

# Material and product innovation through knowledge based standardization in drinking water sector (MaiD)

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Nordic Innovation

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DV 4  
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*Abstracts and presentations*

# Main goal

The main goal of MaiD was to identify the key components that could be included in the national approval procedures in the Nordic countries in order to safeguard drinking water, material quality and a level playing field.

The key components should also be based on European standards and practice as far as possible.

# Purpose

1. Evaluate the current Nordic approval, acceptance practice and related standards for materials and products in contact with drinking water and identify the mechanism(s) that will increase innovation in the drinking water sector.
2. Identify possible Nordic requirements regarding water quality that needs to be addressed in existing test methods and standards to ensure at least the present level of protection regarding health and safety.
3. Evaluate the applicability of the 4MS acceptance procedure and related standards to Nordic conditions.
4. Give recommendations on how the laboratory capacity in the Nordic countries for testing and acceptance of materials in contact with drinking water based on relevant identified standards can be strengthened, in order to provide the services expected from the Nordic industry.

# WP structure

WP number	Name	Leader
WP1	Consortium management and dissemination	SINTEF
WP2	Evaluation of current system	KIMAB
WP3	Water Quality	Wander
WP4	Laboratory capacity and testing	DTI
WP5	Recommendation and guiding documents	SINTEF



# WP2 Main report and 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

# Preliminary results metallic products

Table 7 Criteria for marketing and use of metallic 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

# Preliminary results metallic products

Table 8 Limit values for three main assessed element for metallic taps in the Nordic Countries.

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
	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	20 µg <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

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



# Preliminary results organic materials

Table 9 Overview of standards, requirements and existing limit values for organic materials (under development)

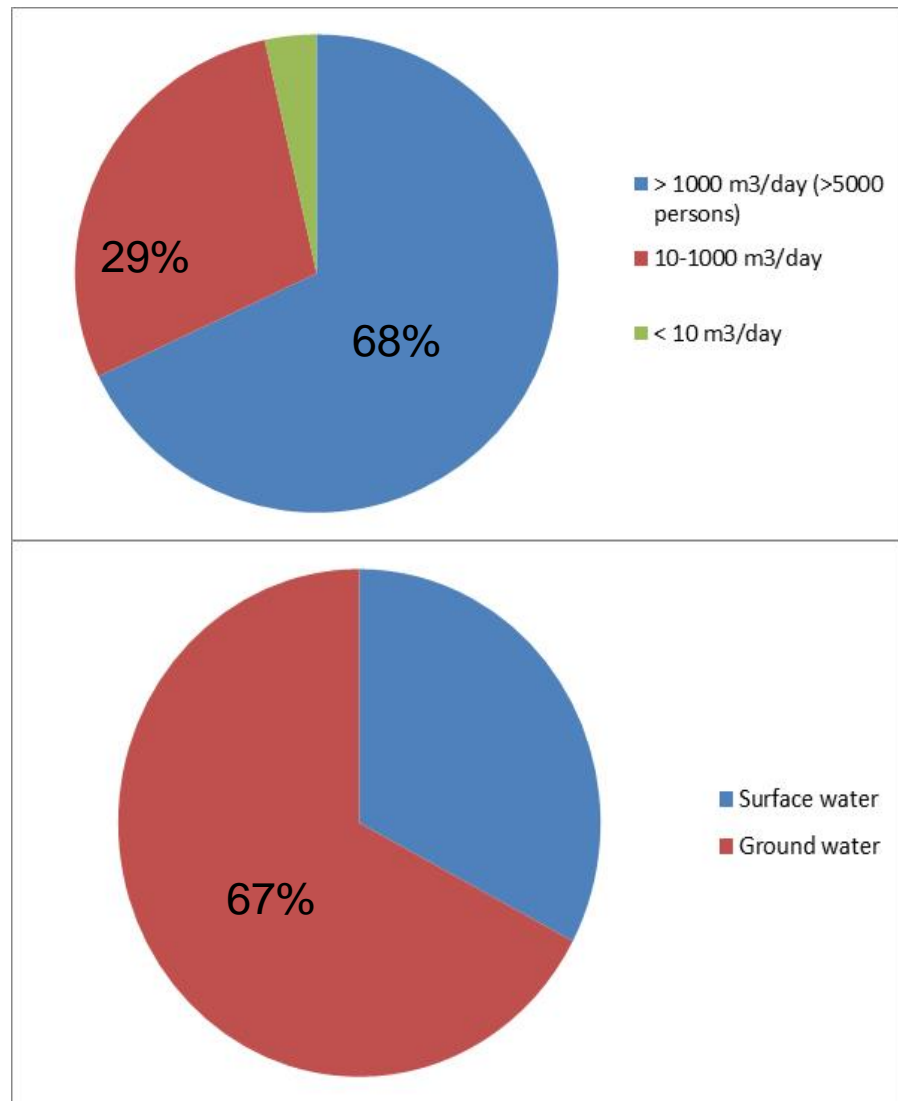
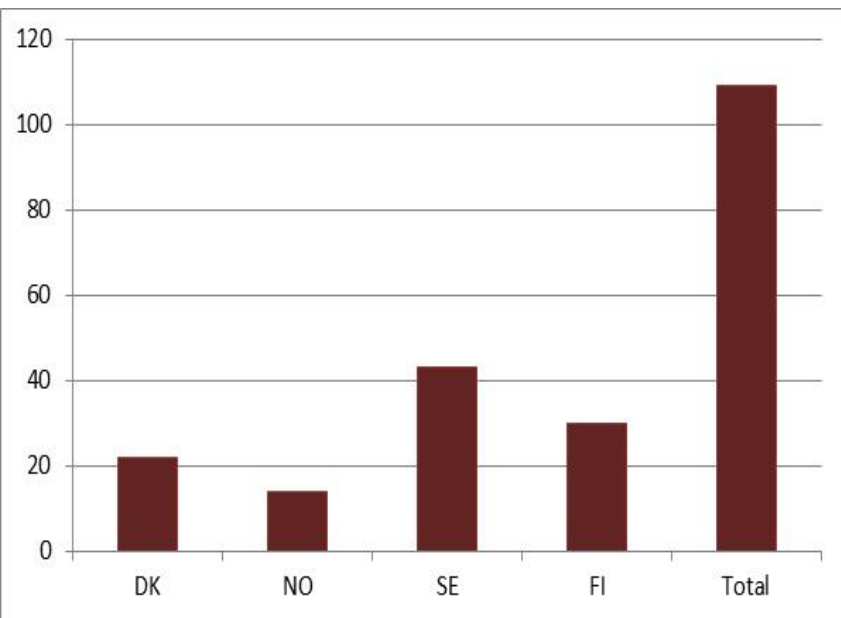
Assessments for organic materials	Norway	Sweden	Finland	Denmark
<b>General Health requirements in building regulation</b>	Yes	Yes	Yes	Yes
<b>Approval required in regulation</b>	No	No	No	Yes
<b>Taste and odour:</b> Required in approval and certification practice	Yes	Yes	Yes	Yes
<b>Taste and odour:</b> test standard used	EN standards	EN standards	SFS 2335 Annex A	EN standards
<b>Taste and odour:</b> Accepted approvals from other country:	D, NL, DK	D, NL (after review of technical documents)	-	D, NL, SE
<b>Leaching:</b> Required in approval and certification practice	Yes	Yes	Yes	Yes
<b>Leaching:</b> Test standard used	EN standards	EN standards	EN standards	EN standards
<b>Leaching:</b> Accepted approvals from other country:	D, NL, DK	D, NL (after review of technical documents)	-	D, NL, SE
<b>Enhancement of microbial growth:</b> Required in approval and certification practice:	Yes	Yes	Under assessment	Yes <sup>b</sup>
<b>Enhancement of microbial growth:</b> Test standard used:	EN standards	EN Standards	-	EN standards
<b>Enhancement of microbial growth:</b> Accepted approval from other country:	D, NL, DK	D, NL (after review of technical documents)	-	D, NL, SE

