



TAMPERE UNIVERSITY OF TECHNOLOGY

Fire Laboratory

INTERNATIONAL SURVEY: REGULATIONS CONCERNING THE FIRE SAFETY OF FIREPLACES AND CHIMNEYS



13.12.2018

Tampere 2018



CONTENTS

TIIVISTELMÄ.....	1
1. INTRODUCTION.....	4
1.1 BACKGROUND	4
1.2 AIM OF THE SURVEY	4
1.3 EXECUTION OF THE SURVEY	5
1.4 STRUCTURE AND METHODS OF THE SURVEY	5
1.5 NOTE TO THE READER.....	6
2. REGULATIONS AND GUIDELINES.....	7
2.1 FINLAND.....	7
2.2 OTHER COUNTRIES	8
2.3 THE STATUTORY FUNCTIONS OF AUTHORITIES AND OFFICIALS	11
2.4 ORGANIZATIONS AND ASSOCIATIONS	13
3. SUPERVISION AND RESPONSIBILITIES	15
3.1 FINLAND.....	15
3.1.1 The end-user of a building.....	15
3.1.2 Municipal/regional level.....	16
3.1.3 Other levels.....	17
3.2 OTHER COUNTRIES	18
4. EU AND NATIONAL STANDARDS.....	21
4.1 FINLAND.....	21
4.2 OTHER COUNTRIES	21
5. STATISTICS	23
5.1 FINLAND.....	23
5.2 OTHER COUNTRIES	23
6. DESIGN AND ASSEMBLY OF THE HEATING SYSTEM.....	24
6.1 GENERAL REQUIREMENTS	24
6.1.1 Finland.....	24
6.1.2 Other countries.....	24
6.2 DESIGN DOCUMENTATION.....	25
6.2.1 Finland.....	25
6.2.2 Other countries.....	25
7. REQUIREMENTS FOR FIREPLACES.....	27
7.1 FIREPLACE DESIGN & ASSEMBLY	27
7.1.1 Finland.....	27
7.1.2 Other countries.....	27
7.2 BASE STRUCTURE.....	28
7.2.1 Finland.....	28
7.2.2 Other countries.....	28
7.3 SAFETY DISTANCES OF FIREPLACES.....	29
7.3.1 Finland.....	29
7.3.2 Other countries.....	29

This report may be copied only in its entirety.



7.4	COMBUSTION AIR.....	30
7.4.1	Finland.....	30
7.4.2	Other countries.....	31
8.	REQUIREMENTS FOR CHIMNEYS AND FLUES	32
8.1	CHIMNEY DESIGN	32
8.1.1	Finland.....	32
8.1.2	Other countries.....	32
8.2	SAFETY DISTANCES	32
8.2.1	Finland.....	32
8.2.2	Other countries.....	33
8.3	SURFACE TEMPERATURES.....	35
8.3.1	Finland.....	35
8.3.2	Other countries.....	35
8.4	MATERIALS	36
8.4.1	Finland.....	36
8.4.2	Other countries.....	36
8.5	DURABILITY.....	37
8.5.1	Finland.....	37
8.5.2	Other countries.....	38
8.6	FIRE RESISTANCE (EI).....	38
8.6.1	Finland.....	38
8.6.2	Other countries.....	38
8.7	SOOT FIRE RESISTANCE	39
8.7.1	Finland.....	39
8.7.2	Other countries.....	39
8.8	THE SIZE AND CROSS-SECTION OF FLUE	40
8.8.1	Finland.....	40
8.8.2	Other countries.....	40
8.9	CHIMNEY HEIGHT FROM THE ROOF	40
8.9.1	Finland.....	40
8.9.2	Other countries.....	41
8.10	DEVIATION FROM THE VERTICAL DIRECTION.....	41
8.10.1	Finland.....	41
8.10.2	Other countries.....	41
8.11	SMOKE DAMPER	42
8.11.1	Finland.....	42
8.11.2	Other countries.....	42
8.12	TIGHTNESS OF CHIMNEY AND JOINTS OF ELEMENT CHIMNEY	43
8.12.1	Finland.....	43
8.12.2	Other countries.....	43
8.13	WALL PENETRATIONS	44
8.13.1	Finland.....	44
8.13.2	Other countries.....	44
9.	FIREPLACE AND CHIMNEY COMBINATIONS	45
9.1	GENERAL REQUIREMENTS	45
9.1.1	Finland.....	45
9.1.2	Other countries.....	45
9.2	SEVERAL FIREPLACES CONNECTED TO THE SAME FLUE.....	46
9.2.1	Finland.....	46
9.2.2	Other countries.....	46

This report may be copied only in its entirety.



10. USE AND MAINTENANCE OF HEATING SYSTEMS	48
10.1 IMPLEMENTATION OF FIREPLACE AND CHIMNEY	48
10.1.1 Finland.....	48
10.1.2 Other countries.....	48
10.2 SWEEPING.....	48
10.2.1 Finland.....	48
10.2.2 Other countries.....	49
10.3 USE OF FIREPLACE AND CHIMNEY	50
10.3.1 Finland.....	50
10.3.2 Other countries.....	50
10.4 TREATMENT OF ASH.....	51
10.4.1 Finland.....	51
10.4.2 Other countries.....	51
11. RENOVATION AND RECONSTRUCTION	52
11.1 REPAIR OF THE FIREPLACE AND CHIMNEY.....	52
11.1.1 Finland.....	52
11.1.2 Other countries.....	52
11.2 INSTALLING A NEW FIREPLACE INTO AN EXISTING CHIMNEY.....	53
11.2.1 Finland.....	53
11.2.2 Other countries.....	53
12. DISCUSSION.....	54
13. CONCLUSIONS.....	56
14. LIST OF SOURCES.....	57
ANNEX 1: List of contact persons and interviewees	



Research report no. RTEK/2564/2018

59 pages + 1 annex page

Clients the Ministry of the Environment/Jyrki Kauppinen
the Ministry of the Interior/Jaana Rajakko
the Finnish Safety and Chemical Agency Tukes/Johanna Ahola
the Fire Protection Fund of Finland

Date of order 7.9.2018

Task International survey on regulations concerning the fire safety of fireplaces and chimneys

Time period 1.10.2017 – 30.11.2018

Researchers Mikko Malaska, prof., D. Sc. (Tech.)
Anu Aaltonen, doctoral student, M. Sc.. (Tech.)
Perttu Leppänen, doctoral student, M. Sc. (Tech)

Tampere University of Technology
Department of Civil Engineering
Fire Laboratory
PO.Box 600
FIN-33101 Tampere

Tel. +358 3 311 511

Distribution of report

TUT / Department of Civil Engineering / Archive
Clients
Public



Ympäristöministeriö
Miljöministeriet
Ministry of the Environment



Ministry of the Interior
Finland



This report may be copied only in its entirety.

Postal address
P. O Box 600
FI-33101 Tampere

Telephone (switchboard)
(03) 311 511

Email
firstname.surname@tut.fi



TIIVISTELMÄ

Tämä tutkimus lähti liikkeelle havainnoista, joiden mukaan tulisijoihin ja savupiippuihin liittyviä tulipaloja vaikuttaa tapahtuvan Suomessa enemmän kuin naapurimaissa, joissa kuitenkin on samantapainen tulisijoihin ja niiden käyttöön liittyvä kulttuuri. Pohdittiin, voisiko palovahinkojen määrää vähentää vertaamalla Suomen tulisijoja ja savupiippuja koskevia säännöksiä naapurimaiden vastaaviin ja ottaa oppia mahdollisesti löydetyistä eroavaisuuksista ja naapurien hyvistä käytännöistä.

Tutkimuksen tavoitteena oli selvittää näitä kehittämismahdollisuuksia, joiden perusteella voitaisiin löytää

- keinoja, joilla voitaisiin selventää käytännön rakentamiskäytännöksiä ja parantaa niiltä osin paloturvallisuutta
- tapoja, joilla ruohonjuuritasolle voitaisiin paremmin viedä oikeaa tietoa tulisijojen ja savupiippujen oikeasta asentamisesta ja käytöstä
- parempia käytäntöjä paloturvallisten rakennusratkaisujen ja niiden oikean käytön kehittämiseen, seurantaan ja valvontaan

ja tätä kautta vähentää tulisijoista tai savupiipuista johtuvien palojen määrää.

Tutkimus toteutettiin vuosina 2017 ja 2018 kirjallisuustutkimuksena ja tekemällä haastatteluja Suomen lisäksi Virossa, Saksassa, Norjassa ja Ruotsissa. Haastattelujen pohjana käytettiin etukäteen lähetettyjä täydennettäviä kyselylomakkeita.

Tutkimus ei paljastanut eri maiden välillä dramaattisia eroja, perustuvathan kaikkien tutkittujen maiden – myös Norjan, joka ei ole EU:n jäsen – aiheita koskevat säädökset EU:n yhteiseen lainsäädäntöön. Joitakin aiheita voitiin kuitenkin nostaa esille.

Lämpötilaluokat

Eri maissa käytetyt savupiippujen lämpötilaluokkien vaatimukset vaihtelevat T400:sta Suomen kattavaan T600-luokkavaatimukseen. Standardointiryhmissä on keskusteltu paljon siitä, miten tulisijasta määritetään savukaasujen lämpötila, jota käytetään savupiipun valintaan. Suomessa T600-vaatimusta on pidetty yksinkertaisena ja tehokkaana tapana parantaa savupiippujen paloturvallisuutta, mutta esim. saksalaiset haastateltavat pitivät tätä tarpeettoman tiukkana.

Suomalaisen kansallisen standardin SFS 7010:n ja savupiippuja koskevat asetuksen 745/2017 välillä on lämpötilaluokkia koskeva lievä ristiriita: SFS 7010 kehottaa käyttämään savupiippujen seinäläpivienneissä kertaluokkaa suurempaa lämpötilaluokkaa kuin testatussa ja hyväksytyssä vaakarakenteen läpiviennissä, mutta asetuksen yleistä vaatimusta T600 suurempaa lämpötilaluokkaa ei ole. (Tämä tullaan korjaamaan tulevilla päivityksillä.)



Tilastointi ja rakennedetaljien arviointi

Tutkimuksen edetessä todettiin, että tilastoinnin määrä ja laatu vaihtelevat suuresti eri maiden välillä. Löydettyjen tilastojenkaan kesken ei voitu tehdä luotettavaa vertailua, koska kirjattavien asioiden luokittelu ja kirjaamisen käytännöt eivät olleet yhteismitallisia edes kunkin maan sisällä, esim. ”savupiipusta lähtenyt palo” saattaa olla yksittäisestä kirjaajasta riippuen savupiipun sisällä tai ympäröivissä eristeissä syttynyt, eikä varsinaista juurisyitä ole tutkittu tai kirjattu. Yhteismitallisempi tilastointi voisi mahdollistaa luotettavampien vertailujen tekemisen ja esim. rakenteellisten detaljien toimivuuden arvioinnin.

Tutkimuksen aikana kerättiin tietoa mm. eri maiden suojaetäisyysvaatimuksista ja läpivientidetaljeista. Vaikka nämä perustuvatkin samaan EU-normistoon, oli kansallisten ratkaisujen ja sovellusten vaihtelu niin suurta, että tutkimuksen puitteissa tyhjentävää vertailua – saati paremmuuden arviointia – ei voitu tehdä.

Käyttöönottotarkastukset

Tulisijojen ja savupiippujen paloturvallisuuden osalta ruohonjuuritason toimija – rakennushankkeeseen ryhtyvä, omistaja tai haltija – on aivan keskeisessä roolissa. Vaikka esim. Viro asettaa säädöstasoisia vaatimuksia tulisijojen käytölle, todellisuudessa lopputarkastuksen toimia on lähes mahdotonta valvoa. Viranomistoimin on mahdollista tehdä ylläpitoon kuten nuohoukseen liittyvää valvontaa ja tulisijan käyttöönottoon liittyviä tarkastuksia. Varsinkin viimeksi mainituissa vaikuttaa olevan mahdollisesti paloturvallisuuden vaikuttavia aukkokohtia.

Säädöstasolla ei käyttöönottotarkastuksiin tai käyttöönottolupaan liittyviä yksityiskohtaisia määräyksiä löytynyt. Haastateltavat kaikissa maissa kertoivat, että heillä hyväksi havaittu ja laajasti käytetty tapa on edellyttää pätevän henkilön, yleensä valtuutetun nuohoojan, tekemää tarkastusta ennen uuden, muutetun tai korjatun tulisijan tai savupiipun käyttöönottoa. Kuntakohtaisesti vaihtelevat tarkastuskäytännöt saattavat kuitenkin jättää piilemään asiantuntemattomien tai välinpitämättömien toimijoiden tekemiä virheitä. Erityisesti tee se itse -pohjalta voidaan hankkia ja asentaa järjestelmiä tai tuotteita ilman mitään tietoa niiden oikeasta käytöstä. Myös pienet työt, jotka eivät vaadi virallisia lupia (ja työt, joita tehdään välittämättä lupavaatimuksista) jäävät valvontaverkon ulkopuolelle.

Käytönaikaiset tarkastukset ja huolto

Sisäministeriö valmistelee pelastuslain uudistusta, joka on astumassa voimaan vuoden 2019 alussa. Uudistuksessa poistuu alueellisten pelastuslaitosten vastuu nuohouspalvelujen järjestämisestä, mikä tarkoittaa käytännössä myös piirinuohoojajärjestelmän poistumista.

Nuohousalan arvion mukaan yksittäisten toimijoiden tekemiä nuohouksia tulee olemaan vaikeampaa luetteloida läheskään kattavasti. Tietoja saadaan lähinnä käyttäjien tekemien omatarkastusten ja viranomaisten pistokokeiden kautta. Myöskään tilastoinnin tarvitsemia pohjatietoja ei saada näiltä osin koottua systemaattisesti.



Muissa tutkituissa maissa nuohoustoimi kuuluu kuntien vastuualueeseen ja on siten jokseenkin raskaasti säädeltyä: valtuutettujen nuohoojien vastuut ja valtuudet ovat suurempia kuin Suomen tämänhetkisessä tilanteessa. Haastatellut olivat tyytyväisiä käytäntöihinsä ja pitivät niitä hyvin järjestettyinä, valvottuina ja toimivina.

Tulisijoja koskevat säännökset

Suomen Rakennusmääräyskokoelmaa koskevan uudistuksen myötä on pyritty siihen, että kokoelmassa esitetään ainoastaan velvoittavia asetuksia. Muurattuja tulisijoja koskevat määräykset ovat kuitenkin edelleen vanhaa perua olevassa E8-julkaisussa, jonka sisältö on lähinnä ohjetasoista. Tällä hetkellä onkin epäselvää, onko tulisijoja koskevia varsinaisia asetuksia olemassa lukuun ottamatta pelastuslain yleisluontoista velvoitetta rakentaa tulisija palo- tai räjähdysvaaraa aiheuttamattomaksi sekä lakia pelastustoimen laitteista, jonka asettamat yleiset vaatimukset (5 §) koskevat myös valmistulisijoja ja -savupiippuja. Lähes kaikilla valmistulisijoilla on CE-merkintä ja ne täyttävät siten harmonisoitujen standardien asettamat vaatimukset, mutta kansallisesti asetetut vaatimustasot puuttuvat. Sovellusstandardit asettavat joitakin vaatimuksia, mutta nekaan eivät ole säädöstasolla velvoittavia.

