TECHNICAL REPORT

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Fire safety engineering — General principles —

Part 2: Example of a dry-cleaning store

Ingénierie de la sécurité incendie — Principes généraux —

Partie 2: Exemple d'application à un pressing

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Foreword

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This document was prepared by Technical Committee ISO/TC 92, *Fire safety,* Subcommittee SC 4, *Fire safety engineering*.

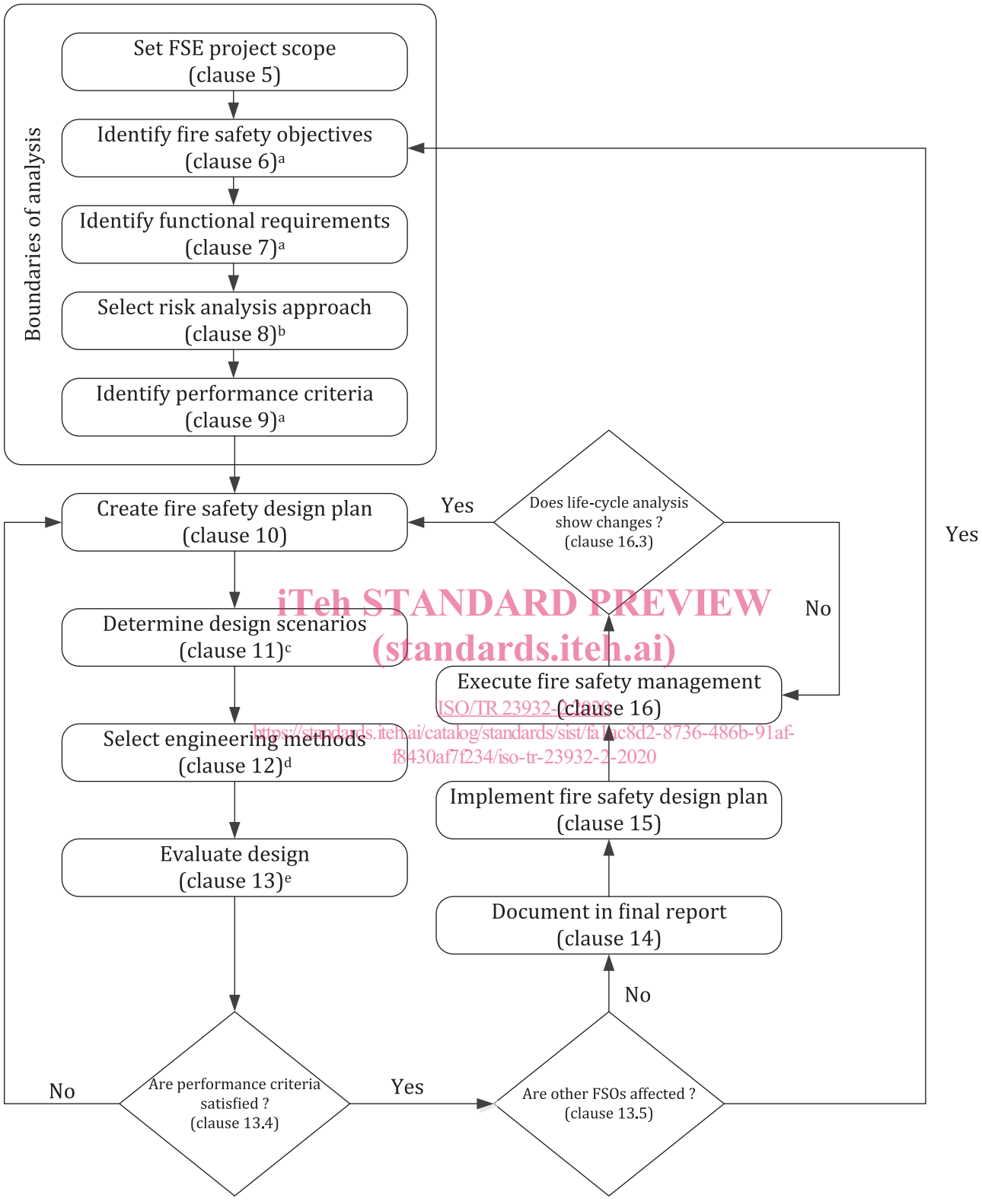
A list of all parts in the ISO 23932 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document gives a complete example to illustrate ISO 23932-1.

The following chart is an outline of the fire safety engineering (FSE) process (design, implementation and maintenance) of a built environment, as described in ISO 23932-1.



