Study of Safety Requirements for Open Stoves or Fireplaces Using Alcohol Fuels

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Study of Safety Requirements for Open Stoves or Fireplaces Using Ethanol

Summary

This paper presents the results of a study of safety requirements for fireplaces that burn alcohol and primarily serves decorative purposes. They can be free-standing or hung on a wall. Their thermal power is limited so they do not have to be connected to a flue. Such fireplaces are often sold under names like “bio fireplace” or “alcohol-powered fireplace”.

Alcohol-powered fireplaces are seen to present an emerging safety issue; they have become increasingly popular in a number of European countries in the recent years and a number of severe accidents have been reported due to problems with stability and accessibility. The fireplaces are also expected to cause health problems because of the emissions from the combustion.

The study was set up following a discussion in the GPSD Committee. The purpose of the study was to make a proposal that addresses the risks associated with such fireplaces. Denmark led the work. France, Germany, Norway and Sweden participated. Furthermore contributions have been collected from Finland. The information collected comprises results from previous national investigations, reports from market surveillance activities and national safety requirements. The study was carried out in the period from June 2009 to June 2010.

The study recognises three major risks associated with alcohol-powered fireplaces:

- The risk of fires because flammable material gets in touch with the flame or hot parts of the appliance.
- The risk of burns, e.g. because the appliance ignites nearby material, the user gets in contact with hot parts or the appliance falls over while it is ignited.
- The risk of intoxication because of gasses (carbon monoxide, nitrogen oxides and volatile organic components) that are produced by the burning flame.

Tests from Norway and France show that the safety level of existing fireplaces on the market seems to be inadequate. The tested fireplaces got very hot during use, the user could easily access hot surfaces and the emission of dangerous gasses exceeded internationally acknowledged levels.

The working group has examined safety requirements and test methods from Finland, France, Germany and Sweden and has included additional safety requirements to mend shortcomings that were found to be in the existing standards. The result is annexed to this report. It includes construction and design requirements, provisions for maximum emission, marking requirements and requirements for the user instructions.

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1 Introduction

This paper presents the results of a study of the safety in alcohol-powered fireplaces. They are fireplaces that burn ethanol and primarily serve decorative purposes. The fireplaces can be designed as free-standing or to be hung on a wall. The fireplace is not required to be connected to a flue because the output power is limited.

Such fireplaces have become increasingly popular in the recent years and simultaneously a number of severe accidents have been recorded. Therefore such appliances are seen to present an emerging safety issue.

The study is initiated by the GPSD Committee and is undertaken by representatives from governmental product safety bodies in Denmark, France, Germany, Norway and Sweden.

2 Project description

2.1 Background

The study has been set up following the discussion in the meeting of the GPSD Committee in Brussels 15 June 2009. At this meeting Denmark requested a discussion on open fireplaces using ethanol as this was seen to present an emerging safety issue. The product is becoming increasingly

popular in Europe and there have been several incidents reported of fire and burns caused by these stoves due to problems with stability and accessibility. Health problems have also been signalled by consumers due to the fumes.

At present, no harmonised European standards cover the product so Denmark proposed to make a first draft proposal for a standardisation mandate. The product does not seem to be covered by any sectoral directives so it seemed natural to develop a standard to be listed under the General Product Safety Directive. Many Member States stated their support for a mandate at the meeting and it was decided to set up a study to make an overview of products on the EU market and a proposal to address the risks associated with these products. Denmark agreed to lead this work.

2.2 Purpose

The purpose of the study is to:

- Make an overview of the market situation and the types of alcohol-powered fireplaces on the EU market.
- Make a proposal to address the risks associated with alcohol-powered fireplaces.

The objective of the study is to produce a proposal for standardised test methods.

2.3 Method

The study falls in the following phases:

- Interested Member States are invited to send relevant information, e.g. results from national investigations, reports from market surveillance activities, national safety requirements, to the Danish Safety Technology Authority.
- The Danish Safety Technology Authority analyses the information and compiles an overview that includes a first draft overview of safety requirements.
- The interested participants meet to comment the above overview.
- The document is finalised and forwarded to the GPSD Committee.
- The document is presented and discussed in the GPSD Committee.

2.4 Timeline

The study follows the below timeline:

15 June 2009	Meeting in the GPSD Committee. Denmark is asked to conduct the study on ethanol-fired fireplaces.
August – September 2009	The Danish Safety Technology Authority collects information

	from the members of the GPSD Committee.
September – November 2009	The first draft report is produced.
19 January 2010	The participants meet to comment the draft report.
March - April 2009	Finalisation of the report.
June 2010	Presentation of the findings for the GPSD Committee.

2.5 Participants

Denmark, Finland, France, Germany, Norway and Sweden participated in the study. Denmark coordinated the project, and Torben Rahbek, an independent consultant, supported the work.

3 Overview of the EU-market for alcohol-powered fireplaces

The alcohol-powered fireplace appears to have been known on the European market for 10 – 15 years but sales have increased markedly since the mid 00's. (One indicator is that such appliances must be certified to go on the Swedish market. The Swedish Test Institute, SP, has only issued such certificates since 2007.)

The products have become popular quickly and the Norwegian authorities estimate the total sales in the Nordic countries to be around 30 – 40,000 units annually. One reason for their popularity is that they are easily installed because they do not require a chimney. Therefore they are often purchased and installed by the end-user.

The size of these fireplaces ranges from small units designed to stand on a table to large wall-mounted fireplaces. In between you find free-standing units to stand on the floor. The fireplaces are intended for decoration even though the larger models contribute significantly to the heating of the room with an output in the range of 3 – 5 kW.

The prices range from 100 to 2,000 EUR.

France has experienced an interesting development. After a number of accidents that raised a lot of attention from the media, the authorities issued a safety standard in 2009. The standard limits the size of the fuel container to only 2,25 litres and it requires that the fireplaces must be able to perform an "emergency shutdown" if the fireplace falls over or if the concentration of CO_2 in the room exceeds a certain level. This has meant that many alcohol-powered fireplaces on the French market today are equipped with a "smart card" unit that includes measurement of tilt angle, CO_2 contents, temperature and operating time and other properties. The most dangerous of the simpler units where the ethanol literally is poured into a cup and burned, have disappeared from the market apart from the smallest units with a total fuel volume blow 0.25 litres. The price of the large units is in the area of 750 - 2,000 EUR.

4 Accident data

The participants have made a survey of accidents in their countries to make a picture of the number of accidents and the nature of the injuries.

Denmark

Denmark has recorded 11 accidents:

- one accident caused by the user refilling a hot fireplace;
- three accidents caused by spillage into the appliance;
- one accident caused by a user that bumped into a free-standing fireplace that fell over;
- one case where flammable material inside the fireplace behind decorative shields caught fire;
- one accident caused by a fireplace falling from a wall.

