Obtainment of health and environmental data – Information to the manufacturer

1 Background

A SINTEF Technical Approval shall always include the health and environmental properties of the product in use. A health and environmental evaluation is performed by the "Environment in Technical Approval"-group (Norwegian: "Miljø i TG") at SINTEF Building and Infrastructure. The contact person for the group is Thale Plesser.

The health and environmental assessment is based on the requirements given in TEK 10 –Regulations on technical requirements for building works (Norwegian: Forskrift om tekniske krav til byggverk). According to TEK 10, it is required that prioritized environmental toxins are avoided and that building materials shall be chosen that are not polluting the indoor air. It also requires the reduction of waste and the use of materials that can be recycled. The Product Control Act (Norwegian: Produktkontrolloven), § 3a, enforces an obligation to evaluate the substitution of substances that are hazardous to health or environment, with less harmful substances.

A product is assessed by taking into account the following:

- Content of hazardous substances that causes damage to health or environment
- Release of hazardous substances to health or environment

2 Documentation and limits

2.1 Documentation that must be submitted for all products regardless of usage

The following documentation shall be submitted for all products or components that are included in a technical approval:

- If the system consists of several components: an adequate overview of all components in the system, with a description of the usage
- The form "*Obtainment of health and environmental data – Manufacturer's declaration*" shall be filled out. If the system consists of several components, a separate form shall be filled out for each component. The form shall be filled out by the manufacturer and it must be signed and dated.
- Technical data sheets of all components that are included in the technical approval.
- Product safety data sheets (applies to the products that are required to have safety data sheets) or other description of the products (applies to the products that are not required to have product safety data sheets).

2.2 Content of substances that are dangerous to health or the environment – limits

Table 1 gives limits for substances that are dangerous to the health and/or the environment. The limits are valid for all products regardless of usage.

Useful links:

- The Norwegian Priority List: http://www.environment.no/Topics/Hazardous-chemicals/Hazardous-chemical-lists/List-of-Priority-Substances/
- Substances of very high concern, Candidate list: http://echa.europa.eu/web/guest/candidate-list-table
- Endocrine disruptors, categories: Download the database *EDS_2003_DHI 2006.mdb* from http://ec.europa.eu/environment/chemicals/endocrine/strategy/being_en.htm
- Classification and labelling of substances: http://echa.europa.eu/information-on-chemicals/cl-inventory-database
- Norwegian waste regulation (Avfallsforskriften), in Norwegian only: https://lovdata.no/dokument/SF/forskrift/2004-06-01-930

Table 1. Limits for products with a SINTEF Technical Approval. The limits applies to chemicals, chemical mixtures and articles (objects). In the case of chemicals and chemical mixtures the limit value applies to the hardend/dried porduct.

Category	**Limit**
Acute Toxicity H300, H310 og H330 (fatal) H301, H311 og H331 (toxic) H302, H312 og H332 (harmful)	H300, H310, H330: 0.1 % weight H301, H311, H331: 3 % weight H302, H312, H332: 25 % weight
Skin corrotion, skin irritation H314 (1A og 1B) (corrotion) H315 (irritation)	H314 – 1A: 1 % weight H314 – 1B: 5 % weight H315: 20 % weight
Serious eye damage/irritation H318 (skade) H319 (irritasjon)	H318: 10 % weight H319: 20 % weight
Allergic reaction H317 (skin) H334 (inhalation)	1 % weight
Germ cell mutagenicity H340 (1A og 1B) H341	H340: 0.1 % weight H341: 1 % weight
Carcinogenicity H350 (1A og 1B) H351	H350: 0.1 % weight H351: 1 % weight
Reproductive toxicity H360 (1A og 1B) H361	H360: 0.5 % weight H361: 5 % weight
Effect on or via lactation H362	0,1 % weight
Damage to organs, single exposure H370 – STOT SE 1 H371 – STOT SE 2 H335 – STOT SE 3	H370 – STOT SE 1: 1 % weight H371 – STOT SE 2: 25 % weight H335 – STOT SE 3: 20 % weight
Damage to organs, repeated exposure H372 – STOT RE 1 H373 – STOT RE 2	H372 – STOT RE 1: 3 % weight H373 – STOT RE 2: 25 % weight
Aspirasjonsfare H304	25 % weight
Farlig for vannmiljø H400 (akutt 1) H410 (kronisk 1) H411 (kronisk 2) H412 (kronisk 3) H413 (kronisk 4)	H400: 25 % weight H410: 0.25 % weight H411: 2,5 % weight H412: 25 % weight H413: 25 % weight
Σ PCB7	0.005 % weight
Benzo(a)pyrene	0.01 % weight
Brominated flame retardants	0.1 % weight
Substances on the Norwegian Priority List	0.1 % weight
Substances of very high concern – Candidate list	0.1 % weight
Endocrine disruptors	Human and/or wildlife, category 1: 0.1 % weight
PBT, vPvB	0.1 % weight
Destroying ozone in the upper athomosphere EUH059/H420	0.1 % weight
Nano particles	No limit, but we ask that content of nano particles is declared

