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# MaiD

## Report 2

### Regulations and approval systems in the Nordic countries

#### A Nordic Innovation project

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## Preface

This document is the second report (Report 2) from the Nordic cooperation project entitled: “MaiD - Material and product innovation through knowledge based standardization in drinking water sector”. The project has been funded by the Nordic Innovation and the MaiD project partners in Denmark, Finland, Norway and Sweden. MaiD was implemented from May 2014 to June 2017. The background for this project has been the different practice to verify that drinking water products are fit for use (i.e. in accordance with the regulations) in the Nordic countries. The practice and regulations are also different for indoor and outdoor water installations among these countries. Hence, different burdens regarding approval testing and certification for the industry operating on the Nordic market are created, which makes it challenging to maintain a level playing field.

The main objective of MaiD was to identify the key components that should be included in the national approval procedures in the Nordic countries in order to safeguard drinking water, material quality and ensure a level playing field. The recommendations to the national procedures have been based on European standards and practice as far as possible. The report has been prepared by the following institutions in the project steering committee: SINTEF (Norway), Satakunta University of Applied Sciences (SAMK)/WANDER (Finland), Swerea KIMAB (Sweden) and Danish Technological Institute (Denmark).

The report has been written as recommendations to the Authority Advisory Group (AAG) and the Industry Advisory Group (IAG) which have contributed with information regarding current legislation, certification and approval practice, potential innovation hindrances etc. The following institutions have been participating in these two advisory groups (alphabetic order):

City of Gothenburg, department of sustainable waste and water (Sweden) (AAG)	Norwegian Food Safety Authority (Norway) (AAG)
Cupori (Finland) (IAG)	Norwegian Water BA (Norway) (IAG)
Danish Environment Protection Agency (Denmark) (AAG)	Oras (Finland) (IAG)
Danish Industry (Denmark) (IAG)	FM Mattsson Mora Group (Sweden) (IAG)
Danish Transport, Construction and Housing Authority (Denmark) (AAG)	Raufoss Water and Gas (Norway) (IAG)
ESBE AB (Sweden) (IAG)	Rørentreprenørene (Norway) (IAG)
Finance Norway (Norway) (IAG)	Rørforeningen (Denmark) (IAG)
Finnish Association of Mechanical Building Service Industries (Finland) (IAG)	Standards Norway (Norway) (AAG)
Kiwa Sweden (Sweden) (IAG)	Scandinavian Copper Development Association (IAG)
Ministry of Environment, Department of the Built Environment (Finland) (AAG)	SP Technical Research Institute of Sweden (Sweden) (IAG)
Ministry of Social affairs and Health (Finland) (AAG)	Swedish Association of Plumbing and HVAC Contractors (Sweden) (IAG)
National Board of Housing, Building and Planning (Sweden) (AAG)	Swedish Chemicals Agency (Sweden) (AAG)
National Food Agency (Sweden) (AAG)	Uponor (Finland and Sweden) (IAG)
Nordic Brass Gusum (Sweden) (IAG)	VA og VVS produsentene VVP (Norway) (IAG)
Norske Rørgrossister Forening (Norway) (IAG)	Valves & Fittings of Sweden (Sweden) (IAG)
Norwegian building authority (Norway) (AAG)	Veltek (Denmark) (IAG)

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## 1 Aim

The aim of WP2 is to perform an evaluation of the current systems used in the Nordic countries with respect to requirements on European level. A description of the current situation in the Nordic countries regarding rules, legislations and standards used for materials and products in contact with drinking water are presented. The current situation of 4MS work and other interesting European initiatives are also presented.

WP2 is thus giving a state which is a basis for proposal of developments towards common use of standards and rules in the Nordic Countries.

## 2 System in the Nordic Countries

The current systems in the Nordic countries are presented in this chapter. The results are based on the detailed overviews given in the Appendix at the end of WP2 report. The appendix is divided into 4 parts:

- Appendix 1: Norway
- Appendix 2: Sweden
- Appendix 3: Finland
- Appendix 4: Denmark

Each appendix contains the following parts:

1. Legislation in the country regarding material coupling to DWD
2. Legislation in the country regarding Durability
3. Legislation in the country regarding health requirements in Building regulation
4. Other national initiatives
5. Responsibility of the different actors

Focus is put on summarizing the similarities and differences between the Nordic Countries, whereas the detailed description of the system in place in each country is found in the appendix.

### 2.1 Governing legislative rules for drinking water products in the Nordic Countries

The situation is summarized and exemplified in Table 1 for metallic materials.

The legislative rules for drinking water materials and products are based on the affirmation that products and materials in contact with drinking water shall not lead to any negative health effects. Regarding this aspect and the governing legislative rules, the system is very similar in the four Nordic countries.

The implementation of Article 10 of the drinking water Directive 98/83/EC states in all countries that the products used shall not adventure human health in any ways. Similarly, the building regulation also state that products and materials used for distribution of drinking water shall not lead to risks for human health. The building regulation cover the indoor water installations, the

service line within the boundary of the property and the water supply installations including water mains and water works differently as can be seen in Table 3. Moreover, there are differences when considering if approval is required or voluntary, and if approval is used in practice. Approval is required in the regulation in Denmark, whether it is only on a voluntary basis in Sweden, Norway and Finland. In practice, the approval is conducted on both indoor installations and service lines (part of service line that are within the building property) in Denmark and Norway, whereas it is only conducted on indoor installation in Finland and Sweden. No approval is used for water distribution installation in none of the countries.

## 2.2 Requirements and limit values for the different material types

A survey of requirements and limit values for metallic, organic and cementitious materials is given in Tables 3-6

For metallic materials, the main focus is on indoor installation and most of all sanitary taps, valves and fittings. Pipe material is essentially made of copper and stainless steel in Sweden, Norway and Finland, none of which are of hygienic concern. However, due to specific water properties in Denmark, copper pipes are only used to a limited extent (as it can lead to pitting corrosion for  $\text{pH} < 7$  and a low alkalinity relative sulphate concentration). Thus, plastic pipes are more common in this country. Two test methods are used for approval of material for drinking water applications in the Nordic Countries, the long term dynamic test according to EN15664 which is used by the 4MS system, and a product test according to NKB rules, which is a Nordic standard (for example NKB4 for faucets).

Table 1 shows that the assessment criteria for metallic materials appear at different levels in the legislation for the different countries. The strongest requirement is in Denmark where approval regarding indoor products within the boundary of property is mandatory to put the products on the market. In Finland, the approval is not mandatory, but the performance criteria are written in the regulation, whereas in Sweden the criteria are written in a guideline to the regulation. Finally in Norway, the criteria are only found in the standard test method description.

It can also be seen in Table 2 that NKB is used in all Nordic Countries for assessing lead release, while the European standard EN 15664 is possible to be used as an alternative to NKB only in Sweden. However, since German approvals are accepted in Denmark, test results according to EN 15664 are accepted. There are also different levels of acceptance referring to NKB test. Assessment of Nickel is only required in Denmark today and refers to two different possible methods.

Table 1 Criteria for marketing and use of metallic kitchen taps, valves and fittings in the Nordic Countries

Criteria	Norway	Sweden	Finland	Denmark
General Health requirements in building regulation	Yes	Yes	Yes	Yes
Approval required in regulation	No	No	No	Yes
Product performance criteria written directly in the regulation	No	No	Yes	Yes
Product performance criteria in the guideline to regulation	No	Yes	No	No
Product performance criteria in the standard test method	Yes	No	No	No

Table 2 Limit values for three main assessed element for metallic taps in the Nordic Countries. For other brass components like valves and fittings, the limit values depend on the dimension of the product.

Element	Test method	Norway	Sweden	Finland	Denmark <sup>a</sup>
Pb	NKB	20 µg <sup>d</sup>	5 µg	20µg <sup>d</sup>	5 µg <sup>b</sup>
	EN 15664	Not used	5 µg/L	Not used	5 µg/L
Cd	NKB	2 µg	2 µg	2 µg	2 µg
Ni	NKB	Not used	Not used	Not used	80 µg <sup>b</sup>
	EN 16058	Not used	Not used	Not used	Not used <sup>c</sup>

<sup>a</sup> Currently, German, Dutch and Swedish approval and certification are accepted in Denmark. The 4<sup>th</sup> alternative is through the Danish GDV (Godkendt til drikkevand). Note also that drinking water in Denmark is defined as cold water intended for human consumption, implying that shower mixers are exempted from the drinking water approval scheme.

<sup>b</sup> One product to be tested, but average of 3 test samples is any part in contact with water is chrome plated.

<sup>c</sup> Optional, but not used in practice for test of the finished products

<sup>d</sup> Proposed revision to 5 µg

In the following, "Requirements" refer to both legislative and what is practiced through voluntary approvals and certifications.

The situation is more complex regarding polymeric materials, which need to be assessed regarding the migration of hazardous substances, but also regarding taste and odour and microbiological growth.

There are in the 4 countries requirements for taste and odour, and the developed test standards for the purpose are EN 1420, EN 1622 and EN 14395. Finland is currently using an own referring standard for taste and odour. Denmark and Norway both accept the German approval KTW, and Denmark in addition the Dutch approval Kiwa watermark. Recognition of these approvals is under assessment in Sweden.

Regarding the leaching assessment, all countries have requirements and accept approvals and certificates made from the test European standard methods EN 12873 and EN 15768 (tough procedure under assessment in Sweden). In Finland, the standard EN ISO 8795 is referred for migration test. However, Denmark has from far the most requirements having set limit regarding TOC, Ag and phenols, which none of the other countries has. Denmark and Norway both accept the German approval KTW regarding leaching, and Sweden is assessing this possibility. In Finland, the revised decree for PEX-pipes will include requirements for TOC.

Regarding microbial growth, all Nordic countries except Finland have requirements referring to the European standard. Denmark and Norway both accept the German approval KTW, and Denmark in addition the Dutch approval ATA. Recognition of these approvals is under assessment in Sweden. Some important comments need however to be mentioned regarding this issue:

- Only products for water treatment need to be tested in Denmark (other products are considered to be sufficiently assessed using TOC test).
- There is a difference between how assessment of the migration of organic substances is carried out in Denmark and Germany. Migration analysis of the different parts of a product are done in Germany, whereas only the final product is assessed in Denmark, even if it contains several parts made of plastics and elastomers.

Tests for enhancement of microbial growth use local drinking water as test water, which implies that product tests performed in German drinking water do not necessarily give the same protection level in Nordic countries. This makes it especially important to determine eventual differences in drinking water properties, in order to assess that the pass-fail criteria used can be validated at national level in respective countries.

Finally, regarding cement based materials, no requirements are implemented in the Nordic countries yet. The existing EN standards for the leaching purpose are EN 14944-3 and EN 15768.

## 2.3 Other on-going initiatives and systems in the Nordic Countries

### 2.3.1 Norway

The building regulations in Norway have recently been revised.

A voluntary certification scheme for all materials and products in contact with drinking water (also outside water installation products) has been suggested in Norway. This scheme tend to build on standard test methods developed in CEN/TC 164/WG3. The intention with the system is to provide certification opportunities for all products and materials in contact with drinking water (also those which fall outside CPR).

### 2.3.2 Sweden

The Swedish requirements on construction works are performance based rather than setting detailed requirements on the performance of individual construction products. The correspondence between product and requirements is assessed through a type approval process within the field of sanitary tapware. A manufacturer can obtain a type approval for a product according to the Planning and Building Act. This is an approval of conformity with Swedish regulations. RISE Certification and KIWA are accredited for issuing type approvals for sanitary tapware.