Plus 4 accidents where the cause of fire had not been found before the study was finished.

France

France has experienced a number of accidents where consumers got burns on their hands.

They also expect that fires caused by alcohol-powered fireplaces are largely underreported, because fire-fighters are not trained in searching for fires with ethanol as source. Therefore it is expected that the number of such fires showing in the statistics is too low.

Germany

The German authorities do not have a complete picture of the situation in the whole country, but the authorities in Bavaria know of five accidents caused by users refilling the fireplace while the burner is still hot. Furthermore the authorities in Lower Saxony have reported an accident caused by spillage of ethanol. The fuel ended up in a closed compartment in the fireplace where it evaporated and caused deflagration, when the consumer tried to ignite the burner.

Norway

DSB in Norway have notifications of 3 accidents:

- a table-top model was refilled while it was still hot;
- a wall-mounted unit where heat was transmitted via the screws on a wall-mounted fireplace into flammable building structures behind the fireplace;
- a wall-mounted fireplace was refilled while it was hot so the fuel caught fire and burning ethanol spread over the floor.

Sweden

In Sweden they have recorded 3 – 4 accidents annually in the 3 latest years. The most common accidents are

- wall-mounted units that come loose and fall down;

- users that pour fuel in a hot fireplace;
- use of improper fuel (wood, bio gasoline E85)

The overview is not complete, but it shows that the most common accidents are related to users refilling hot appliances, where the fuel self-ignites spontaneously and burns the user or causes property damage, and accidents related to wall-mounted fireplaces that fall down from the wall and burn nearby users or property. Spilling of fuel is also a common accident, when the fuel gets into closed compartments in the fireplace where it evaporates and causes explosions or deflagration when the fireplace is ignited or when it get hot enough.

5 National studies on risk and safety requirements – an overview

5.1 Overview of studies

The project group has come across two studies from Norway (2009 – 2010) and from France (2008).

Norway started its project in co-operation with the laboratory at SINTEF in 2009 [1]. The study fell in three phases. The purpose of the first phase was to gather knowledge on fireplaces on the Norwegian market, on fire statistics and on the legislative frameworks in Norway, Sweden and Denmark. The second phase comprised testing of 4 fireplaces as well as examination of the user's guides and the technical files. The third phase included the drafting of a final report including proposal for test criteria. The final report was published early 2010.

The French authorities carried out a thorough study of alcohol-powered appliances [2] in 2008. This includes a study of the construction of fireplaces, the chemical composition of the fuel, the market, the risks and the regulatory framework and the technical standards. The French study also comprised tests of 4 fireplaces. The study was concluded with a recommendation on the safety of alcohol-powered appliances. In summer 2009, the recommendation was followed-up by a French standard, NF D 35-386 [7].

5.2 Risks associated with open fireplaces

The studies show that the risks associated with alcohol-powered fireplaces mainly are three:

- The risk of fire because flammable material gets in touch with the flame or parts of the fireplace with too high temperatures.
- The risk of burns, e.g. because the appliance ignites nearby material, the user gets in contact with flames or the appliance falls over while ignited.
- The risk of intoxication because of gasses that are produced by the burning flame.

The risks of burn can be developed in to a number of injury scenarios that can be linked to product hazards or hazards caused by improper use or installation, table 1. (The table is based on a similar table in the French study [2] as well as descriptions of accidents in Denmark and Norway.)

Injury, damage	**Product hazard**	**Hazard caused by improper installation or operation**
The user or nearby material gets in contact with the flame	The fireplace has no flame screen or the flame screen has openings on several sides	The fireplace is installed in a draughty environment
The flame is unstable, flares or produces small explosions (deflagration)	Ethanol vapours can concentrate inside the fireplace	The user ignites a hot fireplace
Fuel leak out of the tank and catches fire	Corrosion, faulty sealing, insufficient mechanical strength of fuel system and tank	
Spilt fuel accumulates in internal parts of the fireplace and explodes	Leaks in the fuel chamber, fuel system or burning chamber Closed, unventilated compartments outside the fuel system where fuel can accumulate.	The user fills the fireplace from a container that is not suited for this purpose
The user is burned because ethanol catches fire when the fireplace is fuelled (backfire)	Improper closure mechanism to ethanol tank Lack of anti-spill system	The user pours fuel directly into the burning chamber of a hot fireplace The user fills the fireplace from a container that is not suited for this purpose
The fireplace reignites unexpectedly (e.g. when the user attempt to extinguish the fireplace or after a spontaneous flameout)	The user has no indication of the temperature in the burner. Improper closing mechanism to the burning chamber Hot (glowing) components inside the burner	The user does not switch of the fireplace completely or reopens the burning chamber immediately after extinguishing the fireplace
The user or nearby material touches hot parts of the appliance (burner, body, fire screen)	Accessible surfaces get too hot during use	Requirements for safety distances are not observed
Hot emissions ignite materials	No heat regulation device	Requirements for safety distances and material in the vicinity of the fireplace are not observed

Injury, damage	Product hazard	Hazard caused by improper installation or operation
The back of the fireplace gets so hot that radiated heat ignites the wall behind the fireplace	Outer surfaces of the fireplace gets too hot during use	Installation requirements and requirements for material in the vicinity of the fireplace are not observed
Heat is transmitted via screws or mounting fittings to building structures	Mounting system gets too hot during use	Requirements for material where the fireplace is mounted are not observed
The external fuel storage tank ignites and the user or nearby material catches fire		The external fuel storage violates the safety requirements (e.g. distance to fireplace, properties of storage tank)
A hanging fireplace loosens and falls down, people get hurt or burned	Mounting system has insufficient mechanical and thermal strength	Installation requirements are not observed
A free-standing fireplace overturns and people get hurt or burned	Poor stability of the appliance	Requirements for safety distances are not observed
The user employs a wrong fuel that causes unexpected burning behaviour, e.g. soothing or violent burning		Instructions for use of fuel are not observed
Untrained person ignites the fireplace	The fireplace has no lock system (child-resistant ignition system)	Improper storage of fuel and lighting accessories

Table 1 Likely injury scenarios linked to hazards.

Regarding the risks related to intoxication this is also explored in detail in [2]. The risks originate from three major emissions:

- Emission of carbon dioxide and carbon monoxide (CO_2 and CO)
  The French study concludes that the emission of carbon dioxide does not pose a risk that is different from other combustibles used in households (e.g. bottled gas or petroleum). The emission per kW output is a little lower for ethanol.
  A safety problem may arise if the combustion is “incomplete” because it will then produce carbon monoxide which is poisonous. This happens if the fireplace burns in a small room or a room with insufficient ventilation. It may also happen if the burner geometry or the operations of the fireplace causes the flame temperature to be too low.

