

# European Guideline



*Fire safety in  
residential  
homes for the  
elderly*

## **FOREWORD**

The European fire protection associations have decided to produce common guidelines in order to achieve similar interpretation in the European countries and to give examples of acceptable solutions, concepts and models. The Confederation of Fire Protection Associations in Europe (CFPA E) has the aim to facilitate and support fire protection work in the European countries.

The market imposes new demands for quality and safety. Today fire protection forms an integral part of a modern strategy for survival and competitiveness.

The guideline is primarily intended for those responsible for safety in companies and organisations. It is also addressed to the rescue services, consultants, safety companies etc so that, in the course of their work, they may be able to help companies and organisations to increase the levels of fire safety.

The proposal of this guideline have been produced by SPEK - The Finnish National Rescue Association and the author is Mr Matti Orrainen.

This guideline was compiled by the Guidelines Commission and has been adopted by all fire protection associations in the Confederation of Fire Protection Associations Europe.

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Stockholm, 12 Mars 2004  
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## Guideline No 6:2004

1	Introduction .....	4
2	Fire risk assessment.....	4
3	The ability to act: It´s importance for to the individual fire safety .....	5
3.1	The dangers of a fire; the standardised fire for assessment purpose.....	5
3.1.1	The dangers of a fire .....	5
3.1.2	Standardised fire used in the fire risk assessment.....	5
3.2	Fire safety measures in action .....	5
3.3	The effect of weakened or limited ability to act on individual fire safety .....	6
3.3.1	Perception .....	6
3.3.2	Understanding the danger .....	7
3.3.3	Mobility .....	7
3.4	Safe means of escape.....	7
3.5	Rescue.....	7
3.5.1	Rescue by preventing conditions from becoming life-threatening .....	8
4	Preparing a fire risk assessment.....	8
4.1	Can the resident leave quickly enough?.....	8
4.2	Can assistance arrive in time? .....	9
4.3	Rescue by preventive measures .....	9
5	Appendix A .....	11
6	Appendix B .....	12
7	References.....	14
8	European guideline .....	14

## **1 Introduction**

The goal in the living arrangements for the elderly, handicapped and other groups with special needs is for people to live at home or in a home-like environment for as long as possible. The more that people who are sick or in poor healths rely on outpatient care, the greater are the fire risks they face. Several sources of international statistics have shown in recent times that elderly people are more at risk from fire than the average population. The risk of death by fire begins to increase at the age of 65, and, depending on the statistics, those over the age of 80 have a 10-to20 times greater risk compared to younger age groups.

Age as such is not a problem but, sooner or later, old age usually reduces the ability to act. With regard to fire safety, the most significant factors are the lessening of the ability to perceive, comprehend and move. As a result, residents or patients can no longer take care of their own safety in case of fire or, for example, escape to safety on their own. Furthermore, a reduction of the ability to act also increases the risk of a fire breaking out. The reason why people move to special accommodation like residential homes is their need for assistance and safety.

Weakening of the ability to act has not been sufficiently taken into account when evaluating fire safety in premises meant for the elderly, or when assessing the activities carried out in such premises and planning appropriate fire safety measures. This shortcoming is the key reason for the significantly reduced safety of the elderly in the event of a fire.

This guide aim to help with the planning, execution and maintenance of fire safety for individuals with weakened ability to act. The guide is aimed at management, building owners, planners, builders, building control officials and rescue authorities.

A related fire risk assessment is a document that describes the fire hazards affecting people with weakened ability to act in the event of a fire, and aids the elimination or reduction of such hazards. It is compiled in addition to the traditional fire safety plan. The plan must be drawn up so that in the event of fire every individual can exit the building on his or her own or be rescued by other means.

## **2 Fire risk assessment**

The fire risk assessment is a document that surveys the fire hazards that might be faced by, in this case, people with weakened act to escape if a fire breaks out.