In 2014 a governmental investigation was published, which is a review about the prescribed legislation and the situation regarding responsible institutions and involved authorities, regarding drinking water. The investigation was carried out in order to go through the field about drinking water, from raw water to tap, and to enlighten future challenges, and to come with possible. This resulted 2016 in a strategy for work with materials and products in contact with drinking water from the Swedish ministry of housing and building. The proposed strategy can be summarized into three main conclusions:

- The authorities should provide information about their responsibilities and about the current rules, including the approval of materials and products, and about the responsibility of constructors and buildings owners. This is to be done as soon as possible.
- The Swedish ministry of housing and building shall determine whether the requirements of the Building Regulations should be specified so that it is clear what materials, standards, limits and evaluation documents to be used when a material or a product's suitability is assessed. This may be completed by the Chemicals Agency rules on requirements for sales of products.
- Sweden should investigate the possibilities to take active part in the work within 4ms initiative and push for common European rules.
- Materials and products in the distribution systems are submitted to Planning and Building act (2010:900). No mandatory provisions and recommendation has been issued by Boverket. Type approval can be issued based directly to Planning and Building act.

Parallel to the governmental agencies, Sunda hus, BASTA and Byggvarubedömningen are all three initiatives of assessment which stands beside the accrediting system, and are voluntary systems for assessment of plant- and construction products. All three provide guide lines for constructors and real estate managers, for when they need to choose materials for new constructions or during every day management. REACH based often, aim is to phase out dangerous substances. The limits for classification are based on the Chemical legislation in REACH and the CLP-regulation

### 2.3.3 Denmark

The latest Executive Order No. 1007 introduces a two-tier system that maintains the GDV mark and at the same time accepts certificates from DVGW (Germany) and ATA (The Netherlands) and the Swedish type approvals as an alternative to the GDV scheme. During the summer of 2016 - due to some critical hearing statements – quite a lot of criticism was expressed in the media. The great concern is that the requirements of Executive Order No. 1007 have been eased too much. Consequently the Minister for Transport and Building has announced that the Executive Order must be scrutinized again. This work is ongoing at the moment.

### 2.3.4 Finland

The Finnish building regulations are under revision by now and new decrees will come into force in 2018. Instead of performance based criteria new regulations will give specified requirements for essential characteristics of construction products. At the same time the type approval decrees will be revised.

Table 3 Overview of general hygienic requirements, coverage of buildings, regulations and approvals

	Denmark	Finland	Norway	Sweden
<b>Products in contact with drinking water shall not pose any negative health effects</b>				
Covered in drinking water regulation:	Y	Y	Y	Y
Covered in building regulation:	Y	Y	Y	Y
<b>The extent of building regulation</b>				
Indoor water installations covered:	Y	Y	Y	Y
Service line within the boundary of the property covered:	Y	Y	Y	Y
Water supply installations covered:	N	N	Y	Y*
<b>Approval and certification</b>				
Approval required	Y	N	N	N
Approval is in practice conducted for:	Indoor + service line**	Indoor installations	Indoor + service line	Indoor installations*

\*Building regulations apply to all installations, but the building rules from the Ministry of Housing and building only applies to indoor installations

\*\* Applies for building but not mandatory for other infrastructures.

Table 4 Overview of standards, requirements and existing limit values for metallic materials

Metallic materials requirements and standards	Denmark	Finland	Norway	Sweden
Taste and odour requirements	N	N	N	N
Leaching criteria specified in regulation or in guidance to regulation	Y	Y	N	Y
Leaching criteria specified in test standard referred to in regulation guidance	-	Y	Y	-
Leaching test standard available for material	EN 15664	EN 15664	EN 15664	EN 15664
Leaching test standard available for final product	NKB, EN 16058	NKB, EN 16058	NKB, EN 16058	NKB, EN 16058
Leaching test standard used	NKB or EN 15664	NKB	NKB	NKB or EN 15664
Limit value Pb ( $\mu\text{g}$ ) for NKB (the size of the product has to be taken into account)	5	20* (kitchen taps)	20*	5
Limit value Pb ( $\mu\text{g/L}$ ) for EN 15664	5	-	-	5
Limit value Cd ( $\mu\text{g}$ ) for NKB	2	2	2	2
Limit value Ni ( $\mu\text{g}$ ) for NKB	80	-	-	-
Limit value Ni ( $\mu\text{g/L}$ ) for EN 16058	20	-	-	-
Limit values for other trace metals	When 15664 is used	-	-	When 15664 is used
Microbial growth requirements	N	N	N	N

\*) This value will be lowered in the new decree of Ministry of the Environment in Finland. Proposed to be 5  $\mu\text{g}$  in Norway.

Table 5 Overview of standards, requirements and existing limit values for organic materials

<b>Organic materials requirements and standards</b>	<b>Denmark</b>	<b>Finland</b>	<b>Norway</b>	<b>Sweden</b>
Taste and odour tested by standard EN 1420, EN 14395 and EN 1622	Y	SFS 2335 Annex A	Y	Y
Taste and odour verified through acceptance of German Approval (KTW)	Y	N	Y	Under assessment*
Taste and odour verified through acceptance of Dutch Approval (ATA)	Y	N	Y	Under assessment*
Leaching test standard used: EN 12873, EN 15768	Y	EN ISO 8795	Y	Under assessment*
Leaching verified through acceptance of German Approval (KTW)	Y	-	Y	Under assessment*
Leaching of other substances than mentioned in drinking water act	Y	Under assessment	Under assessment	Under assessment*
Limit value TOC (VOC + NVOC) (mg/L): Products of > 2m / products of <2m	0.3/1.3	-	-	-
Limit value TOC (VOC + NVOC) (mg/m <sup>2</sup> /day):	1.0/15	2.5**	-	-
Limit value Ag (silver)	10	-	-	-
Limit value for sum of phenols by EN-ISO 14402 shall be lower than LOD (µg/L)	2	-	-	-
Bacterial count EN ISO 6222: Number of times lower than source water	5	-	-	-
Microbial growth requirements tested according to EN 16421	Y	Under assessment	Y	(Y)
Microbial growth accepted through approval which use EN 16421	DVGW and ATA	N	DVGW	Under assessment*

\* Under assessment under the responsibility of the ministry of housing and building

\*\* ) TOC will be 2.5 mg/m<sup>2</sup>/day in the new decree of Ministry of the Environment

Table 6 Overview of standards, requirements and existing limit values for cementitious materials

<b>Cementitious materials requirements and standards</b>	<b>Denmark</b>	<b>Finland</b>	<b>Norway</b>	<b>Sweden</b>
Taste and odour requirements	N	N	N	N
Taste and odour standards available, EN 14944-1	Y	Y	Y	Y
Leaching criteria specified in regulation or in guidance to regulation	N	N	N	N
Leaching test standard available: EN 14944-3 and EN 15768	Y	Y	Y	Y
Microbial growth requirements	N	N	N	N
Microbial growth standard available EN 16421	Y	Y	Y	Y

### 3 European initiatives

The most developed work on the European level is the so-called 4 MS initiative and system, which is based on material or chemical approval through positive and composition lists and European testing standards and is presented below. In addition, the way of working in some other European countries as Switzerland and Austria are also briefly summarized. There are also currently numerous initiatives going on in Europe, both from the Commission, trade associations and industry and different countries, with the overall aim to work towards a common European system. These initiatives are also briefly presented below.

This chapter gives an actual status on European level as per 2017-01. As many activities are presently performed, it is important to be aware that some part may soon be obsolete. The latest developments are reported from a round-table meeting in Brussels 2017-01-19 to which the main stakeholders within the field participated.

#### 3.1 4 MS procedure and related testing methods (EN standards); application in different countries

The four EU Member States, France, Germany, the Netherlands and the United Kingdom (4MS) announced in January 2011 that they have formalized arrangements to work together on the regulatory frameworks regarding materials in contact with drinking water, in order to ensure the hygienic safety of the drinking water. The 4MS intend to adopt common, or directly comparable, practices for:<sup>1</sup>

- The acceptance of the constituents used in materials in contact with drinking water
- The testing of materials
- The use of common test methods and setting acceptance levels
- The specification of tests to be applied to products
- Reviewing factory production control and setting audit testing requirements
- Assessing the capabilities of certification and testing bodies

The objective of the Common Approach is not to introduce a single assessment system that operates in exactly the same way in each country. It defines a suite of policies and practices that may be adopted within the existing national legal and institutional frameworks. The aim is therefore to ensure that products are assessed consistently, and with the same outcome irrespective of where the work is carried out.

The 4 MS system addresses the 3 main types of materials used for water distribution, metallic, polymeric and cementitious materials. The overall principle of the acceptance scheme for the three main types of material in 4 MS is given in Table 7 and the related test standards used are

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<sup>1</sup> UBA (2016). <https://www.umweltbundesamt.de/en/topics/water/drinking-water/distributing-drinking-water/approval-harmonization-4ms-initiative> (Accessed 31st of May 2016).

given in Table 8. A more detailed description of the actual situation is described in the three following chapters for each category of materials.

Table 7 Principle of the acceptance scheme for the three main types of material in 4 MS

Product type	Name of the acceptance list	Content of the list
<b>Metallic</b>	Composition list	Alloy Compositions
<b>Organic</b>	Positive list	Monomers, additives, aids to polymerization and production
<b>Cementitious</b>	Positive list – cementitious materials  Admixture list of accepted generic constituents	Organic and inorganic substances used for cementitious products  Main constituent materials in cementitious products including their additive and mixtures

Table 8 Test standards used in the 4 MS system for assessment of the different types of materials

Product type	Taste and odour	Leaching	Microbial Growth
<b>Metallic</b>	Not relevant	EN 15664-1	Not relevant
<b>Organic</b>	EN 1420 EN 14395 EN 1622	EN 12873-1 EN 1484 EN 15768	EN 16421
<b>Cementitious</b>	EN 14944-1	EN 14944-3 EN 15768	EN 16421

In addition, there is a number of open issues which the 4 MS group is working with at present:

1. Minor substances (maximum content of substances that have not to be declared in the formulation), which requirements are necessary and how to define them
2. Minor products/minor materials (due to the small contact area with drinking water for which products /parts of products no assessment or a reduced assessment is sufficient), which requirements are necessary and how to define them
3. Assembled products – common approach how to deal with assembled products (testing of parts of product as a whole)

### 3.1.1 Metallic materials

For metallic materials a Common Approach including a Composition List (positive list of accepted materials) is available and ready for implementation on national level. The list is based on using the test standard EN 15664 (part 1 and 2) for the approval of the material compositions, which aims to assess the long term leaching characteristics of metallic materials. The duration of the

exposure is minimum 26 weeks conducted with 3 different natural test waters. Hence, the implementation of the Composition List will lead to materials on the market that are pre-tested under conditions that are closer to the actual consumer scenario. For the certification or approval of products it is only necessary to ensure that the listed metallic materials are used. There is presently only one laboratory in Germany (TZW) which is recognized to perform test according to EN 15664 with the 3 test waters needed.

The approval system according to the 4MS composition list has been implemented in Germany and the Netherlands but progress in France and UK is unclear. There is an on-going debate about reducing the acceptance level for lead and possibly banning lead from the products as in the US.

The system for metallic materials is the most achieved, with mainly one open issue remaining. An additional product tests (e.g. for the nickel release of chromium plated taps) is today not in use in any of the 4MS but is considered to be needed and might be proposed in the future, and the 4 MS group is currently working with this issue.

### 3.1.2 Organic materials

For organic materials the fundamentals for the assessment based on positive list of the starting substances is agreed. This includes the assessment of substances according to the principles for the food contact materials. A summary of national assessed substances (combined list) is available and it was agreed that the substances should be transferred to a core list by an opinion process. The combined list is being progressively merged into the core list using MS and EFSA data.

Note that the Core list and combined list both accept substances according to Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food. In addition to those, the combined list per 2017-01 contains 213 substances and the core list 55 substances. Lack of toxicological data on historically used materials is presenting difficulties – as well as deleting materials which are no longer used.

The Core List is anticipated to be finalised in 2022 due to the many types of organic formulations present in products, the number of single substances used, absence of toxicological data etc.<sup>2</sup>

For products made of organic materials several product tests will have to be performed. All these testing standards are now available (EN 12873 series (migration test), EN 1420 (TON & TFN), EN 16421 (EMG), EN 15768 (GC-MS Screening). However, common acceptance criteria are still missing according and are currently addressed according to Table 9.

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<sup>2</sup> Common Approach, 2016. Common Approach 4/5 MS – Work program and planning, Joint Management Committee 30.03.2016.