- Emission of nitrogen oxides (NO_X)
  The French study notes that the fuel system in an alcohol-powered fireplace does not regulate the fuel flow. This means that the fireplaces may produce high emissions of nitrogen oxides if the flame temperature is too high and there is plenty of oxygen. Nitrogen oxides are irritating gases that can cause respiratory problems to sensitive people and tend to increase bronchial sensitivity to infections in children.
  Production of nitrogen oxides are caused by certain burner geometries or insulated burners (that reach high flame temperatures while burning) and burners that operate in a highly ventilated environment. Furthermore the contents of nitrogen in the fuel (primarily in additives) influence the emissions of NO_X.

- Emission of volatile organic compounds (VOC)
  Volatile organic compounds may cause eye or skin irritation and allergies. Some compounds are reported to be carcinogenic. They are mainly produced from fuel of poor quality or fuel with additives that can produce volatile organic compounds. They can also be emitted from components in the fireplace or nearby when they are heated because the fireplace is ignited.
  The risk related to VOC is however still poorly understood and no officially agreed threshold values exist for the moment.

The Swedish experience is that the emission of CO may be a fairly good indicator for the quality of the combustion. Furthermore this emission is reasonably simple to measure.

5.3 Tests of open fireplaces

The Norwegian study [1] and the French study [2] both comprised testing of 4 fireplaces.

The Norwegian laboratory measured the temperatures on several spots on the tested fireplace and in its surroundings. The highest temperature was measured on the side of the fuel container (which is also the burning chamber for this construction). It reached a temperature of 255 degrees C during the test. The test lasted 3½ hours.

The French tests comprised 4 fireplaces of different designs. One was designed to be hung on a wall, the others were stand-alone units. The investigation comprised the following tests:

- Test for re-ignition
  The test was carried out in the way that the fireplace was fuelled and ignited. It was allowed to burn out and then fuelled again while hot. The fireplace was then re-ignited while hot.
  Two of the four fireplaces produced dangerous flames during the re-ignition as the hot burner has lead to increased evaporation of ethanol. The re-ignition was not done on a third of the

fireplaces as the laboratory judged this to be too dangerous because it had produced dangerous flames even when ignited cold.

- Measurement of surface temperatures
  Temperatures were measured on the front, side and to of the body of the fireplace and on the burner.
  The report notes that the bodies of several fireplaces are kept to a bare minimum for aesthetic reasons. This makes it difficult or even impossible to measure the temperatures. On the other hand it means that the user can easier touch the burner and the flame shield.
  The result is that the temperatures on the burner reach 260 degrees C and 358 degrees C for two of the fireplaces. The temperatures were not measured at the two other fireplaces as the burner was covered by decorative shingles. The report notes that the shingles could be removed so the user could get in touch with the burner.

- Measurements of emissions of carbon monoxide
  The laboratory measured the emission of carbon monoxide from the fireplaces in a normally ventilated room. Three of the four fireplaces exceed the threshold values laid down by WHO. The excesses would trigger symptoms of intoxication like headaches, nausea and dizziness.
  The report also notes that a CO_2 detector would have shut off all four fireplaces before their tanks were emptied.

- Measurements of emissions of nitrogen oxides
  All four fireplaces exceed the threshold values laid down by WHO. The excess is from 7 to 30 times higher than allowed and it occurs within the first hour of operation.

- Measurements of emissions of volatile organic compounds
  The laboratory measures the emission of aldehydes as they are the ones that are most commonly found in households and they are the most harmful ones. The measurements are compared to threshold values for formaldehyde laid down by WHO. (This is the only aldehyde where WHO has issued recommendations.)
  The tests show that the recommended maximum concentrations are exceeded after 30 – 60 minutes burning time for all four fireplaces.

5.4 Safety requirements

Six countries have contributed to this part of the study, Denmark, Finland, France, Germany, Norway and Sweden.

Denmark has indicated that they use the Swedish safety requirements to assess the safety of alcohol-powered fireplaces on their market. The safety requirements are put on the website of the

Danish Technology Safety Authority. They give instructions for installation and use of the fireplace as well as instructions for choice and handling of fuel. The also advise what information must be provided to the consumer to ensure that he can use the fireplace safely.

Norway has recently decided that wall-mounted fireplaces are to be considered as construction products and governed by the Norwegian Planning and Building Act. Free-standing fireplaces including small “lamps” are governed by the General Product Safety Act. The safety requirements are taken from the Swedish test method [5] until a harmonised European standard has been developed.

The Finnish safety requirements are put on the website of the Finish Safety Technology Authority, TUKES [3]. They give instructions for installation and use, instructions for choice and handling of fuel. The also advise what information must be provided to the consumers to ensure that the consumer can use the fireplace safely. The requirements do not describe detailed test criteria or threshold values.

Safety of such fireplaces in Sweden is covered by the Swedish certification standard 034 from SP SITAC [4]. It references the national Swedish test method SP-Metod 4160 [5]. This regulation lays down requirements for construction material, stability, fuel container, maximum power, flame adjustment, insensitiveness to draught, carbon monoxide emissions, surface temperatures, user’s guide and marking. The documents give detailed test criteria and threshold values. Alcohol-powered fireplaces must be certified according to the Swedish legislation to be marketed in Sweden.

The French report [2] includes a study of international standards for the product. The report mentions two standards issued by Underwriters Laboratory (UL 1370, “Factory built unvented liquid or gelled alcohol based fuel burning decorative heating system” from April 2006, and ULC/ORD-C627 “Unvented Ethyl Alcohol fuel burning decorative appliances” from April 2008. Furthermore the report elaborates a bit on French standards. The essential requirements are laid down in the AFNOR certification standard 427, “Marque NF – appareils domestiques fonctionnant a l’ethanol” [6]. This test method is more detailed than the Swedish method and includes requirements for safe operation of the fireplace. It also lays down requirements for the producer’s quality control system.

The French study has also examined the French standards in detail and addresses a number of shortcomings in the present standard and in the work with a new standard that is in progress:

- A new standard should cover all types of alcohol-powered appliances, their fuel and accessories.
- The maximum operating time of the fireplace should be limited to prevent accumulation of carbon monoxide and nitrogen oxides in the ambient air.
- The standardisation work should consider the maximum permissible power for fireplaces that are not connected to a flue. The present limit in the French standard is 4.65 kW whereas the American standard ULC/ORD-C627 limits the size to 3 kW.
- The standard should consider if gel fuels can be used in-door as they can produce carbon monoxide and aldehydes.
- The fireplace must be designed to prevent the user from direct contact with the flames and the burner
- There must be requirements for heat conductivity and mechanical resistance for the fire screens and for their safe attachments to the fireplace.
- A device suitable to ignite the specific fireplace must be installed at an appropriate distance from the burning chamber.
- More detailed specifications including requirements for the resistance to fire for the material used for the body of the fireplace should be given.
- The standard should have requirements for mounting systems for hanging fireplaces and requirements for fastening systems for free-standing fireplaces.
- Fireplaces shall not have fittings (wheels, handles, etc.) that tempt the user to move it while it is burning.