Buildings for which the fire risk assessment is compiled may serve any purpose. It is important to know if the building has been designed for people who have a weakened ability to act if there is a fire. The risk assessment should be prepared regardless of the number of people using the building or of the size of the building. Often these buildings are care institutions, residential homes for the elderly or similar types of accommodation.

Fire risk assessments are typically prepared for residential and day-care buildings for the elderly and other groups with special needs, for institutions for the insane, group hostels etc., as well as hospitals. The procedure can be applied to the review of fire safety of other buildings, frequented by people with a weakened ability to act; such premises include schools, kindergartens, assembly rooms etc. In the preparation of an assessment, a key task is to evaluate the level of people's ability to act, especially their capacity to perceive, comprehend and move.

### **3 The ability to act: It's importance for to the individual fire safety**

#### **3.1 The dangers of a fire; the standardised fire for assessment purpose**

##### **3.1.1 The dangers of a fire**

A fire should always be regarded as extremely dangerous. People often underestimate this danger because few of us have personal experience of a fire. A fire is dangerous because it almost always surprises its victims by

- developing extremely fast,
- forming large quantities of poisonous smoke that limits visibility or prevents it completely, and
- being extremely hot almost instantaneously, up to 800-1 000 degrees Celsius.

The human body is not capable of coping with the conditions of a fire. Destruction of the pulmonary alveoli begins at 150 degrees Celsius. Smoke vapours are always poisonous or suffocating, and they quickly cause loss of consciousness. (From 60 to 90 per cent of all fire deaths are primarily due to the inhalation of poisonous smoke vapours.) In a fire the conditions are life threatening in a matter of minutes.

##### **3.1.2 Standardised fire used in the fire risk assessment**

The fire risk assessment uses the example of an ordinary residential fire as a basis for planning. In considering the case of an individual resident or patient, the most dangerous situation is a fire that ignites in his or her own room. The development of this kind of a fire is well known from research and practical experience. Under normal circumstances a fire in a living room can develop from flash point to an all-embracing fire in less than six minutes. The effects of smoke vapours and heat become life-threatening in three to four minutes from flash point.

If it has not been noticed before, a fire will be detected when a fire alarm of a smoke detector operates. This applies particularly to night time fires. Given the appropriate type of detector, properly installed, it will operate about a minute after the start of the fire. During that minute, any attempt to rescue the resident or patient is unlikely to have started. The conditions in the room where the fire has started become life-threatening for the resident or patient in 2 to 3 minutes after the fire has been detected.

A fire that has ignited in one room becomes life-threatening for the entire ward, residential home or equivalent in approximately 15 minutes. This means that, according to current regulations, the ward must be divided into individual compartments that can withstand fire for 15 minutes. If some elements of constructions, usually doors or windows, do not fulfil this criterion, the situation can become life-threatening for the entire ward much quicker.

If the ward or equivalent includes a lobby or other communal facilities that contain a fire load, a fire that starts in such an area can tender the conditions in the entire ward life-threatening even faster than 15 minutes. This needs to be taken into account when making any estimate of evacuation time.

#### **3.2 Fire safety measures in action**

Fire safety is a part of the risk management of every enterprise and institution. In care institutions, residential homes and the like, fire safety of the residents and patients is included in the service provided and it is an essential element of the provision. Put another way, "Fire safety is included in the price of the service".

Fire safety of the residents and patients is primarily the responsibility of the management and the owner of the building. This is often not fully realised; instead, it is often thought that fire safety is the responsibility of government and municipal officials. Well-managed fire safety requires that the entire staff from the top down is committed to a properly planned and monitored fire prevention culture.

Fire safety can be divided into two parts: personal safety and property protection. In buildings that are challenging in terms of personal safety, where fire risks arise from the use of the building and the residents' weakened or limited ability to act, **personal safety** is of prime importance.

The maintenance of fire safety is a comprehensive process, a key feature of which is the **prevention of fires**. With effective prevention, the number of fires can be reduced but it is impossible to prevent fires altogether. For this reason, preparations must be made to limit the damage of a fire with preventive measures and actions taken the event of fire. There needs to be a combination of aims, to ensure that individuals are rescued, that the **spread of fire** and **smoke** is contained and that the fire is extinguished as quickly as possible.