Key

a See also ISO/TR 16576 (Examples).

b See also ISO 16732-1, ISO 16733-1, ISO/TS 29761.

c See also ISO 16732-1, ISO 16733-1, ISO/TS 29761.

d See also ISO/TS 13447, ISO 16730-1, ISO/TR 16730-2 to 5 (Examples), ISO 16734, ISO 16735, ISO 16736, ISO 16737, ISO/TR 16738, ISO 24678-6.

e See also ISO/TR 16738, ISO 16733-1.

NOTE Documents linked to large parts of the FSE process: ISO 16732-1, ISO 16733-1, ISO 24679-1, ISO/TS 29761, ISO/TR 16732-2 to 3 (Examples), ISO/TR 24679-2 to 4 and 6 (Examples).

Figure 1 — Flow chart illustrating the fire safety engineering process (design, implementation and maintenance) as per ISO 23932-1:2018, Figure 1

Fire safety engineering — General principles —

Part 2: Example of a dry-cleaning store

1 Scope

This document provides a complete example to illustrate ISO 23932-1.

The example is a dry-cleaning store, for which the fire safety objective is life safety, for both people located inside or outside the shop, in the event of a fire within the shop.

NOTE Generally, an FSE study is not needed for such a small shop. However, this example was chosen to demonstrate the application of ISO 23932-1 in detail while keeping the documentation provided sufficiently brief.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13943, *Fire safety — Vocabulary*

ISO 23932-1, *Fire safety engineering — General principles — Part 1: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943 and ISO 23932-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Objective

The objective of this case study is to demonstrate, by way of an example, how a fire safety engineering (FSE) process (as illustrated in the chart in Figure 1) can be applied to a simple building.

5 Example of FSE process applied to a dry-cleaning store

5.1 Scope of the project concerning FSE process (ISO 23932-1:2018, Clause 5)

The project is the construction of a small shop for dry-cleaning activity.

This dry-cleaning shop is open 6 days a week, between 8 am and 7 pm. The staff consists of 5 people (the manager, three laundry employees, one surface technician).

Its activity involves the usual activities of dry-cleaners, namely:

— receiving clothes (to be washed) at a counter (direct connection in business with customers);

— sorting clothing in packaging containers;

— brushing and stain removal of clothes;

— use of a washing and drying machine (front-opening window);

— ironing clothes;

— handling and packaging of the clothes under cover;

— storing clothes before and after washing;

— receiving and storing products used in dry-cleaning;

— delivery of clothing to the customer.

With the further complementary activities:

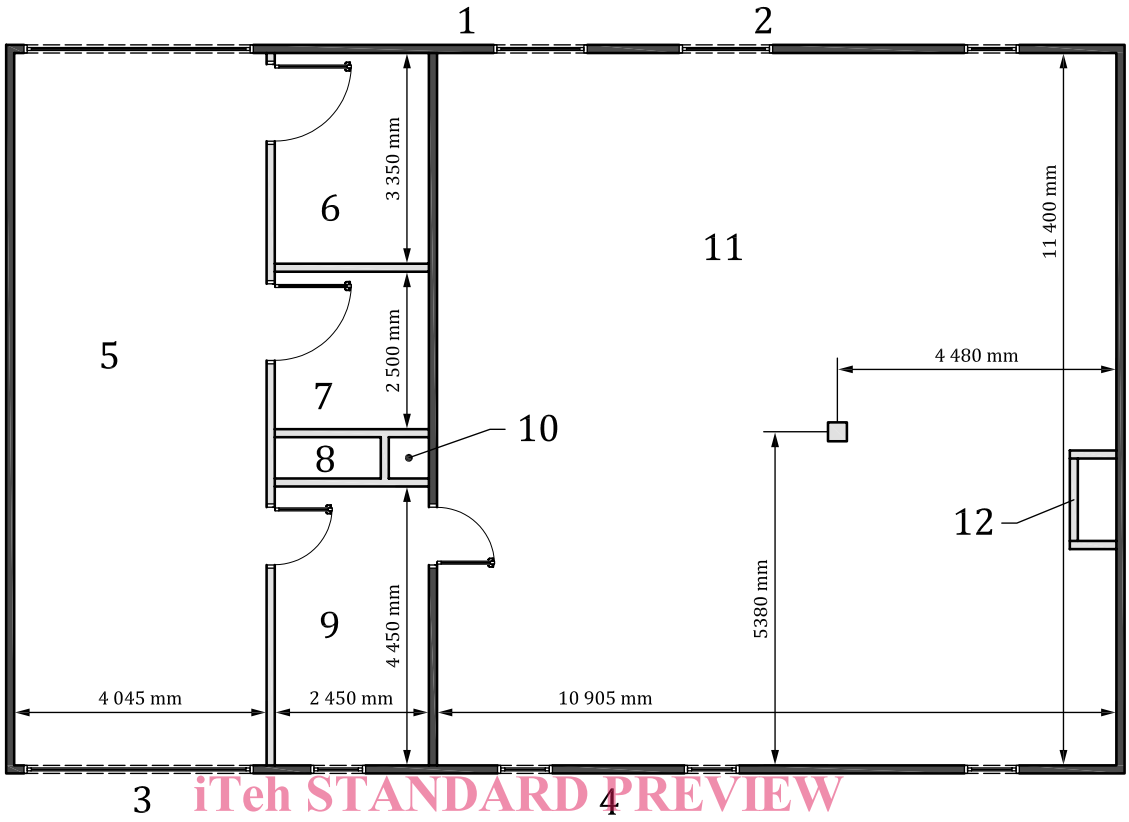
— accounting and administration for a small business;