Table 9 Remaining open issues regarding common assessment criteria for organic materials

Parameter	Test method	National Implemented	Harmonized requirements
Migrations of PL substances	EN 12873	D, NL UK test method F in preparation	Conversion and requirements agreed
Migration of TOC	EN 12873 EN 1484	D, NL, UK F in preparation	Agreed
Odour / Flavour	EN 1420	D, NL, F UK in preparation	Proposal available
Enhancement of microbial growth	EN 16421	D, NL in preparation	Proposal available
GC-MS screening	EN 15768	F, UK	To be defined

### 3.1.3 Cementitious materials

For cementitious materials a Common Approach including a generic positive list is available. A common evaluation procedure and combined substances list has been agreed. The combined list is to be merged into a positive list. The inorganic materials used (water, cement, sand and stone), in addition to grinding aids at concentrations less than 0.2%, are expected to be regulated "straight-forward" by using the content-approach. The organic admixtures need to be evaluated and drafted and placed in an admixtures Positive List.

The Common Approach represents an improved health safety level, as no requirements for most of the cementitious products exist today.

## 3.2 Procedures in Switzerland and Austria)

Austria and Switzerland are both associated with the German DVGW system via organizations ÖVGW and SVGW. These organizations make their own certifications of the mechanical/physical properties and apply in practice the German KTW certificates and UBA list as basis for the assessing the health related properties.

## 3.3 Other on-going European initiatives

There are right now many parallel activities and initiatives going on through Europe, both driven by the European Commission and by other players like trade associations groups. All these initiatives have a similar ultimate goal, which is a common acceptance procedure for materials and products in contact with drinking water in Europe. We try below to give a short overview and presentation of the most important initiatives.

### 3.3.1 Revision of the Drinking water Directive and more precisely of article 10

This Work is driven by DG Environment. The REFIT review of the Drinking-water Directive has been reported separately and it is anticipated that a mandate for its revision will be issued by the

end of 2017. One of the conclusions is that Article 10 permits too much flexibility to Member States. In terms of effectiveness, there was a high compliance (99%) with the parametric values, but in terms of efficiency, Article 10 presents a burden to industry and an obstacle to the internal market. In terms of coherence, Article 10 has shown compliance with control of lead level stipulated in Annex I, but it conflicts in that Annex I contains very few substances which may be leached from drinking-water installations.

A Materials Study order by DG Environment (UBA Austria/WRC) will be completed during spring 2017. It reviews the situation “on the market”. There is no evidence that a MS refuses a product. Large components are not an issue – smaller products contribute to taste and odour and microbial growth- with confusion about the 3-method standard for EMG. The main issue is the burden to industry.

A draft Impact Assessment Study is expected to be published during spring 2017 with a “route forward” proposal for a new document by summer 2017. It will include consumer health and people at risk. There is communication with DG Growth and DG santé. Food contact materials are currently under review.

### 3.3.2 CPR – New CEN mandate

Mandate M/136 has been formally withdrawn. Test methods (supporting standards) have been developed by CEN but harmonised product standards have not, as the mandate was too imprecise. The current proposal is to split the task into parts to enable incremental progress where the issues are less complex. The first step is to categorise under materials (organic, metallic, and cementitious) and focus on the material in contact with water – not necessarily the “main material”.

A first draft of proposal for new mandates has been sent to stakeholders through Europe by DG Growth, anticipating responses beginning of January 2017. The new mandate(s) will essentially be an instruction to CEN for developing harmonised product standards. DG Growth is looking for a model standard approach starting with products that are already standardised. An adhoc-group of the TC 164 is preparing a “Model standard” to help the European Commission to develop a new Mandate 136.

When considering which products are included and which are not, the concept of clusters on a step by step basis is suggested. What a construction product exactly is, is defined in the CPR, though not very precisely, and does not include the treatment works.

### 3.3.3 EDW: Industry Proposals for Materials in Contact with Drinking Water

European Drinking Water (EDW) is an alliance of European trade associations representing industries which are involved with supply products or materials that are used in drinking water applications and connected to municipal drinking water supplies within the European Union. This includes, for example, pumps, pipes, valves, taps, fittings, water treatment, water heaters, catering equipment industry, seals, etc. and all types of materials such as elastomers, metals, plastics, etc. The alliance is open to any industry association relevant to drinking water contact applications. EDW is regrouping by now 29 members, all European trade associations,



representing a large part of the companies producing material and products for drinking water distribution in Europe.

The mission of the EDW is to address the current absence of harmonization of regulatory requirements within the EU, for suitability of products and materials that are used in applications involving contact with drinking water. Their objective is to achieve an EU harmonized scheme for requirements and conformity assessment of products and materials that are used in drinking water applications, which will be accepted in all EU Member States.

The strategy of the EDW is to engage with the 4MS, DG Growth, DG Environment and possibly EU Parliament. A dedicated website has been launched (: <https://www.europeandrinkingwater.eu/>).

The EDW also proposed certification scheme for plastics and silicone products used in drinking water applications. It is based on the Portuguese notification (TRIS notification 2015/234/P), addresses the regulatory issues raised by CEN TC164 and covers enhancement of microbiological growth. The proposed scheme will be widely circulated to DG Environment, Growth, Santé, 4MS, etc. A scheme for elastomers is being prepared based on the plastics scheme and EDW will continue with metals and cementitious.

### 3.3.4 Mutual recognition – DG Growth Review and on-going work

According to the principle of the mutual recognition regulation EC No 764/2008, every product lawfully marketed in one Member State should be acceptable for another. The regulation covers procedural aspects such as contact points in each MS, and every MS should notify the Commission if it wants to prevent import of a product.

The results of an external evaluation of the regulation 2014 were not good. The principle is not being applied, Member states are in denial and the economic operator is reluctant because of associated costs. DG Growth is working on a new initiative to cover (1) Lack of awareness by economic operators and authorities of the obligation (2) Procedural guarantee – how to challenge national authorities with a fast track approach engaging with the Commission – third party (3) Source of advice on harmonised procedures and proportionality (4) Demonstrate product is validly marketed in local market. DG Growth is working on evaluation and impact assessment process coming into application in 2018. As article 10 in the Drinking water Directive addresses minimum contamination of the water by materials of construction, there will be a need is to define how the law is being applied in the particular case.

## 4 Appendix

The Appendix is divided into 4 parts:

- Appendix 1: Norway
- Appendix 2: Sweden
- Appendix 3: Finland
- Appendix 4: Denmark

Each appendix contains the following parts:

- Legislation in the country regarding material coupling to DWD
- Legislation in the country regarding Durability
- Legislation in the country regarding health requirements in Building regulation
- Other national initiatives
- Responsibility of the different actors

Following background is to be considered for point 1 above.

Drinking water directive: Implementing Article 10 of Directive 98/83/EC in the Nordic Countries

Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption, the Drinking Water Directive (DWD), is a minimum directive. This means that the directive sets a threshold which national legislation must meet, but that the member states also are free to apply more stringent national measures, provided these do not conflict with free movement and free market rules. The requirements for drinking water materials and products are stated in Article 10 of this directive:

***Article 10 Quality assurance of treatment, equipment and materials***

*Member States shall take all measures necessary to ensure that no substances or materials for new installations used in the preparation of distribution of water intended for human consumption or impurities associated with such substances or materials for new installations remain in water intended for human consumption in concentrations higher than is necessary for the purpose of their use and do not, either directly or indirectly, reduce the protection of human health provided for in this Directive; the interpretative document and technical specifications pursuant to Article 3 and Article 4 (1) of Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products <sup>(1)</sup> shall respect the requirements of this Directive.*

In addition to the requirements in Article 10, the Drinking Water Directive lists a certain amount of parameters with maximum allowed levels in the Annexes. The point of compliance for these maximum levels are at the point where the water emerges from the taps that are normally used for human consumption. These maximum levels do apply regardless from where the pollution origins, whether it is from the water source, from the drinking water materials or products, or from some other source.

## 4.1 APPENDIX 1, Regulations and approval systems in Norway

### 4.1.1 Legislation in Norway regarding DWD

#### Overview of implementation of Article 10 in Norway

		Name of regulation implementing DWD Article 10	Reference	The legal text	Mandatory approval		Voluntary approval		Comments
					Y	N	Y	N	
Norway	Native	FOR 2001-12-04 nr 1372: Forskrift om vannforsyning og drikkevann (Drikkevannsforskriften)	§ 13 første ledd	<i>Materialer i transportsystem, internt fordelingsnett og vannbehandlingsanlegg med videre som direkte eller indirekte kommer i kontakt med vann i vannforsyningssystem, må ikke kunne avgi stoffer til vannet som kan medføre fare for helseskade eller som kan føre til en uakseptabel endring i vannets sammensetning, herunder en forringelse av vannets sensoriske egenskaper.</i>					
	English	Reg. No. 1372 of 4 December 2001: Regulations concerning water supply and water intended for human consumption (Drinking Water Regulations)	Section 13 first paragraph	<i>Materials in the transport system, domestic distribution system and treatment plants, etc., that come into direct or indirect contact with water in the water supply system must not release substances into the water that can result in a risk of harm to human health or lead to an unacceptable alteration in the composition of the water, including a deterioration of the water's sensory characteristics.</i>		X	X		

#### 4.1.2 Legislation regarding durability

**Overview of the specific requirements on safety/durability (e.g. mechanical failure, water leakage) regulated in Norway both for water main, service line and domestic installations. Test Methods and related requirements for mechanical properties are given in the next chapter.**

Name of national regulation relating to safety and durability requirements	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Comments
			Y	N	Y	N		
Byggteknisk forskrift 2017 (TEK17)	FOR-2017-06-19-840	<p><b>Section 15-5. Indoor water installation</b></p> <p><u>Guideline for TEK 17:</u></p> <p>Pressure reduction valve are to be used if water pressure &gt; 0.6 MPa.</p> <p>For plastic pipes regarding Tightness. References are made to: NS-EN ISO 3503:2015, NS-EN ISO 3458:2015 and NS-EN ISO 3459:2015.</p>			X		SINTEF Technical Approval and SINTEF Certificate	<p>In TEK 17 only function based requirements are specified.</p> <p>Documentation is mandatory. Therefore approvals may be used.</p>
		<p><b>Section 15-7. Outdoor water supply installations with mains network</b></p> <p><u>Guideline for TEK 17:</u></p> <p>The pipeline network must be secured against backflow of polluting substances. Reference is made to NS-EN 1717 and VA-Norm VA/Miljø-blad nr. 61.</p> <p>The pipeline network shall be tested against tightness before use and comply with the criteria in NS-EN 805:2000. For drinking water installations reference is made to NS-EN 806-1:2000.</p>			X		<p>SINTEF Technical Approval and SINTEF Certificate</p> <p>The municipalities have their own "in-house" procedure for selecting materials and product.</p>	<p>In TEK 17 only function based requirements are specified.</p> <p>Documentation is mandatory. Therefore approvals may be used.</p>

Regulation on conditions for the marketing and sale of construction products (DOK)	FOR-2013-12-17-1579	<p>Section 10. Documentation of essential characteristics</p> <p>Products shall have characteristics that, when properly installed, the 7 basic work requirements for building works in CPR are fulfilled.</p> <p><u>Guideline for DOK:</u>  Examples of relevant characteristics that the products need to have to fulfil basic work requirements are: mechanical strength, dimensions, fire resistance and related characteristics, thermal conductivity, sound isolation, air/rain/steam tightness, leaching of metals to drinking water, emission of polluting substances and the content of dangerous substances according to article 57 in REACH regulation nr. 1907/2006, dependent of what type of construction product and intended use.</p>			X		SINTEF Technical Approval and SINTEF Certificate	<p>In DOK only function based requirements are specified.</p> <p>Documentation is mandatory. Therefore approvals may be used.</p>
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**Overview of mechanical properties and criteria practiced in Norway:** The mechanical properties with corresponding performance criteria are summarised for the main drinking water products in domestic installation. The basis for the selected properties is the existing documentation required to place a product on the market and to properly install it in works so that the works are in compliance with the building regulation.