The risk of a fire breaking out can be diminished by removing or **reducing sources of ignition** and by using fireproof materials in building structures and furnishings.

Potential fire damage can be addressed in advance with **passive** (permanent) **structural fire safety** solutions, such as using fireproof materials, dividing the building into fire-tight compartments, and providing protected escape routes.

If fire breaks out, its effects can be limited with **active fire safety** solutions (systems which detect the outbreak of fire and operate accordingly) and effective **rescue measures** by staff and the fire service. Active fire safety solutions include automatic fire doors, automatic fire fighting equipment and automatic smoke removal system. Effective rescue measures carried out by the staff and the fire service include (for the staff) practising the evacuation procedure to be followed when the fire alarm sounds, being trained to use portable extinguishers on small fires and (by the fire service) actual fire fighting and rescue activities.

It is vital that staff is trained in the maintenance of fire safety, the prevention of the ignition of fire, the maintenance of both active and passive routines fire safety features, **rescuing** those in danger and **extinguishing** a fire in its early stages.

### **3.3 The effect of weakened or limited ability to act on individual fire safety**

For the fire safety of individuals, important features of the ability to act include the ability to perceive, the ability to comprehend and the ability to move. Reduction of any of these abilities lessens the capacity of the residents or patients to save themselves, warn others, attempt to extinguish the fire. These effects should be taken into account in fire safety planning.

#### **3.3.1 Perception**

It is important for fire safety that individuals are quick to notice when a fire starts. Measures to take action can only start once the alarm is raised. An individual's ability to notice is crucial to independent escape. An individual with a normal ability to perceive (and is awake) notices a fire in his own room primarily on the basis of sight, smell and sound. Nowadays, residents' and patient's rooms always have a fire alarm or a smoke detector linked to an automatic fire alarm, to ensure that a fire is detected and the alarm is raised quickly.

The weakening or absence of an individual's sight or hearing have an effect on the person's fire safety by lengthening the time it takes them to notice a fire. Furthermore, deciding and

taking to action to escape may take longer than necessary if an adequate assessment of the situation cannot be made immediately. Poor eyesight may cause escape to take longer because movement is slowed down.

Some diseases cause a weakening or complete loss of the ability to communicate. This can have effects comparable to the weakening of the ability to act especially when it comes to notifying others of an emergency situation and indicating the need for assistance.

The use of tranquillisers or sedatives weakens individuals' ability to observe. Such medications are most commonly used at night, which is usually the most dangerous time for a fire.

Thus, weakening of a person's powers of perception slows down independent escape. This must be taken into account in calculating evacuation times. The lack of the ability to notice an outbreak of fire may completely prevent independent escape, in which case the fire safety of such individuals cannot be based on the presumption that they can make their own escape.

### **3.3.2 Understanding the danger**

For independent escape, understanding the danger caused by a fire is important. Making a decision to exit and reacting to the situation requires a correct assessment of the situation.

As a result of various illnesses, the most common among the elderly being dementia, an individual's ability to comprehend can be weakened to the extent that making a quick and correct assessment of the situation is unlikely or impossible. In such a case the individual is incapable of making the decision to exit independently even if the opportunities to do so would be straightforward for an able-bodied person. The evacuation of patients with severe and medium-severe dementia usually requires the assistance of others in a fire situation.

### **3.3.3 Mobility**

The ability to move has an effect on evacuation time. The time taken to evacuate includes getting up from a bed or seat, standing up, beginning to move and passing along the actual exit route.

Mobility may be reduced as a result of rheumatic diseases, disabilities or accidents. The person can move independently but in a limited manner, with or without walking aids. Sooner or later, old age usually leads to such weakening of the ability to move. Mobility can also be lost completely.

## **3.4 Safe means of escape**

In case of fire, persons must be able to evacuate a building under their own volitions or they must be rescued through other means. Evacuation means independent exit to a place of safety in threatening circumstances. Rescue means moving people with the partial or complete assistance of other persons.

