



**POSITION OF THE COMMISSION FOR
SUSTAINABLE BUILDING AT THE
GERMAN ENVIRONMENT AGENCY**

// FEBRUARY 2016 //

**Contaminant Input to the local
Environment from Buildings and
Building Products**

Imprint

Editor:

Commission for Sustainable Building at the German Environment Agency (KNBau)

The KNBau is a commission of independent experts. It advises the German Environment Agency, providing specific proposals for sustainable building.

Chairpersons:

Attorney Iris Behr, authorized signatory of the Institute Wohnen und Umwelt GmbH (IWU)
Dr. Burkhard Schulze Darup, Schulze Darup and Partners

Members:

Jun. Prof. Dr. Fazia Ali-Toudert, TU Dortmund
Dr.-Ing. Tanja Brockmann, Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)
Prof. Dr. Michael Burkhardt, HSR Hochschule für Technik (College of Technology) Rapperswil, Switzerland
Annette von Hagel, Institute for Federal Real Estate (BIMA)
Ajo Hinzen, Büro für Kommunal- und Regionalplanung (Office for Community and Regional Planning, BKR), Aachen
Theresa Keilhacker, Vice-president of the Chamber of Architects Berlin
Prof. Dr.-Ing. habil. Thomas Lützkendorf, Karlsruhe Institute of Technology (KIT)
Wolfgang Misch, Deutsches Institut für Bautechnik (German Institute for Construction Engineering, DIBt)
Prof. Dr.-Ing. habil. Anette Müller, Weimar Institute of Applied Construction Research (IAB)
Prof. Dr. Riklef Rambow, Karlsruhe Institute of Technology (KIT)
Jun. Prof. PhD Dirk A. Schwede, University of Stuttgart
Prof. Dr.-Ing. Klaus Sedlbauer, Fraunhofer Institute for Building Physics (IBP)

Office:

German Environment Agency
Division III 1.4 / III 2.2
Til Bolland
Post Box 14 06
06844 Dessau-Roßlau
Phone: +49 340-2103-0
info@umweltbundesamt.de
Internet: www.umweltbundesamt.de

 /umweltbundesamt.de

 /umweltbundesamt

Publication as pdf:

<https://www.umweltbundesamt.de/publikationen/>

Image source:

© Kadmy / Fotolia.de

Date: Februar 2016

ISSN 2362-8273

Preliminary Remark

The Commission for Sustainable Building at the German Environment Agency (KNBau) has discussed the issue of environmental protection in relation to sustainable building at several meetings concluding in its 5. meeting held on 13.11.2015. The KNBau believes there is particular need for action with regard to the environmental protection objective “local risk to water, soil, air from substances during processes on building sites or from weathering during the utilization phase“ described in the guideline for sustainable building issued by the federal government.

The guideline for sustainable building provides an extensive description of environmental protection objectives for sustainable building. In addition to the aforementioned objective it also envisages to minimize i.a. the following environmental effects caused by building:

- ▶ Global warming
- ▶ Destruction of the ozone layer
- ▶ Ground level ozone formation in the form of summer smog
- ▶ Acidification of soil and water as well as rain
- ▶ Overfertilization of water, ground water and soil
- ▶ Reduction or avoidance of building-related heat-island effects of urban structures compared to the surrounding area.

In addition, protection of natural resources in the building industry is aimed for in connection with the following objectives:

- ▶ Low land consumption
- ▶ Reduction of resource requirements when constructing and operating buildings
- ▶ Extension of useful life of products, building constructions and buildings
- ▶ Reduction of transportation of building materials and parts
- ▶ Minimizing of primary energy requirements
- ▶ Minimizing of energy requirements in the utilization phase
- ▶ Use of regenerative energy
- ▶ Use of rainwater or if appl. grey water and the reduction of fresh water consumption
- ▶ Use of reusable or recyclable building products / building material
- ▶ Safe return of material into the natural cycle of materials

Some certification systems, e.g. BNB (Assessment System for Sustainable Building of Federal Buildings) and DGNB (German Quality Seal Sustainable Building – Private Sector) include extensive criteria catalogues for the assessment of sustainability of buildings and thus implement the guideline for sustainable building. However, up to now such certification systems have only been introduced on a binding scale for federal buildings. This means that the great majority of buildings are not certified.