Following the study, a French standard with safety requirements and test methods for ethanol-fired fireplaces was published in summer 2009 [7]. This standard is based on the above requirements and recommendations even taking them further in some respects. The standard for instance prescribes that the fireplace must employ an auto shut-down facility that will shut of the fireplace completely if it falls or if the level of CO_2 in the room exceeds a given threshold value. The standard is voluntary.

6 Resulting proposal for testing requirements

The safety requirements for alcohol-powered fireplaces should include the following provisions:

General requirements:

- The standard should cover all types of alcohol-powered appliances, their fuel and accessories.

Construction and design requirements:

- Requirements for stability.
- Mechanical and thermal requirements to mounting systems for hanging fireplaces (and standing fireplaces when relevant).
- Requirements to prevent fires from spreading into building structures.
- A fireplace shall not have fittings (wheels, handles, etc.) that tempt the user to move it while it is burning.
- Requirements for burning behaviour.
- The user must be prevented from getting direct contact with the flames and the burner.
- Accessible surfaces must not reach dangerous temperatures.
- Requirements for heat conductivity, mechanical strength and fire resistance for the flame shields and the body of the fireplace.
- Requirements for the attachments of flame shields.
- Specific requirements for fireplaces with ceramic wood on top of the burning chamber.
- A fireplace must be designed to prevent re-ignition, backfire (i.e. that the fireplace ignites the fuel in the hands of the user, when fuel is poured into the fireplace) and spillage of fuel.
- Components inside the burner should not become hot enough to re-ignite the fireplace.
- The fuel system including any sealing must have sufficient mechanical strength and be resistant to corrosion.
- The fuel tank must have an appropriate closing mechanism.
- Spilt fuel must not be able to accumulate in closed compartments inside the appliance, from where it can evaporate and cause explosions.
- It must be possible to ignite the fireplace safely at any time
- A device suitable for extinguishing the fireplace must be supplied with the fireplace.
- The fireplace should be protected from unintended ignition e.g. by small children.

Provisions for maximum emission:

- Threshold values for carbon monoxide and nitrogen oxides.
- Maximum operating time.
- Maximum power for fireplaces that are not connected to a flue.
- Requirements for the fuel including any gel and additives to limit generation of carbon monoxide and volatile organic compounds.

Marking

- Important safety marking.
- Names of producer and importer.
- Name and identification of product.
- Essential safety information must be on the fireplace.

- Marking must be durable.
- Marking must be in the language of the country where the fireplace is sold.

Instructions to the user
- Essential safety information and instructions shall be on the fireplace.
- Specification of requirements to the wall for hanging fireplaces.
- Specification of requirements for surroundings, in particular floor (and ceiling when relevant).
- Specification of fuel type.
- Information on consumption of oxygen and instructions for ventilation of the room.
- Information on minimum size of room (floor area or volume of room).
- Information on safety distances to flammable material.
- Instructions on fuelling including a warning not to pour fuel into a hot fireplace.
- Instructions on safe storage of fuel.
- Instructions not to use the fireplace in a draughty environment.
- Instruction not to ignite a hot fireplace.
- Instructions on how to extinguish a fireplace.
- Instructions must be in the language of the country where the fireplace is sold.

The test method should allow a producer to demonstrate that a fireplace is safe and an authority to verify this in physical tests.

7 Conclusion, recommendations for further work

The study has shown that national safety requirements are in place for alcohol-powered fireplaces in a few Member States: France, Germany and the Nordic countries (that base their requirements on a Swedish safety standard). These requirements have been examined and it turns out that the differences between them are small. All safety requirements basically address the same safety issues and the test methods are quite similar.

One major difference is found however. The French safety requirements prescribe that the fireplace must be equipped with a device that can shut down the fireplace if it is falling or if the concentration of CO_2 in the ambient air exceeds a given threshold value. The consequence has been that some fireplaces on the French market appear to be more advanced employing sophisticated electronics, a number of sensors and a design of the fuel system that employs a valve to shut of the supply to the burner. Apparently this has not affected the retail price of the high end fireplaces significantly but it means that the simpler designs with open burners that can not be adjusted are likely to disappear from the market.

The group appreciates that the whole issue seems to require a quick intervention as the product seems to be very popular and severe accidents seems to be rather frequent. Therefore the group has proposed both short-term measures and long-term measures.

7.1 Short term measures

The project group proposes that the GPSD Committee adopt common requirements for warnings and instructions on alcohol-powered fireplaces until a European standard is in place. The proposed requirements are:

An alcohol-powered fireplace must be marked with the following safety instructions:

- The sentence “Only use fuel according to the requirements in the user’s guide”
- The sentence “Never pour fuel into a hot or burning fireplace”
- The sentence “Carefully wipe away any excess fuel before igniting the fireplace.”
- The sentence “Vent the room well regularly”

In case of wall-mounted fireplaces, the following additional warnings are necessary:

- The sentence “Only use screws, fittings and plugs that are suited for mounting of the fireplace”
- The sentence “Ensure that the wall can carry the fireplace and withstand the heat.”
- The sentence “Check regularly that the fireplace remains tightly mounted.”

The sentences can be replaced by appropriate pictograms.

Further warnings are necessary if the manufacturer knows of other risks.

The warnings shall be printed on the fireplaces so that they can not be removed without use of tools.

7.2 Long term measures

The group recommends that the Commission drafts a mandate to CEN laying down the basic safety requirements that a future standard should provide. Before drafting the mandate, the GPSD Committee must however decide what safety philosophy to use.

During its work, the group found out that two philosophies appear to exist in the examined safety requirements. The group wants to point the attention of the GPSD Committee to this fact as the choice will influence the mandate significantly. The group can see two ways forward:

- One way is to accept that there will be simpler burner designs on the market. If this route is chosen, CEN should develop safety requirements that would make such appliances as safe as possible. The authorities should however at the same time be aware that it is possible to develop even safer products but this will have a significant impact on the market.

- The other way is to apply an approach where all (large) fireplaces are required to have advanced (electronic) safety systems. This approach will address the majority of the hazards identified in this report but it will also have a significant impact on the market as it will effectively remove all low-end simple-design fireplaces from the market.