Type of product		Standard or technical specification	Main test parameters and criteria used for mechanical properties																
			Marking	Dim.	Dezincification resistance [ $\mu\text{m}$ ] (EN ISO 6509)	Stress corrosion resistance (ISO 6957)	Leak-tightness [MPa]	Hydraulic strength [MPa]	Torque [Nm]	Bending [Nm]	Endurance	Temp. cycling	Flow rate [l/s]	Acoustic (EN ISO 3822)	Water hammer	Pull out [N]	Opening & closing pressure [MPa]	Vacuum	
Stop valves inside buildings	Ball valve	NS-EN 13828	X	X	< 200	N/A	1,6	2,5	X	X	X	N/A	N/A	X	N/A	N/A	N/A	N/A	
	Stop valve	NS-EN 1213	X	X	< 200	N/A	1,6	2,5	X	X	X	N/A	X	X	N/A	N/A	N/A	N/A	
	Magnetic valve	NT VVS 100	X	N/A	< 200	N/A	1,6	N/A	N/A	N/A	X	N/A	N/A	N/A	X	N/A	N/A	N/A	
Stop valves outside buildings	Ball and stop valve	NKB 13	X	X	< 200	N/A	1,6	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	N/A	
Pressure reduction valve		NS-EN 1567	X	X	< 200	N/A	1,6	2,5	N/A	X	X	N/A	X	X	N/A	N/A	X	N/A	
Fittings	Ends for capillary soldering or brazing	NS-EN 1254-1																	
	Compression ends	NS-EN 1254-2	X	X	< 200	X	X	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	
	Compression ends	NS-EN 1254-3	X	X	< 200	X	X	N/A	N/A	X	N/A	X	N/A	N/A	N/A	X	N/A	X	
	Capillary or compression ends	NS-EN 1254-4																	
	Short ends for capillary brazing	NS-EN 1254-5																	
	Push-fit ends	NS-EN 1254-6	X	X	< 200	X	X	N/A	N/A	X	N/A	X	N/A	N/A	N/A	X	N/A	X	
	Press ends	prEN 1254-7	X	N/A	< 200	X	X	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	X
	Press ends	NS-EN 1254-8	X	X	< 200	X	X	N/A	N/A	X	N/A	X	N/A	N/A	N/A	X	N/A	N/A	X
Safety equipment for water heaters	Hydraulic safety groups	NS-EN 1487	X	X	< 200	X	1,6	2,5	X	X	X	N/A	X	X	N/A	X	X	N/A	
	Expansion groups	NS-EN 1488	X	X	< 200	N/A	1,6	2,5	X	X	X	N/A	X	X	N/A	N/A	X	N/A	
	Pressure safety valves	NS-EN 1489	X	X	< 200	N/A	N/A	2,5	X	X	X	N/A	X	X	N/A	N/A	X	N/A	
	Combined temperature and pressure relief valves	NS-EN 1490	X	X	< 200	N/A	N/A	2,5	X	X	X	N/A	X	X	N/A	N/A	X	N/A	
	Expansion valves	NS-EN 1491	X	X	< 200	N/A	N/A	2,5	X	X	X	N/A	X	X	N/A	N/A	X	N/A	
Water filter		NS-EN 13443	X	X	< 200	N/A	X	N/A	N/A	X	X	N/A	X	X	N/A	N/A	N/A	N/A	
Water meter		ISO 4064-2																	

#### 4.1.3 Legislation regarding health requirements in Building regulation

##### **Regulation regarding health requirement in Building regulation in Norway both for water main, service line and domestic installations**

The review presents how the national legislation refer to the EU Construction Products Regulation (CPR, Regulation (EU) No 305/2011).

Name of national building regulation	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Test methods and related requirements (limit values)	Comments
			Y	N	Y	N			
Byggteknisk forskrift 2017 (TEK17)	FOR-2017-06-19-840	<p><b>Section 15-5. Indoor water installation</b></p> <p><u>Guideline for TEK 17:</u></p> <p>Products to be used must be adequately documented.</p> <p>For plastic based products, it is specifically important to consider leaching.</p> <p>Reference is made to the parametric values in the Norwegian Drinking Water Act (Drikkevannsforskriften).</p> <p>References are made to sanitary taps tested according to NS-EN 817, NS-EN 111.</p> <p>To prevent growth of legionella the following should complied with:</p> <ul style="list-style-type: none"> <li>• Hot water in circulating system should have minimum 65 °C.</li> <li>• Plastic materials that enhance the growth should be avoided.</li> <li>• The installation is desigend to have normal flow for ech pipe dimmentions used.</li> </ul>				X	SINTEF Technical Approval and SINTEF Certificate	Cd and Pb criteria of 2 µg and 20 µg, respectively, given in NKB 4.	<p>In TEK 17 only function based requirements are specified.</p> <p>Documentation is mandatory. Therefore approvals may be used.</p>

		Hot water for personal hygiene should not be higher than 38 °C at the draw off point in preschools, assisted livings etc. For other installations the temperature should not be higher than 55 °C.							
		<p><b>Section 15-7. Outdoor water supply installations with mains network</b></p> <p><u>Guideline for TEK 17:</u></p> <p>For plastic based products, it is specifically important to consider leaching.</p> <p>Reference is made to the parametric values in the Norwegian Drinking Water Act (Drikkevannsforskriften).</p> <p>Products shall comply with the documentation required in: Regulation on conditions for the marketing and sale of construction products (DOK).</p> <p>Example of documented products may be sanitary taps tested according to NS-EN 817, NS-EN 111 and products that comply with NKB 4 product rules.</p>			X		<p>SINTEF Technical Approval and SINTEF Certificate for products used in the service line only.</p> <p>The municipalities have their own "in-house" procedure for selecting materials and product.</p>	<p>Cd and Pb criteria of 2 µg and 20 µg, respectively, given in NKB 4.</p>	<p>In TEK 17 only function based requirements are specified.</p> <p>Documentation is mandatory. Therefore approvals may be used.</p>



Regulation on conditions for the marketing and sale of construction products (DOK)	FOR-2013-12-17-1579	<p>Section 10. Documentation of essential characteristics</p> <p>Products shall have characteristics that, when properly installed, the 7 basic work requirements for building works in CPR are fulfilled.</p> <p><u>Guideline for DOK:</u> Examples of relevant characteristics that the products need to have to fulfil basic work requirements are: mechanical strength, dimensions, fire resistance and related characteristics, thermal conductivity, sound isolation, air/rain/steam tightness, leaching of metals to drinking water, emission of polluting substances and the content of dangerous substances according to article 57 in REACH regulation nr. 1907/2006, dependent of what type of construction product and intended use.</p>		x		SINTEF Technical Approval and SINTEF Certificate	Cd and Pb criteria of 2 µg and 20 µg, respectively, given in NKB 4.	<p>In DOK only function based requirements are specified.</p> <p>Documentation is mandatory. Therefore approvals may be used.</p>
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#### 4.1.4 Other national initiatives

A voluntary certification scheme for outside water installation products have been suggested in Norway. This scheme tend to build on standard test methods developed in CEN/TC 164/WG3. The intention with the system is to provide certification opportunities for all products and materials in contact with drinking water (also those which fall outside CPR).

#### 4.1.5 Responsibility of the different actors

A brief description of the different actors involved and of their respective responsibilities

##### *Authorities*

Name of authority	Regulation / approval system / other system	Responsibility
Norwegian Building Authority (DiBK)	Byggteknisk forskrift (TEK10) and Forskrift med dokumentasjon av byggevarer (DOK).	The main authority for the building part in the Norwegian Plan and Building Act. Responsible for TEK and DOK.
Norwegian Food Safety Authority (Mattilsynet)	Drikkevannsforskriften	A governmental body whose aim is to ensure that food and drinking water are as safe and healthy as possible for consumers.

##### *Material and products producers*

Producers group	Regulation / approval system / other system	Responsibility
Manufacturers	DOK (marketing and sale) and TEK (actual use). In practice, this group produce products that fulfill both. Approval and certification	To manufacture products which fulfil the building regulations
Importers, distributors	DOK (marketing and sale) and TEK (actual use). In practice, this group place products on the market that fulfill both. Approval and certification	To put in the market products which fulfil the building regulations
Planners, designers, installers	DOK (marketing and sale) and TEK (actual use). It is mandatory that this group specifies and installs product that are fulfilling TEK. For those who specify specific products it is important that they choose products that are according to DOK. Approval and certification	To specify and install products which fulfil the building regulations

##### *Water suppliers*

Type of supplier	Regulation / approval system / other system	Responsibility
Water works	DOK (marketing and sale) and TEK (actual use) for the use of materials and products in the water supply installations.  The municipalities have their own "in-house" procedure for selecting materials	To use materials and product which fulfil the building regulations.

	and product.	
Water works	Reg. No. 1372 of 4 December 2001: Regulations concerning water supply and water intended for human consumption (Drinking Water Regulations).	To ensure that the quality of drinking water is according to the regulation. If quality requirements are not met, to take measures and/or to inform property owners.
Water works	Paragraph 15 in Reg. No. 1372 of 4 December 2001: Approval of water treatment chemicals	The water works shall ensure that the chemicals are on the positive list of National Food and Safety Agency.
Water works	Paragraph 13 in Reg. No. 1372 of 4 December 2001: Material choice and designing water supply installations and water works.	Ensure that the materials in contact with the water do not contaminate it. The water quality parameters need to be fulfilled at any time and use. No performance criteria (e.g. leaching criteria) are given for the materials and products.

### *Property owners and building companies*

<b>Type of company</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Contractor	DOK and TEK	Ensure that the products used are in compliance with DOK.  Regarding "total contracts" comprising engineering, procurement and construction conducted by the contractor, the contractor is responsible to ensure that the products are also in compliance with TEK.
Property owner	Norwegian Plan and Building Act	The property owner should order the property in such a way that it fulfills DOK and TEK.

## 4.2 APPENDIX 2. Regulations and approval systems in Sweden

### 4.2.1 Legislation in Sweden regarding DWD

#### Overview of implementation of Article 10 in Sweden

Name of regulation implementing DWD Article 10	Reference	The legal text	Mandatory approval		Voluntary approval		Comments
			Y	N	Y	N	
NFA regulations about drinking water, SLVFS 2001:30 (includes amendments).	2 §	<p>2 § These regulations apply to the handling of and quality of drinking water, whether management is part of a professional activity or not.</p> <p>The regulations apply to facilities for drinking water supply:</p> <ul style="list-style-type: none"> <li>- Which on average provide 10 m<sup>3</sup> of drinking water or more per days, or</li> <li>- Supplying 50 or more people with drinking water.</li> </ul> <p>Drinking water supplied or used as part of a commercial or public activity is always covered by this regulation, irrespective of their size. (LIVSFS 2013: 4)</p>	X				<p>The regulations are enacted with the support of Food Regulation 2006: 813 (3, 5, 6, 11, 31, 40 §§).</p> <p>The water is to be analysed according to description in (LIVSFS 2001:30). Standard and extended analyses are described. The analyses will determine compliance with (SLVFS 2001:30) appendix 2.</p> <p>Only analyse of the water is considered, not any analyse of materials and products</p>

	5 §	<p>5 § Drinking water may not contain any substances used in the preparation and distribution of drinking water, or contaminants linked with such substances in concentrations higher than is necessary to satisfy the purpose with use.</p> <p>Drinking water must not contain material from installations used in the preparation or distribution of drinking water, or substances associated with such materials, in higher concentrations than necessary to meet the purpose of the use of the materials.</p>	X			Appendix 1 also contains a list of process chemicals that may be used in the preparation of drinking water. Purposes and terms of use are also stated
	6 §	<p>6 § Distribution plant shall be designed, maintained and managed in such a way that the drinking water meets the requirements of these provisions when it reaches the users. There should be a description of the distribution plant if this part of such a general system under the Act (2006: 412) on general water services.</p>	X			
	7 §	<p>7 § Drinking water shall be wholesome and clean. It shall be regarded as wholesome and clean if it</p> <ul style="list-style-type: none"> <li>- Does not contain microorganisms, parasites and substances which, in numbers or concentrations that they may pose a hazard to human health, and</li> <li>- Meet the quality requirements in Appendix 2.</li> </ul>	X			<p>The quality of the water is measured at the tap and outgoing water from the water work.</p> <p>Responsibility for water quality transfer from water producer to the property owner after the so-called connection point, which is usually located at the property boundary.</p>