2.3 Requirements for products that affect the indoor environment

Products that influence the indoor environment: products that are used inside of the vapour barrier or are part of the vapour barrier/vapour barrier system.

The products shall be tested with regards to emission of dangerous substances to the indoor air.

2.3.1 Glued wood based products

Tests of formaldehyde according to EN 717-1:2004, EN 717-2:1994 or EN 120 are accepted for glued wood products. The testing shall be carried out by an independent test laboratory that has been accredited for the test method. The products must meet formaldehyde emission class E1.

2.3.2 All products exept glued wood products

Testing shall be conducted according to the following standards (testing at 28 days):

- Emissions of volatile organic compounds (VVOC, VOC and SVOC as specified in EN ISO 16000-9:2006 (or EN ISO 16000-10:2006) and ISO 16000-6:2011.
- *Emissions* of formaldehyde, other *aldehydes and ketones* to indoor air as specified in EN *ISO 16000-9:2006* or EN *ISO* 16000-10:2006 in combination with *ISO* 16000-3:2011.

Test specimen preparation, calculation of TVOC, calculation of SVOC and the report shall be according to PD CEN/TS 16516:2013. The testing shall be carried out by an independent test laboratory that has been accredited for the test method. The test results must meet the requirements given in table 2.

Products that are certified according to the following classification schemes meet the emission criteria for SINTEF Technical Approvals:

- M1 Emission Class for Building Materials
- GEV Emicode EC1 og EC1 Plus

Table 2. Requirements.

Parameter – 28 days	**Limits – very small areas[1)] [µg/(m^2 h)]**	**Limits – floor/ceieling, wall and small areas[2)] [µg/(m^2 h)]**
TVOC	7100 µg/(m^2 h)	200 µg/(m^2 h)
Formaldehyde	700 µg/(m^2 h)	50 µg/(m^2 h)
Sum carcinogenic	70 µg/(m^2 h)	10 µg/(m^2 h)

1) Very small areas are defined in PD CEN/TS16516:2013 as selants and similar products used in small amounts, i.e. loading factor 0,007 m^2/m^3.

2) Floor/ceiling, wall and small areas are defined in PD CEN/TS16516:2013. These products are used in larger amounts than selants. Windows and doors are small areas.

2.4 Requirements for products that come in contact with soil and water

Products that come into contact with soil and water: products that come into contact with rainwater, surface water or soil - mainly outdoor surface products.

The products shall be tested with regard to leaching of hazardous substances to water.

2.4.1 Testing of monolithic products or plate-like/sheet-like construction products

A diffusion-chamber leaching test shall be used for surface dependent release of substances from monolithic or plate-like or sheet-like construction products (like roofing and radon membranes). The test is conducted according to the principles outlined in CEN/TC 351 - standards under development – Construction Products – Assessment of release of dangerous substances/ WG 1 leaching to soil, ground water and surface water.