## **3.5 Rescue**

The successful rescue of residents or patients with the assistance of other persons always requires quick response to the alarm on the part of the rescuers. This, in turn, requires an effective automatic fire alarm system (based on smoke detection) that is connected directly to the staff and the emergency centre of the rescue service. Because all occupants of the room(s) on fire must be rescued within 2 to 3 minutes of the detection of the fire, the rescuers must attend to it immediately. Only the building's own staff can do this. The fire

service cannot get to the scene that quickly. If the fire safety of the residents or patients depends on assistance from others, the staff must assume responsibility for initial rescue measures.

The social and health services for people with a weakened ability to act (supplied by an outside emergency provider) are too slow if the person in question cannot get to safety independently or quickly enough. Because of delays in using emergency telephones and other alarm systems for the disabled and for elderly persons, help cannot reach the scene within the time limit of 2-3 minutes required to achieve safe rescue from fire. That kind of alarm system is appropriate only when the time in which help arrives is proportional to the seriousness of the emergency.

### **3.5.1 Rescue by preventing conditions from becoming life-threatening**

It is not always possible for the staff of fire fighters to rescue all residents or patients quickly enough. It is possible, however, to take steps to prevent conditions from becoming life-threatening as a result of fire. This can be done by equipping the premises with an appropriate, automatic fire-extinguishing system that continuously monitors the premises, quickly detects a fire and operates to extinguish the fire immediately after it has been detected. Furthermore, the system simultaneously sounds the alarm to alert the staff and the fire service. Even if the automatic fire-extinguishing system does not put out a fire completely, it slows down the development of the fire and prevents conditions from becoming life-threatening, thus providing extra time for the rescue of the occupants of the premises.

## **4 Preparing a fire risk assessment**

Those who undertake the preparation of a fire risk assessment need to take into account the reduced ability of elderly and disabled people to react in the event of a fire, compared to fitter and younger folk. They must also understand that assistance may be needed in varying degrees of urgency by such people and that help if fire breaks out is more vital than assistance with meals or personal hygiene.

Thus a fire risk assessment for premises housing elderly or disabled people needs to give due considerations to a reduced ability to act and to the necessary speed of response.

### **4.1 Can the resident leave quickly enough?**

The fire risk assessment first determines whether the resident or patient is able to exit to safety on his own in 2 to 3 minutes. The manager evaluates all residents or patients so that further planning can take into account the number of persons with a weakened ability to act and the extent of their weakening.

If the residents' or patients' ability to act is not weakened and they can exit to safety on their own, this is noted in the conclusion of the fire risk assessment. The information on the residents' or patients' ability to act (used as a basis for planning) is also recorded in the assessment. Fire safety planning is carried out as usual without any further measures required by the fire risk assessment.

If a resident's or patient's ability to act is so low that it prevents his independent exit, this is noted in the fire risk assessment and the individual's chances of being rescued by outside assistance are evaluated.

If the resident's or patient's ability to act is weakened to an extent that it slows down his exit, it is evaluated more carefully whether the individual can exit the premises in 2 to 3 minutes. If

the resident's or patient's ability to act has weakened to an extent that he is not able to exit in 2-3 minutes, it is noted in the fire risk assessment and his chances of being rescued with assistance from others are evaluated.

The most hazardous circumstances for the resident or patient must be chosen as the exit scenario. It most often occurs during the night when people are asleep. The effect of medication on the ability to act must be taken into consideration.

Consideration must be given to the natural but inevitable reductions in the occupants' ability to act as time goes by, linked to possible changes that may be necessary to the building and its facilities. Age-related weakening of the ability to act cannot be ignored in housing and caring for the elderly unless clear and adequate support requirements for the ability to act in an emergency situation are available.

#### **4.2 Can assistance arrive in time?**

If the fire risk assessment shows that there are residents or patients who need help in the event of fire, the next phase of assessment determines whether there are often people who can rescue the resident or patient in 2 to 3 minutes after the smoke detector has activated. If there are several individuals in the apartment or patient room, they must all be rescued in the specified time frame.