— cleaning and maintenance of the facility.

The building is an old building consisting of 2 stories, with the north and south facades equipped with windows and overlooking either the street or an interior courtyard. The east and west facades are common with neighbouring buildings. An entry on the west side of the property leads to the stairwell and apartments upstairs. A trash storage room and a bike storage room are adjacent to the shop with shared access from the courtyard (see Figure 2). The building is equipped with a garbage chute accessed from the upper floor.

The courtyard serves as a car park for residents of the building and employees. It is bounded by walls about 2 m high, which separate it from other courtyards of neighbouring buildings.

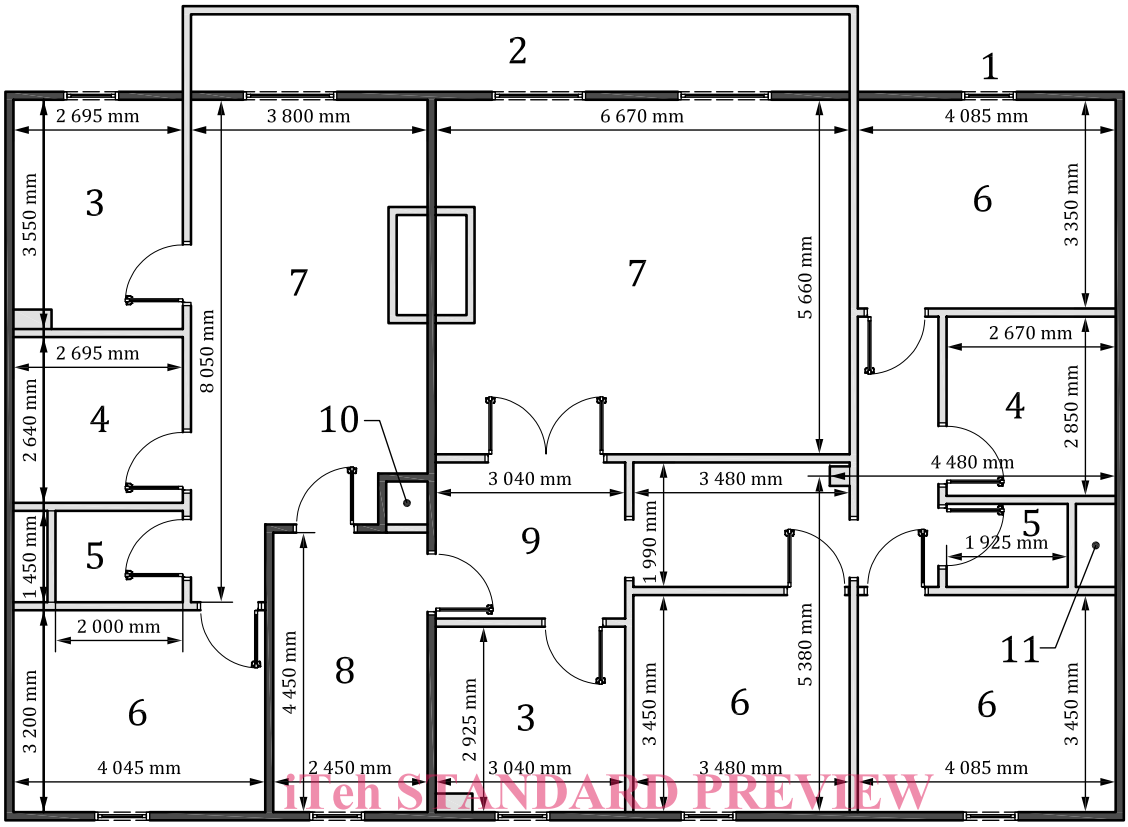
On each floor there are two apartments. One type T2, composed of a bedroom, a living room, a bathroom, a kitchen and a separate toilet. The other type T4 is composed of three bedrooms, a large living room, a kitchen, a bathroom, a toilet, an entrance and a hallway with storage cupboards (see Figure 3). Note the presence of a balcony at the first-floor level overlooking the street. There are five windows per floor and per facade. At the balcony level, there are French windows. Each apartment has a fireplace.