2.4.2 Testing of granular/pulverized material

An equilibrium - controlled leaching test shall be used for the release of substances from granular construction products. The test is conducted according to the principles outlined in CEN/TC 351 - standards under development – Construction Products – Assessment of release of dangerous substances/ WG 1 leaching to soil, ground water and surface water.

The following leaching tests can be used:

- CEN/TS14429:2005
- CEN/TS144997:2006
- CEN/TS14405:2004
- EN 12457-1:2002

2.4.3 Selection of method and analysis parameters

A suitable leaching method and parameters shall be selected in a collaboration with the "Environment in Technical Approval"-group at SINTEF Building and Infrastructure. Testing shall be conducted by an independent test laboratory.

2.5 Requirements for products that come into contact with drinking water

Products that come into contact with drinking water: products used for the supply of drinking water that come into direct contact with the water.

The products should be tested with regard to leaching of hazardous substances to water.

2.5.1 Testing of metallic products

Metals which are in contact with drinking water, e.g. couplings and taps, shall be tested with respect to leaching of lead and cadmium according to NKB product rule 4.

The analysis shall be carried out by an independent test laboratory.

2.5.2 Testing of plastic products

Plastic products which are in contact with drinking water shall be tested using the following standards or similar test procedures:

- The leaching test shall be conducted according to EN 12873-1:2003
- Determination of leaching water odour and flavour should be conducted according to EN1420-1:1999 in combination with EN 1622:2006

- Determination of other parameters in the leachate depends on the type of plastic material. Possible parameters: Total organic carbon (TOC) and the microbial growth potential of the water (AOC - assimilable organic carbon)

The analysis shall be carried out by an independent test laboratory.

3 References

CEN/TS 14429:2005. Characterization of waste - Leaching behaviour tests - Influence of pH on leaching with initial acid/base addition (Horizontal standard)

CEN/TS 14997:2006. Characterization of waste - Leaching behaviour tests - Influence of pH on leaching with continuous pH-control

CEN/TS 14405:2004 Characterization of waste – Leaching behaviour tests – Up-flow percolation test (under specified conditions)

EN 717-1:2004. Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method.

EN 717-2: 1994. Wood-based panels. Determination of formaldehyde release – Part 2: formaldehyde release by the gas analysis method.

EN 1420-1:1999. Influence of organic materials on water intended for human consumption – Determination of odour and flavour assessment of water piping systems – Part 1: Test method.

EN 1622:2006. Water quality – Determination of threshold odour number (TON) and threshold flavour number (TFN)

EN 12457-1:2002. Characterisation of waste- Leaching – Compliance test for leaching of granular waste materials and sludges – Part 1: One stage batch test at a liquid ration of 2 l/kg for materials with high solid content and with particle size below 4 mm (without or with size reduction)

EN 12873-1:2003. Influence of materials on water intended for human consumption – Influence due to migration – Part 1: Test method for non-metallic and non-cementitious factory made products.

EN ISO 16000-9:2006. Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method.

EN ISO 16000-10:2006. Indoor air - Part 10: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test cell method

ISO 16000-3:2011. Indoor air – Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air – Active sampling method.

ISO 16000-6:2006. Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS-FID.

NKB Product Rules 4. 1986. Product rules for sanitary taps for hot and cold water supply systems.

PD CEN/TS 16516:2013. Construction products. Assessment of release of dangerous substances. Determination of emissions into indoor air.

Product Control Act. Produktkontrolloven. Lov om kontroll med produkter og forbrukertjenester. www.lovdata.no

TEK10. Regulations on technical requirements for bulding works. Forskrift om tekniske krav til byggverk (Byggteknisk forskrift). English translation: http://byggeregler.dibk.no/cms/content/uploads/Regulations-on-technical-requirements-for-building-works.pdf. Norwegian: www.lovdata.no