#### 4.2.2 Legislation regarding durability

**Description of which safety/durability requirements (e.g. mechanical failure, water leakage) are regulated in Sweden both for water main, service line and domestic installations**

Name of national regulation relating to safety and durability requirements	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Comments
			Y	N	Y	N		
Planning and Building Act (2010: 900), the Ministry of Industry RS N.	8 ch, 1 §	<b>Section 1.</b> A building must: 1. be suitable for its purpose; 2. demonstrate a good effect of design, colour and material; and 3. be accessible to and usable for individuals with limited mobility or orientation capacity.	X				The regional advisory council is responsible for the supervision over the constructor and make sure that the constructor full fill its obligations according to the legislation regulated in SFS 2010:900 e.g. regulation about technical properties	
	2 §	<b>Section 2.</b> Unless otherwise specified in this chapter or in regulations issued pursuant to Chapter 16, Section 2, the requirements in Section 1 shall be fulfilled such that they: 1. are fulfilled for the entire building in the case of new construction; 2. are fulfilled for the entire building in the case of reconstruction or, if this is not reasonable, for that considerable and clearly definable part of the building which has been significantly renewed in the reconstruction; and 3. are fulfilled with respect to the alteration in the case of some other alteration than reconstruction of a building.	X					

	4 §	<p><b>Section 4. /Comes into force 1:01 January 2017/</b></p> <p>A construction works must have the technical characteristics which are essential in terms of:</p> <ol style="list-style-type: none"> <li>1. load-bearing capacity, stability and durability;</li> <li>2. safety in case of fire;</li> <li>3. protection with regard to hygiene, health and the environment,</li> <li>4. safety in use;</li> <li>5. protection against noise;</li> <li>6. energy management and heat retention;</li> <li>7. suitability for the intended purpose;</li> <li>8. accessibility and usability for individuals with reduced mobility or sense of direction;</li> <li>9. economical management of water and waste; and</li> <li>10. broadband access.</li> </ol>	X					
BBR (BFS 2011: 6 with amendments up to BFS 2016: 6)	6.623 (BFS 2014:3 )	Water outlets shall be designed in such a way that water flows remain adequate without causing interfering noise or corrosion due to high water velocity. The design shall also minimise the risk of dangerous pressure surges. Hot tap water at the correct temperature shall be provided without having to wait an inconvenient amount of time.	X					
	6.625 (BFS 2014:3 ).	Tap water installations shall be designed and made from materials which have adequate durability against the external and internal mechanical, chemical and microbial processes to which they are likely to be exposed.	X					
	6.625	Tap water installations shall be designed for a static water pressure of at least 1 MPa and take into account the consequences of impacts of pressure surges.	X					
	6:961 (BFS 2011:2 6).	If a wholly or partially new system is installed, this must be designed and constructed so that the same level of requirements in section 6:62 is fulfilled.	X					

	6:961 (BFS 2014:3 )	<p>General recommendation</p> <p>A risk assessment should be made as part of a preliminary investigation. The risk assessment for the tap water systems should, from a microbiological aspect include how the rebuilt installation components are connected to the existing installation components, taking into account the risk of proliferation of, for example, legionella bacteria. The preliminary investigation should also include the risk of future problems with corrosion, water damage and back flow of contaminated water.</p>				X		
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**Overview of mechanical properties and criteria practiced in Sweden:** The mechanical properties with corresponding performance criteria are summarised for the main drinking water products in domestic installation. The basis for the selected properties is the existing documentation required to place a product on the market and to properly install it in works so that the works are in compliance with the building regulation.

Type of product		Standard or technical specification	Main test parameters and criteria used for mechanical properties																
			Marking	Dim.	Dezincification resistance [µm] (EN ISO 6509)	Stress corrosion resistance (ISO 6957)	Leak-tightness [MPa]	Hydraulic strength [MPa]	Torque [Nm]	Bending [Nm]	Endurance	Temp. cycling	Flow rate [l/s]	Acoustic (EN ISO 3822)	Water hammer	Pull out [N]	Opening and closing pressure [MPa]	Vacuum	
Stop valves inside buildings	Ball valve	SS-EN 13828	X	X	< 200	N/A	1,6	2,5	X	X	X	N/A	N/A	Vol <sup>3</sup>	N/A	N/A	N/A	N/A	
	Stop valve	SS-EN 1213	X	X	< 200	N/A	1,6	2,5	X	X	X	N/A	X	Vol	N/A	N/A	N/A	N/A	
	Magnetic valve	NT VVS 100	X	N/A	< 200	N/A	1,6	N/A	N/A	N/A	X	N/A	N/A	Vol	X	N/A	N/A	N/A	
Stop valves outside buildings	Ball and stop valve	NKB 13	X	X	< 200	N/A	1,6	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	N/A	
Pressure reduction valve		SS-EN 1567	X	X	< 200	N/A	1,6	2,5	N/A	X	X	N/A	X	Vol	N/A	N/A	X	N/A	
Fittings	Ends for capillary soldering or brazing	SS-EN 1254-1																	
	Compression ends	SS-EN 1254-2	X	X	< 200	X	X	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	
	Compression ends	SS-EN 1254-3	X	X	< 200	X	X	N/A	N/A	X	N/A	X	N/A	N/A	N/A	X	N/A	X	
	Capillary or compression ends	SS-EN 1254-4																	
	Short ends for capillary brazing	SS-EN 1254-5																	
	Push-fit ends	SS-EN 1254-6	X	X	< 200	X	X	N/A	N/A	X	N/A	X	N/A	N/A	N/A	X	N/A	X	
	Press ends																		
	Press ends	SS-EN 1254-8	X	X	< 200	X	X	N/A	N/A	X	N/A	X	N/A	N/A	N/A	X	N/A	X	
Pipes	Pe-X	EN ISO 15875	X	X	N/A	N/A	X	X	N/A	N/A	N/A	X	N/A	N/A	N/A	X	N/A	N/A	
	Multilayer	EN 21003	X	X	N/A	N/A	X	X	N/A	N/A	N/A	X	N/A	N/A	N/A	X	N/A	N/A	
	Copper	EN 1254	X	X	N/A	N/A	X	X	N/A	N/A	N/A	X	N/A	N/A	N/A	X	N/A	N/A	
	PE pipe	EN 12201	X	X	N/A	N/A	X	X	N/A	N/A	N/A	X	N/A	N/A	N/A	X	N/A	N/A	
Mixer	Single hand	EN 817	X	X	N/A	N/A	X	X	N/A	N/A	X	N/A	X	Vol	N/A	N/A	N/A	N/A	
	Double hand	EN 200/EN 817	X	X	N/A	N/A	X	X	N/A	N/A	X	N/A	X	Vol	N/A	N/A	N/A	N/A	
	Electrical	EN 15091	X	X	N/A	N/A	X	X	N/A	N/A	X	N/A	X	Vol	N/A	N/A	N/A	N/A	
	Thermost.	EN 1111	X	X	N/A	N/A	X	X	N/A	N/A	X	N/A	X	Vol	N/A	N/A	N/A	N/A	
	Flex. hoses	EN 13618	X	X	N/A	N/A	X	X	N/A	N/A	X	N/A	N/A	N/A	N/A	X	N/A	N/A	
Material	Alloys	Own Kiwa rules	X	N/A	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

<sup>3</sup> Voluntary in Sweden. Part of type approval if available.

#### 4.2.3 Legislation regarding health requirements in Building regulation

Regulation regarding health requirement in Building regulation in Sweden both for water main, service line and domestic installations The review presents how the national legislation refer to the EU Construction Products Regulation (CPR, [Regulation \(EU\) No 305/2011](#)).

Name of national building regulation	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Test methods and related requirements (limit values)	Comments
			Y	N	Y	N			
BBR (BFS 2011: 6 with amendments up to BFS 2016: 6).	6.61	Buildings and their installations shall be designed to ensure water quality and hygiene conditions satisfy public health requirements.			X		This relates to CE market products and products in contact with drinking water is not CE-marked		6:6Rules in this section is valid for installations for water and sewer in buildings and its surrounding property.
	6.62 (BFS 2014:3)	6.Tap water installations shall be designed to ensure tap water, after the water outlet, is hygienic and safe, and comes in a sufficient quantity. Cold tap water shall meet the quality requirements for drinking water after the water outlet. Hot tap water shall be hot enough to allow personal hygiene and household chores. Tap water installations shall be designed using materials that ensure that detrimental concentrations of harmful substances cannot be dissolved in the tap water. Installations shall not impart odour or taste to the tap water.	X				General advice: no higher value than 5µg with the NKB 4 method or 5µg/l with the SS-EN 15664 method is accepted. Other tests can be used if it can be proved that they fulfil the regulation.		

	6.622.	6:622 Microbial growth Tap water installations shall be designed to ensure that the opportunities for growth of micro-organisms in the tap water are minimised. Cold tap water installations shall be designed in such a way that the cold tap water cannot be heated accidentally. Circulation pipes for hot tap water shall be designed in such a way that the temperature of the circulating hot tap water does not drop below 50 °C in any part of the installation.	X						
Planning- and Building act SFS 2010:900  Supported by regulations below:	8 chap. 4§	Construction works on technical features. A construction shall have those technical properties which are essential in question of safety, with respect to hygiene, health and the environment.	X						The plan and building act regulates constructions technical properties.
	8 Chap. 19 §	Construction products suitability. A construction product shall be considered eligible if it has 1. Such properties that the construction, which is intended to be a part of, can meet those technical properties which is stated in 4§ 1-6, 8 and 9. And 2. Reach the demands in rules which have been advised with support of 16 Chap. 6§.	X						Regarding p2: The government, or the authority that the government designates, may issue regulations.

	8 Chap. 22§	Type approval and production control. Materials, construction and facilities can be type approved for its usage in a construction. Such a type approval can only be notified by somebody that is accredited for the task according to the European parliament and the council's regulation ( <a href="#">EG nr 765/2008</a> . If the regulation so states with, support from 16 Chap. 6§, a certain material or construction or facility shall be type approved in order to be used in a construction (mandatory type approval). Even if a type approval is not mandatory an application for a type approval can be notified (voluntary type approval). A certain material or a certain construction or facility which is type approved shall be presumed to able to reach the technical property demands which is stated in 4§ in those respects which the type approval applies.								Type approved or production controlled materials and designs are suitability tested against Swedish Building Regulations requirements in the parts approval indicates. The Swedish system disappears as the products become possible to CE mark and after a specified transition period (text from website SFS).
Rules and general advices regarding type approval and production control, BFS 2011:19	1§	1§ Includes rules and general advices regarding voluntary type approval and decisions about production control in accordance with the legislations stated in 8 chap. 22 and 23 §§ the plan- and building act (2010:900) and in 4 chap. 9 and 10 §§ the plan- and building regulations (2011:338).								The national board of housing, building and planning has issued rules and general advices regarding type approval and production control (BFS 2011:19) (8Chap. 13 and 15 §§ plan- och byggförordningen).
	2§	2§ Type approval and decisions regarding production control for different materials, constructions and facilities shall state intended use and be notified according to the provisions in BFS 2011:19 5-15§§.	X							

BBR (BFS 2011: 6).	2:322	The developer shall assess whether the product is suitable to use for the finished works to comply. The developer can either do tests of construction products to be used or the use of such products whose properties are already assessed.	X						
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#### 4.2.4 Other national initiatives

Here, the systems according to Sunda Hus, Byggvarubedömning and Basta will be described. The approach concerning own dwells will also be presented here.

Sunda hus, BASTA and Byggvarubedömningen are all three initiatives of assessment which stands beside the accrediting system, and are voluntary systems for certification of plant- and construction products. All three provide guide lines for constructors and real estate managers, for when they need to choose materials for new constructions or during every day management.