Ohjeiden löydettävyys

Tutkimuksen rajapinnassa on lukuisa joukko eri toimijoiden julkaisemia hyviä käytäntöjä esittäviä suosituksia ja ohjeita, jotka täydentävät asetuksia määrittelemällä, kuinka asetusten antamat velvoitteet voidaan käytännössä täyttää. Usein nämä ohjeet ovat varsin haastavia ja työläitä hahmottaa ja löytää kattavasti. Tutkimuksen aikana huomattiin, että mm. norjalaiset ja ruotsalaiset viranomaiset ovat koonneet omien säädössivujensa yhteyteen kiitettävän kattavat ja selkeät linkkilistat asiaan liittyvistä ohjeista.

Tutkimukseen liittyvä työ jatkuu erilaisissa asiantuntijaryhmissä ja toimikunnissa. TTY:n Palolaboratorion työryhmä toivoo ja uskoo, että tällä raportilla on käyttöä tämän toiminnan työkaluna. Työryhmä haluaa kiittää rahoittajatahoja – ympäristö- ja sisäministeriöitä, Tuakesia ja Palosuojelurahastoa – sekä näiden ohjausryhmään osallistuneita edustajia Jyrki Kauppista, Jaana Rajakkoa ja Johanna Aholaa.



1. Introduction

1.1 Background

According to the rescue authorities' statistics approximately 15 – 17 % of building fires or risks of fire are related to fireplaces or chimneys. This adds up to a number of 770 – 1 000 fires of this type per year.

This survey was initially launched by a presumption that chimney- and fireplace-related incidents might be more frequent in Suomi than in some neighbouring countries with similar fireplace cultures. It was reckoned that it would be possible to decrease the amount of these fires by scrutinizing the national regulation and its differences to the better-achieving neighbour countries.

The idea of this survey was introduced by the Ministry of the Environment, the other participating officials are the Ministry of the Interior and the Finnish Safety and Chemical Agency Tukes, that all have representatives in the steering group. All three were also funding the survey as well as the Fire Protection Fund of Finland. The survey was executed by the Fire Laboratory research group of Tampere University of Technology.

The steering group was participated by Jyrki Kauppinen (the Ministry of the Environment), Jaana Rajakko (the Ministry of the Interior), Johanna Ahola (the Finnish Safety and Chemical Agency Tukes), the TUT Fire Laboratory research group leader Mikko Malaska and employees Anu Aaltonen and Perttu Leppänen.

1.2 Aim of the survey

There is already a lot of research done on the fire safety of fireplaces and chimneys, but implementing the results to fire safety design, solutions and control might be further developed. Combining legislation, control methods and previous research results may offer solutions that clarify the practices and improve the fire safety.

The aim of this research is to explore these development opportunities and

- bring up solutions that will improve and clarify the practical construction and increase the fire safety of fireplaces and chimneys
- develop policies in which information on the fire-safe installation and use of fireplaces and chimneys is better implemented to consumers
- improve fire control and fire protection installation and implementation mechanisms for fireplaces and chimneys,

and thus reduce the number of fires in the fire and the chimneys.

Presently preparatory work is underway for reforming several standards and guidelines concerning fireplaces and chimneys. This survey provides useful background information also for these procedures.



1.3 Execution of the survey

The aim of the survey was realized by surveying laws and regulations concerning the fire safety of fireplaces and chimneys in selected countries. Finland, Estonia, Germany, Norway and Sweden were included. Notable differences of the regulations and possible good practices were to be found and compared.

Initially, the interviewees in the selected countries were assumed to be officials of ministries, but it was soon found out that actually the sweeper organizations and their networks had a good overall understanding on the issue. So, in most cases, they were the active conveners and hosts of the interviews. The comprehensive list of participants and their respective organizations is found in the Appendix 1.

Unfortunately, the survey timetable didn't eventually allow an in-depth interview in Estonia. The Estonian information is thus based on the literary survey and the questionnaire filled in by Estonian officials at and with the Estonian Rescue Board.

For the reasons of scope and width of the project, it was narrowed down to residential buildings and fireplaces using solid, primarily timber or timber-based fuel.

At the end of the project the results of the survey were compiled and reviewed during a workshop that also assessed the suitability of different implementation models in Finland.

1.4 Structure and methods of the survey

The survey was executed during years 2017 – 2018 in 4 work packages as follows:

WP1 – Literature survey of the national characteristics

- Legislation, regulations and instructions
- European standards and regulations effective on national levels
- Structural solutions and details

WP2 – Interviews

- Finding out the appropriate contacts
- Sending out preliminary information and questions
- Face to face interviews in each country

WP3 – Reporting

- Temporary reports for the steering group: Results of WP1 and WP2
- Final report: Comparison of the laws and regulations concerning the fire safety of fireplaces and chimneys. Execution of inspection and monitoring. Analysis of the found differences and good practices and proposals for the future use of results.
- Summary of the results to the interview participants

**WP4 – Workshop for the development of the Finnish practices**

- Officials of the ministries involved, building inspection and rescue authorities
- Manufacturers of chimneys and fireplaces
- Chimney sweepers
- Building supervisors and managers
- Construction designers
- Insurance sector
- etc.

1.5 Note to the reader

The literary or online sources refer primarily to an official or semi-official English translation. If one is not available, the reference is to a native language version. In cases of interpretations or contradictions, the original text is binding.

In many cases, an English version – at least draft – may be found in the EU TRIS database. One must take notice and compare it to the national final and legally valid document.

The text sections without an especially mentioned source are mostly given and verified by the interviewees either in the pre-filled questionnaire or at the actual interviews.

An alert reader may wonder about the amount of “no special requirements” entries all along the report. It may not necessarily mean absolute non-existence, but due to drawing lines between regulations and guidelines some minor issues may be omitted. It is also possible that the choices of structure and subtitles have dropped some regulation sentences out. It may, however, be presumed that no significant issues have been ignored due to these choices.



2. Regulations and guidelines

All the surveyed countries have rather similar hierarchy of building-related (or other) regulations, which relate to each other in a predetermined way. **Laws, or Acts**, are adopted by the national Parliament. It is possible for Acts to contain mandatory provisions issued by the Government or the agency determined by the Government.

Certain kinds of provisions do not need to be regulated through an Act. Instead, the level of Government-adopted **Ordinance** is sufficient for this purpose. **Ordinances and mandatory provisions** provide typically a more detailed clarification of what is laid down in the Acts. Mandatory provisions may be drafted by authorized government agencies.

As all the above mentioned regulations state *what* should be done to meet the binding demands, it is not always clear *how* to fulfil them. This question is often answered by **General recommendations**, which may be seen as toolboxes presenting a method or solution. It is not obligatory to follow the recommendations, but in that case one is obliged to prove that the regulation demands are properly fulfilled. A government agency (or another organization) may draft a general recommendation without having an authorisation as long as the general recommendation lies within the drafter's expertise.

The EU influences national regulations of member countries through **EU Directives** and **EU Regulations**. EU Directives must be implemented in the national legislation, meaning that the national regulations must be amended in order to achieve the purpose of the Directives. An EU Regulation immediately becomes a part of national legislation. An example of an EU Regulation is **the Construction Products Regulation, CPR**.¹

2.1 Finland

The umbrella law of the Finnish building branch is **the Land Use and Building Act** (Maankäyttö- ja rakennuslaki, MRL 132/1999). Its general objective is "to promote ecologically, economically and culturally sustainable environment" by means of use of land and waters areas and building activities on them (MRL 132/1999 1 §). It also defines some lower-level regulation such as the Finnish Building Code and municipal Building Ordinances. The building authorities are defined – on the national level the Ministry of Environment (MRL132/1999 17 §), then the local building supervision authorities such as building committee and building inspector (MRL 132/1999 21 §, 124 §). In Chapter 17, General preconditions for building activities, fire safety is dealt briefly on general level; it is mentioned that the Ministry may give out also more detailed decrees (MRL 132/1999 117b §). Another notable definition is the section about market surveillance, which gives the authority to the Finnish Safety and Chemical Agency Tukes, as referred to in the Construction Product Directive (MRL 132/1999 181 §).

If the Land Use and Building Act defined responsibilities and authorities for the actual building activities, **the Rescue Act** (Pelastuslaki, PelL 379/2011), given by the Ministry of

¹ The contents of the previous paragraphs are largely adapted from the text at the Swedish Boverket's web site "Regulatory hierarchy – from law to general recommendation" (boverket.se/en/).



the Interior, defines responsibilities more from the viewpoint of the building in use. The Act states that the owners, occupants and operators of a building are responsible for the condition of the building, structures and surroundings to minimize the risk of fire and enable the effective rescue operations (PeL 379/2011 Ch. 3). Especially they must ensure the adequate frequency and quality of the chimney and fireplace sweeping (PeL 379/2011 13 §). The regional rescue services are (among their overall duties) responsible for arranging and authorizing the chimney sweeping services (PeL 379/2011 59 §), fire inspections (78 §) and rectifying orders or suspension of operations (81 §). Further decrees on sweeping may also be given by the Ministry of the Interior (PeL 379/2011 13 §). **The Act on Rescue Equipment** (SM 10/2007) touches tangentially some fireplace issues.

The core of building-related regulations are collected to form the **National Building Code of Finland** (Rakennusmääräyskokoelma, RakMK). In the beginning of 2018 the Building Code has been under revision so that it doesn't or will not contain any more guidelines, but only regulations. So far, concerning the fire safety of building, there are two decrees – **the Decree of the Ministry of the Environment on Fire safety of buildings** (Ympäristöministeriön asetus rakennusten paloturvallisuudesta, YM 848/2017) and **the Decree of the Ministry of the Environment on Structures and fire safety of small chimneys** (Ympäristöministeriön asetus savupiippujen rakenteista ja paloturvallisuudesta, YM 745/2017) and still one guideline, **Masonry fireplaces, guidelines** (Muuratut tulisijat, ohjeet, YM E8/1985). The decrees are both accompanied by motivational background memos. The decree 745/2017 and the guideline E8 are relevant to this survey and will be referred throughout the report.

As implied before, a further decree on sweeping does exist, namely **the Chimney Sweeping Decree** (Sisäasiainministeriön asetus nuohouksesta, SM 539/2005) by the Ministry of the Interior. The decree defines e. g. the objects, intervals and contents of sweeping work, as well as the contents of a sweeping certificate. It will also be referred to later in the report.

2.2 Other countries

Estonia

The Building Code (Ehitusseadustik, EhS 2015) is defined very much by the same scope as the Finnish Land Use and Building Act: “to promote sustainable development and to ensure the safety, purposeful functionality and usability of the built environment” (EhS 2015, §1). However, the land use and planning is defined elsewhere in the Planning Act and the Building Code goes more into details of construction works, their design, building, use and maintenance (EhS 2015 § 2). On authorities it is noted that the Rescue Board exercises state supervision over compliance with the fire safety requirements for construction works (EhS 2015 § 130 (10)). The most relevant part, though, is given in the Division 3, “Obligations of persons operating in the field of building work”, where it is particularly stated that construction and installation of heating appliances that use solid fuel and of chimneys and flue vent connectors and chimney sweeping may only be performed by a competent person with professional certificate (EhS 2015 § 23, § 24 (9, 10)).



The Act of Fire Safety (Tuleohutuse seadus, TuOS 2017) gives rather comprehensive and detailed information concerning the fire safety requirements for heating systems. It is complemented by **the Heating system cleaning requirements** (Küttesüsteemi puhastamise nõuded, 2010), which defines further e.g. the sweeping procedures with annexes of certificate and suggested action forms and national standard **EVS 812-3:2018**, Fire safety of constructions Part 3: Heating systems (Ehitiste tuleohutus. Osa 3: Küttesüsteemid), which goes very much into detail in normative and instructive guiding on the issue. EVS 812-3:2018 is referenced in this survey only if the other above mentioned, “higher” regulations do not state anything, or if the EVS 812-3:2018 gives some significant further information on the issue at hand.

The Rescue Act gives no relevant requirements for the issues of this survey.

Germany

Germany’s legislation structure is different to the other surveyed countries because of its federal government. There are federal laws that are mandatory for the constituent states, but the states have also possibility to issue own laws. This survey doesn’t go into different details in different states, but deals only with the federal laws and their introduction to the state level.

The most important law in German building planning is the **Federal Building Code** (Baugesetzbuch, BauGB 1997). As the Finnish Land Use and Building Act, it deals with big entities such as urban planning and control of land use and doesn’t mention the issue of chimneys or fireplaces directly.

The federal level sets also **Model Codes** (Muster) that may be adopted to the states so that they become state laws, for example **the Model Building Code** (Musterbauordnung, MBO 2012). A state may change a Model Code, but it must prove that the changes are appropriate and justified. Usually the changes are only minor, editorial ones. At the federal state the Model Codes are considered exemplary, presenting detailed good practices and guidelines. The most relevant and referred item in this report would be **the Model Regulation for Heating Equipment** (Muster - Feuerungsverordnung, MFeuV 2017).

The Federal Immission Control Act (Bundes-Immissionsschutzgesetz, BImSchG 1990) or Act on the Prevention of Harmful Effects on the Environment caused by Air Pollution, Noise, Vibration and Similar Phenomena deals with some issues of e. g. burning wood and its emissions, as well as the Federal Immission Control Regulations (Bundes-Immissionsschutzverordnungen, BImSchV).

The Act of Chimney Sweeping Profession (Schornsteinfeger-Handwerksgesetz, (SchfHwG 2008) is a federal law that define the trade of chimney sweeping. Also the **Sweeping and Control Regulations** (Kehr- und Überprüfungsordnung, KÜO 2013) are issued on the federal level.



Norway

As well as in the other surveyed countries, Norwegian fire safety regulation is mostly bi-partite: there are regulations on building and structures, on the other hand there are regulations relating to rescue services. According to the Norwegian interviewees the most explicit way to define the regulations is by the organizations responsible for each.

Directorate of Building Quality

Directorate of Building Quality (Direktoratet for Byggkvalitet, DiBK) is organized under the Ministry of Local Government and Modernisation. It is responsible e. g. for managing laws and rules related to building and construction and authorizing rules related to documentation of construction materials and their properties, as well as approving companies related to the Planning and Building Act.