Intermediate solutions are off course also viable. For instance, it seems sensible to develop stricter requirements for fireplaces with a high thermal output and less strict requirements for fireplaces with a lower thermal output because the hazards and risks may be different for the two types.

The group suggests that the GPSD Committee discusses this question to decide which route to take.

The group has included a detailed proposal for European safety requirements in an annex to the report. The intention is that the proposal can serve as a starting point for CEN once a mandate has been agreed by the GPSD Committee. The proposal describes all safety requirements that are common for the simple design and the advanced design. The safety requirements that only apply to the more advanced design are noted in the proposal in “remarks” where relevant.

The group suggests that the Member States comment the proposal. Comments will be incorporated in a final version of this report.

Bibliography

All quotes and references in the text are stated with a number in brackets, e.g. [1]. The full list of references is given below.

1 Karolina Storesund, Thai T. Mai, Christian Sesseng: ”Ethanol-fuelled, flueless fireplaces – An evaluation”, A09127 – unrestricted report, SINTEF, February 2010, report prepared for DSB, Norway.

2 “Recommendation on the safety of alcohol-powered appliances”, The Consumer Safety Commission DGCCRF, Paris, France, December 2008.

3 “Flueless fireplaces, Safety of flueless fireplaces”, the Safety Technology Authority, Helsinki, Finland. The safety requirements can be downloaded from http://www.tukes.fi/en/What-can-I-do-to-promote-product-safety/Data-bank-for-companies/Safety-requirements-for-products-/Flueless-fireplaces-/

4 "P-märkning af byggprodukter. Certifieringsregel 034. Skorstensfria dekorativa spisar som eldas med alkoholbränsle", SITAC standard, October 2006. SP-SITAC.

5 "Provningsmetod för skorstensfria öppna spisar som eldas med alkoholbränsle", SP-Metod 4160, test method from SP Technical Research Institute of Sweden, published 9 October 2006, revised 25 April 2008.

6 "Marque NF – appareils domestiques fonctionnant a l'ethanol", certification rule 427, LNE, France, December 2007. An overview of the rule can be found on the webpage http://www.lne.fr/fr/certification/en_savoir_plus/popup_savoir_plus_427.shtml together with links where the complete rule can be downloaded.

7 "Ethanol-fired appliances. Safety requirements and test methods", French standard NF D 35-386, AFNOR, France, August 2009.

8 „Feuerstätten für flüssige Brennstoffe – Dekorative Geräte, die unter Verwendung eines Ethanol basierten flüssigen oder gelförmigen Brennstoffes eine Flamme erzeugen", DIN 4734, draft proposal for a German standard, DIN, Germany, October 2009.

Annex 1 Alcohol-powered flueless appliances – safety requirements and test methods

General remark: The below text presents a compilation of some of the safety requirements that were recognised by the participants as important for the safety of alcohol-powered flueless appliances.
The text is intended to guide a future standardisation working group in its work to produce a European standard and shall not be taken as an exhaustive list of all relevant safety requirements and test methods.

Remark: This text makes use of "remarks" to explain background information, when the participants in the project group recognised the need for a safety requirement but did not find itself able to decide on a threshold level or a method;

1 Introduction

This note describes safety requirements and test methods for alcohol-powered flueless appliances that are mainly installed for decorative purposes.

2 Scope

The requirements and test methods in this document are applicable to flueless appliances including their accessories with a thermal output below 4,5 kW that are powered with alcohol with or without additives and mainly installed for decorative purposes.

The document includes requirements for safety, emission and operation of the appliance.

Remark: The participants have noted that various maximum thermal outputs are allowed in the national standards investigated, e.g. 3.0 kW in the German requirements [8], 4.0 kW in the Swedish requirements [5] and 4.65 kW in the French standard [7].

Remark: It is found practical if the standard also limits the scope by defining a minimum threshold value under which appliances are excluded from the standard. As an example the French standard excludes appliances with a fuel chamber volume below 0.2 l [7].

3 Normative references

EN 12600:2003, "Glass in building - Pendulum test - Impact test method for flat glass"

4 Definitions

Alcohol-powered flueless appliance
Appliance designed primarily to produce a decorative flame and secondly to produce heat by burning alcohol. The appliance can be intended to be permanently fixed to building structures (wall, floor, etc.) or it can be intended to be free-standing. The output of the appliance is so low that it is not required to connect it to a flue.

The alcohol may contain additives that change its colour, viscosity or other properties.

5 Requirements

5.1 Construction and design

5.1.1 General

Alcohol-powered flueless appliances shall be made from materials that maintain their shape at the highest operating temperatures that will occur in the fireplace during use. The materials shall have a sufficient resistance to thermal, mechanical and chemical impacts.

Flame shields shall be attached in a way and employing materials that can withstand the temperatures they are exposed to.

Decorative elements that are intended to glow when the fireplace is burning (e.g. “ceramic wood” on top of the burning chamber) shall be designed to withstand the highest temperatures that can occur without causing dangerous situations.

An alcohol-powered flueless appliance shall be designed to prevent re-ignition and backfire. The burner shall be separated from the place where fuel it filled to the appliance. The fireplace shall employ a system for collecting fuel that is spilled when fuel is poured in to the fuel container.

Conformity is verified by inspection.

5.1.2 Maximum power

The maximum power of the appliance shall not exceed 4.5 kW when tested in accordance with clause 6.2.1.

Remark: The participants have noted that various maximum thermal outputs are allowed in the national standards investigated, e.g. 3.0 kW in the German requirements [8], 4.0 kW in the Swedish requirements [5] and 4.65 kW in the French standard [7].

5.1.3 Stability

Free-standing fireplaces shall not fall over and fuel shall not be spilt when tested accordingly to clause 6.2.2.

Remark: The French standard [7] prescribes that fireplaces that do not pass a 20 kg impact test (light fireplaces) shall extinguish completely and immediately (an "emergency shutdown") when tilted 20 degrees. Heavier fireplaces (that pass the 20 kg impact test) only need to be equipped with a safety shut down.

5.1.4 Impact sensitivity

Free-standing fireplaces shall not fall over and fuel shall not leak when tested accordingly to clause 6.2.3.

Remark: The French standard [7] only prescribes that fuel shall not be spilt or leak following the impact test.
Remark: An "emergency shutdown" device as prescribe in the remark to clause 5.1.3 would decrease the fire hazard by shutting down the fireplace if it falls over during the impact test.

5.1.5 Fittings (wheels, handles, etc.)

A fireplace shall not have fittings (wheels, handles, etc.) that tempt the user to move it while it is burning.

Conformity is verified by inspection.

5.1.6 Ignition

It shall be safe to ignite the fireplace at any time containing any amount of fuel when tested in accordance with clause 6.2.5.