In conventional planning, environment-oriented criteria are seldom considered. Lack of information prevents interest groups (building owners, architects, consultants etc.) from giving more consideration to contaminant leaching when building. One cause of this is that minimum standards for the emission of contaminants only exist for a few building products to which consideration might be given during planning. This even applies for products which come into direct contact with the environmental media of water and soil. Voluntary information offers are also very seldom. Current environmental product declarations (EPDs) do not usually include any data concerning contaminant leaching. Many public and private builders, however, would like to minimize emission of hazardous substances into the environment when selecting building products and when planning and erecting building structures. Manufacturers are interested in reducing the use of hazardous substances and thus improving durability and functionality.

This lack of information becomes clear with the example of the herbicide Mecoprop: use of this herbicide as a rooting protectant in bituminous roof sheeting is not marked, nor is it declared that it can be washed out. For builders, washing out of Mecoprop, which may damage garden plants and facade greening on account of its herbicidal impact and may contaminate groundwater and surface water, often comes as a surprise. Marking via the Biocidal Products Regulation (EU) No. 528/2012 is not possible since it does not cover such protectants. And the European Plant Protection Products Legislation only issues approvals for the protection of crops.

This example illustrates there are gaps in the interface between building law (building regulations and building product law) and environmental law which prevent observation of the environment quality objectives – for example, no exceeding of 0.1 µg/l

(individual active substance, protected good drinking water) for all plant protection products and relevant metabolites in the ground water.

Recommendations

One objective of sustainable building is to ensure a high standard of protection for the environment and for health against hazardous substances. The KNBau has identified implementation deficits in this field and believes that urgent action is required. In the following, approaches will be described via which decision-makers can close legal gaps to ensure that manufacturers receive specific development perspectives and that more transparency on the emission of hazardous substances from building products is provided for builders.

Setting Minimum Standards – Recommendations to German Authorities

As a result of demands made by planners and clients to manufacturers, more and more building material is being developed which is sophisticated, fast to process and low price. The new product formulations include the use of flame retardants, biocides, softeners etc. If such organic material is exposed to weather conditions, the rainwater releases such substances. Other materials release substances into the environment per se, for example copper surfaces, or are in contact with groundwater. Leaching of building material content has gained in importance in recent years for soil and water contamination. Legal minimum standards for the leaching of substances from building products are intended to counteract this development, by means of incorporating the following measures in building law and in environmental law:

- ▶ Binding definition of the insignificance threshold in environmental law (support for the amendment to the groundwater ordinance with a specification of a duty to declare leaching behaviour in the declaration of performance in the building product standardization)
- ▶ Specification of requirements for leaching of hazardous substances from building structures in building regulations (model building code) with reference to the insignificance threshold and appropriate criteria of soil and surface water protection

- ▶ Continuation of ongoing work in the DIBt to derive criteria for roof and facade building material and incorporation of criteria for building products which have contact to soil as well as for roof and facade building material in a directive which can be introduced as a technical building regulation or rule.

Transparency via declaration of performance – Recommendations to the Construction Division of the Directorate-General GROW (Directorate-General Internal Market, Industry, Entrepreneurship and SMEs)

To facilitate the declaration of leaching behaviour in the declaration of performance and thus to provide builders, users and approving authorities with extensive information, a uniform European format is required. This should be initiated by the European Commission via

- ▶ Definition of performance classes or levels in accordance with harmonized test procedures, especially CEN/TS 16637-2 “Construction Products – Assessment of release of dangerous substances – Part 2: Horizontal dynamic surface leaching test“, by the European Commission or a respective mandate to the CEN and ensuring that the performance classes or levels to be prepared are also appropriate for declaration of assessment results from biological tests.
- ▶ Issuing of amendments to standardization mandates still missing, where national requirements already exist.
- ▶ Financing of the validation of CEN/TS 16637-2 “Building Products – Evaluation of emission of hazardous substances – Part 2: Horizontal dynamic surface leaching“ as a priority task.