The Planning and Building Act (Lov om planlegging og byggesaksbehandling, or Plan- og bygningsloven) is central to all land management and construction activities in Norway. As in the other countries, it deals with big entities on general level. More detailed information is to be found in the Building Regulations.

Technical Description of Building Regulations (Forskrift om tekniske krav til byggverk, or Byggteknisk forskrift, TEK17) deals with chimneys and fireplaces mostly in Chapter 15 part I., Installations and plants/Heating and cooling installations. Some short mentions are also found in other chapters about emissions or energy supplies.

Regulations relating to building applications (Forskrift om byggesak, or Byggesaksforskriften, SAK10) supplements the TEK part with e. g. approval and responsibility issues.

Directorate for Civil Protection

The Norwegian Directorate for Civil Protection (Direktoratet for samfunnssikkerhet og beredskap, DSB) is a Norwegian government agency under the Ministry of Justice and Public Security. As its general purpose is to protect Norway and its citizens from accidents, disasters, and other incidents, also fire rescue and protection issues are among the agency's activities.

Act relating to the Prevention of Fire, Explosion and Accidents involving Hazardous Substances and the Fire Services (Lov om vern mot brann, eksplosjon og ulykker med farlig stoff og om brannvesenets redningsoppgaver, or Brann- og eksplosjonsvernloven) defines it to be the local fire department's responsibility to arrange sweeping and supervision of fireplaces.

Other responsibilities of different parties are defined further in the **Fire Prevention Regulations** (Forskrift om brannforebygging).

Sweden

The Planning and Building Act (Plan- och Bygglagen, PBL 2010:900), and the **Planning and Building Ordinance**, PBF 2011:338, contain provisions on the planning of land and water areas, and on construction.



The Swedish National Board of Housing, Building and Planning (Boverket) is a central government authority assorted under the Ministry of Enterprise and Innovation. One of its main fields of activities is issuing **Boverket's Building Regulations** (Boverkets Byggregler, BBR²). The BBR consists of mandatory provisions that one has to fulfil and general recommendations that state how the mandatory provisions might be fulfilled. It is divided into nine chapters, of which Chapter 5, Safety in case of fire and especially the section 5:4, Protection against the outbreak of fire are relevant to this survey.

The Act on protection against accidents (Lagen om skydd mot olyckor, 2003:778), supervised by the Swedish Civil Contingencies Agency (Myndigheten för samhällsskydd och beredskap, MSB), defines the responsibilities of municipalities on arranging and authorizing the chimney sweeping services and fire protection control (2003:778 4 – 6 §).

2.3 The statutory functions of authorities and officials

Official	Issues concerning the safety of fireplaces and chimneys	Based on regulation
Finland		
Ministry of Environment	Definitions of e. g. the responsibilities of other officials Delegating down of certain legal rights	the Land Use and Building Act
Ministry of Environment	Provisions and guidelines	the National Building Code of Finland
Ministry of the Interior	Definitions of responsibilities from the viewpoint of the building in use	The Rescue Act
Ministry of the Interior	Definitions of e. g. the objects, intervals and contents of sweeping work	the Chimney Sweeping Decree
Finnish Safety and Chemical Agency Tukes	The market surveillance authority in Finland	System fireplaces, sauna stoves and chimneys: CE markings European non-harmonized standards National standards

² The BBR is updated quite often. At the moment the latest version is BBR 26, which is available only in Swedish. The source used in this survey is the unofficial translation of the version BBR 23 by Boverket.



Estonia		
The Parliament	Regulates the acts concerning design, construction, operation and maintenance of heating systems	the Fire Safety Act
Ministry of Economic Affairs and Communications/Construction and Housing sector	Definitions of the authorities and responsibilities for some organizations and competent persons	the Building Code
Ministry of the Interior	The requirements for heating system maintenance	the Fire Safety Act The Regulation of Heating system cleaning requirements
Ministry of the Interior /Estonian Rescue Board	National fire safety supervision; verification of the fire safety requirements, compliance with them, giving out appropriate precepts	the Fire Safety Act
Estonian Centre for Standardisation	Construction standards for fireplaces and chimneys	Construction standards for fireplaces and chimneys: CE markings European non-harmonized standards National standards
Germany		
The Federal Parliament	Definitions of the federal/constituent legislative rights and responsibilities	The Constitutional Law
Federal Ministry of the Interior, Building and Community	Mandatory acts concerning urban planning and control of land use	Federal Building Code
Federal Ministry of Economics and Technology	Exemplary acts for the adaptation in constituent states Definitions of authorities of procedures, approvals and inspections Definitions of specific requirements	Model Building Codes, e. g. the Model Regulation for Heating Equipment
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	Issues of e. g. burning wood and its emissions	Federal Immission Control Act Federal Immission Control Regulations
Federal Ministry of Economics and Energy	Definitions, regulations and practices of the trade of chimney sweeping	The Act of Chimney Sweeping Profession Sweeping and Control Regulations

 This report may be copied only in its entirety.



Norway		
Ministry of the Environment	Definitions of e. g. the responsibilities of other officials; delegating down of certain legal rights	Planning and Building Act
Ministry of Local Government and Modernisation/ Directorate of Building Quality	Regulations on technical requirements for construction works	TEK - Regulations on technical requirements for construction works
Ministry of Local Government and Modernisation	Regulations relating to building applications: content, processing approvals, responsibilities etc.	SAK – Building Application Regulations
Ministry of Justice and Public Security/ Directorate for Civil Protection	Responsibilities of e. g. local rescue services in sweeping and supervision of fireplaces Other responsibilities on the issue	Act relating to the Prevention of Fire, Explosion and Accidents involving Hazardous Substances and the Fire Services Fire Prevention Regulations
Local municipalities	Definitions, implementing and inspections of sweeping procedures	Sweeping regulations
Sweden		
The Swedish Parliament	Provisions on the planning of land and water areas and on construction Delegating down of certain legal rights and responsibilities	Planning and Building Act Planning and Building Ordinance
Ministry of Enterprise and Innovation/ Swedish National Board of Housing, Building and Planning	Building regulations – mandatory provisions and general recommendations	Boverket's Building Regulations
Ministry of Defence/ Swedish Civil Contingencies Agency	Definitions of fire protection responsibilities for individuals, municipalities and government authorities	The Act of Protection against accidents
Ministry of Defence/ Swedish Civil Contingencies Agency	Regulations concerning periodic sweeping and fire protection control of fireplaces and chimneys	The Swedish Civil Contingencies Agency's regulations and general advice on cleaning (chimney sweeping) and fire safety inspections

2.4 Organizations and associations

It is typical for the regulations not to go to the details: they define, *what* are the requirements for e. g. fire safe structures, not *how* to achieve these goals. Further guidance for grass-root level planning and building is needed. Usually these guidelines are created by expert associations and organizations – either governmental, commercial or society-based. Of course the instructions given by the manufacturers of fireplaces and chimneys are an important source of information, too. The scope and range of this survey does not allow a comprehensive listing, but some examples from the surveyed countries are given.



Publisher	Publications/databases
Finland	
Building Information Foundation RTS/Building Information Ltd	RT Building Information File, Codes of Construction Practices (RYL), textbooks, handbooks, form overlays, CAD libraries
The Finnish Association of Civil Engineers RIL	Instructions and norms, textbooks
The Central Association of Sweeping	Diverse guidelines and forms on sweeping for both professionals and customers
Municipal rescue and building inspection authorities	Diverse guidelines on planning, constructing and maintenance
Estonia	
ET Infokeskuse AS/The Estonian Construction Centre	ETF-Net Building Information File, Codes of Construction Practices, textbooks, handbooks, form overlays, CAD libraries
The Estonian Chamber of Chimney Sweepers	Diverse guidelines and forms on sweeping for the professionals
Germany	
Centre of Competence for Construction	National technical guidelines
The Central Guild Association of Sweepers (Bundesverband des Schornsteinfegerhandwerks - Zentralinnungsverband ZIV)	Diverse guidelines and forms on sweeping for professionals
Associations and organizations on constituent state and municipal level	Diverse guidelines for both the public and professionals
Norway	
Appropriate Directorates	Handbooks (Veiledninger) on regulations
SINTEF Building and Infrastructure	Byggforskserien (e. g. model details)
Sweepers' National Association (Feiermesternes Landsforening FLF)	Diverse guidelines on sweeping for both professionals and customers
Sweden	
Swedish Building Service	General Materials and Work Description AMA; a collection of design and execution standards
Swedish National Board of Housing, Building and Planning	Regulations and General Advice BFS (separate from Building Regulations), guide books and leaflets
The National Association of Sweeper Masters	Guide books and leaflets for both the public and the professionals

 This report may be copied only in its entirety.



3. Supervision and responsibilities

Before putting into use, it must be ensured that the chimney and fireplace are valid and compatible. There are requirements for the different parties involved.

3.1 Finland

The fire safety supervision is, as well as the regulations, mostly bipartite: on the other hand there are inspections of the planning, constructing and implementing of fireplaces and chimneys, on the other hand there are procedures concerning their use and maintenance.

3.1.1 *The end-user of a building*

The building owner and/or occupant is basically the grass-root level in which all the fire safety regulations and their aims culminate. Of the more than 5 000 annual building fires in Finland half are caused by human activities (D3 2018).

Building inspections

The party engaging in a building project (the “initiator”) shall ensure that the building is designed and constructed so that its structures are solid and stable, suitable for the site conditions for the service life of the building. This includes ensuring of sufficient and relevant fire safety. (MRL 132/1999, 117a, b §.)

The initiator of the project shall also ensure that the building is designed and constructed in accordance with building provisions and regulations and the permit granted. The party shall have the necessary competence to implement the project, as required by its difficulty. They must also ensure that the construction project has designers and project managers who meet the professional requirements and that other building personnel have also sufficient expertise and professional skills, taking into account the requirements of their duties. (MRL 132/1999, 119 §.)

Before the chimney is put into service, the initiator must ensure that the chimney and fireplace are compatible and that the installation work has been carried out according to plan. (YM 745/2017 11 §.)

Sweeping

The owner and occupants of a building shall, for their part, ensure that the building and structure and their surroundings are kept in such a condition that the risk of a fire, the risk of a fire being started deliberately and the risk of a fire spreading is low (PeIL 379/2011 § 9 (1)). This responsibility includes the ensuring of appropriate sweeping of fireplaces and flues, cleaning of the ventilation ducts and maintenance of the roof safety equipment (PeIL 379/2011 § 13 (1)). The owner or occupant is also obliged to keep the certificate of performed sweeping given by the sweeper so that it may be presented to the rescue authorities on demand.



A fireplace in a privately owned holiday home is swept once in three years. All the other sweeping is performed once a year. If a fireplace or chimney has been unused for more than 3 years, it must be swept before use. The sweeper gives a certificate of the performed sweeping to the building owner or user. (SM 539/2005 2 – 3§.)

After a soot fire the building owner is responsible for arranging the inspection and eventual repairing of the chimney (YM 745/2017, 8 §).

In the proposed Rescue Act renovation (cf. the next subchapter) the actions of arranging and recording the sweeping would be increasingly assigned as responsibilities of the occupant.

3.1.2 Municipal/regional level

Building inspections

Statutory functions regarding building control are the charge of a committee or some other multimember body, excluding the municipal board, appointed by the local authority. The local authority must have a building inspector for the purpose of building guidance and control. (MRL 132/1999, 21 §.)

It rests with the local building supervision authority to supervise building and ensure that the provisions of the Land Use and Building Act, and provisions and regulations issued under it, are observed in building activities. The extent and type of supervision shall depend on the difficulty of each building project, the expertise and professional skill of the permit applicants and the persons in charge of project design and construction, and other issues relevant in terms of supervision. (MRL 132/1999, 124 §.)

It is the responsibility of the local building supervision authority to assess and approve the building permit for a construction project (MRL 132/1999, 130 §). The supervision of actual construction work by the authorities begins when work subject to a permit is commenced, and ends with a final inspection. Supervision takes place at the stages of work and on the scale decided by the authorities, and focuses on aspects that are significant to achieving a satisfactory end-result. (MRL 132/1999, 149 §.)

In addition to the overall supervision of the building project, relevant to the issue are the inspections of flues and fireplaces. It is the responsibility of the local building supervision authority to inspect or authorize another competent instance (e. g. the site manager) to perform the inspections deemed necessary in the supervision plan (MRL 132/1999, 150 b §). The person carrying out the inspection must make an entry regarding compatibility and compliance with plans in the construction work inspection document (YM 745/2017 11 §).

This responsibility defined in the regulations concerns mainly new buildings, but it is applicable also for renovation or alteration works. However, on this issue diverse practices prevail depending on the municipality.



Sweeping

Currently a district sweeping practice is in use in most of Finland. The Rescue Act states that regional rescue services decide on the arranging of chimney sweeping services in their regions. The services may be provided by the rescue departments or procured from other providers, or building owners or occupants may be allowed to contract sweeping from a service provider of their choice. (PeL 379/2011, 59 §.) However, sweeping may only be implemented by the service providers authorised by regional rescue services. Only in individual cases rescue departments may permit chimney sweeping to be carried out by persons other than chimney sweepers. (PeL 379/2011, 59 §.) Chimney sweeping entrepreneurs, persons doing independent chimney sweeping work in their employ and chimney sweepers employed by rescue departments shall have passed the chimney sweep examination (PeL 379/2011 63 §).

Flues and fireplaces in a privately used vacation home need sweeping once in 3 years, all the others once a year. An open fireplace may be swept at a period of separate agreement. If a flue or fireplace have been unused for more than 3 years, they must be swept before putting into use. (SM 539/2005, 2 – 3 §.) In chimney sweeping, the fireplace, smoke flue and their parts are cleaned and the condition of the fireplace and smoke flue inspected. The chimney sweeper shall give the customer a certificate stating the chimney was swept (PeL 379/2011 § 60 (1)).

If the chimney sweeper detects defects in fireplaces or smoke flues that may cause a fire risk, they shall notify the building occupant and the rescue department of the faults or defects in writing. The same applies to the condition of roof safety equipment. (PeL 379/2011 60 §.) The rescue authority may, based on the sweeper's recommendation, set a rectifying order or even prohibition of operation on the faulty device (PeL 379/2011 81 §).

The regional rescue service may name a district sweeper (or other party engaged in sweeping) who is responsible for keeping a list of the swept premises. The information must be kept for ten years after the performed measure. (PeL 379/2011 § 62.)

The Ministry of the Interior is preparing a renovation of the Rescue Act effective from the beginning of year 2019. The regional rescue services would be no more responsible of arranging the sweeping services. In practice, this would mean abandoning of the district sweeping practices. Sweeping would be open to free competition and consumers would be able to choose service providers of their own choice. The building owner would be still responsible of arranging the sweeping at appropriate intervals. The demand of sweeper's professional certification would remain. This renovation is justified according to the Government's aims of trimming off the municipal duties, reducing the number of regulations and enabling the free competition. (<https://intermin.fi/nuohous>, in Finnish.)