Sunda hus is an initiative which work with delivering of expertise and consultancy services for real-estate owners and constructors, with the goal of marginalising unhealthy and environmentally unfriendly substances used by the society. Sunda hus is an independent consulting company which business concept is to sell structural information and consultancy services for a sustainable development within the construction and real-estate sector. The evaluation system for Sunda hus is based on the rules in KIFS 2005:7 regarding classification of labelling, the European parliament and board of CLP regulations in EG number 1272/2008, and the Swedish chemical inspections prioritization guide PRIO. These regulations are then used as a foundation together with the products documentation, and each evaluated product is provided a grade from D to A, with A being the best possible grade. A product is given the grade D when the documentation of the product is insufficient.

The BASTA-system is owned by the IVL (the Swedish institute of environment) and Swedish construction industry and work towards the goal of removing dangerous chemical substances from the construction sector. BASTA has created a database with plant- and construction products which properties are approved by the BASTA-system. The Reach regulations are a foundation for the BASTA demands and address all responsible actors in construction business. In the REACH regulations certain materials with particular dangerous properties, according to EG nr 1272/2008 and CLP, are pointed out.

Byggvarubedömningen, is a standardized environmental and health assessment system for products used in the construction sector. Byggvarubedömningen is a financial organisation which addresses constructors, real estate and plant owners and managers. The limits for classification are based on the Chemical legislation in REACH and the CLP-regulation. All products which are to be evaluated by the Byggvarubedömningen have to have attached product specific information *e.g.* safety data sheet and declaration of construction. Products are later, when evaluated, divided into three different categories called recommended, accepted and avoid.

In 2014 a governmental investigation was published, which is a review about the prescribed legislation and the situation regarding responsible institutions and involved authorities, regarding drinking water. The investigation was carried out in order to go through the field about drinking water, from raw water to tap, and to enlighten future challenges, and to come with possible solutions. As a result of this investigation, Boverket was given the responsibility to coordinate the authorities work concerning materials in contact with drinking water.

Finally, Nordic Poly Mark should also be mentioned, which is a voluntary quality mark for plastic products. On products marked with the Nordic Poly Mark, manufacturers have committed to carry out a continuous production control of the product and to be monitored by an independent testing, third-party control. The scope of both internal and external monitoring is specified by the certification organization INSTA-CERT. The suitability for drinking water installations will be assessed according to the national requirements, which so far exist only in Denmark and Finland.

The label applies mainly technical characteristics as the long-term strength, dimensional stability etc..

#### 4.2.5 Responsibility of the different actors

A brief description of the different actors involved and of their respective responsibilities

##### *Authorities*

Name of authority	Regulation / approval system / other system	Responsibility
Boverket	Swedish Code of Statutes 2012: 546 with instructions for the National Board of Housing. (SFS 2010:900) Plan- and Building act, regulations about construction products in contact with drinking water.	<p>Boverket is responsible for the legislation of SFS 2010:900. Is administrative authority in questions regarding</p> <ul style="list-style-type: none"> <li>• Construction environment</li> <li>• House holding with land and water areas</li> <li>• Physical planning</li> <li>• Building and administration of habitation</li> <li>• Residents and residential financing</li> </ul> <p>Is responsible for supervision of construction products eligibility and marketing controls over products which are included in the EU's regulations regarding construction products, including materials in contact with drinking water.</p> <p>Have a national responsibility of coordinating questions regarding materials in contact with drinking water.</p>
Livsmedelsverket	Swedish Statute Book 2009: 1426 with instructions for NFA. LIVSFS 2011:7 Regulations regarding materials in contact with food. LIVSFS 2011:3 Regulations about drinking water.	<p>Is administrative authority in questions regarding</p> <ul style="list-style-type: none"> <li>• safe provisions,</li> <li>• probity in the production of food and</li> <li>• good eating habits.</li> </ul> <p>Shall work in the interest of the consumers. Shall also work in order to increase knowledge about these questions.</p> <p>Is responsible for supervision of foods, and to lead and to coordinate the food control.</p> <p>Is responsible for information and consulting regarding individual drinking water facilities.</p>
Kemikalieinspektionen	Swedish Code of Statutes 2009: 947 with instructions for the Swedish Chemicals Agency. LIVSFS 2011:3	<p>The chemical inspection has operational supervision over primary suppliers and their environmental emissions on to the market.</p> <p>Is responsible for information and consulting regarding operational inspection of chemicals.</p>
Swedac	SFS 2011:791 §18. The law about accrediting and technical control.	SWEDAC has oversight over the accrediting certifying agencies which can acknowledge type approval for materials in contact with drinking water.



### *Material and products producers*

<b>Producers group</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Manufacturer or other business manager which is responsible for releasing a product on to the market.	The environmental code SFS 1998:808	To ensure the products eligibility, and to prove that the product pose no threat to the human health and to the environment.

### *Water suppliers*

<b>Type of supplier</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Water works, all communal water producers	(SLVFS 2001:30) NFA regulations about drinking water.	To ensure the quality of the drinking water according to, SLVFS 2001:30, along the preparation and distribution system and at the tap. If quality requirements are not met, to take measures and/or to inform property owners if the problem is due to materials on the properties after the connection point.

### *Property owners and building companies*

<b>Type of company</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Constructor	Plan- and Building act SFS 2010:900	To ensure that the Swedish regulations regarding planning and construction is followed. That the construction products used are eligible for intended use.

### *Property owners and building companies*

SP Certifiering (f d SP SITAC)	Acknowledged by SWEDAC	Accredited approval agencies.
Kiwa Sverige AB	Acknowledged by SWEDAC	Accredited approval agencies.

### 4.3 APPENDIX 3 Regulations and approval systems in Finland

#### 4.3.1 Legislation in Finland regarding DWD

##### Overview of implementation of Article 10 in Finland

	Name of regulation implementing DWD Article 10	Reference	The legal text	Mandatory approval		Voluntary approval		Comments
				Y	N	Y	N	
Finland	Native	Sosiaali- ja terveysministeriön asetus talousveden laatuvaatimuksista ja valvontatutkimuksista (1352/2015)	20 § <b>Vedenkäsittelyn, laitteiden ja materiaalien laadun varmistaminen</b>  <i>Kunnan terveydensuojeluviranomaisen on varmistettava, että talousveden valmistukseen käytetty vedenkäsittely on asianmukainen ja raakaveden laatuun nähden riittävän tehokas.</i>  <i>Talousveden käsittelyssä tai jakelussa käytetyistä aineista tai laitteissa käytetyistä materiaaleista ei saa joutua talousveteen epäpuhtauksia suurempia määriä, kuin niiden käytön mahdollistamiseksi on välttämätöntä, eivätkä ne saa vaarantaa tämän asetuksen mukaisten talousveden laatuvaatimusten täyttymistä.</i>  <i>Talousveden käsittelyssä käytettävien aineiden on täytettävä vähintään SFS-EN-standardien mukaiset vaatimukset. Ellei aineelle ole vahvistettua standardia, sen on täytettävä vastaavat vaatimukset kuin sellaisten aineiden, joille standardi on vahvistettu.</i>			X	X	
	English	Decree of the Ministry of Social Affairs and Health relating to the quality and monitoring of water intended for human consumption (1352/2015)	<i>Local health authorities shall ensure that treatment for producing drinking water is appropriate and efficient enough considering the quality of raw water.</i>  <i>Materials in treatment or distribution, or materials in installations must not release impurities in drinking water in concentrations higher than is necessary for the purpose of their use and they shall not endanger fulfilling the drinking water quality criteria of this decree.</i>  <i>Substances used in drinking water treatment shall fulfil at least requirements of SFS-EN standards. If there is no published standard for the substance, it must fulfil corresponding requirements of such substances that have a published standard.</i> <i>(Unofficial translation)</i>					

### 4.3.2 Legislation regarding durability

**Description of which safety/durability requirements (e.g. mechanical failure, water leakage) are regulated in Finland both for water main, service line and domestic installations**

Name of national regulation relating to safety and durability requirements	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Test methods and related requirements	Comments
			Y	N	Y	N			
Land Use and Building Act (132/1999) Land Use and Building Decree (895/1999) The National Building Code D1 Water supply and drainage installations for buildings - Regulations and guidelines 2007		Basic requirements for buildings							
Act on the Approval of Certain Construction Products (954/2012) Ministry of the Environment decree on the approval of certain construction products (555/2013)		Requirement for products and their quality control							

<p>Type approval decrees, given by by the Ministry of the Environment, for water installations inside buildings</p>				X	X	<p><b>Type approval decrees:</b>          -Check Valves (Yksisuuntaventtiilit) (2008)          -Shut-off Valves (Sulkuventtiilit) (2006)          -Brass and Copper Pipe Connections (Messinkiset ja kupariset putkiyhteet) (2008)          -Compression Connectors for Copper Pipes (Kupariputkien puserrusliittimet) (2007)          -Multilayer Pipes and their connectors (Monikerrospuutket ja niiden liittimet) (2009)          -PE Pipe Connectors (PE-putkien liittimet) (2008)          -PEX Pipe Connectors (PEX-putkien liittimet) (2008)</p>	<p>The dezincification resistance must be tested according to the standard SFS-EN ISO 6509 and the average depth of dezincification layer must be <math>\leq 200 \mu\text{m}</math> and the maximum depth <math>\leq 400 \mu\text{m}</math>.</p>	<p>The type approval body for pipes and components in water installations inside buildings, authorised by the Ministry of the Environment, is VTT Expert Services Ltd. The type approval rules describe the procedures for the initial type testing as well as for periodical auditing by the certification body once a year. Type approval decisions are valid for a maximum of five years.</p>
						<p><b>Type approval decrees:</b>          -Brass and Copper Pipe Connections (Messinkiset ja kupariset putkiyhteet) (2008)          -Compression Connectors for Copper Pipes (Kupariputkien puserrusliittimet) (2007)          -Multilayer Pipes and their connectors (Monikerrospuutket ja niiden liittimet) (2009)          -PEX Pipe Connectors (PEX-putkien liittimet) (2008)</p>	<p>Test for stress corrosion resistance according to the standard SFS-EN ISO 6957 is required for brass connectors of multilayer pipes and PEX pipes and brass pipe connections. In stress corrosion test no cracks, deeper than 1/3 of the initials wall thickness, may occur.</p>	
							<p>No requirements or approval system for mains and products used in distribution network of waterworks</p>	

**Overview of mechanical properties and criteria practiced in Finland:** The mechanical properties with corresponding performance criteria are summarised for the main drinking water products in domestic installation. The basis for the selected properties is the existing documentation required to place a product on the market and to properly install it in works so that the works are in compliance with the building regulation.

Type of product		Standard or technical specification	Main test parameters and criteria used for mechanical properties															
			Marking	Dim.	Dezincification resistance [ $\mu\text{m}$ ] (EN ISO 6509)	Stress corrosion resistance (ISO 6957)	Leak-tightness [MPa]	Hydraulic strength [MPa]	Torque [Nm]	Bending [Nm]	Endurance	Temp. cycling	Flow rate [l/s]	Acoustic (EN ISO 3822)	Water hammer	Pull out [N]	Opening and closing pressure [MPa]	Vacuum
Stop valves inside buildings	Ball valve																	
	Stop valve (Shut-off Valves)	SFS-EN 1213	X	X	< 200		1,6	2.5	X	X	X		X	X (when needed)				
	Magnetic valve																	
Stop valves outside buildings	Ball and stop valve																	
Pressure reduction valve																		
Fittings	Brass and Copper Pipe Connections	SFS-EN 1254-1 SFS-EN 1254-5	X	X	av. < 200 max 400	X	X											
	Compression Connectors for Copper Pipes	SFS-EN 1254-2	X	X	av. < 200 max 400	X	X		X							X		
	PE Pipe Connectors	SFS-EN 12201-3 SFS-EN 1254-3 and 4	X	X	av. < 200 max 400		X		X							X		
	PEX Pipe Connectors	SFS-EN ISO 15875-3		X	X	X	X									X		
	Multilayer Pipes and their connectors	SFS-EN ISO 21003 Parts 1,2,3 and 5	X	X	X	X	X			X		X				X		X
Check valves <sup>1)</sup>	Family E, type A, B, C and D	SFS-EN 13959 Anti-pollution check valves. DN 6 to DN 250 inclusive family E, type A, B, C and D (SFS-EN 1717: family E)	X	X	av. < 200 max 400		1,6	2,5		X	X		X	X (when needed)			X	
	Family H, type B and D																	

### 4.3.3 Legislation regarding health requirements in Building regulation

#### **Regulation regarding health requirement in Building regulation in Finland both for water main, service line and domestic installations**

The review presents how the national legislation refer to the EU Construction Products Regulation (CPR, [Regulation \(EU\) No 305/2011](#)).