Transparency in Communication – Recommendations to Stakeholders in Sustainable Building

An appropriate leaching test is available, voluntary communication of environmental impacts is possible. It is essential to use this opportunity, for example in the Blue Angel and in environmental product declarations (EPDs) for building products. In addition, the CPR (EU Construction Products Regulation) provides

European technical Assessments (ETA) as a voluntary instrument for declaration of performance and CE marking. The KNBau recommends the following steps until complete legal incorporation of leaching performance into CE marking has been finalized:

- ▶ Specification of requirements for the declaration of results and leaching tests in the EPD standard DIN EN 15804 and EPDs prepared on their basis, as well as specification of relevant building product groups and pollutants as well as test criteria (standardization).
- ▶ Support for EPDs to enhance horizontal test regulations for leaching tests with product-specific data concerning sample preparation, in so far as such data are required but are still missing (EPD program operator).
- ▶ Providing information on leaching into the environment on the use phase for the sustainability assessment of buildings.
- ▶ Integration of leaching properties in awarding criteria for the Blue Angel for leaching—relevant building products.
- ▶ Increasing demand for ETAs with verification of leaching properties, e.g. via the building certification systems.
- ▶ Setting up of a platform at UBA, to obtain access to legal documents, test regulations, leaching results or declarations (cf. Biocide portal).
- ▶ Support for leaching-reduced / optimized building products and formulations via public funds
- ▶ Definition of “Good Practice for Rainwater Management“ (BVT) for buildings and land use, involving rainwater retention (e.g. ponds, channels, seepage covering, underground basins), the retention of contaminants (e.g. soil, adsorbed material) and use (e.g. WC flushing, irrigation).
- ▶ Integration of sustainable building into practice (building plans, tender documents etc.).
- ▶ In practice, the process should be established of allowing rainwater to seep away, for example, from metal roofs on exceeding a surface area, only after cleaning. Such measures should be actively demanded as an ecological and aesthetic design element with immense significance for the water balance.
- ▶ To ensure sustainable rainwater management, models and scenarios needs to be developed and established. Manufacturers should be provided with a set of instruments to help them assess and avoid material leaching, exposure of soil and water as well as possible risks for terrestrial and aquatic organisms based on such models. The KNBau recommends application-related research and provision of research resources.

Closing of Urban Water Cycles – Recommendations to Building Research, Planners and Community Participants

The Water Resources Act requires the local seepage of rainwater. However, little consideration is given to the management of rainwater in planning or in building certification. Exceptions to this are the consideration of roof greening in connection with the sealing level and rainwater use to reduce drinking water consumption. The following issues are to be addressed:

- ▶ The share of water-permeable surfaces is of immense importance for flood protection and protection of urban aquifers. Urban surface sealing is to be counteracted in planning terms with new products or processes (seepage blocks etc.), sealing restrictions or removal of sealing.

Annex

Legal Basis and its Integration in the BNB System

The requirements which can be derived from environmental protection legislation and its subordinate provisions for building products with contact to the ground are extensively described in the principles for assessing the impact of building products on soil and groundwater issued by the German institute for Construction Engineering. These principles define the level of protection to be aimed for all building products which have contact to the ground. The most important criteria for assessment are the so-called insignificance thresholds (GFS) for groundwater, whose observance can be inspected via a leaching test. Biological tests as assessment support are planned for organic materials in eluate, for which there are no GFS. The GFS have not yet been bindingly incorporated in environmental law, but their inclusion is planned in the amendment to the Groundwater Ordinance. The principles of the DIBt are currently only bindingly incorporated for certain building products (refer to Annex 1). Supplementary criteria which also consider the protective resources of surface water (quality objectives of the surface water ordinance) are currently being developed for facade and roof building material.

Since mid 2013, a declaration of performance has been obligatory for all building products with CE marking in accordance with the EU Regulation laying down harmonised conditions for the marketing of construction products (CPR). The declaration of performance would be a good instrument to communicate the performance level of building products also in relation to the environmental properties, for example in the form of class results for leaching tests. To be able to show information in the declaration of performance, a member state first has to demand this in its own national regulations and request the European Commission to define leaching as an essential characteristic in the respective standardization mandates for construction products. Mandate amendments already exist for some construction products, these were issued before the coming into force of the CPR. They commission the supplementing of data on leaching, but incorporation of such into product standards has not yet been completed. A new horizontal test procedure has existed since 2014, CEN/TS 16637-2

“Construction products – Assessment of the Release of Dangerous Substances – Part 2: Horizontal Dynamic Surface Leaching Test“, which facilitates data in declarations of performance. A percolation test for granular building products is scheduled as CEN/TS 16637-3. However, there is still no format for a clear and coherent declaration of the test results: it is not expedient to declare all results from a test report. In accordance with the CPR, the European Commission can define respective performance classes.