3.1.3 Other levels

At the moment, there are no clearly defined duties for the organizations between the local authorities and the ministry level. The responsibilities concern mainly the organizing and supporting of the local authorities and their actions; they are not directly relevant to the issue at hand. The planned regional government reform might change some features.

This report may be copied only in its entirety.



The duties of involved Ministries are given in the Land and Planning Act (MRL 132/1999, 17 §.) and the Rescue Act (PeL 379/2011, § 23 (1).) The responsibilities include the general development and guidance, directing, steering and monitoring their respective activities and coordinating and delegating the responsibilities of other sectors or authorities.

3.2 Other countries

The overall layout of supervision and responsibilities correspond mainly to the Finnish structures described above. Some issues concerning the use and maintenance phase of fireplaces and chimneys are presented in this section.

Estonia:

TuOS defines the requirements and procedures of sweeping as follows (TuOS 2017 §11):

1. Ovens, fireplaces or kitchen ranges in use and their chimneys and connection flues shall be cleaned when necessary but not less frequently than recommended in the documentation thereof. If there is no documentation or unless other frequency has been provided in the documentation, they shall be cleaned at least once a year. The cleaning frequency shall prevent the risk of soot fire.
2. The occupant of a building shall provide a chimney sweep access to the premises or the part of the building required for cleaning of ovens, fireplaces or kitchen ranges and chimneys and connection flues, and ensure the equipment required for the access to them.
3. Ovens, fireplaces or kitchen ranges and chimneys and connection flues may be cleaned by a competent person engaged in professional and economic activities if he or she holds a professional certificate of a chimney sweep.
4. Persons not holding the professional certificate of a chimney sweep may also clean
 - an oven, fireplace or kitchen range, and/or
 - chimney and connection flue in non-residential buildings with one apartment, and/or
 - buildings required for servicing thereof or in other buildings, which occupy an area of up to 60 square metres and are up to five metres high, for own use by adhering to the requirements for cleaning of heating systems, except for soot combustion in smoke flues.
5. In the case specified in the clause 4 above, a chimney sweep with a professional certificate shall clean the ovens, fireplaces or kitchen ranges or chimneys and connection flues thereof once during a period of five years, and issue a chimney cleaning report concerning the technical condition and safety of the heating system.
6. (Repealed)
7. The occupant of a building shall maintain records on the cleaning of ovens, fireplaces or kitchen ranges and chimneys and connection flues, and preserve the report of a chimney sweep on sweeping the chimney until the reception of the next chimney sweep report.
8. In the case of detection of a violation of fire safety requirements or a fire hazard in the course of the cleaning of ovens, fireplaces or kitchen ranges and chimneys and

This report may be copied only in its entirety.



connection flues, the chimney sweep shall notify the owner and Rescue Board in writing within ten days as of the date of cleaning.

9. Requirements for the cleaning of ovens, fireplaces or kitchen ranges and chimneys and connection flues shall be established by a regulation of the minister responsible for the area.

Burning the soot out is allowed only for a competent person (certified sweeper) (TuOS 2017, §11 (4).) Detailed procedures are defined in KÜPN 2010, § 9.

After a soot fire the heating system must always be cleaned and checked. The person with the appropriate competence must also provide an assessment of the safety of the whole heating system after a soot fire. (EVS 812-3:2018, 8.1.)

Germany

The house owner is responsible to arrange sweeping and to report done jobs and results to the authorities.

Frequency of sweeping per year for solid fuel chimneys are defined in the Sweeping and Checking Order KÜO:

- year-round use: four times
- regular use in the heating season: three times
- more than occasional use, but not on a regular basis (e.g., additional stove): twice
- occasional use (maximum 30 days per year): once. (KÜO 2013, §1 (4), Annex 1.)

A district authorized sweeper system is in use. An authorized district sweeper (bevollmächtigter Bezirksschornsteinfeger, or bBSF) has the responsibility of inspections, even if other sweepers may perform ordinary sweeping tasks.

The authorized sweeper is responsible by his/her inspection authority for the validation of:

- safe evacuation of flue gases
- acceptable emissions
- safety of the appliance in general and in relation to fire.

This is ensured by visual controls of the appliances every 3 to 4 years. The district master chimney sweep shall issue a certificate of the result of the fireplace inspection to the owner or occupant of the building. (KÜO 2013, § 3.)

If accumulated soot is perceived, there is a procedure defined in KÜO: “An installation subject to sweeping shall be burned out, knocked out or chemically cleaned if the combustion residues cannot be removed using the usual sweeping implements. [...]. Burning out may only be done by persons authorized to exercise the chimney sweeping trade independently. The time of burning out shall be notified in advance to the owner and the occupants of the building and the fire department. After burning out, the installation shall be inspected for fire hazards.” (KÜO 2013, §2 (1).)

The Central Guild Association of Sweepers (ZIV) has published several guidelines for internal use on the details of validation.



Norway

The responsibilities of a municipality are defined in the Fire prevention regulations FOR 2015. In practice, all the sweeping activities belong to the municipality's area of responsibility.

The municipality shall ensure that smoke ducts in fireplaces used for the heating of building are swept as needed. The sweeping should be carried out in a professional satisfactory manner which will cause the least possible disadvantage for owners and users. After sweeping, the sweeper must ensure that all the soot is removed and brought to a suitable place. The municipality shall also arrange for the supervision of fireplaces used for the heating of buildings as necessary. The municipality shall ensure that the fireplace is inspected after a fire or explosion in or in connection with the fireplace. (FOR-2015, § 17.)

The detailed regulations on sweeping – e. g. intervals, fees and qualifications – are defined individually by each municipality. "Forskrift om tilsyn med fyringsanlegg" may be searched at the website <https://lovdata.no/>.

Sweden

In connection with the application to install a fireplace and/or chimney, a control plan must be established and approved by the municipality's building committee. The inspection plan shall indicate which inspections, tests and documents that are required to have the facility approved. The final inspection by the building supervising authorities doesn't typically include any fireplace or chimney inspection. However, it must be stated that the system has been built and assembled according to the accepted plans. Most municipalities demand a sweeper's statement to prove this. (Information at the interview.)

MSBFS 2014:6 (The Swedish Civil Contingencies Agency's regulations and general advice on cleaning (chimney sweeping) and fire safety inspections) gives outlines to the municipally organized sweeping. When the municipality establishes chimney sweeping intervals for various types of facilities, the length of the intervals should be considered in the light of how the following factors affect fire safety:

- soot formation,
- fuel,
- facility type,
- energy needs with regard to the climatic conditions and
- the structure.



4. EU and national standards

All the surveyed countries accept the EU legislation as their national regulations. Even Norway, not an EU member, is a member of EEA and EFTA, and thus has adopted the EU legislation at least in the issues related to this survey.

Harmonised European product standards (hENs) provide a technical basis to assess the performance of construction products. They enable manufacturers to draw up the Declaration of Performance as defined in the **Construction Products Regulation** (CPR), and affix the **CE marking**. The CPR is as well a part of harmonised regulations that bind every member state of the EU.

The harmonized standards covering the requirements and test methods of different system chimneys and fireplaces were not of interest here, because the adoption and use of them binds every party of the survey. Instead, non-harmonized standards such as EN 15287 (Chimneys. Design, installation and commissioning of chimneys) or EN 13384 (Chimneys. Thermal and fluid dynamic calculation methods) were discussed and reflected in relation to national standards in use.

4.1 Finland

Finland is using the SFS 7000-series, which includes detailed requirements regarding CE-markings. SFS 7000 -standards are national application standards based on the hENs and they set out recommendations of the characteristics to be reported according to the product standard for CE-marked products and the minimum requirements or categories for their properties.

4.2 Other countries

Estonia

In Estonia's national EVS series EVS 812-3:2018 (Fire safety of constructions Part 3: Heating systems) complements the European standards. It is in contents and level of details very much reminiscent of the former Finnish National Building Code guidelines.

Germany

Instead of EN 15287, the German standard DIN V 18160-1 (Chimneys – Part 1: Design and performance) has been introduced in the German building regulations. It does not contradict EN 15287, but is more specific. DIN 18896 (Fireplaces fired by solid fuel – technical specifications for installation) is likewise in use to complement the harmonized standard.

EN 13384-1 and -2 are used by the chimney sweepers to assess the safe usability of heating appliances and chimneys.

MVVTB (Technical Regulations) clarify the issues of how the harmonized standards are used in Germany and how the building products may meet the requirements.

This report may be copied only in its entirety.

**Norway**

There are national standards in use for testing and determining the environmental effects of fireplaces and chimneys: NS 3058 (Enclosed wood heaters - Smoke emission) and NS 3059 (Enclosed wood heaters - Smoke emission - Requirements).

Sweden

In the national SS standards there are none related to fireplaces and chimneys (that wouldn't be EN standards, too).



5. Statistics

The quality and availability of statistic information was very varied in the surveyed countries, even so that no reliable comparison was not possible to make within the resources of this survey.

5.1 Finland

According to the rescue authorities' statistics approximately 15 – 17 % of building fires or risks of fire are related to fireplaces or chimneys. This adds up to a number of 770 – 1 000 fires of this type per year, depending on and varying with statistical procedures.

The Finnish Rescue Services' database PRONTO (via the publication "Finnish rescue services' pocket statistics 2013–2017", D3 2018) states that in the years 2013 – 2017 there have been yearly approximately 600 – 900 fires starting from chimneys or fireplaces, of which app. 300 were soot fires that required rescue service involvement.

5.2 Other countries

Estonia

There are ca. 100 fireplace related fires per year according to the Estonian Rescue Board statistics module PÄHKAL.

Germany

The interviewees could not name relevant, reliable and comprehensive statistics.

Norway

The DSB has a non-public database, according to which there were in the year 2017

- 1149 chimney fires (of which the majority is soot fires)
- 58 building fires due to fireplaces or chimneys
- total number of fires 1833

Sweden

An overall estimate by the interviewees was ca. 900 fireplace or chimney related fires per year. There is statistics from MSB from years 2006 – 2015, however, as the criteria has changed during the period, it is not reliably comparable.



6. Design and assembly of the heating system

This chapter is about issues related to general requirements concerning both fireplaces and chimneys as an entity. Individual demands for both are presented in the following Chapters 7 and 8 and the issues of actual connecting in the Chapter 9.

6.1 General requirements

6.1.1 Finland

No specific demands on the system entity; requirements are set separately for fireplaces and chimneys.

6.1.2 Other countries

Estonia

Design, installation, check and maintenance of a heating system shall conform to the technical regulation and manufacturer's instructions and the provisions of safety requirements to allow the heating system to perform its function and to prevent the outbreak of fires, occurrence of explosions or other accidents. (TuOS 2017 §8 (1)).

Only a certified installer can build or install a solid fuel heater and a chimney (TuOS 2017 §9 (1)). Exception: installing devices for one's own use in one family buildings or other small buildings of max area 60 m² and max height 5 m (TuOS 2017 §9 (2)).

Ventilation tubes shall not be used to direct the smoke in the installation and design of a heating system (TuOS 2017 §8 (2)).

Germany

There are general requirements for installation in MBO, MFeuV and standards that deal with verification of safe evacuation of flue gases, verification of safety distances according to product hEN's and CE-mark and/or MVVTB requirements.

Norway

Heating (and cooling) installations shall be designed and constructed so that

- a) they comply with safety and indoor environment requirements;
- b) they perform as intended;
- c) they can be regulated and are adapted for energy-efficient operation;
- d) they do not increase the risk of fire and explosions;
- e) heat loads on building elements do not pose a risk of fire or impair the performance of building elements;
- f) they are protected against leaks; and
- g) they have safe, facilitated access for easy and efficient cleaning and maintenance of the installation, including safe sweeping. (TEK17 §15-1 (1))



Sweden

Heat-producing appliances connected to the chimney or flue shall be designed to ensure the system is a safe and well-functioning unit. They shall also ensure protection from other dangers such as chimney fires or incomplete combustion. (BBR 23, 5:421.)

Readily accessible parts of heating installations shall be fitted with protection against unintended contact if their surface temperature is so high that they may cause burns on contact. In spaces where children may be present special attention shall be given to the risk of accidents to children. (BBR 23, 8:41.)

6.2 Design documentation

Finland has set requirements for planning documents and their contents at the regulation level. In other countries the requirements are more general and are usually defined in the overall building application documentation rules. The information of this section is mainly given by the interviewees.

6.2.1 Finland

The plans must indicate

- the building materials and accessories
- the installation instructions for the chimney and the connected fireplace
- the information needed for the use
- maintenance instructions
- chimney compatibility with the designed flue gas temperature
- principles on lead-throughs and their sealing
- safety distances and cleaning and sweeping possibilities (YM 745/2017, 3 §).

The plans must also state the maximum temperature of the flue gases coming from the fireplace into the chimney (YM 745/2017, 9 §).

The layout and protection of the chimney must be presented in the plans (YM 745/2017, 10 §).

6.2.2 Other countries

Estonia

Fire safety principles for heating equipment should be presented in the plans with:

- Brief description of the system
- Fuel applied for the system
- Safety distances
- Insulation materials
- Technical data
- References to product manuals (Information given in the questionnaire.)

**Germany**

The requirements are subject to the hEN's of the products and/or they shall comply with MVVTB. Basically any product (including fireplaces, boilers and chimneys) shall comply with a hEN or shall show its fitness for use by an ETA or national approval; usually it shall have a CE mark. The authorized district sweeper shall control the validity of the documentation.

Norway

No specific requirements. Chapter 5 of SAK10 sets some general demands on applications and documentation.

Sweden

There are no specific demands for documentation as such. However, based on requirements in BBR, it's the sweeper that may require the following documentation (basically the same as in the Finnish listing), in Swedish language:

- materials and accessories
- installation instructions
- information needed for the use and maintenance guides
- compatibility with the designed flue gas temperature
- principles on lead-throughs and their sealing
- safety distances



7. Requirements for fireplaces

7.1 Fireplace design & assembly

This section defines what kind of rooms and installation spaces the fireplaces may be assembled to.

7.1.1 Finland

The fireplace is allocated a sufficient space, taking into account the safety distances, operation and maintenance. The fireplace may not be a load-bearing structure. If the fireplace acts as a base structure for the chimney, the chimney maximum height is 4 meters. (YM E8/1985 2.) (Detailed information of space requirements of custom-built fireplaces in YM E8/1985, for system ones in the respective DoPs).

7.1.2 Other countries

Estonia

The fireplace is allocated a sufficient space, taking into account the safety distances, operation and maintenance. The fireplace may not be a load-bearing structure. (EVS 812-3:2013 5.)

Germany

The fireplace must not be situated in staircases or rooms containing emergency exits or exit routes, or in garages (with some exceptions) (MFeuV §4 (1)).

