.o.,
- ZAPLETAL-KOVO a.s.,

EXTERNAL SUPPLY POINTS:

- HAWLE,
- KRAMMER,
- SCHMIEDING.

Types of above-ground fire hydrants:

HAWLE (Krammer) DUO – model K230



DN 80

DN 100

HAWLE H4 – model 5196 H4 - non-corroding bypass



DN 80 and DN 100

HAWLE H4 – model 5096 H4 cast iron bypass



DN 80 and DN 100

Types of underground fire hydrants:

HAWLE model D 490 – full-flow



DN 80

SCHMIEDING model 393 RD - full-flow



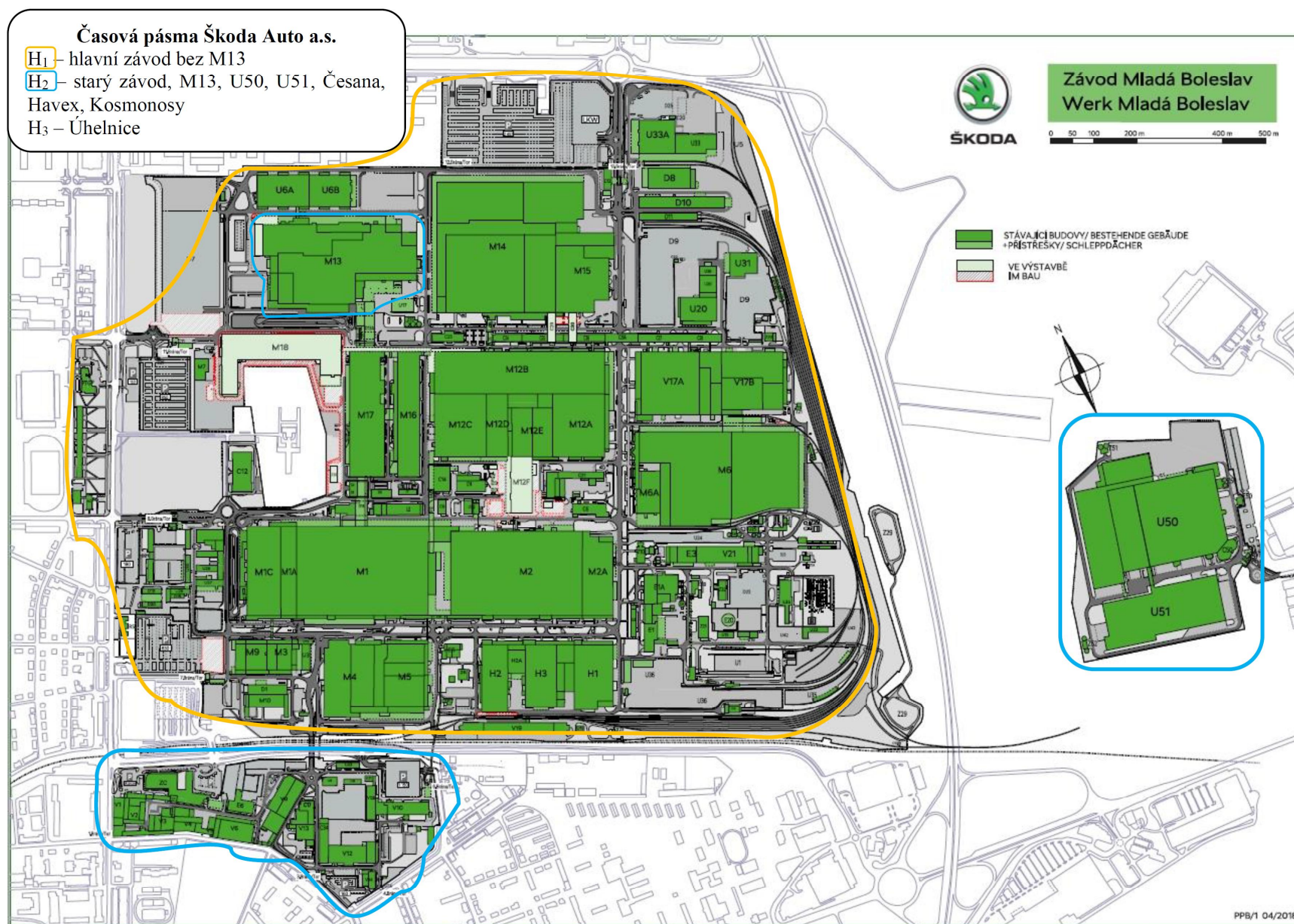
DN 80

Safety Measures for Manipulation of Traction Li-Ion Battery

- Implementation of the measures are an integral condition for basic equipment, design and construction layout of fire safety equipment of buildings, constructions, and fire safety attachments.
- They include a number of parameters, based on which a classification of battery condition is determined after an evaluation including appropriate measures for each condition.
- Monitoring of the temperature during the whole process of battery movement along the plant premises (production, storage, installation into vehicle, development, service and technical centres, quality centres, vehicle operation).
- For battery temperature monitoring mainly thermocameras – these devices will be installed in warehouses, where bigger amount of the batteries is expected (i.e. shop floors M6, M13, K7, Technical Centres):
 - It is always important to ensure information transfer from the thermocameras to the CFRS dispatch
 - Furthermore, it is necessary to verify the request for thermal detection information in the operator's station – e.g. in the form of traffic lights, alarm device, visualisation panels, etc.
- An integral part of these measures is defining qualification prerequisites for work and activities connected to these batteries in the sense of Decree no. 50/1978 Coll. on professional qualifications in electrical engineering.
- It is necessary to handle and define the procedure for identifying condition of the battery and the follow-up security concept process related to the specific shop floor and object already in the design stage. I.e., define:
 - special fire safety means
 - special transport containers
 - emergency containers with fire resistance of 90 minutes and equipped with FDS and semifixed extinguishing device
 - emergency areas equipped with monitoring
- It is necessary to handle and define the procedure for identifying condition of the electro vehicle (or of the battery already installed in the vehicle) and the follow-up security concept process related to the specific shop floor and object already in the design stage. I.e., define:
 - special fire safety means (thermocameras, extinguishing, Cobra)
 - special transport containers
 - emergency areas equipped with monitoring
 - defined procedures for fire-fighting intervention by the corporate CFRS unit.
- Solutions deviating from measures defined always must be discussed with the departments PPB – Fire Protection Planning and SO/1 – ŠKODA AUTO a.s. Company Fire Rescue Service.

Further details will be provided by the appropriate ŠKODA AUTO a.s. departments (PPB a SO/1) as necessary

Annex no. 5: FP Unit Arrival Range Time Zones at Mladá Boleslav



Rychlost 40 km·h⁻¹ H₁ → 1,2 km (2 min - hlavní závod bez M13) H₂ → 7 km (10,5 min – Česana, Kosmonosy, Havex, U50, U51)