In practice, only the staff in a residential home or hospital ward can come to the rescue in time. There is also an analysis of whether staff together with the fire service can rescue the remaining residents or patients from the same compartment or equivalent in less than 15 minutes. If structural fire protection does not include sectioning the building into fire compartments that can each withstand fire for at least 15 minutes, evacuation time needs to be shorter. Residents of a building constructed like a block of flats must be evacuated in less than 30 or 60 minutes.

If staff can rescue residents or patients quickly enough from a burning room or apartment, and staff together with fire fighters can rescue the remaining patients in the ward or other residents in a building, this is noted in the conclusion of the fire risk assessment. Information on the number of staff during critical hours, their preparedness to act, the readiness and ability of the fire brigade to get to the site, the fire detection, alarm and notification systems and other necessary information used as a basis for planning, is recorded in the fire risk assessment. It must to be complied with at all times in the future and must be kept up to date with changes in circumstances at the premises.

#### **4.3 Rescue by preventive measures**

If the assessment shows that the resident or patient is not able to exit the apartment or treatment room quickly enough and that rescue by others in time is not possible, conditions must be prevented from becoming life-threatening by fitting a system to contain the spread of fire. This is possible with an appropriate automatic fire-extinguishing system. See, for example, *Sprinkler systems: planning and installation* (CEA 4001: 2000-04 Annex F). If the staffs do not have time to rescue a resident or patient, they will not have time to extinguish the fire with portable extinguishers.

Once fire has broken out, the staff has up to 15 minutes to rescue all occupants of the ward, apartment or equivalent unit. In a building that is divided into to apartments, such as residential homes, the occupants of neighbouring apartments must be rescued in from 30 to 60 minutes, depending on the building's structure. If all occupants cannot be rescued in the relevant time, steps must be taken to effect improvements. This can be done with appropriate automatic fire-extinguishing apparatus, which should be installed in the building if

any of its circumstances requires it. This provision needs to be recorded in the conclusion of the fire risk assessment.

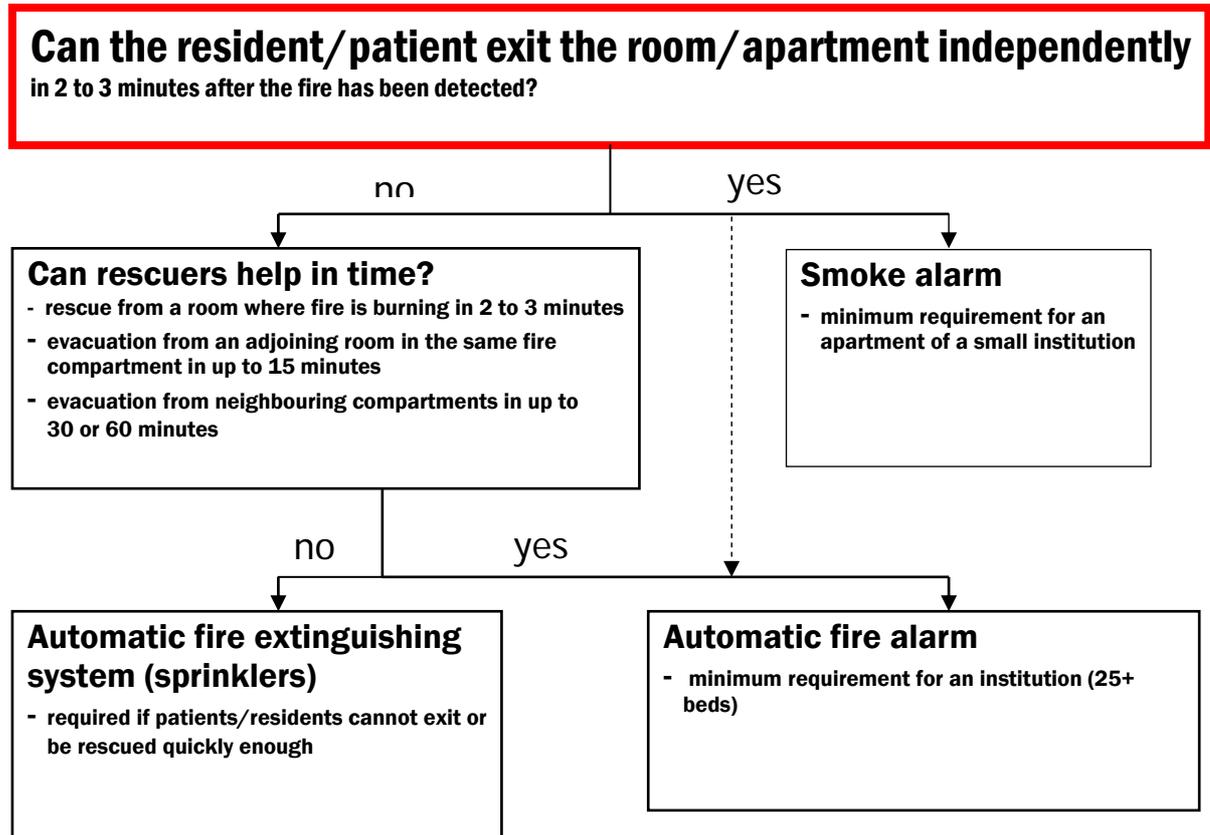
A residential sprinkler system aims to prevent general fire in the room which is the site of the fire. It also improves residents' or patients' chances of evacuation or rescue. This kind of sprinkler system is not required to protect property in the way that a fully engineered sprinkler system would.