Name of national building regulation	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Test methods and related requirements (limit values)	Comments
			Y	N	Y	N			
Land Use and Building Act (132/1999) Land Use and Building Decree (895/1999)									
Act on the Approval of Certain Construction Products (954/2012)									
Ministry of the Environment decree on the approval of certain construction products (555/2013)									
The National Building Code D1 Water supply and drainage installations for buildings - Regulations and guidelines 2007									

Type approval decrees, given by by the Ministry of the Environment, for water installations inside buildings				X	X	<b>Plastic pipes and connectors</b> -PEX Pipes (PEX-putket) (2007) -PEX Pipes Connectors (PEX-putkien liittimet) (2008) -PE Pipe Connectors (PE-putkien liittimet) (2008) -Multilayer Pipes and their connectors (Monikerrospotket ja niiden liittimet) (2009)	-The additives of plastic pipes and fittings must be compared to the list of the Finnish decree 953/2002, given by the Ministry of Trade and Industry, based on the directive 2002/72/EY, relating to plastic materials and articles intended to come into contact with foodstuffs, and recommendations for polymers in contact with food. -Migration test (SFS-EN ISO 8795) -Taste and odour test (SFS 2335 Annex A)	The type approval body for pipes and components in water installations inside buildings, authorised by the Ministry of the Environment, is VTT Expert Services Ltd. The type approval rules describe the procedures for the initial type testing as well as for periodical auditing by the certification body once a year. Type approval decisions are valid for a maximum of five years.
						<b>Metal products</b> -Copper Pipes (Kupariputket) (2006) -Brass and Copper Pipe Connections (Messinkiset ja kupariset putkiyhteet) (2008) -Compression Connectors for Copper Pipes (Kupariputkien puserrusliittimet) (2007) -Check Valves (Yksisuuntaventtiilit) (2008) -Water Fixtures (Vesikalusteet) (2006) -Shut-off Valves (Sulkuventtiilit) (2009)	<b>Brass components</b> The material of fittings and connectors shall be specified in CEN/TS 13388. Release of lead and cadmium must be tested according to the test method described in the type approval decree (short-term test in synthetic stagnated water). The requirement for cadmium release is $\leq 2 \mu\text{g}$ . Requirement for lead release depends on the product type. For taps used in drinking water installations $\text{Pb} \leq 20 \mu\text{g}$ . In other use of taps, like showers, the requirement is $\text{Pb} \leq 200 \mu\text{g}$ . For valves the requirements depend on the dimensions, being $\text{Pb} \leq 5 \mu\text{g}$ for DN 10 and $\text{Pb} \leq 500 \mu\text{g}$ for DN 50. Also for brass fittings the requirements depend on the dimensions, being $\text{Pb} \leq 5 \mu\text{g}$ for DN 15/16 and $\text{Pb} \leq 250 \mu\text{g}$ for DN 50/54. For fittings in multilayer pipes with $\text{DN} \geq 63$ the limit value is $\text{Pb} \leq 350 \mu\text{g}$ .	
							No requirements or approval system for mains and products used in distribution network of waterworks	

#### 4.3.4 Other national initiatives

##### **Building Water Safety Plan**

Water Safety Plan for water works has been developed in a project, financed and managed by the Ministry of Social Affairs and Health, in order to minimize and control risks in production and distribution of drinking water. A web-based tool (software) was built up for free use of water works. Procedures for risk management and control in water systems inside buildings were developed in another project financed by the Ministry of Social Affairs and Health and the Ministry of the Environment, and carried out by WANDER/Satakunta University of Applied Sciences.

The main target is to increase the awareness of health risks among the inhabitants and owners of the buildings and to give simple tools to decrease and control the risks. Depending on the control procedures advice are given for the inhabitant, owner, maintenance staff or plumber. For example the inhabitant is asked whether the water system is used regularly, since stagnation of water may cause deterioration of the microbiological quality of water. Control of temperatures in cold and hot water is important for preventing growth of legionella. Some procedures are aimed to decrease the risk for leakages in water pipes, like advice to follow up the water consumption from the readings of the water meter and so find possible hidden leaks. Risk control system will be taken in use through general information and by including the procedures into existing standard maintenance practices.

Some risks are outside of control by inhabitants or maintenance after the building and its water system has been designed, constructed and installed. The quality of products is very important for the durability and reliability of the system. The drinking water pipes and components shall be fit for use in contact with drinking water, and their quality shall be tested and inspected. The regulations don't give specification for accepted materials or products, but voluntary type approval decrees have been given for pipes, fittings, taps and valves. For other products it is on the responsibility of the manufacturer or importer to prove the suitability of the products. This must be shown with adequate testing corresponding to type approval requirements. However, tests performed in other countries do not necessarily show the suitability in Finnish drinking water.

The Finnish building regulations are under revision by now. Instead of performance based criteria new regulations should give specified requirements for essential characteristics of construction products. For materials and products in contact with drinking water, criteria should be given by the Ministry of the Environment, responsible for construction products, in close cooperation with the Ministry of Social Affairs and Health, responsible for drinking water quality.

Too many of the damages in drinking water plumbing occur due to mistakes in installation and procedures before use. Installation of water pipes is recommended to become subject to license in Finland.

Report (in Finnish): <http://urn.fi/URN:ISBN:978-951-633-181-5>.



### 4.3.5 Responsibility of the different actors

A brief description of the different actors involved and of their respective responsibilities

#### *Authorities*

<b>Name of authority</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Ministry of Social Affairs and Health	-Decree Relating to the Quality and Monitoring of Water Intended for Human Consumption (1352/2015) - Decree Relating to the Quality and Monitoring of Water Intended for Human Consumption in Small Units (461/2001)	Requirements and recommendations for drinking water quality
Ministry of the Environment	-National Building Code D1 (2007) -Type approval decrees	-Basic requirements for buildings -Requirement for products and their quality control
The National Supervisory Authority for Welfare and Health (Valvira) is a centralised body operating under the Ministry of Social Affairs and Health	-Decree Relating to the Quality and Monitoring of Water Intended for Human Consumption (1352/2015) -Decree Relating to the technical and hygienic competence of workers in water works producing drinking water, and testing of competence (1351/2006)	-Supervision of health authorities in control procedures of drinking water quality  -Administration of the water hygiene safety card procedure and acceptance of trainers to do the competence testing
local health authorities		Monitoring of the quality of drinking water
building supervision authority		Control of the product information (material, test, quality control) and check that the products fulfil the building regulations
VTT Expert Services Oy	Type approval body authorised by the Ministry of the Environment	Type approval and quality control, testing, inspection and certification body
Finnish Safety and Chemicals Agency (TUKES)	The Act on the Approval of Certain Construction Products (954/2012) The decree on the approval of certain construction products (555/2013)	Marketing surveillance of construction products
The National Public Health Institute of Finland	Directive 98/83/EC on the quality of water intended for human consumption	Collection of drinking water quality data from large water works and preparing every three years a national report to the European Commission.
The Ministry of Justice	Water Act (587/2011)	To control the use and management of water resources
The Ministry of Agriculture and Forestry	Act on Water Services (119/2001)	To ensure water supply so that drinking water of good quality is sufficiently available with reasonable expenses
municipalities	Act on Water Services (119/2001)	To develop municipal water supply to meet the demands of the community, in cooperation with local water works and sewage treatment plants, and other municipalities; as well as participate in regional planning of water supply

### *Material and products producers*

<b>Producers group</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
manufacturers	National Building Code D1 (2007) Type approval decrees	To manufacture products which fulfil the building regulations
importers, distributors	National Building Code D1 (2007) Type approval decrees	To put in the market products which fulfil the building regulations
planners, designers, installers	National Building Code D1 (2007) Type approval decrees	To specify and install products which fulfil the building regulations

### *Water suppliers*

<b>Type of supplier</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
water works	Decree Relating to the Quality and Monitoring of Water Intended for Human Consumption (1352/2015)	To ensure that the quality of drinking water is according to the decree. If quality requirements are not met, to take measures and/or to inform property owners.
water works	Decree Relating to the technical and hygienic competence of workers in water works producing drinking water, and testing of competence (1351/2006)	To ensure, that the workers have the water hygiene safety card
water works	Article 10 of the Directive 98/83/EC on the quality of water intended for human consumption	No national criteria or acceptance procedure for water treatment chemicals. SFS-EN standardized chemicals must be used whenever they exist

### *Property owners and building companies*

<b>Type of company</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
constructors	National Building Code D1 (2007) General quality requirements for construction	Quality of installation, commissioning
property owner	Building Water Safety Plan: recommendations for use of water installations (temperature control, prevention of stagnation, professional renovation procedures etc.)	Responsible for ensuring that the quality of water does not get worse in the water installation inside building

#### 4.4 APPENDIX 4. Regulations and approval systems in Denmark

##### 4.4.1 Legislation in Denmark regarding DWD

##### Overview of implementation of Article 10 in Denmark

	Name of regulation implementing DWD Article 10	Reference	The legal text	Mandatory approval		Voluntary approval	
				Y	N	Y	N
Denmark	Native	LBK nr. 1185 af 24.10.2010 (Byggeloven)	<p>§ 5 Økonomi- og erhvervsministeren udfærdiger et bygningsreglement med regler om de i §§ 6-13 omhandlede forhold samt om forhold, som loven i øvrigt indeholder hjemmel til.</p> <p>§ 6 I bygningsreglementet kan fastsættes regler om udførelse og indretning af bebyggelse med hensyn til:</p> <p>a) varetagelse af sikkerheds-, brand- og sundhedsmæssige hensyn</p>				
		Bygningsreglement 2015	8.4.2.4	<p>Stk. 2 Fabriksfremstillede produkter, der indgår i eller tilsluttes de faste drikkevandsinstallationer til og med tapstedet, skal efterleve reglerne i bekendtgørelse om markedsføring og salg af byggevarer i kontakt med drikkevand</p>			
		BEK nr. 1007 af 29.6.2016	<p>Markedsføring og salg af byggevarer i kontakt med drikkevand</p> <p>Godkendt til drikkevand-ordning</p>				
English	Law No. 1185 of 24 October 2010 (Danish Building Act)	§ 5	<p>The Minister for Economy and Business draws up the Danish Building Regulations including rules about the conditions mentioned in sections 6-13 and conditions of which the law includes legal basis.</p>		X		
	The Danish Building Regulations 2015	§ 6	<p>The Danish Building Regulations can provide rules regarding building and design of houses with regard to:</p> <p>a) safety, fire and health</p>				
	Executive Order No. 1007 of 29 June 2016	8.4.2.4	<p>Subclause 2 Manufactured products which are part of or connected to the built-in drinking water installations up to and including the tap must meet the requirements of the Executive Order on the placement on the market and sale of building components that come into contact with drinking water.</p> <p>Placement on the market and sale of building components that come into contact with drinking water. Approved for drinking water scheme</p>				

#### 4.4.2 Legislation regarding durability

**Description of which safety/durability requirements (e.g. mechanical failure, water leakage) are regulated in Denmark both for water main, service line and domestic installations**

Name of national regulation relating to safety and durability requirements	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Comments
			Y	N	Y	N		
The Danish Building Regulations 2015  For main installations in the water supply system pursuant to section 56a and 84, subsection 2, in law on water supply, etc., cf. law No. 635 of 7 June 2010	8.4.2.4	Subclause 3 Installation components that are placed in such a way that they are not replaceable must be of such quality that they are as durable as the building component which they are part of.			X		Voluntary scheme driven by the industry. VA approval and VA certificate  Approval scheme administered by ETA-Danmark	The VA scheme is not controlled by the authorities. The VA approvals and other mentioned schemes and approvals are not applicable as documentation for the market control conducted by the Danish Transport and Construction Agency
	Executive Order No. 132	Executive Order on quality assurance of general waterworks. Section 3: General waterworks annually supplying 17,000 m <sup>3</sup> of water or more must assure the quality by:  1) mapping the total water supply system and the quality of the system, cf. annex 2  2) making a survey of the operational routines of the waterworks including working procedures, general operation, cleaning, sampling, maintenance, new equipment, etc.  3) assessing the risk of contamination of the water from the total supply system, including the individual components, unsuitable constructions, the total maintenance conditions and the operational routines and prioritise according to the risk of contamination of the water.			X		INSTA-CERT approval Nordic Poly Mark  DK-VAND (hygienic requirements)	The large supply systems and service lines with the mains network are not covered by any legal approval schemes. However, the waterworks are obliged to assess the risk of contamination of the drinking water from the components used in the system. Hence, an optional marking scheme for drinking water pipes has been implemented. The scheme is called DK-VAND and is managed by representatives from the waterworks, manufacturers of plastic pipes, toxicological experts and some of the large water suppliers. The scheme is based on the previous DS scheme and takes into account a number of additional requirements for degradation components from antioxidants that were previously required by the waterworks.