To ensure that the declaration of performance supports the interests of environmental protection in future it would be useful if the level of protection described in the principles for assessment of impact of building products on soil and groundwater were to apply for all building products which, when used, come into contact with soil, groundwater, rain or seepage water. Such a general requirement could be implemented by the manufacturers themselves without any approval obligation, at least for building products normally considered harmless. The European Court of Justice has requested that Germany waive any additional approval for building products with CE marking. The requirements of building regulations affect all building structures and building products even if no test or verification obligations have been established in relation to respective products. For building products which up to now have passed a leaching test as part of their official approval process, an equivalent building law solution continues to be essential to ensure the level of protection.

The level of protection currently described in the principles on assessment of the impact of building products on soil and groundwater must also be maintained, if the German approval system has to be abandoned in future. The existing levels of protection concerning appropriate solutions in building and/or environmental law have to be maintained, further developed and enhanced. For example, requirements of building products and building structures which stand directly in the groundwater are planned in the amendment to the groundwater ordinance. However, the draft version does not include a clear order for standardization which would be required in accordance with the CPR. The assignment for standardization is, however, specifically included in the draft for the substitute building materials ordinance. This enables demand for specific data on leaching in declarations of performance for a range of industrially

produced or recycled aggregates. It is planned to consider leaching in the BNB system in future. Leaching tests are recommended particularly for roof sheeting, sealing sheets, coatings and sealants outside as well as for external components in direct or indirect contact with water or soil.

Table



Building products with contact to soil, groundwater or rainwater which are to be tested based on the “Principles on the assessment of the impact of building products on soil and groundwater” and which must observe the assessment criteria specified there in order to be officially useable in Germany

| Building product | Scope of application |
|--|--|
| Concrete components / cement-bound building materials: <ul style="list-style-type: none"> ▶ Fly ash for concrete ▶ Recycled and industrially produced aggregates for mortar (except for crystalline blast-furnace slag, granulated slag and granulated slag abrasive) ▶ Recycled and industrially produced light aggregates for concrete, except for expanded mica, expanded perlite, expanded shale, expanded clay, brick chippings from unused bricks and pumice slag (environmentally compatibility is to be checked for sintered hard coal fly ash and furnace bottom ash, if secondary fuels are also burnt apart from coal) | Installation (in-situ concrete and precast concrete parts) directly in the ground (saturated zone and unsaturated zone) and as facade or roof with indirect or direct contact to water and soil such as e.g. <ul style="list-style-type: none"> ▶ Exposed concrete facade ▶ Cement-bound facade cladding ▶ Impermeable concrete /WU concrete) |
| Building products for foundations and substrate preparations <ul style="list-style-type: none"> ▶ Light aggregate for unbound application (fill) ▶ Base injections of silica gel to produce excavation pits | Installation directly in the ground: unsaturated zone or saturated and unsaturated zone |
| Insulating material (here, only not standardized) <ul style="list-style-type: none"> ▶ Building kits of prefabricated elements for thermal insulation of outside walls consisting of fastening material, insulating material and a surface layer of e.g. stone, bricks, glass (except for natural stone, glass, ceramic as surface layer or for building products whose environmental compatibility is deemed verified) ▶ Factory made fill of foam glass gravel ▶ Fill of foam glass gravel as load-bearing thermal insulation under foundation slabs | Facade Installation directly in the ground (unsaturated zone) |
| Fire safety products and building kits of fire safety products <ul style="list-style-type: none"> ▶ Partitions and linear sealed joints ▶ Fire protection covering and fire protection coating of steel components | Facade |
| Other building products <ul style="list-style-type: none"> ▶ Artificially manufactured stone tiles for floor covering and stair cladding (outside) with recycled and industrially manufactured aggregate (except for blast furnace slag, granulated slag and granulated slag abrasive) ▶ Light self-supporting composite boards (outside wall cladding; here, only not standardized) | Installation directly in the ground (unsaturated zone) Outside stairs and platforms Facade |

Source: German Environment Agency



► **This brochure as download**
www.uba.de/publikationen

 www.facebook.com/umweltbundesamt.de
 www.twitter.com/umweltbundesamt