The use shall be able to stay at a horizontal distance of at least 140 mm from the burner while igniting the fireplace. If this is not possible, the fireplace shall be equipped with an ignition device.

5.1.7 Burning behaviour

The fireplace shall burn with a stable flame that does not flare or soot when tested in accordance with clause 6.2.5.

Remark: The French standard [7] gives requirements for a stable fuel consumption during operation and prescribes that burner runaway shall not occur. Burner runaway is understood as an increase of fuel consumption of more than 10% from one 5-minute measurement interval to the next.

5.1.8 Extinguishing

A fireplace shall be extinguishable at any time when tested in accordance with clause 6.2.7.

5.1.9 Self-ignition

Self-ignition and reignition shall be prevented.

Remark: The French standard [7] prescribes that it shall not be possible to reignite the fireplace before any part of the fireplace including the burner has cooled down to a temperature below 60 °C.
The German draft standard [8] prescribes that no part of the fireplace including any ceramic decorative items above the burner shall reach a temperature exceeding 60 °C. If this is the case, the instructions shall include information of the time it takes the fireplace to cool down to a temperature of 60 °C.

5.1.10 Accessible surfaces

The user shall be prevented from getting direct contact with the flames and the burner.

Conformity is verified by inspection.

5.1.11 Temperatures

Accessible surfaces shall not reach dangerous temperatures during operation.

This implies that the temperature increase shall not exceed the following values for surfaces that are not intended to be touched during use:

- Metal or metallic surfaces, 60 K
- Metal enamel surfaces, 65 K
- Surfaces of other materials, 70 K

The temperatures shall not exceed the following values for surfaces that are intended to be touched during use, e.g. to operate the fireplace. The threshold values also apply to a 10 mm zone around the operated zones.

- Metal or metallic surfaces, 30 K
- Metal enamel and ceramic surfaces, 40 K
- Surfaces of plastics and similar material, 60 K

The temperature on the stand of the fireplace shall not reach a temperature above 85 °C where it touches the floor.

The temperature on adjacent walls shall not reach a temperature above 85 °C when tested in accordance with clause 6.2.9.

Fireplaces intended to be mounted on gypsum walls shall be designed so they allow for the fact that gypsum starts to decompose (undergoing calcination) at a temperature of 45 – 50 °C.

Components inside the burner shall not become hot enough to re-ignite the fireplace.

NOTE: If a surface is coated with a layer of other material thinner than 0.3 mm the threshold value of the base material applies.

Remark: CENELEC has developed a guideline for maximum permissible temperatures on accessible surfaces, CENELEC Guide 29, "Temperatures of hot surfaces likely to be touched. Guidance document for Technical Committees and manufacturers.", April 2007. Available from the national standardisation committees.

5.1.12 Fuel container and fuel system

The fuel container shall be constructed so it does not fall. It shall prevent leaking or spillage of fuel. It shall be designed to allow the user to pour fuel safely into the container without spilling.

Air shall be able to get into the fuel container as fuel is consumed by the burner.

The fuel container shall have an appropriate closing mechanism and an anti-spillage system that leads excess fuel back to the fuel container.

The fuel system including any sealing shall have sufficient mechanical strength to withstand normal foreseeable use. It shall have sufficient resistance to corrosion to withstand long-term influence from the fuel. The burner shall be designed so that corrosion is prevented.

The maximum capacity of the fuel system shall not exceed 2.5 litres.

Remark: Some differences are observed between national standards. The French standard [7] states a maximum capacity of 2.25 litres. The German standard [8] gives a value of 3 litres. The Swedish standard [4] gives a value of 5 litres.
Remark: The German standard [8] furthermore gives a requirement of maximum 0.5 litres for devices that are intended to stand on a table. It may also be suitable to have different requirements for wall-mounted and free-standing devices.

Conformity is verified by inspection.

5.1.13 Child safety

The fireplace shall be designed to prevent children from direct access to the fuel.

Conformity is verified by inspection.

NOTE: During operation, it is considered that the fuel is inaccessible when flames are present.

Remark: An "emergency shutdown" device as prescribe in the remark to clause 5.1.3 would allow implementation of further child safety requirements, e.g. requirements against unintended operation by small children.

5.2 Equipment and fittings for installation of the appliance

5.2.1 Mounting systems

Mounting systems that are supplied with the fireplace shall have adequate mechanical strength and long-term thermal properties to ensure that they can carry the fireplace safely during its foreseeable lifetime.

Conformity is tested according to clause 6.2.4.

5.2.2 Plugs and fittings

Plugs and fittings with adequate mechanical strength and long-term thermal properties shall be supplied with the fireplace.

The user's guide shall warn the user only to use the supplied plugs and fittings or plugs and fittings with similar mechanical and thermal properties.

Conformity is verified by inspection.

5.3 Auxiliary equipment

5.3.1 Equipment for safe ignition of the fireplace

A device suitable for igniting the fireplace safely shall be installed or supplied with the fireplace.

Conformity is verified by inspection.

5.3.2 Equipment for safe extinction of the fireplace

A device suitable for extinguishing the fireplace safely shall be installed or supplied with the fireplace.

Conformity is verified by inspection.

5.4 Emission

Remark: The following requirements are only to be understood as a compilation of seemingly relevant emission requirements picked from the national standards that were examined in this study. Only spare efforts have been made to check the requirements for inconsistencies.

5.4.1 Carbon monoxide

The ratio between carbon monoxide (CO) and carbon dioxide (CO_2) shall not exceed 0,002 and the concentration of carbon monoxide shall not exceed 35 ppm when measured on accordance with 6.3.1.

Remark: The French standard [7] prescribes that the fireplace shall shut down when the contents of CO_2 exceeds 0.8% +/- 0.2%.

5.4.2 Nitrogen oxides

The concentrations of nitrogen oxides shall not exceed the following values when measured in accordance with 6.3.2:

- NO, 30 ppm, volumetric
- NO_x beside NO, 3 ppm volumetric

5.4.3 Maximum operating time

The fuel container shall have a capacity that limits the operating time of the fireplace to 6 hours when measured in accordance with clause 6.3.3.

Remark: The French standard [7] states a limit of 3 hours after which it shall not be able to refill and ignite the appliance before it has cooled down to a temperature below 60 ^{o}C. The French standard also states that it shall not be possible to run the appliance for more than 6 hours every 24 hours. The German draft standard [8] states a threshold value of 14 hours.
Remark: Application of an “emergency shutdown” device as prescribed in the remark to clause 5.1.3 may allow the requirement for maximum operating time to be replaced with a requirement that the fireplace self-extinguishes when e.g. the emission requirements or temperature requirements are violated

6 Testing

6.1 General test conditions

All tests are done using fuel (alcohol) as prescribed by the manufacturer.