Key

1 street side
2 north facade
3 south facade
4 courtyard side
5 access to the courtyard
6 room for bicycles
7 room for trashcan
8 switchboard
9 staircase
10 garbage chute
11 location of the dry-cleaning shop
12 service shaft

Figure 2 — Ground floor (dry-cleaning shop) plan



Key

1 north facade
2 balcony
3 kitchen
4 bath room
5 restroom
6 bedroom
7 living room
8 staircase
9 entrance
10 garbage chute
11 service shaft

Figure 3 — Upper floor (flats) plan

The building has the following characteristics:

a) floor:

— full reinforced concrete slab 18 cm thick;

b) concrete load-bearing walls 20 cm thick:

— delimiting the outline of the building;

— separating the local trash room and the staircase of the shop;

— separating the two apartments on each floor;

c) internal partitions:

   — solid brick walls 6 cm thick;

d) wood frame windows;

e) solid wood doors.

The property is located in a large city, on the ground floor of a residential building in a one-way street, with parking authorized vehicles on both sides. The environment consists of the following elements, which are assumed to not change in the future:

— east side, the presence of an adjacent residential building composed of two apartments on two floors and a tobacco/press shop on the ground floor. Access to the courtyard for cars separates the establishment from the tobacco/press shop;

— west side, the presence of an adjoining apartment building composed of four apartments over two floors and a neighbourhood grocery store on the ground floor. The staircase leading to the houses of the neighbouring building separates the dry-cleaning shop from the grocery store;

— north side, the presence of a clinic on the other side of the street (vis-à-vis). It is separated by a wall about 2,50 m high overlooking a car park and a garden. The main building is located 20 m away from the street;

— south side, the presence of a courtyard used as car park and gardens of neighbouring buildings.

The shop is located on the ground floor of the building whose construction predates 1986. With a total area of 120 m^2, there are three distinct areas (see Figure 4):

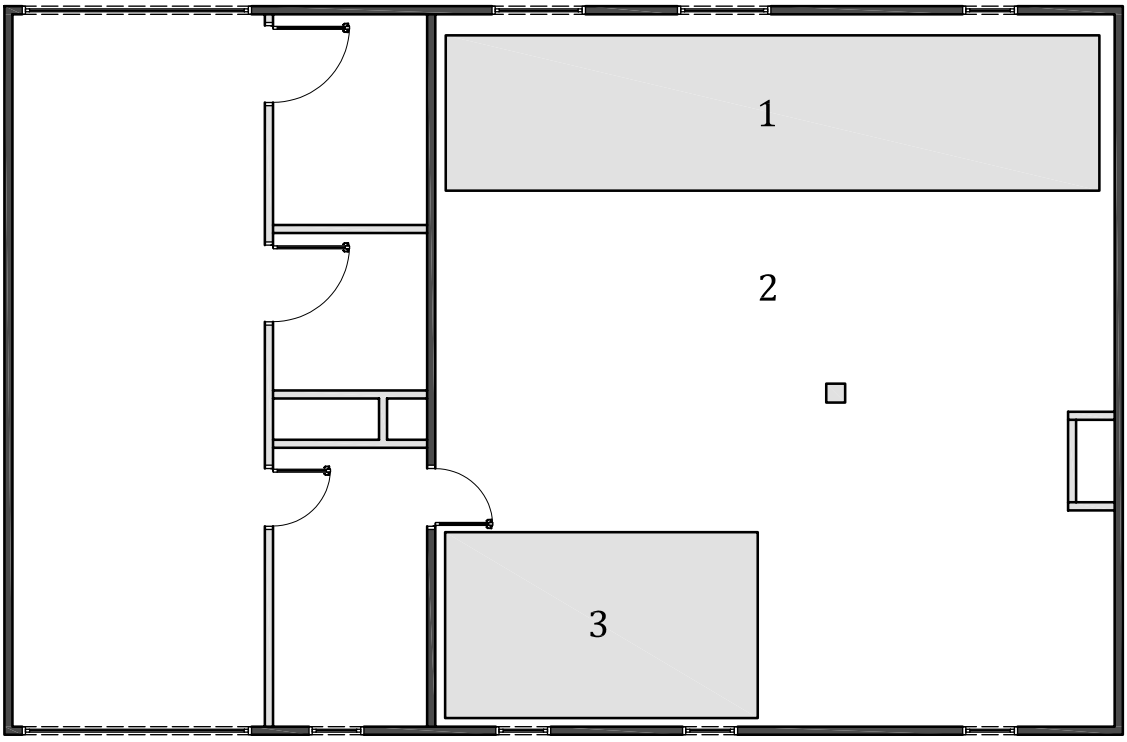
— the "commercial" area where the reception area is located for customers and where products used by the laundry are received;