The fireplace's operational safety must not be compromised by the functions of air ventilation systems:

- Fireplace and ventilation are prevented to function simultaneously, or
- Flue gases are monitored by safety systems, or
- Flue gases are exhausted by a motorized fan, or
- The furnace technology prevents any perilous depressurisation (MFeuV §4 (2))

MBO and MFeuV have several other safety-related general requirements without details. The safety (especially in relation to fire) is to be verified by a certified sweeper (bBSF) using DIN V 18160-1 and DIN 18896 as references.

Norway

Fireplaces shall not be situated in rooms where combustible gases or dust particles can occur that could result in dust explosions, unless the fireplace is designed for this. (TEK17 § 15-1 (6)).

Sweden

No specific requirements.



7.2 Base structure

This paragraph requires that the base structure must withstand the weight of the fireplace. In addition, the base material must be non-igniting. Heavy masonry fireplaces are very common in Finland, but in many other countries lighter fireplaces are preferred.

7.2.1 Finland

A brick fireplace must be founded on a stable mineral-based pedestal (or other sufficiently load-bearing and heat-proof horizontal structure). If ground-supported, the base is insulated against frost, moisture and/or, if needed, water. The insulation material must be heat-proof. The fireplace may also be supported on an intermediate horizontal structure, if it is designed to withstand the structural and heat loads from the fireplace. (YM E8/1985.)

There are no requirements for lightweight fireplaces.

7.2.2 Other countries

Estonia

A built-in fireplace must be founded on a stable pedestal (or other sufficiently load-bearing and heat-proof horizontal structure). If ground-supported, the base is insulated against frost, moisture and/or, if needed, water. The insulation material must be heat-proof. The fireplace may also be supported on an intermediate horizontal structure, if it is designed to withstand the structural and heat loads from the fireplace. A fireplace may also be constructed on a timber structure, if the bottom of the fireplace, smoke flues and ash chamber are at least 210 mm above the flammable floor, or the safety is otherwise provided. (EVS 812-3:2018, 6.1.)

For a fireplace weighing less than 400 kg, there is no need to set up a separate foundation. The load-bearing capacity under the fireplace has to be defined beforehand. The safety and stability of heavier heating systems without a foundation should be verified by calculations. (EVS 812-3:2018, 6.1.)

Germany

No specific requirements.

Norway

Heating installations shall be installed on a base that can withstand the expected weight of the installation (TEK17 § 15-1 (3a)).

Sweden

Heat-producing appliances and flues shall have sufficient strength to absorb any occurring loads. They shall be placed on a base of sufficient load-bearing capacity. Bases and foundations shall be designed to ensure that fire spread downwards is limited and that leaks due to subsidence do not occur in connected ducts and pipelines. (BBR 23, 5:4222.)



7.3 Safety distances of fireplaces

Safety distances should follow the lines of EN standards. The following section contains mainly supplementary national readings and instructions.

7.3.1 Finland

The fireplace is located so that it will not transfer heat to surrounding structures. The safety distances are defined by the fireplace model according to standards such as EN 15250, EN 13240 and EN 15821, or YM E8/1985.

For custom-built masonry fireplaces the security distances depend on the categories of fireplaces and their parts (vary depending on the fireplace and the fireplace combination). With open fireplaces it is 1500 mm from the bottom of the fire or floor. In front of the fireplaces the floor of combustible material must be protected by a metal plate:

1. Fireplaces with oven doors min 100 mm on each side and min 400 mm in front
- 2a. Open fireplaces up to 150 mm in the sides, 750 mm in front of the front edge of the firebox
- 2b. If the open fire chamber depth is min 750 mm or at the edge there is a min 50 mm high rolling-blocking border, in front 600 mm. (YM E8/1985.)

Pre-fabricated fireplaces have no requirements in the regulations. The CE markings of fireplaces, however, define the distances to adjacent combustible materials.

7.3.2 Other countries

Estonia

The distance of a heating system from walls, ceilings and combustible materials and substances must prevent ignition of the materials due to thermal radiation or movement of hot air (TuOS 2017 §8 (3)).

Detailed instructions on safety distances based on classification of surface temperatures are given in the EVS 812-3:2018, Section 5.3. and Annex A.

Germany

The primary rule is that the safety distances from appliance safety tests are to be fulfilled.

The following values in MFeuV are to be used in case of non-existing data.

The fireplace must be protected from or located at such a distance from combustible materials that they will not heat to over 85 °C surface temperatures. This is achieved by following the manufacturer's instructions or by a safety distance of min 40 cm. (MFeuV §4 (7)).

The front of a fireplace must be protected by non-combustible materials: forward 50 cm, sideward 30 cm, (MFeuV §4 (8)).

For an open fireplace, min 80 cm of non-combustible materials are required upwards and to the sides. With ventilated radiation shields 40 cm is enough. (MFeuV §4 (9)).



Norway

Heating installations shall have sufficient distance between the installation and flammable materials to prevent ignition, and they must ensure protection against damage or injury due to high surface temperature (TEK17 § 15-1 (3b, c)). Details should be presented in the manufacturer's instructions.

Sweden

The temperature on the surface of adjacent structural elements and fixtures of combustible material shall not be high enough to ignite the material. This is fulfilled if the surface temperature does not exceed 85°C. Other temperature criteria can be used if the material properties are well known and documented. The design should take into account that the temperature may increase with long-term continuous use or if the fixed installation is concealed in the building construction. When installation components are clad, materials that may be heated to temperatures exceeding 85°C, should be at least of class A2-s1, d0. (BBR 23, 5:41.)

Heat-producing appliances and connecting ducts can satisfy the above mentioned requirement, protection against thermal effects, by having the required safety distances, protection from radiation or a combination of both.

The required safety distance depends on the radiating surface area, temperature and emissivity.

The determination of the required distance can be made as follows:

1. For an uninsulated and non-water jacketed heat-producing appliance or an uninsulated flue, the required safety distance to a combustible structural element can be set to minimum of 0.5 meters.
2. Combustible structural elements can be protected by radiation protection using material of at least fire resistance class A2-s1, d0, and with a sufficient distance horizontally and vertically to combustible structural elements or to the heat-producing appliance.
3. For heat-producing appliances, depending on the type, the required safety distance can be verified using SS-EN 13229 or SS-EN 13240. (BBR 23, 5:4221.)

More detailed recommendations for fireplace safety distances are given under BBR 23, 5:4223.

7.4 Combustion air

A sufficient amount of combustion air seems to be an increasing problem. It may be not so much the incomplete burning, but the underpressure created by the exhaust ventilation in an airtight building: smoke sucks into the room instead of chimney.

7.4.1 Finland

The chimney must provide a sufficient draft for acceptable combustion (YM 745/2017, 3 §).



7.4.2 Other countries

Estonia

For normal combustion process (to prevent incomplete burning), the combustion air flow is required to be smooth and organized. If necessary, it is separated from the air ventilation of the room(s). It must be ensured that the smoke flue does not function as ventilation inlet route. (EVS 812-3:2018, 4.2.)

Germany

There are different requirements in MFeuV § 3 concerning room connections and volumes and combustion air aperture sizes. The requirements vary depending on the fireplace's nominal output:

1. Fireplaces with nominal output ≤ 50 kW
2. Nominal output > 50 kW

Combustion air apertures must not be closed by any safety mechanisms, if it is not ensured that they keep open during fireplace usage. The cross sections may not be narrowed down by shutters or grates.

The sufficiency of combustion air may be verified also by other means.

Norway

No specific requirements.

Sweden

Heat-producing appliances should supply a sufficient amount of combustion air to ensure that combustion does not occur with an unchecked shortage of air (BBR 23, 5:4221).



8. Requirements for chimneys and flues

8.1 Chimney design

Design of chimneys consists of issues related to adequate draft, structural durability, tightness, service life and equipment for maintenance activities to achieve successful combustion and exhaust performance.

8.1.1 Finland

The chimney needs to achieve the required draught, structural durability, tightness and service life. It must be cleanable and inspectable. (YM 745/2017, 3 §.)

8.1.2 Other countries

Estonia

The chimney, fireplace and the chimney connection joints are designed and dimensioned in a way to ensure adequate drag, service life, strength and safety. (EVS 812-3:2018, 7.1.1).

Germany

MBO and MFeuV have several safety-related general requirements without details. The safety (especially in relation to fire) is to be verified by a certified sweeper (bBSF) using DIN V 18160-1 and DIN 18896 as references.

Norway

Flues and chimneys shall be designed and constructed to ensure heating installations can function satisfactorily. (TEK17 § 15-3 (1)).

Sweden

No specific requirements.

8.2 Safety distances

Safety distances of chimneys and especially the lead-throughs have lately been a big issue in Finnish discussions of fire safety. The special national features of thick insulation layers and hot surface temperatures (e. g. flues of sauna stoves) do not always comply well with the EU Construction Product Regulation.

Safety distances should follow the lines of EN standards. On the chimneys there is, however, a variety of national interpretations, additions and applications.

8.2.1 Finland

Especially storage spaces must be designed so that movable items can't be stored near the chimney. Other structures may not be supported by or attached to the chimney, and it



may not contain pipes, wires or other equipment that does not support the chimney performance. (YM 745/2017, 10 §.)

For custom-built chimneys there are detailed measures dealing with different structures, air slots and insulation (YM 745/2017, 6 §):

1. There must be a gap of min 20mm between the chimney and other structures, and it must be filled with a suitable class A1 material.
2. When designing a movement joint, the deformation of the adjacent structures in relation to the chimney must be taken into account.
3. There must be a ventilated gap of min 50 mm between insulated wall and the chimney.
4. Other than class A1 materials or structures should be at least 100 mm away from the outer surface of the chimney.
5. At least 100 mm thick thermal insulating layer of the appropriate Class A1 material shall be installed into lead-throughs in horizontal structures or walls, or in wall junctions. This is not required, if the thickness of the chimney masonry wall is at least 230 mm and the total heat output of the fireplaces connected to the flues is not more than 60 kW.
6. At lead-throughs, there must be a max 200 mm thick, class A1 thermal insulation layer at a stretch of 200 mm.
7. Other measures may be used, be they verified by calculations or testing.
8. The insulation width shall be measured from the outer surface of the insulation layer.
9. The area must be protected from dirt and other combustible loose material.

The safety distances for system chimneys or products are given by the manufacturer and must be determined by testing or by a calculation method verified by tests. (YM 745/2017, 10 §.)

8.2.2 Other countries

Estonia

The chimney must be located at such a distance from the wall, ceiling and combustible materials that the ignition of materials from heat radiation or hot air is prevented (TuOS 2017, § 8 (3)).

If no proven calculations or other reliable method are provided and unless otherwise specified by the manufacturer of the chimney, it is considered that the temperature of combustible building materials does not exceed 85 °C, if installed at least 100 mm from the outer surface of the chimney, at a maximum temperature of the flue gas output up to 350 °C (EVS 812-3:2018, 7.6.3).

Metal chimneys may be installed in shafts made of non-combustible material. The safe distance between the outer surface of the chimney and the internal wall of the shaft must be at least 50 mm in the shaft of the reaction class A material and at least 100 mm in the shaft of the reaction class B material. The shaft made from non-combustible material requires not exterior safety distance. (EVS 812-3:2018, 7.6.7.)

This report may be copied only in its entirety.



Detailed information for different types of chimneys, structures, air gaps and insulation is given in the EVS 812-3:2018, especially in the Chapter 7 and normative Annex A. System chimney safety distances are defined by the manufacturers.

Germany

Chimneys and chimney systems must be at a safe distance from combustible structures and materials or shielded so that the temperatures of the combustibles do not exceed 85 °C using the nominal output, or 100 °C in soot fire (MFeuV 2017, §8 (1)). This may be considered proven if safety distances are as follows (MFeuV 2017, §8 (2)):

1. Safety distances given in harmonized specifications.
2. With the flue gas temperatures up to a nominal output of max 400 °C, the thermal resistance of at least 0.12 m²K/W and fire resistance duration of at least 90 minutes, a minimum distance of 5 cm is required. This distance also applies to shafts in which the flue gas temperatures do not exceed 400 °C and which, alone or together with the flue systems, have the aforementioned properties,
3. With the flue gas temperatures up to a nominal output of max 400 °C, an overall minimum of 40 cm*, or
4. With flues installed in fire-resistant shafts, where the flue gas temperatures do not exceed 120 °C, or with higher flue gas temperatures, if in a rectangular shaft there is at least 2 cm air gap around a round flue, a minimum distance of 3 cm is required.

For timber beams and similar components of appropriate dimensions, 2 cm is sufficient. For components of small area (baseboards, battens) safety distance is not required. (MFeuV 2017, §8 (2).)

* Exception, if the exhaust gas temperatures do not exceed 300 °C:

1. A minimum safety distance of 20 cm.
2. If the flues are covered with 2 cm layer of incombustible building materials having a low thermal conductivity, or the flue gas temperatures do not exceed 160 °C, a minimum distance of 5 cm is acceptable.

* Exception: Safety distance of 10 cm is sufficient for the connecting pieces of chimney or flues, if they are covered with 2 cm layer of incombustible building materials having a low thermal conductivity.

For flues and connecting pieces with flue gas temperatures up to a nominal output of max 400 °C, which pass through structures made of combustible building materials, the requirements of MFeuV 2017, §8 (1) apply. This may be considered proven, if the lead-through components

1. are provided with a protective tube of incombustible building materials at a minimum distance of 20 cm, or
2. are coated in min 20 cm thick layer of incombustible materials with low thermal conductivity. (MFeuV 2017, 8 § (3)).

The chimney lead-throughs in ceilings and roofs must be filled with non-combustible building materials of low thermal conductivity and the requirements of MFeuV 2017, §8 (1) must be fulfilled (MFeuV 2017, 8 § (4)).

This report may be copied only in its entirety.



These rules apply in principle for both horizontal and vertical structures. Empirically, the distance of 20 cm is found to be sufficient in most cases.

Norway

No specific regulations. The general requirements of safety and functionality given in TEK17 apply. There are some more detailed instructions in the SINTEF guidelines 552.135 and 752.135.

Sweden

Chimneys and flues shall be positioned and designed to ensure adjacent structural elements and fixed installations cannot ignite (BBR 23, 5:4251). Detailed information and measures may be found in the more unofficial guides such as AMA or SSR (Sweepers' Association) booklets. Safety distances of system chimneys are defined by testing or test-verified calculations.

8.3 Surface temperatures

8.3.1 Finland

The chimney must be designed so that the surface temperature does not pose a risk of fire or to personal safety (YM 745/2017, 10 §).

8.3.2 Other countries

Estonia

The temperature of the exterior surface of the chimney located inside the building shall not exceed 80 °C when heated by the fireplace at a continuous maximum power. The higher temperature is allowed only in the cases specified in the chimney product standard and in the sauna room.