The tests shall be carried out in indoor conditions with a temperature of 23 +/- 5 ^{o}C and relative humidity between 30 and 90% HR.

The burner shall be operated at the conditions that results in the highest operating temperatures unless otherwise stated.

Emissions are measured with equipment and methods that can detect the following concentrations:

- 0,5 ppm (volumetric) CO with an accuracy of +/- 0,2 ppm (volumetric) CO
- 50 ppm (volumetric) CO_2 with an accuracy better than 5%
- 0,2 ppm (volumetric) NO_x with an accuracy of +/- 0,1 ppm (volumetric) NO_x

6.2 Construction and design

6.2.1 Maximum power

The fireplace is installed according to the manufacturer's instructions. It is filled with the maximum amount of fuel according to the instructions. The fireplace is ignited and left burning. If the fireplace has more burners or fuel containers, this test is carried out with the maximum number of fuel containers installed and the maximum number of burners burning. The test shall run for at least 60 minutes from thermal equilibrium has been reached or until the fireplace burns out of fuel.

The maximum power is determined using the following formula:

$$P = \frac{B \times H_i}{3,6}$$

where:

P = Output power (W)
B = Fuel flow (l/h)
H_i = Lower heating value (kJ/l)

6.2.2 Stability

The fireplace is placed on a hard flat surface. The fuel container is filled with fuel to 80% of the height of the container. The fireplace is tilted 30 degrees.

It is observed that fuel does not pour from the fuel container and that the fuel container does not fall over.

Conformity is verified by inspection.

NOTE: This test only applies to free-standing appliances.

Remark: The French standard [7] prescribes that fireplaces that do not pass a 20 kg impact test (light fireplaces) shall extinguish completely and immediately (an "emergency shutdown") when tilted 20 degrees. Heavier fireplaces (that pass the 20 kg impact test) only need to be equipped with a safety shut down.

6.2.3 Impact sensitivity

The fireplace is tested using the test equipment from EN 12600.

The fireplace is situated in the least favourable position so that the middle of one side of the fireplace touches the free hanging hammerhead from the test equipment. A counterweight is placed on the opposite side of the fireplace. The hammerhead is lifted to 45 degrees and released so it hits the fireplace. The test is carried out twice.

The fireplace shall not fall over during the test and fuel shall not leak after the test.

Conformity is verified by inspection.

6.2.4 Mounting systems

The fireplace is mounted according to the instructions and loaded with 1.5 times the mass of the fireplace or 60 kg whichever is the heavier for 10 minutes.

The fireplace shall remain tightly fixed to the wall and no part of the mounting system shall have been deformed after the test.

Conformity is verified by inspection.

Remark: It should be considered how the standard address the long-term mechanical and thermal properties of the mounting system, in particular any plastic plugs.

6.2.5 Ignition

The fireplace is conditioned to room temperature.

The fireplace is filled with fuel to the intended level and ignited. The fireplace is extinguished after 3 minutes using any cover supplied for this purpose or using the procedure prescribed by the manufacturer. The fireplace is left to cool down. When ambient temperature is reached or after 1 hour, any cover re removed and the fireplace is immediately ignited. The ignition shall result in a stable flame without flaring, spitting or sputtering.

The test is repeated with the fuel container filled to 50%, 25% and 10% of the intended capacity. This test is carried out irrespectively of any contradictory advice given in the user's guide. If the fireplace ignites, the ignition shall result in a stable flame without flaring, spitting or sputtering. If the fireplace does not ignite in one of the tests with reduced fuel volume, it is counted as a "pass" of that specific test.

The fuel container is filled and the fireplace is ignited. It is left burning for so long time that the hottest part of the fuel system including the burner has reached a temperature of 60 °C. The fireplace is extinguished and immediately reignited. If the fireplace ignites, the ignition shall result in a stable flame without flaring, spitting or sputtering. If the fireplace does not ignite, it is counted as a "pass" of the test.

6.2.6 Burning behaviour

The fireplace is conditioned to room temperature.

It is ignited and left burning for 2 minutes after which time the flame is observed.

6.2.7 Extinguishing

The fireplace is conditioned to room temperature.

The fireplace is filled with fuel to the intended level and ignited. The burner shall be operated at the conditions that results in the highest operating temperatures unless otherwise stated.

When the fireplace has burned for approximately 90% of the maximum operating time, it is extinguished using any covers or other equipment supplied for this use by the manufacturer or using the procedure prescribed by the manufacturer.

All flames shall extinguish within 10 seconds.

NOTE: If the fireplace employs more burners, all burners shall be burning, when the test is performed.

Remark: Permissible time for flames to extinguish to be considered.

6.2.8 Draught

The fireplace is ignited and left burning until it reaches thermal equilibrium.

The fireplace is exposed to draught with a wind speed of 2 m/s from a fan with a diameter not less than 120 mm. The fan is switched on and off in cycles of 10 s on and 10 s off. This is repeated 5 times.

The test is carried out with the fan placed in the worst position in a horizontal plane.

The flame is observed during the cycles.

6.2.9 Temperature on adjacent walls

The fireplace is mounted in a black painted corner with thermocouplers embedded in the wall using the mounting system and fittings supplied by the manufacturer. The “black test corner” is constructed in accordance with EN 60335-2-6.

The fireplace is ignited and left burning until it reaches thermal equilibrium or until 90% of the fuel is used.

The maximum temperatures are recorded.

6.3 Emission

Remark: The following test methods are only to be understood as a compilation of seemingly relevant methods picked from the national standards examined in this study. Only spare efforts have been made to check the requirements for inconsistencies.

6.3.1 Carbon monoxide

The exhaust gas is collected for analysis using the device shown on figure 1. The device is constructed to collect as much of the exhaust gas as possible from the burner without disturbing the combustion. The top of the cone in the device shall be vertically above the burning chamber of the fireplace or the geometrical centre between the burning chambers in case of multiple burners.

The side panels of the device are adjusted during the test to achieve a concentration of CO_2 in the top of the cone of approximately 1%. This may not always be possible because the adjustment in certain cases would disturb the combustion in the fireplace. Therefore an adjustable membrane is installed in the top of the device to control the flow to a CO_2 concentration of 1%. However, this membrane shall not be used if it changes the quality of the combustion.

Remark: The device shall have a sufficient size to cover the appliance that is tested.

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NF – APPAREILS DOMESTIQUES
FONCTIONNANT A L'ETHANOL

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Annexe 1 : Description des systèmes de captation des fumées pour l'essai de combustion en local aéré.