Even though the fire safety of individuals is addressed principally by being prepared to extinguish fire in a premise in its early stages with automatic fire-extinguishing apparatus, all other fire safety arrangements must be as effective as possible, considering the circumstances.

Even an efficient system of fire protection (active and passive measures combined) does not decrease the importance of fire prevention. Preventing the outbreak of fire is always the primary goal. The maintenance of passive and active fire protection and concurrent require of fire prevention practice are necessary requirement of good fire safety.

Rescuing individuals as quickly as possible from a burning apartment or room is always important. Because conditions in a room or apartment with a sprinkler system should not become life-threatening, more time is available and time is therefore not such a critical factor. The conditions in such a room or apartment will nevertheless harmful to human beings because of their combination of smoke, soot and water. For this reason individuals must still be rescued as quickly as possible. Overall property damage is also smaller the sooner rescue activity is commenced.

## Choosing a level of fire safety on basis of fire risk assessment



## 6 Appendix B

<b>FIRE RISK ASSESSMENT</b>	
<b>Starting information</b>	
<b>Name of premises</b>	
<b>Address of premises</b>	
<b>Other contact information</b>	
<b>Basic information on the building</b>	
<b>Structural information (building's fire class, compartmentalisation, sectioning structures etc.)</b>	
<b>Description of protection level</b>	
<b>Number of staff and their level of preparedness</b>	
<b>Number of residents/patients and a general description of their ability to act</b>	
<b>1. EVALUATION OF THE EFFECT OF OCCUPANTS' ABILITY TO ACT ON INDEPENDENT EXIT</b>	
(a) all occupants can independently exit the apartment or patient room in 2 to 3 minutes	<input type="checkbox"/> move to item 6
(b) weakening of the ability to act slows down the exit of at least one occupant	<input type="checkbox"/> move to item 2
(c) weakening of the ability to act prevents the independent exit of at least one occupant	<input type="checkbox"/> move to item 3
<b>2. TO WHAT EXTENT DOES THE WEAKENING OF THE ABILITY TO ACT SLOW DOWN EXIT?</b>	
(a) all occupants can independently exit the apartment or patient room in 2 to 3 minutes	<input type="checkbox"/> move to item 6
(b) weakening of the ability to act slows down the exit of at least one occupant	<input type="checkbox"/> move to item 3
<b>3. CAN THE STAFF RESCUE THE OCCUPANTS OF A BURNING APARTMENT OR PATIENT ROOM IN TIME?</b>	