Under the following conditions higher surface temperatures are also allowed: The surface temperatures of visible and easily accessible chimneys may be up to 80 °C. In other parts, the surface temperature may be higher than this, if the temperature of the structures of other materials than those of reaction to fire class A1 situated above the chimney does not exceed 85 °C. If no proven calculations or other reliable method are provided and unless otherwise specified by the manufacturer of the chimney, it is considered that the temperature of the building materials of combustible materials does not exceed 85 °C, if installed at least 100 mm from the outer surface of the chimney, at a maximum temperature of the flue gas output up to 350 °C.

At higher temperature surfaces, a safety shield or enclosure should be used to prevent accidental exposure of people. (EVS 812-3:2018, 7.6.3.)

Germany

General mentions in e. g. MBO imply to the similar principle as the Finnish regulation text above. The safety is to be verified by a certified sweeper along the lines of DIN V 18160-1 and DIN 18896.



Norway

No specific regulations. The general requirements of safety and functionality given in TEK17 apply.

Sweden

Chimneys and flues, including insulation and the surrounding duct, must not reach a surface temperature on the outside that exceeds 100 °C when the connected device is operated at the highest rating. However, within the room where the heat-producing appliance is placed, higher surface temperature can exist. (BBR 23, 5:4251.) See also the sources indicated in the subsection 8.2.2, because the regulation concerning safety distances is coupled with the surface temperature issues.

8.4 Materials

8.4.1 Finland

The heat resistance of a chimney or flue connected to a fireplace using solid fuel must be equivalent to temperature class T600. This is considered proven, if a custom-built chimney is otherwise built according to the requirements of the Decree YM 745/2017 (YM 745/2017, 9 §.)

The wall of a custom-built brick chimney must be at least 120 millimetres thick. The external surface must be coated with class A1 filler from the building's internal parts to roof level, except for parts which are visible in living spaces and laid with a continuous surface or grouted. The masonry of parts of the chimney where the temperature of flue gases may rise above 350 °C must be bricked up flexible mortar which achieves sufficient strength and withstands the stresses caused by temperature changes. Weatherproof mortar must be used in the masonry of external parts. (YM 745/2017, 4 §)

The wall thickness of a custom-built steel or cast-iron smoke flue must be at least 4 millimetres. The thickness of the external steel casing of the heat insulation of a steel flue built in situ must be at least 0.5 millimetres. The chimney's inner envelope must be surrounded by a continuous class A1 thermal insulation (at least 100 millimetres thick) in two overlapping layers, which can withstand a temperature of 600 °C without deformation and with thermal conductivity of max 0,19 W/(m · K). (YM 745/2017, 5 §.)

8.4.2 Other countries

Estonia

Chimneys are classified according to the following performance characteristics:

- temperature class
- pressure class,
- condensation resistance
- corrosion resistance,
- soot fire resistance and distance from combustible materials. (EVS 812-3:2018, 7.2.)

This report may be copied only in its entirety.



This classification sets requirements to all chimney materials.

Specifications for masonry chimneys are given in the EVS 812-3:2018, 7.4., as follows:

- If masonry is used as chimney elements for a solid fuel burning fireplace, full or perforated refractory bricks are used for this purpose. Perforated bricks shall have a density of at least 1200 kg/m³, full bricks 1500 kg/m³ and fireproof bricks 1700 kg/m³.
- The shatter value of refractory bricks shall be at least 8, the softening temperature (load 0.2 NM/m²) at least 1000 °C and the melting point at least 1300 °C.
- Bricks that are exposed to flue gases must withstand the acidic environment caused by flue gases and temperature fluctuations.
- Mortar mixes are made from conventional mortars or lime mortars, or elastic mortars inside the building, such as clay mortar. Parts of the chimney, where the flue gas temperature can rise above 350 °C, are laid with flexible mortar (e.g. clay mortar).
- The wall thickness of the masonry chimney must be at least 120 mm. The exterior of the chimney may be covered with mortar, plaster or filler. In humid areas, a damp-proof coating, such as ceramic tiles, is used. The coating material shall comply with at least reaction to fire classification A.
- The top end of the masonry chimney shall be protected against weather with a fire resistant cap made of material of reaction to fire A1 class, which must be open or removable for chimney sweeping

Germany

No specific regulations; the safety is to be verified by a certified sweeper along the lines of DIN V 18160-1 and DIN 18896.

Norway

The general requirements in TEK17 imply that the chimney bricks must be applicable for high temperatures.

Sweden

Walls in chimneys and flues shall be designed to ensure their function is not compromised. In particular, temperature fluctuations, climatic conditions, corrosive flue gases, moisture, and the use of cleaning tools shall be taken into account. (BBR 23, 5:4255.)

8.5 Durability

8.5.1 Finland

The chimney must withstand the loads, stresses and weathering to which it is exposed, as well as the deformations and strains caused by freezing, thawing, temperature changes and compounds formed at the acid dew point. (YM 745/2017, 3 §.)

The top end of a masonry chimney must be protected from the effects of the weather. The weather protection structures must be made of class A1 materials (YM 745/2017, 4 §.)

This report may be copied only in its entirety.



8.5.2 Other countries

Estonia

The chimney must withstand weather changes and loads due to weathering and frost, melting and temperature fluctuations (EVS 812-3:2018, 7.1.1). External loads for the chimney, such as wind and snow loads and dynamic loading due to gliding snow, must be taken into account (EVS 812-3:2018, 7.1.21).

The upper end of the chimney is protected against the effects of the weather by weather protection or a chimney cap, if rain can enter the chimney flue or if the chimney does not have a condensate or rainwater drainage system or the water cannot be otherwise diverted. The weather protection cap is made of materials with a reaction to fire class A1 and must not prevent the chimney draft. It must be removable during maintenance. (EVS 812-3:2018, 7.1.24).

Germany

The chimney must be founded directly on the base ground or on other fire-proof structure.

In building classes 1 to 3, for chimneys that start above the top floor or are situated by the building, a base of non-combustible building materials is sufficient. (MFeuV 2017, 7 § (7).)

Norway

Moulded or brick-lined chimneys shall be constructed on a load-bearing structure of incombustible materials (TEK17, § 15-3 (4)).

Sweden

When designing the chimney's dead weight, the external loads and temperature influence on the construction material properties shall be taken into account (BBR 23, 5:4252).

8.6 Fire resistance (EI)

8.6.1 Finland

No specific regulations.

8.6.2 Other countries

Estonia

In connection with shafts, it is mentioned that the fire resistance of the masonry chimney is calculated for the fire resistance of EI 60 (EVS 812-3:2018, 7.6.7.5). As it is not mentioned elsewhere, it may be considered as a thumb rule and/or good practice.

Germany

If a chimney goes through several floors, it must be of class EI90 or it must be located in a shaft of EI90. (MFeuV 2017, 7 § (7).)



Norway

The regulation level doesn't give specific requirements. The interviewees' instruction was min EI60 when the chimney goes through another compartment. EI60 is recommended for ventilation flues.

Sweden

No specific regulations.

8.7 Soot fire resistance

In Finland there are ca. 300 soot fires per year. They pose a big eventual risk of fire damage, even if only some of them actually cause damage to the building. E. g. the German interviewees do not consider soot fires very remarkable risk source. The Norwegians agree that there is an amount of soot fires in Norway, but due to the statistical recording practices they may be difficult to sort out from other chimney fires.

Some countries have specific regulations concerning soot burning. They are found under the section 3.2.

8.7.1 Finland

Smoke flues that may sustain soot and pitch coating must be soot fire resistant and able to withstand the cleaning of accumulated soot and pitch (YM 745/2017, 8 §).

A custom-built chimney is considered soot fire proof, if it meets the other requirements of 745/2017. System chimneys must be soot fire proof (class G). (YM 745/2017, 8 §.)

8.7.2 Other countries

Estonia

A chimney that is connected to a heating system whose exhaust gases may contain solid, flammable and volatile particles must have soot fire resistance. Chimneys are divided into classes based on soot fire resistance as follows:

- O: chimneys without soot;
- G: soot fire proof chimneys.

The required distance of combustible materials from the outer surface of the chimney in millimeters is defined according to the class. (EVS 812-3:2018, 7.2.5.)

Germany

Chimneys must be soot fire proof (applies to solid fuel burning fireplaces only) (MFeuV 2017, 7 § (7)).

Norway

No specific requirements. For system chimneys CE marking applies.



Sweden

Flues that connect to heat-producing appliances intended for soot generating fuels shall be designed with adequate protection against the development of soot fire (BBR 23, 5:4257).

8.8 The size and cross-section of flue

8.8.1 Finland

There are no requirements to any defined sizes of flues, but for custom-built masonry chimneys there are some recommendations in the YM E8/1985:

- Small stoves, ovens and air duct may be the size of half a brick (ca. 140 x 140 mm²)
- Large heating and baking ovens and open fireplaces may have flue sizes of one brick (ca. 140 x 270 mm²) or larger

There are no flue size requirements for system chimneys.

8.8.2 Other countries

Estonia

There are no normative requirements for the size or cross-section of flue. Some informative guidance is given in the EVS 281-3:2018 Annex C.

Germany

A flue must have such an overall cross section and height, and if necessary, also thermal resistance and structure of the inner surface that the flue gases are guided out at all intended operating conditions (MFeuV 2017, 7 § (1)).

Norway

The cross-section must be designed according to the fireplace (heating capacity, fuel). The cross-section must remain the same from bottom to top (TEK17, § 15-3 (1) & (3).)

Sweden

Flues shall be designed with regard to flue gas flow amount. The cross-section area of a flue, which acts through natural draft, shall be designed with consideration taken to the heat-producing appliance that the flue shall be connected to, the heat output of the appliance, the fuel that will be used and the flue height. (BBR 23, 5:4251.)

8.9 Chimney height from the roof

8.9.1 Finland

The height of the chimney must be at least 0.8 m from the roof ridge. The height on other than class Broof (t2) roofs shall not be less than 1.5 m. The height of the chimney shall be



increased by 0.1 meters per meter of the slope from the ridge, if no other solution is shown and proofed valid in the plans. (YM 745/2017, 10 §.)

8.9.2 Other countries

Estonia

The chimney shall extend over the surface of the roof covering or other parts of the building so high that it guarantees fire safety and adequate draft. To improve the draft, it is wise to install the chimney at the roof ridge (EVS 812-3:2018, 7.6.8.1). It is the minimum requirement that the chimney extends at least 0.8 m above the roof of the building, however, several exceptions for higher structures are described in the EVS chapter 7.6.

Germany

The chimney height must be min 1.0 m higher than any roof structure, part of building, opening to rooms and unprotected, combustible components nearer than 1.5 m to the chimney. In case of solid fuel, if the roofing isn't sufficiently resistant to fire exposure from outside due to flying sparks and radiant heat, the chimney height from the ridge is min 0.8 m. (MFeuV 2017, 9 § (1)).

Norway

According to the TEK17 the chimney shall be so high that it doesn't ignite surrounding structures (TEK17 15-3 (2)). Detailed information for best practices is found e. g. in SINTEF 552.135 or EN 15287.

Sweden

Chimneys and flues shall be high enough to restrict the risk of fire (BBR 23, 5:4253). General recommendation is 1 m above the roof surface or higher (BBR 23, 6:743).

8.10 Deviation from the vertical direction

8.10.1 Finland

No specific regulations.

8.10.2 Other countries

Estonia

Maximum deviation of the chimney from the vertical direction is 45°. Over 30 degrees deviation must have additional support. (EVS 812-3:2013, 7.1.12.)

Germany

For chimneys of negative pressure the deviation may be max 30° (information at the interview).



Norway

Draught and cleaning need to be taken care of (TEK17, 15-3 (1)). That fulfilled, it is possible to make deviations. The chimney manufacturer may set limits.

Sweden

The deviation of chimneys and flues from the vertical direction must not affect fire safety or chimney function (BBR 23, 5:4254).

For system chimneys, manufacturers may give instructions.

8.11 Smoke damper

8.11.1 Finland

The chimney or the connected fireplace must be fitted with a damper (solid fuel). The service life of the damper must match that of the chimney, or it must be possible for the damper to be replaced. There must be a carbon monoxide outlet from the fireplace to open air via the chimney even if the damper is closed. (YM 745/2017, 7 §.)

8.11.2 Other countries

Estonia

When a fireplace is not in use, the air flow in the flue is usually closed with a smoke damper. The damper may be located either in the fireplace, in the chimney or in the connecting component. To ensure the safety during the heating, the damper should be operated from the same or neighbouring room with the fireplace.

The damper should not prevent the cleaning of the flue. Rotating dampers are not allowed.

The structure of the damper must ensure a minimum air flow from the fireplace to remove possible carbon monoxide gases. This is provided with an opening of min 3% of the area of the damper. If there is no smoke damper, the room must be equipped with a carbon monoxide detector. (EVS 812-3:2013, 7.6.9.)

Germany

If a flue damper is installed in the connecting flue pipe, it must be a device that does not completely close the flue. The damper must be easy to operate and have an opening as a circular cutout or section in the wing, which in a contiguous area is at least 20 cm² or at least 3% of the cross-sectional area of the wing, if it is larger. (DIN 18896 4.1.3.).

If a pendulum air flap is used, the requirement for the minimum cross-sectional area does not apply. However, the device must be easily accessible for cleaning purposes. The adjustment of the damper must be recognizable to the user. (DIN 18896 4.1.3.).



Norway

In the current/new regulation the smoke damper is required for the energy efficiency performance, not for fire safety (information at the interview).

Open fireplaces without oven doors shall have a tight fitting flue gas damper (TEK17, 15-1 (7)).

Sweden

No specific requirements.

8.12 Tightness of chimney and joints of element chimney

The requirements of this section, especially the detailed definitions of EVS 812-3:2018, derive directly from the EN standards.

8.12.1 Finland

The joints of system chimney elements may not be situated inside structures at the lead-trough points (YM 745/2017, 10 §).

8.12.2 Other countries

Estonia

The smoke exhaust systems are divided into underpressure (N), overpressure (P) and high-pressure enclosures (H) according to the test pressure and leakage rate. The leakage rate depends on the tightness of the chimney. The required minimum pressure class for indoor fireplaces, ovens, hearths and other similar fireplaces is N1. (EVS 812-3:2018, 7.2.2.)

Germany

Chimneys and connecting flue pipes operated under overpressure must

- be situated in permanently ventilated rooms
- be located in rooms that comply with MFeuV 2017, § 3 (1) no. 3 (subsection 7.4.2. of this document)
- ,if they are in shafts, be ventilated over the entire length and perimeter, or
- be designed so that flue gases cannot escape in danger-threatening amount. (MFeuV 2017, 7 § (8)).

Joints must not be placed

- inside ceilings, walls or inaccessible cavities
- other floors or different fire compartments. (MFeuV 2017, 7 § (9))

Norway

Flue and chimney shall be sufficiently leak-tight. They shall have such outer surfaces that any cracking can be detected. (TEK17, 15-3 (5).)