Dimensions en millimètres

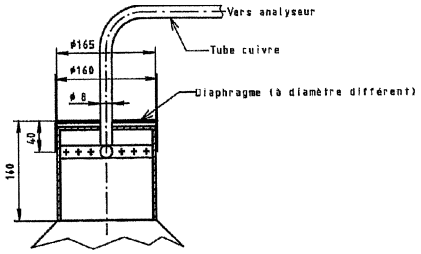

Figure B.1 : détail du dispositif d'aspiration et diaphragme

Les cotes indiquées sont indicatives et doivent correspondre aux plus grandes dimensions des appareils concernés par cet essai.

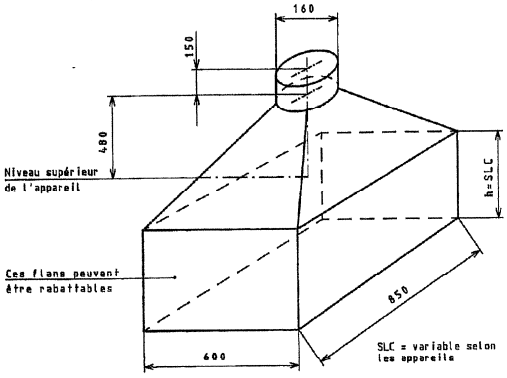

Figure B.2 : dispositif spécial pour le prélèvement moyen des gaz dans l'essai de contrôle de la combustion en local aéré

Figure 1 Drawing of the device that is used to collect the exhaust gases from the fireplace for the measurement of the CO emission.

The measurement shall not disturb the combustion in the fireplace.

The concentration is calculated using the following formula:

$$\%(CO)_N = \%(CO_2)_N \times \frac{\%(CO)_M}{(\%(CO_2)_M - \%(CO_2)_{amb})}$$

where:

$\%(CO)_N$ is calculated, normalised concentration of CO
$\%(CO)_M$ is the measured concentration of CO

$\%(CO_2)_N$ is 15% (the concentration of CO_2 in a natural combustion og ethanol)

$\%(CO_2)_M$ is the measured concentration of CO_2

$\%(CO_2)_{amb}$ is the ambient concentration of CO_2 during the test

6.3.2 Nitrogen oxides

The concentration of CO_2 locally around and over the burner is kept at 5% during the test.

The equivalent concentration of NO and NO_x (representing any nitrogen oxide beside NO) during natural combustion is calculated using the following formulas:

$$\%(NO)_N = \%(CO_2)_N \times \frac{\%(NO)_M}{(\%(CO_2)_M - \%(CO_2)_{amb})}$$

and

$$\%(NO_x)_N = \%(CO_2)_N \times \frac{\%(NO_x)_M}{(\%(CO_2)_M - \%(CO_2)_{amb})}$$

where:

$\%(CO_2)_N$ is 15% (the concentration of CO_2 in a natural combustion of ethanol)

$\%(CO_2)_M$ is the measured concentration of CO_2

$\%(CO_2)_{amb}$ is the ambient concentration of CO_2 during the test

$\%(NO)_N$ is the calculated, normalised concentration of NO

$\%(NO)_M$ is the measured concentration of NO

$\%(NO_x)_N$ is the calculated concentration of NO_x

$\%(NO_x)_M$ is the measured, normalised concentration of NO_x

6.3.3 Maximum operating time

The fireplace is conditioned to room temperature. The fuel tank is filled to the maximum, the fireplace is ignited and the time is recorded.

The fireplace is observed and the time when the fireplace extinguishes is recorded.

The maximum operating time is calculated as the difference between the time when the fireplace was ignited and the time it extinguished.

7 Marking and instructions

7.1 General

The information specified in 7.2 to 7.4 shall be marked on the fireplace or included in the instructions to the user.

The information shall be given in the language(s) of the country in which the fireplace is offered for retail sale. For each language, it shall be presented as a whole and shall not be interrupted by other text. Additional text given in another language shall not conflict with the required information.

Conformity shall be verified by inspection.

7.2 Safety information

The fireplace shall be marked with the following information:

- The sentence “Only use fuel according to the requirements in the user’s guide”
- The sentence “Only use in a well ventilated room”
- Information on safety distances to flammable material
- The sentence “Never pour fuel into a hot or burning fireplace”
- The sentence “Carefully wipe away any spilt fuel before igniting the fireplace.”
- The sentence “Only use in draught free surroundings”
- The sentence “Never ignite a hot fireplace”
- The sentence “Never leave small children or pets unattended near a burning fireplace”

The warning sentences can be replaced by suitable pictograms.

7.3 User instructions

The appliance shall come with instructions to the user. They shall include the following information:

- A device suitable for igniting the fireplace shall be installed at an appropriate distance from the burning chamber
- Specification of requirements to the wall for hanging fireplaces
- Requirements to mounting systems for hanging fireplaces (and standing fireplaces when relevant)
- Specification of requirements for surroundings, in particular floor (and ceiling when relevant)
- Specification of requirements for walls, including warnings against wall types where particular care is to be exercised, e.g. gypsum walls, wooden walls, etc.

- Information on the type(s) of fuel including additives that can be employed to ensure that the fireplace burns safely and the maximum emissions of carbon monoxide and nitrogen oxides are not exceeded.
- Information on consumption of oxygen and instructions for ventilation of the room
- Information on safety distances to flammable material
- Information on minimum size of the room or minimum floor area
- Instructions on fuelling including a warning not to pour fuel into a hot fireplace
- Instructions on safe storage of fuel
- Instructions not to use the fireplace in a draughty environment
- Instructions of maximum operating time
- Instruction not to ignite a hot fireplace
- Instructions on how to extinguish a fireplace

7.4 Identification of manufacturer, distributor or importer

The fireplace shall be marked with the name or trade mark of the producer.

Name, address and telephone number of the producer and the importer shall be marked on the fireplace or stated in the instructions.

7.5 Printing

Labelling shall be visible, legible, indelible and on a single-colour background.

8 Test report

The test report shall include the information necessary for the interpretation of the results and at least the following information:

- a title
- the name and address of the laboratory, and the location where the test where carried out if different form the address of the laboratory
- the names, function and signature or equivalent identification of persons authorizing the test report
- the name and address of the client
- unique identification of the test report and on each page an identification in order to ensure that the page is recognized as a part of the test report and a clear identification of the end of the test report
- identification of the test method used including reference to the date and version of the testing requirements
- deviations from, additions to or exclusions from the test method

- information in specific test condition, such as environmental conditions
- a description of, the conditions of and an unambiguous identification of the items tested
- the date of receipt of the test item and the date of performance of the test
- the test results and units of measurement
- a statement on the estimated uncertainty of measurement
- a statement of compliance or non-compliance with the requirements and/or specification