(a) staff can rescue all occupants in need of assistance from an ignited apartment or patient room in 2 to 3 minutes	<input type="checkbox"/> move to item 4
(b) staff cannot rescue all occupants in need of assistance from an ignited apartment or patient room in 2 to 3 minutes	<input type="checkbox"/> move to item 5
<b>FIRE RISK ASSESSMENT</b>	
<b>4. CAN THE STAFF AND THE FIRE BRIGADE ACT QUICKLY ENOUGH TO SAVE ALL OCCUPANTS OF THE WARD OR EQUIVALENT OR OF THE BUILDING WHO NEED ASSISTANCE?</b>	
(a) the staff and the fire brigade can rescue quickly enough from the building all occupants in need of assistance	<input type="checkbox"/> move to item 6
(b) the staff and the fire brigade cannot rescue quickly enough from the building all occupants in need of assistance	<input type="checkbox"/> move to item 5
<b>5. CONDITIONS ARE PREVENTED FROM BECOMING LIFE-THREATENING BY INSTALLING AN AUTOMATIC FIRE EXTINGUISHING SYSTEM IN THE PREMISES!</b>	
Carried out in accordance with items 2.5.1 and 3.3 of the guide.	<input type="checkbox"/> move to item 6
<b>6. ON THE BASIS OF FIRE RISK ASSESSMENT, THE BUILDING'S LEVEL OF FIRE SAFETY IS ADEQUATE!</b>	
It is necessary that the following requirements concerning fire prevention and maintenance of fire safety are followed	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>• A safety plan has been made and communicated to the staff</li> <li>• Staff has received building-specific safety training before the commencement of activities. Training will be held for the entire staff later in accordance with the training programme of the safety plan.</li> <li>• Staff is capable of rescue (the entire staff will participate in a rescue drill before the commencement of operations and after that at least once a year).</li> <li>• Staff is capable of first-aid extinguishing (the entire staff participates in a first-aid extinguishing drill before the commencement of operations and after that at least once a year).</li> <li>• Before the commencement of operations a full-scale fire drill will be carried out to check the functioning of safety arrangements. The drill will be carried out in accordance with the information acquired in the fire risk assessment.</li> <li>• Preconditions for ignition have been removed as far as possible.</li> <li>• A maintenance programme has been set up for all fire technical equipment (automatic fire extinguishing equipment, automatic fire detector, fire alarms and fire alarm system, safety and instruction signs, smoke removal, automatic fire doors, first-aid extinguishers etc.), the program is followed and procedures are documented. The maintenance programme are added to the instructions for the use and maintenance of the building.</li> <li>• Internal fire safety control has been organised.</li> </ul>	
<b>Date/Signature of main planning representative:</b>	<b>Date/Signature of management representative:</b>

## 7 References

Fire safety in residential homes for the elderly, The Finnish National Rescue Association, Guide 18, 2002, Author Seppo Männikkö

## 8 European guideline

- Guideline No 1:2002 - Internal fire protection control
- Guideline No 2:2007 - Panic & emergency exit devices
- Guideline No 3:2003 - Certification of thermographers
- Guideline No 4:2003 - Introduction to qualitative fire risk assessment
- Guideline No 5:2003 - Guidance signs, emergency lighting and general lighting
- Guideline No 6:2004 - Fire safety in residential homes for the elderly
- Guideline No 7:2005 - Safety distance between waste containers and buildings
- Guideline No 8:2004 - Preventing arson – information to young people
- Guideline No 9:2005 - Fire safety in restaurants
- Guideline No 10:2007 - Smoke alarms in the home
- Guideline No 11:2005 - Number of fire protection trained staff
- Guideline No 12:2006 - Fire safety basics for hot work operatives
- Guideline No 13:2006 - Fire protection documentation
- Guideline No 14:2007 - Fire protection in information technology facilities
- Guideline No 15:2007 - Fire safety in guest harbours and marinas