This report may be copied only in its entirety.



Sweden

Chimneys and flues shall be tight enough to prevent fire hazards, the risk of poisoning or other problems (BBR 23, 5:4256).

8.13 Wall penetrations

Horizontal penetrations may pose a considerably bigger risk of fire than the vertical ones. That is because the horizontal penetrations are not separately tested.

8.13.1 Finland

As a guideline, e. g. in the standard SFS 7010 it is stated that a horizontal penetration structure may be used, if it is tested vertically and the temperature class is set one step higher than the one of the similar vertical structure. Controversially, the Decree YM 745/2017 requires the highest possible class T600 even for the vertical penetrations (YM 745/2017, 9 §). (This will be corrected in future updates.)

8.13.2 Other countries

Estonia

The chimney horizontal lead-throughs in a flammable material wall, thickness < 300 mm, must be insulated upwards with a minimum of twice as thick insulation layer as required in the vertical lead-throughs of the chimney. If the size of wall penetration exceeds 300 mm or the temperature of the flue gases in the chimney is > 350 °C, chimney lead-through can only be made on the basis of the installation instructions of the chimney manufacturer. Lead-throughs in walls of non-combustible materials shall be insulated with a minimum thickness of 50 mm insulation layer. (EVS 812-3:2018, 7.6.6.)

Germany

No specific regulations.

Norway

Recommendations and best practices are given in installation manuals; the manufacturer has to provide fire safe details based on testing so that the product fulfils the general requirements of the TEK17.

Sweden

In the regulations there is no difference between vertical and horizontal penetrations. 10 cm below, 30 cm above is given as a good practice, manufacturers' instructions may also give some guidance.



9. Fireplace and chimney combinations

9.1 General requirements

There may be some special requirements for connecting the fireplace and chimney. Especially connecting several fireplaces to the same flue has been taken into account.

9.1.1 Finland

The chimney and the connection and crossover flues of the attached fireplace, including joints, must form a fire-safe and functional unit. In order to ensure flue and fireplace compatibility, the highest temperature of the combustion gases entering the chimney from the fireplace must be declared. The flue gas temperature resistance of flues and crossover flues of fireplaces intended for heating, and of sauna stoves, must be at least temperature class T600 equivalent. (YM 745/2017, 9 §.)

9.1.2 Other countries

Estonia

The fireplace is connected to the chimney by means of a connecting piece to which the requirements of the chimney flue are given. The assessment of the fitting of the connecting piece and the chimney must be based on the installation instructions of the heating appliance and this standard (Annex C). The compatibility of the fireplace and the chimney must be ensured under all conditions. (EVS 812-3:2018, 6.4.)

The manufacturer of the heating appliance shall determine and declare the flue gas temperature directly in the combustion gases of the fireplace in the combustion of the nominal heat output (or volume) conditions. Chimney type suitable for the fireplace is determined by the manufacturer of the heating appliance. (EVS 812-3:2018, 6.4.3.)

The temperature class of the chimney shall be selected according to the exhaust gas temperature declared by the manufacturer of the heating appliance. The temperature class of the sauna stove chimney shall be T600 unless otherwise specified by the manufacturer of the stove. In the case of a self-made sauna stove, the suitability of the fireplace and the chimney must be demonstrated in accordance with the requirements of EVS-EN 15821. (EVS 812-3:2018, 7.2.1.)

Germany

There are general guidelines in MBO, MFeuV and MVVTB.

The minimum temperature class of the chimney is T400 (DIN V 18160-1). Environmental regulation doesn't allow higher temperatures.

Norway

The flue gas temperature in the fireplace must be appropriate for the chimney (TEK17, 15-1 (5d)). The chimneys are divided into temperature ranges according to NS-EN 1443: 2003. For fireplaces using solid fuel, the min temperature class is T400.

This report may be copied only in its entirety.



Sweden

Heat-producing appliances connected to the chimney or flue shall be designed to ensure the system is a safe and well-functioning unit (BBR 23, 5:421).

For fireplaces using solid fuel, there are no temperature class requirements for the chimney; the requirement is defined according to the fireplace. Basically for wood-burning fireplaces, the temperature class T450 is used.

9.2 Several fireplaces connected to the same flue

9.2.1 Finland

The wall of a custom-built brick chimney must be min 120 mm thick, when the total heat output of the fireplaces connected to one flue shall not exceed 60 kW, and min 230 mm, when the total heat output of the fireplaces connected to one flue is max 60 – 120 kW (YM 745/2017, 4 §).

There are no requirements for system flues or chimneys.

9.2.2 Other countries

Estonia

When assessing the suitability of a flue, it is necessary to take into account the simultaneous use of fireplaces. All heating devices must be supplied with a separate smoke damper. (EVS 812-3:2018, 7.1.6.)

Germany

It is allowed to connect several fireplaces to the same flue, if

- by the design according to paragraph MFeuV 2017 7 § (1) and the nature of the exhaust system, the discharge of the flue gases is ensured for each operating condition,
- escape of flue gases from the fireplace in use to a non-operating fireplace is prevented
- the shared flue is made of non-combustible materials or fire transmission between the floors is prevented by automatic shut-off or other measures, and
- the requirements of operational safety for all connected fireplaces together are fulfilled. (MFeuV 2017, 7 § (4)).

Norway

Connecting is allowed, as far as the system functions properly according to the general requirements of TEK17.

**Sweden**

Flues that connect to more than one heat-producing appliance shall be designed to ensure that fire hazards or other problems do not increase This includes the conditions that apply for the flue in accordance with maximum temperature, rated power, and flue gases that can be discharged from the building in a reliable way. (BBR 23, 5:426.)



10. Use and maintenance of heating systems

This chapter concentrates on the technical requirements that the phase of use and maintenance set for fireplaces and chimneys. The issues of operations, inspection and supervision are dealt with in the Chapter 3, Supervision and responsibilities.

10.1 Implementation of fireplace and chimney

10.1.1 Finland

Before putting into use, it must be ensured that the chimney and fireplace are valid and compatible. There are requirements for the different parties involved:

- Project initiator/building owner is responsible of the system validity
- Prime designer is responsible of documentation endorsing
- Inspection authority checks and approves. (YM 745/2017, 11 §).

10.1.2 Other countries

Estonia

Only a heating system which is in good technical condition, complete and safe may be used (TuOS 2017 §8 (4)).

Germany

No specific regulations.

Norway

No specific regulations. The general responsibilities given in SAK 10 chapters 8-2 and 12 apply.

Sweden

No specific regulations.

10.2 Sweeping

As stated before in the section 8.7, soot fires pose an eventual risk of dire damage. Appropriate sweeping and inspection of the heating system is an efficient way to decrease this and other fire-related risks.

10.2.1 Finland

The sweeping hatches are placed in such a way that the fireplace can be thoroughly cleaned with the customary sweeping devices. In front of the hatch there must be a min 600 mm free space. Minimum measures of the hatch are 65 mm x 130 mm. (YM E8 1985, 4.6).



The chimney and its surrounding area must be planned and constructed so that the chimney and its flues can be cleaned, and its integrity and condition inspected (YM 745/2017, 3 §).

The fireplace must be situated in a sufficient space, taking into account the safety distances, operation and maintenance. The fireplace must be equipped with cleaning hatches and must be cleanable in all its parts. (YM E8 1985, 2).

A fireplace in a privately owned holiday home is swept once in three years. An open fireplace may be swept at a period of separate agreement. All the other sweeping is performed once a year. If a fireplace of chimney has been unused for more than 3 years, it must be swept before use. The sweeper gives a certificate of the performed sweeping to the building owner or user. (SM 539/2005 2 – 3§.)

After a soot fire the building owner is responsible for arranging the inspection and eventual repairing of the chimney (YM 745/2017, 8 §).

10.2.2 Other countries

Estonia

TuOS doesn't give technical requirements for sweeping. The procedure regulations are presented in the section 3.2 of this report.

EVS 812-3:2018 deals with the issues in the chapter 8, Repair and maintenance of the heating system. Beside the general requirements of safe access, inspection and cleaning, some detailed information of cleaning hatch placement is given. It is also stated that "Maintenance of the fireplace and chimney is done according to the instructions of the manufacturer or installer of the fireplace. The entire heating system must be inspected, maintained and cleaned at least once a year. After a soot fire the heating system must always be cleaned and checked. The person with the appropriate competence must also provide an assessment of the safety of the whole heating system after a soot fire." (EVS 812-3:2018, 8.1.)

Germany

The chimney must have appropriate openings for sweeping (MFeuV 2017, 7 §).

Norway

The flue or chimney and the fireplace must have safe, facilitated access for easy and efficient cleaning and maintenance of the installation, including safe sweeping (TEK17, 15-1 (1g), 15-3 (5d)).

Sweden

Heat-producing appliances and flues shall be accessible for cleaning, checking and inspection without problems. Cleaning hatches shall be designed in materials that cannot be ignited and that can withstand temperature fluctuations and corrosion. (BBR 23, 5:428.)



10.3 Use of fireplace and chimney

This section deals with the everyday instructions given mainly to the consumers. Issues of authority-managed sweeping and maintenance are discussed in the chapter 3. Only Estonia sets instructions of use on regulation level, all the other countries give instructions of good practice and common sense, published mainly by enterprises or non-authoritative organizations.

10.3.1 Finland

[Along with a system device] there must follow information and instructions needed for its appropriate assembling, use and maintenance. These manuals must include sufficient information about the characteristics, intended use and safe handling of the device. (SM10/2007 5 §.)

There are no other specific regulations, but instructions may be found in manufacturers' material and unofficial guides by various associated organizations.

10.3.2 Other countries

Estonia

A heating system may be used only for the intended purpose and with the intended capacity thereof, and only the fuel intended for the particular heating system may be used for combustion therein. (TuOS 2017 §8 (5).)

Control over ovens, fireplaces or kitchen ranges shall be ensured during the entire period of heating thereof and immediately after the heating is completed to prevent fire hazard. Such control may be replaced with the use of fire safety installations. Use of combustible liquids for lighting a fire in the chamber of ovens, fireplaces or kitchen ranges is prohibited. Fuel or combustible materials shall be placed at a safe distance from ovens, fireplaces or kitchen ranges. (TuOS 2017 §10.)

Ovens, fireplaces or kitchen ranges shall be supervised during the entire period of heating and also after the heating is completed to prevent fire hazard. Such control may be replaced with the use of fire safety installations. Use of combustible liquids for lighting a fire is prohibited. Fuel or combustible materials shall be placed at a safe distance from ovens, fireplaces or kitchen ranges. (TuOS 2017 §10.)

EVS 812-3:2018, 6.6 (Instructions for installation, operation and maintenance) defines information that the user's manual must contain. Annex C gives some very grass-root advice on correct burning and maintenance of heating systems.

Germany

Directions may be found in e. g. manufacturer instructions and authorities' and ZIV's guides on the use of heating systems (especially for wood burning appliances).

The Federal Immission Control Regulations (BImSchV) give some outlines of allowed fuel (definition of allowed fuel is given in the Environmental Law), as well as minimum requirements on emissions and efficiency (measured on site by the chimney sweeper).

This report may be copied only in its entirety.

**Norway**

There are no specific regulations, but instructions may be found in manufacturers' material and unofficial guides by associated organizations.

Sweden

There are no specific regulations, but instructions may be found in manufacturers' material and unofficial guides by associated organizations.

10.4 Treatment of ash

Hot objects, hot ash and sparks cause annually in Finland ca. 200 building fires and 100 wildfires. After removing from a recently used fireplace, ash remains hot for a relatively long time. Improper treatment of ash is thus the cause of numerous fires.

10.4.1 Finland

No specific regulations, except the general "Duty of care" defined in PeL3729/2011 clause 4.

10.4.2 Other countries**Estonia**

Removal of combustion products from the room (from the building) must be organized as follows: [...] Solid combustion residues (ash, cinder, etc.), by equipment or systems specially designed for this purpose, which take into account the flammability of these substances. (EVS 812-3:2018, 4.3.)

Germany

No detailed regulations on private disposal.

Norway

No specific regulations.

Sweden

In buildings other than single-family houses, an indoor or outdoor space for the storage of soot and ash, in which the ash can be stored in a secure manner, shall be provided adjacent to a separate boiler room with a heat-producing appliance. A secure manner means that the space shall be separated to ensure that ash or other burning material cannot ignite or cause pyrolysis in or at the ash tray. (BBR 23, 5:423)



11. Renovation and reconstruction

11.1 Repair of the fireplace and chimney

Renovation and reconstruction becomes all the more important as the building stock is aging and the amount of said project increases. Repair and alteration works may include construction of a new chimney in an existing building, coating of chimney interior walls, installation of a new flue gas inside an old chimney, or the replacement or alteration of a fireplace. Significant for all these works is to ensure the compatibility of the fireplace and the chimney. In some cases also the museal protection needs may come into effect.

11.1.1 Finland

The design of the chimney repair must take into account the condition of the chimney, as well as the construction materials and the characteristics of the flue gases (YM 745/2017, 3 §).

11.1.2 Other countries

Estonia

A chimney with a new flue is called an **existing chimney**, the flue of which has either been restored, replaced or installed. The flue components used for restoration, replacement or after-installation must be made of rigid pipes meeting the requirements of EVS-EN 1457, EVS-EN 1856-2 or EVS-EN 1857 or flexible pipes meeting the requirements of EVS-EN 1856-2. A chimney with a new flue, having the same temperature class and the same thermal characteristics as the previous flue, can maintain the existing distances from combustible materials. (EVS 812-3:2018, 7.5.8.)

Changed chimney is an existing chimney that has been altered for use as indoor air supply or whose structure or parts are altered in a way to affect its technical characteristics or performance. All chimney products must be selected in such a way that their markings correspond to the intended use of the chimney. The completed chimney must comply with the requirements of EVS-EN 1443, and a minimum safety distance from combustible materials must be provided. Requirements for materials and components used and examples of modified chimney markings are given in standard EVS-EN 15287-2. (EVS 812-3:2018, 7.5.9.)

If the technical design of a new flue or modified chimney requires any repair of an existing chimney (including the improvement of structural stability), this must be done before installing a new component or changing the chimney. (EVS 812-3:2018, 7.6.1.3.)

The chimney ID plate must contain information of the alterations (EVS 812-3:2018, 7.3.3).

Germany

At an interval of 3 to 4 years a visual control of the appliance is performed by the authorized sweeper, who may require maintenance or replacement of broken parts for safety reasons (information at the interview).

**Norway**

No specific regulations.

Sweden

A property owner will maintain its fireplaces and chimneys in such a way as to ensure safety. This also includes renovation of the installations when needed.

Chimney sweeper is authorized to give an order to fix or repair the chimney. A report is given to the building owner including all non-conformities and inspection procedures. (MSBFS 2014:6.)