<sup>a</sup> EN standards given in Table 1

<sup>b</sup> Only for filters

# WP3 DW survey

Data from 109 waterworks



# DW qualities in Nordic countries

Table 4. Water compositions in the Nordic countries. The results are given as average values and its standard deviations (std).

Country	pH	Alkalinity (mmol/L)	Hardness (mmol/L)	Chlorides (mg/L)	Sulphates (mg/L)	Conductivity (µS/cm)	TOC (mg/L) <sup>a</sup>
<b>Denmark</b>							-
-average	7.6	3.93	2.44	49	54	598	
-std	0.2	2.6	1.2	25	29	229	
<b>Finland</b>							
-average	8.0	0.96	0.61	9	24	175	1.34
-std	0.4	0.5	0.3	8	24	80	0.8
<b>Norway</b>							
-average	7.8	0.61	0.42	7	7	106	2.51
-std	0.3	0.2	0.1	5	6	24	0.9
<b>Sweden</b>							
-average	8.1	1.4	0.81	13	15	226	2.97
-std	0.2	0.7	0.4	11	12	87	0.8

<sup>a</sup> Includes only exact values; in some reports data on TOC were given as < 2 mg/L

11 % of the Nordic population use drinking water of their own wells, and quality of this drinking water is not known

# Water qualities compatibility with EN 15664-2

Table 5. Test water compositions in the rig test specified in 15664-2

Test water	pH	Alkalinity (mmol/l)	[Cl <sup>-</sup> ] + [SO <sub>4</sub> <sup>2-</sup> ] (mmol/l)	TOC (mg/l) <sup>a</sup>
T1	7.1-7.5	> 5.0	> 3	> 1.5
T2	6.7-7.1	0.5-1.3	No specification	No specification
T3	8.0-8.4	0.7-1.3	No specification	No specification

Table 6 (still under development). Evaluation of the compatibility with the test waters in EN 15664-2

Test water	Denmark	Finland	Norway	Sweden
T1	Compatible	Low	Applicable for few lime areas in Norway	Fair for groundwater part
T2	Low	Compatible	Compatible	Low
T3	Low			Compatible (surface water part)

# Draft summary

1. The certification and approval situation differ significantly in the Nordic countries today.
2. It is not possible to define only one typical water composition for the Nordic region. Hence, for metallic materials, EN 15664 is beneficial as it uses 3 different water compositions for bulk material leaching properties.
3. Proposal for a revised NKB 4 method (pH, number of replicate samples, flushing regime etc.) as an intermediate product test (initial surface properties) until an appropriate EN test is available for copper alloys containing a certain amount of Pb
4. When positive lists (substances, material compositions etc.) are developed and used for assessments and approvals with respect to hygienic properties, it is crucial to equally consider the mechanical properties for new MPDW.
5. Based on the existing approval and certification practice in the Nordic countries for products made of organic materials used in the water main, the service line and the indoor installations, the Common Approach may represent an improved health safety level for some countries (e.g. Norway).