**Overview of mechanical properties and criteria practiced in Denmark:** The mechanical properties with corresponding performance criteria are summarised for the main drinking water products in domestic installation. The basis for the selected properties is the existing documentation required to place a product on the market and to properly install it in works so that the works are in compliance with the building regulation.

Type of product		Standard or technical specification	Main test parameters and criteria used for mechanical properties															
			Marking	Dim.	Dezincification resistance [ $\mu\text{m}$ ] (EN ISO 6509)	Stress corrosion resistance (ISO 6957)	Leak-tightness [MPa]	Hydraulic strength [MPa]	Torque [Nm]	Bending [Nm]	Endurance	Temp. cycling	Flow rate [l/s]	Acoustic (EN ISO 3822)	Water hammer	Pull out [N]	Opening and closing pressure [MPa]	Vacuum
Stop valves inside buildings	Ball valve	VA PG 13828	X	X	N/A	X	1,6	2,5	X	X	X	X	X	N/A	N/A	N/A	X	X
	Stop valve	DS/EN 1213 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Magnetic valve	EN 60730 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
Stop valves outside buildings	Ball and stop valve	DS/EN 1074-2 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
Pressure reduction valve		DS/EN 1567 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
Fittings	Ends for capillary soldering or brazing	DS/EN 1254-1 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Compression ends	DS/EN 1254-2 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Compression ends	DS/EN 1254-3 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Capillary or compression ends	DS/EN 1254-4 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Short ends for capillary brazing	DS/EN 1254-5 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Push-fit ends	DS/EN 1254-6 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Press ends	EN 1254-7 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Press ends	DS/EN 1254-8 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
Safety equipment for water heaters	Hydraulic safety groups	DS/EN 1487 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Expansion groups	DS/EN 1488 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Pressure safety valves	DS/EN 1489 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	Combined	DS/EN 1490	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*

	<b>temperature and pressure relief valves</b>	VA PG*																
	<b>Expansion valves</b>	DS/EN 1491 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
<b>Water filter (Mechanical)</b>		DS/EN 13443 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
<b>Water meter</b>		DS/EN ISO 4064-2 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
<b>Pipe in tube system</b>	<b>Manifold</b>		*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
<b>Check valves</b> <sup>1)</sup>	<b>Family E, type A, B, C and D</b>	DS/EN 13959 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*
	<b>Family H, type B and D</b>	DS/EN 15096 VA PG*	*	*	N/A	*	*	*	*	*	*	*	*	N/A	*	*	*	*

1) DS/EN 1717 divides check valves into families and types. The different families and types have its own standard.

N/A = the test is not applicable or not included in the standard or technical specification

\*- Future VA PG (Testing and Approval conditions) will be based on the relevant EN-standard supplied with a yearly external control (inspection + audit test). – Design water pressure in Denmark is 10bar – Other parameters relevant for Norway, Sweden and Finland can be included in the test scheme if necessary (products to be sold there).

#### 4.4.3 Legislation regarding health requirements in Building regulation

##### **Regulation regarding health requirement in Building regulation in Denmark both for water main, service line and domestic installations**

The review presents how the national legislation refer to the EU Construction Products Regulation (CPR, [Regulation \(EU\) No 305/2011](#)).

Name of national building regulation	Reference	The legal text	Mandatory approval		Voluntary approval		Related approval system if applicable	Test methods and related requirements (limit values)	Comments
			Y	N	Y	N			
The Danish Building Regulations 2015	8.4.2.4	Subsection 2 Manufactured products which are part of or connected to the built-in drinking water installations up to and including the tap must meet the requirements of the Executive Order on the placement on the market and sale of building components that come into contact with drinking water	X						
Executive Order No. 1007 of 29 June 2016 on the placement on the market and sale of building components that come into contact with drinking water		Godkendt til drikkevand (approved for drinking water) scheme	X				Godkendt til drikkevand (approved for drinking water) <a href="http://godkendtildrikkevand.dk/">http://godkendtildrikkevand.dk/</a>		According to Executive Order No. 1007 products placed on the Danish market must either have a DVGW, an ATA, a GDV or a Swedish type approval.

#### 4.4.4 Other national initiatives

In Denmark, during the last 10 years, various initiatives and schemes covering components that come into contact with drinking water have been initiated. These schemes have existed simultaneously due to administrative prolongations and transitional periods. This is why the historic survey below is essential in order to understand the current situation.

Building components that come into contact with drinking water may release health hazardous substances to the drinking water. Due to lack of harmonized European standards in this field, the European countries have adopted their own regulations and have established national approval schemes. In Denmark, from 1972 to April 2013, this issue was handled by the so-called VA approval scheme. This scheme covered the requirements for the health related properties of the building components as well as the mechanical/physical properties.

However, in 2005, when the VA approval scheme belonged under the former National Agency for Enterprise and Construction, the rules were changed so that products that did not come into contact with drinking water no longer had to be VA approved. VA approvals covering the mechanical/physical properties were - however - still requested by the manufacturers of drainage products and taps. Hence, in reality the VA approval scheme continued unchanged, but as a voluntary scheme driven by the industry in which the authorities were not involved.

The extent of the health related evaluations and tests required in order to obtain a VA approval were assessed from one case to another based on a pragmatic assessment of the degree of contact with drinking water and the design of the product. E.g. in practice, normally cartridges in mixer taps, small O-rings and other plastic parts should not be subject to a migration analyses in order to obtain a VA approval.

In 2007, a TV programme, "Operation X", directed the attention to the quality of especially mixer taps. With hidden camera it was documented that some factories in China mixed large amounts of various metal scrap in the alloys that were used for the production of taps for drinking water. The TV programme also documented that it was possible to find building components with or without a misleading VA marking in the Danish stores. Due to the revelations in the TV programme, the former National Agency for Enterprise and Construction launched a tightening of the VA approval scheme, and the certification body, ETA-Danmark, was required to initiate an annual control of the health related properties of the taps for drinking water. It was decided that by random sampling a number of VA approved taps should be tested annually according to the NKB method. The random sampling should be carried out at warehouses in Denmark, and it was also a requirement that the importers' quality systems were satisfactory. The NKB method is a short-term migration analysis used for examining the release of lead and cadmium from products made of metal alloys. In connection with this tightening of the rules, an investigation was initiated to find out whether the method could also be used for measuring release of nickel from finished products.

In the VA approval scheme plastic materials were analysed in connection with the first approval of the product, and subsequently the documentation was scrutinized when the approval was renewed after three years. ETA-Danmark did not have any chemical or toxicological expertise which is why the assessment was assigned to DHI which is part of the Danish GTS network (GTS = Advanced Technology Group). The industry was – however - very unsatisfied with the fact that



DHI in practice had a monopoly on this service, so ETA-Danmark allowed two other organisations, Eurofins and Danish Technological Institute, to perform toxicological assessments. It was a huge task for ETA-Danmark to ensure that these three organisations had the required expertise and had a mutual understanding of the task of carrying out toxicological assessments of plastics materials. ETA-Danmark was still working on these issues, when in 2013 the new responsible authority, the Danish Energy Agency, decided to replace the VA approval scheme with the GDV approval scheme and thus change the national mandatory scheme radically.

On 1 April 2013, EU enforced the CPR (Construction Product Regulation) superseding the former CPD (Construction Product Directive). The EU Commission's intention with the CPR was to minimize the technical trade barriers between the member states. As a consequence, Denmark and a number of other member states had to change their existing approval systems. However, CPR still allows maintaining of specific national requirements concerning the release of hazardous substances to the drinking water from building components. In Denmark, the problem was that the National Building Regulations required that building components in contact with drinking water were covered by a VA approval. As the VA approval scheme covered both the mechanical/physical requirements and the health related requirements, it was necessary to separate the health related requirements by making a new mark and new regulations.

The new approval scheme for building components that come into contact with drinking water was implemented when Executive Order No. 31 became effective on 21 January 2013. This Executive Order incorporated all the amendments of 2005, 2007 and 2009 and it included a tightening of the rules with regard to administrative law. Besides, the limit value for release of lead was tightened, a test of release of nickel was required and an annual inspection was also required. The Energy Agency assigned an independent and accredited approval secretariat to handle the processing of the applications and approvals. Information regarding the approval secretariat can be found on the website of the secretariat <http://godkendttildrikkevand.dk>. The approval scheme is called "Godkendt til drikkevand" (GDV) and is symbolised by a water drop. However, the processing of cases and the rules of the approval scheme never worked optimally, and in May 2015 Executive Order No. 31 was amended and replaced by Executive Order No. 666. However, there was still a general discontent with the GDV approval scheme and in June 2016 the new responsible authority, the Danish Transport and Construction Agency, amended the rules again and enforced Executive Order No. 1007. Simultaneously, the expired health related VA approvals issued before 1 April 2013 were administratively prolonged until June 2017.

The latest Executive Order No. 1007 introduces a two-tier system that maintains the GDV mark and at the same time accepts certificates from DVGW (Germany) and ATA (The Netherlands) and the Swedish type approvals as an alternative to the GDV scheme. During the summer of 2016 - due to some critical hearing statements – quite a lot of criticism was expressed in the media. The great concern is that the requirements of Executive Order No. 1007 have been eased too much. Consequently the Minister for Transport and Building has announced that the Executive Order must be scrutinized again. This work is ongoing at the moment.

#### 4.4.5 Responsibility of the different actors

A brief description of the different actors involved and of their respective responsibilities

##### *Authorities*

<b>Name of authority</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Danish Transport and Construction Agency (TBST)	The Danish Building Regulations 2015 Executive Order No. 1007 of 29 June 2016	Responsible for building components in general and building components in contact with drinking water.
Danish Agency for Water and Nature Management (SVANA)	Executive Order No. 802 of 1 June 2016 (drinking water)	Consultant for TBST in matters about limit values and test requirements in correlation with Executive Order No. 1007

##### *Water suppliers*

<b>Type of supplier</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
<b>DANVA</b> Association of Danish waterworks and wastewater treatment plants	DK-VAND Law No. 1204 of 28 September 2016 (Law on water supply)	Ensuring that the rules are observed with regard to water quality for the consumers, recording, etc.
<b>Danske Vandværker</b> Association of Danish waterworks		

##### *Property owners and building companies*

<b>Type of company</b>	<b>Regulation / approval system / other system</b>	<b>Responsibility</b>
Manufacturers and fitters	Law No. 1185 of 24 October 2010 (Danish Building Act)  The Danish Building Regulations 2015  DS 439:2009 Vandnormen (standard on water)	Ensure that Danish legislation is observed and that the building component is suitable for specific use.