11.2 Installing a new fireplace into an existing chimney**11.2.1 Finland**

The same basic principles apply as for any new construction.

11.2.2 Other countries**Estonia**

The same basic principles apply as for any new construction.

Germany

All the previous regulations apply to any new installation, including a new fireplace to an existing chimney.

Norway

Based on TEK17 § 15-1 (5d) (...do not increase the risk of fires...) the temperature class of the chimney should be re-evaluated. It is the house owner's responsibility to order an inspection of the authorized sweeper. (Information given at the interview.)

Sweden

The same basic principles apply as for any new construction.



12. Discussion

Temperature classes

Between different countries there was a large variation in allowed temperature classes of chimneys from T400 to Finland's overall requirement of T600. In the standardisation groups there have been lots of discussion about the principles of defining the temperature of flue gases transmitted from the fireplace to chimney or smoke flue, which would influence the choice of the chimney temperature class. The Finnish conclusion has been that the T600 requirement is an efficient and effective way of improving the chimney fire safety. It was on the other hand considered maybe unnecessarily high especially by the German interviewees.

There is also a slight controversy between Finnish national standard SFS 7010 and Decree 745/2017 (discussed in the subsection 8.13.1) concerning temperature classes in horizontal penetrations. (This will be corrected in future updates.)

Statistic information and assessment of details

As stated in chapter 5, the quality and availability of statistic information was very varied in the surveyed countries and comprehensive comparison was not possible. Also inside each country there were problems about the reliability of input data; e.g. for a stated "chimney fire" there is no information about the real point or reason of ignition. A more uniform and detailed procedure of registration would give also more detailed and reliable data to contribute for e. g. assessment and designing of safety distances.

During the survey a great amount of detailed data was reviewed both by the means of literature survey and questionnaires and/or interviews. Due to amount and variations of e. g. safety distance or lead-through solutions – and the lack of reliable statistics discussed above – it was not possible to point out any significant differences, not to mention ranking them in terms of impacting fire safety.

Pre-use supervision

As stated in the beginning of subsection 3.1.1, the grass-root level of building procedures –building project initiator, building owner and occupant – is of crucial importance when it comes to increasing or decreasing the fire safety of fireplaces and chimneys. Even if there is regulation e. g. in Estonia about the actual using of fireplaces, it is practically impossible to authoritatively supervise the actions. All that can be done would be happening at the maintenance and control, which have been discussed in the sections about sweeping, and the phase of implementation, which seems to contain some gaping loopholes.

No definitive regulation was found about authorities' inspections or official permit to start using a new or renovated fireplace or chimney. All the interviewees introduced inspections by a competent person (usually a certified sweeper) as accepted and largely adopted good practice in their countries. The lack of supervision might however leave lots of undiscovered defects done by incompetent or indifferent builders, especially DIY persons who might buy and assemble whatever products or accessories without any knowledge of



their proper use. Also, minor works requiring no permits (or works performed without required permits) might go well under radar.

Supervision of use and maintenance

The Ministry of the Interior is preparing a renovation of the Rescue Act effective from the beginning of year 2019. The regional rescue services would be no more responsible of arranging the sweeping services. In practice, this would mean abandoning of the district sweeping practices. Sweeping would be open to free competition and consumers would be able to choose service providers of their own choice. The building owner would be still responsible of arranging the sweeping at appropriate intervals. The demand of sweeper's professional certification would remain.

Interviewed, the Finnish sweeping sector presented concerns of difficulties in compiling comprehensive information about performed sweepings. The supervision would be performed by the occupants' self-inspection and random checking of the authorities. Consequently, systematic statistic information on sweeping-related issues would be harder to collect.

All the other surveyed countries are practicing rather heavily municipally regulated sweeping procedures, where the demands and authorities of qualified district sweepers are larger than in Finland. The interviewees (who, however, represented or were connected to sweepers' organizations) were very content with these features and found their systems well organized, supervised and implemented.

Regulations of fireplaces

As stated in the section 2.1, in the Finnish National Building Code the part dealing with fireplaces, YM E8/1985, is of the older heritage of Codes, considered a guideline. So, de facto, at the moment it is indistinctive whether there are normative regulations on fireplaces at all (except for a general statement in YM 848/2017: "heating device must be located and constructed so that its use does not cause fire or explosion hazards" and the general requirements of SM10/2007, which apply also to the system fireplaces and chimneys). Almost all system fireplaces have CE markings, but there are no national requirements for level of performance. Application standards set some requirements, but on the other hand, like YM E8/1985 they might be ruled as non-binding.

Centralized access to instructions

As we can see in section 2.4, typically the guidelines and good practice instructions are published by various operators and it is rather challenging to collect comprehensive information. During the survey it was especially noted that the Nordic officials at Boverket, DiBK and DSB offer at their websites exemplary link listings to regulation and guideline collections.



13. Conclusions

This survey was initially launched by a presumption that chimney- and fireplace-related incidents seem to be much more frequent in Finland than in some neighbouring countries with similar fireplace cultures. It was reckoned that it would be possible to decrease the amount of these fires by scrutinizing the national regulation and its differences to the better-achieving neighbour countries.

The aim of this survey was to explore these development opportunities and

- bring up solutions that will improve and clarify the practical construction and increase the fire safety of fireplaces and chimneys
- develop policies in which information on the fire-safe installation and use of fireplaces and chimneys is better implemented to consumers
- improve fire control and fire protection installation and implementation mechanisms for fireplaces and chimneys,

and thus reduce the number of fires in the fire and the chimneys.

The aim of the survey was realized by surveying laws and regulations concerning the fire safety of fireplaces and chimneys in selected countries. Finland, Estonia, Germany, Norway and Sweden were included. Notable differences of the regulations and possible good practices were to be found and compared.

No dramatic differences were found, partly because all the surveyed countries accept the EU legislation as their national regulations. The technical and statistical issues are discussed in the previous sections, as well as the most diverse findings on supervision of use and maintenance.

The labour on the issues of this survey will go on in expert groups and committees. It is the sincere hope of the TUT Fire Laboratory working team that this report serves as a useful tool in this work. The team wants to express their thanks to the financiers – the Ministry of the Environment, the Ministry of the Interior, the Finnish Safety and Chemical Agency Tukes and the Fire Protection Fund of Finland – and to the steering group members Jyrki Kauppinen, Jaana Rajakko and Johanna Ahola.



14. List of sources

Finland	
MRL 132/1999	Maankäyttö- ja rakennuslaki (Land Use and Building Act) Note: the official English translation does not include all the amendments referred to in the text. https://www.finlex.fi/fi/laki/kaannokset/1999/en19990132.pdf
PelL 379/2011	Pelastuslaki (Rescue Act) Note: only an unofficial English translation by the Ministry of the Interior is available. https://www.finlex.fi/fi/laki/kaannokset/2011/en20110379.pdf
SM 10/2007	Laki pelastustoimen laitteista (Act on Rescue Equipment) No online translations available. Unpublished translation by the Ministry of Interior used. https://www.finlex.fi/fi/laki/alkup/2007/20070010
YM 848/2017	Ympäristöministeriön asetus rakennusten paloturvallisuudesta (Decree of the Ministry of the Environment on Fire safety of buildings) No online translations available*. https://www.finlex.fi/fi/laki/ajantasa/2017/20170848
YM 745/2017	Ympäristöministeriön asetus savupiippujen rakenteista ja paloturvallisuudesta (Decree of the Ministry of the Environment on Structures and fire safety of small chimneys) No online translations available*. https://www.finlex.fi/fi/laki/alkup/2017/20170745
YM E8/1985	Muuratut tulisijat, ohjeet (Masonry fireplaces, guidelines) No online translations available. http://www.finlex.fi/data/normit/1940-e8.pdf
SM 539/2005	Sisäasiainministeriön asetus nuohouksesta (the Chimney Sweeping Decree) No online translations available*. https://www.finlex.fi/fi/laki/alkup/2005/20050539
D3 2018	Finnish rescue services' pocket statistics 2013–2017 http://info.smedu.fi/kirjasto/Sarja_D/D3_2018.pdf
Estonia	
EhS 2015	Ehitusseadustik (Building Code) The translations published in "Riigi Teataja" database are unofficial texts. https://www.riigiteataja.ee/en/eli/ee/Riigikogu/act/503072018002/consolide
TuOS 2017	Tuleohutuse seadus (Fire Safety Act) The translations published in "Riigi Teataja" database are unofficial texts. https://www.riigiteataja.ee/en/eli/ee/Riigikogu/act/502022016005/consolide
KüPN 2010	Küttesüsteemi puhastamise nõuded (Heating system cleaning requirements) No online translations available https://www.riigiteataja.ee/akt/13354895

This report may be copied only in its entirety.



EVS 812-3:2013	Ehitiste tuleohutus. Osa 3: Küttesüsteemid. (Fire safety of constructions. Part 3: Heating systems) No online translations available https://www.evs.ee/tooted/evs-812-3-2018
	Estonian statistics on causes of fires in residential buildings, available for years 2015 – 2017 (in Estonian only) https://public.tableau.com/profile/ron1622#!/vizhome/Omaavalitsusteldnit-ajad/Omaavalitsusteldnitajad
Germany	
BauGB 1997	Baugesetzbuch (Federal Building Code) https://germanlawarchive.iuscomp.org/?p=649#more-649
MBO 2016	Musterbauordnung (Model Building order) No online translations available*. https://www.bauministerkonferenz.de/Dokumente/42318979.pdf
MVVTB 2017	Musterverordnung Technische Baubestimmungen (Model Regulation for Technical Building Regulations) No online translations available*. https://www.dibt.de/de/Geschaeftsfelder/data/MVV_TB.pdf
MFeuV 2017	Muster - Feuerungsverordnung (Model Regulation for Heating Equipment) No online translations available*. https://www.is-ergebaut.de/Dokumente/42319885.pdf
BImSchG 1990	Bundes-Immissionsschutzgesetz (Federal Immission Control Act) https://germanlawarchive.iuscomp.org/?p=315
BImSchV	Bundes-Immissionsschutzverordnungen (The Federal Immission Control Regulations)
SchfHwG 2008	Schornsteinfeger-Handwerksgesetz (The Act of Chimney Sweeping Profession) No online translations available. http://www.gesetze-im-internet.de/schfhwg/SchfHwG.pdf
KÜO 2013	Kehr- und Prüfungsordnung (Sweeping and Control Regulations) No online translations available*. http://www.schornsteinfegerinnung.de/allgemeinDownload/K%C3%9CO-8april2013.pdf
Norway	
LOV 2008-06-27 nr 71	Plan- og bygningsloven (Planning and Building Act) https://www.regjeringen.no/en/dokumenter/planning-building-act/id570450/
TEK17	Forskrift om tekniske krav til byggverk (Regulations on technical requirements for construction works) Unofficial translation by DiBK for informative uses only. https://dibk.no/globalassets/byggeregler/regulation-on-technical-requirements-for-construction-works--technical-regulations.pdf
SAK10	Byggesaksforskriften (Regulations relating to building applications) Unofficial translation via DiBK for informative uses only. https://dibk.no/globalassets/byggeregler/building_application_regulations.pdf
FOR-2015	Forskrift om brannforebygging (Act relating to the Prevention of Fire, Explosion and Accidents involving Hazardous Substances and the Fire Services) No online translations available.

This report may be copied only in its entirety.



	https://lovdata.no/dokument/SF/forskrift/2015-12-17-1710
	A rather comprehensive list of Norwegian regulations and guidelines concerning the issues of heating systems, fire protection and Health, Environment and Safety is compiled at the Sweeper Organization's website: https://www.feiermester.org/proff/regelverk/
Sweden	
2010:900	Plan- och bygglag (Planning and Building Act) https://www.boverket.se/globalassets/publikationer/dokument/2016/legislation.pdf
2011:338	Plan- och byggförförordning (Planning and Building Ordinance) https://www.boverket.se/globalassets/publikationer/dokument/2016/legislation.pdf
BBR 23	Boverkets Byggregler (Boverket's Building Regulations) version 23 Note: English translation is for informative uses only. https://www.boverket.se/globalassets/publikationer/dokument/2016/boverkets-building-regulations--mandatory-provisions-and-general-recommendations-bbr-23.pdf
SFS 2003:778	Lagen om skydd mot olyckor (The Act of Protection against accidents) No online translations available.* https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattnings-samling/lag-2003778-om-skydd-mot-olyckor_sfs-2003-778
MSBFS 2014:6	Myndigheten för samhällsskydd och beredskaps föreskrifter om rengöring (sotning) och brandskyddskontroll (The Swedish Civil Contingencies Agency's regulations and general advice on cleaning (chimney sweeping) and fire safety inspections) https://www.msb.se/externdata/rs/0056c40d-32c1-417a-a640-fe5be1b40bc3.pdf
	The Swedish Civil Contingencies Agency's statistics https://www.msb.se/en/Products/Publications/Publications-from-the-MSB/The-Swedish-Rescue-Services-in-Figures/ https://www.msb.se/sv/Kunskapsbank/Statistik--analys/Raddningstjanststatistik/

*A draft version in the EU TRIS database is utilized. One must take notice and compare it to the national final and legally valid document.



ANNEX 1

Contact persons and interviewees

Title	Person	Organisation
Finland		
Mr	Hannu Murtokare	Nuohousalan keskusliitto ry (The Central Association of Sweeping)
Estonia		
Mrs	Tagne Tähe	Päästeamet (The Estonian Rescue Board)
Germany		
Dipl.-Ing	Frank Kienle	Industrieverband Haus-, Heiz- und Küchentechnik e.V. (HKI Industrial Association of House, Heating and Kitchen Technology)
Dipl.-Ing	Rolf Heinen	Industrieverband Haus-, Heiz- und Küchentechnik e.V. (HKI Industrial Association of House, Heating and Kitchen Technology)
Dipl.-Ing (FH)	Annekathrin Schmitt	Industrieverband Haus-, Heiz- und Küchentechnik e.V. (HKI Industrial Association of House, Heating and Kitchen Technology)
Dr.-Ing.	Dieter Stehmeier	Bundesverband des Schornsteinfegerhandwerks - Zentralinnungsverband ZIV (The Central Guild Association of Sweepers) The European Federation of Chimney-sweeps
Norway		
Mr	Tom Erik Galambos	Feiermesternes Landsforening) (the National Sweeper Organization) Norsk brannvernforening (Norwegian Fire Protection Association)
Mrs	Kari Jensen	Direktoratet for samfunnssikkerhet og beredskap DSB (Directorate for Civil Protection)
Sweden		
Mr	Johan Schön	Sveriges Skorstensfejaremästares Riksförbund SSR (The National Association of Sweeper Masters)
Mr	Håkan Melin	Sveriges Skorstensfejaremästares Riksförbund SSR (The National Association of Sweeper Masters)

This report may be copied only in its entirety.