— the "dry" area itself that covers the main activities (sorting, washing, ironing, storage, etc.);

— the "administrative" area made up of a desk and archive cupboards.

The ceiling height is 2,50 m, for ground dimensions of 11,40 m × 10,90 m. The shop features a glass facade overlooking the street and windows overlooking the internal courtyard to provide light.

A door provides access to the building lobby that serves the non-enclosed stairwell. The electric-meter, gas-meter and water supply-meter of the shop are located in a wall cupboard in the stairwell.



Key

1 commercial area
2 dry-cleaning shop
3 office room

Figure 4 — Three different areas within the shop

It is assumed that the shop is designed to fulfil national regulations and fire safety standards related to the city where the building is located. These regulations are mainly:

— a labour code;

— a decree of 25 June 1980 and of 22 June 1990 approving the general provisions of the safety regulation against the risks of fire and panic in establishments open to the public.

These regulations have the following main objectives:

— the protection of the health and life of the occupants of the establishment;

— the protection of surrounding people;

— the building owner is forced to ensure that the building design minimizes the risk to workers;

— the user is obliged to ensure that the workspaces are arranged so that their use ensures worker safety.

The chemical products used in the activities of dry cleaners contain volatile organic compounds (VOCs), harmful to health. For example, perchlorethylene has been classified R40 (suspected carcinogen). Regulations concerning installation classified for the protection of the environment have made some constructive provisions and mandatory safety measures from a defined threshold of such a hazardous product.

The organization of this project revolves around:

1) the client who will be the future operator. They are responsible for:

   — the choice of voluntary security objectives to complement the "regulatory" objectives;

— the project financing and choices made thereunder;

2) a project management team (design office + architect), which coordinates the various stakeholders' trades. They are responsible for:

— the choice of skills and trades required for the project;

— the budget and integration requirements from the FSE study;

— satisfying the regulatory requirements and the meeting required time-frames;

3) the engineering design office responsible for the FSE study. They are the guarantor of the application of the methodology and have a duty to advise on the different phases of the FSE. They are responsible for:

— the choice of engineering tools to set up and the competence of the users;

— the coherence between the input data and the results given by the FSE study;

— the feasibility of the design solution with respect to the regulatory requirements.

4) the insurer, who can make his/her point of view to the operator on the development strategy of the work safety regarding contractual requirements; and

5) the relevant safety committee, which has to validate the preliminary study report and then the FSE study, leading to the operating license.

To meet fire safety objectives as prescribed in the national regulation and standards, prescriptive requirements are implemented except those in direct relation with the current FSE study which deal with:

— the smoke generation and propagation within the shop;

— the tenability of people;

— and, regarding safety of neighbours:

  — smoke propagation within the stairwell leading to the upper floor of the building;

  — assessing the risk level of fire spread by the facade;

  — fire resistance of the upper floor of the shop.

Regarding protection of environment, there are specific regulatory requirements according a decree of 2 May 2002 on the general requirements applicable to facilities classified for the protection of the environment subject to declaration under heading No. 2345 on the use of solvents for dry-cleaning and treatment of textiles or clothing. These prescriptive requirements are fulfilled.

5.2 Identification of fire safety objectives (ISO 23932-1:2018, Clause 6)

5.2.1 Safety of life

Selected fire safety objectives are the protection of health and life of:

— occupants, namely the employees of the company and the public;

— neighbours;

— fire fighters.

5.2.2 Conservation of property

The property conservation objective regarding the shop is not a selected objective of this document. However, safety of movable and immovable property of third parties is an objective to fulfil.