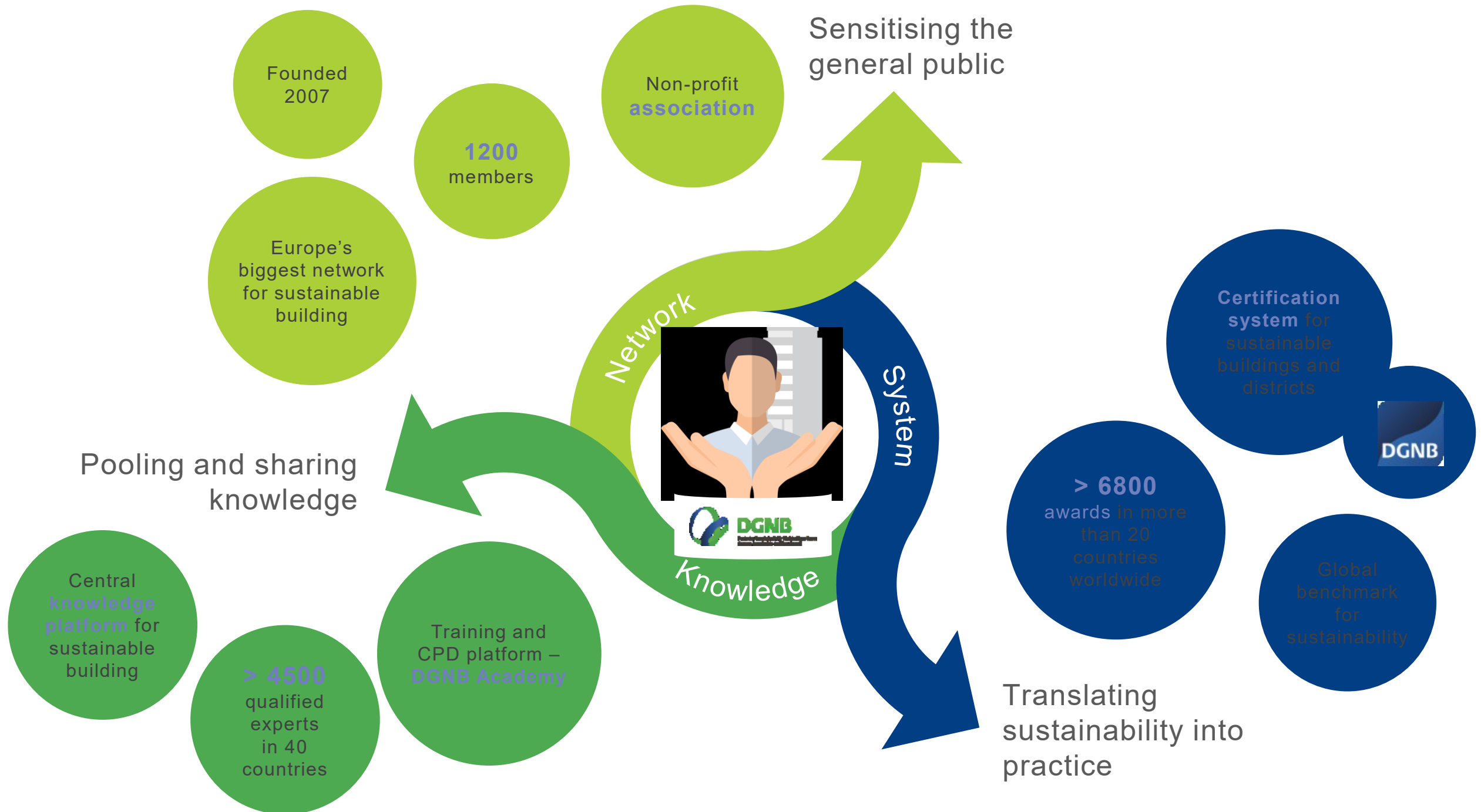


VOCs in the DGNB Certification System

Dr. Anna Braune | DGNB | Nov 18, 2020





Founded 2007

1200 members

Non-profit association

Europe's biggest network for sustainable building

Sensitising the general public

Network



System

Pooling and sharing knowledge

Central knowledge platform for sustainable building

> 4500 qualified experts in 40 countries

Training and CPD platform – DGNB Academy

> 6800 awards in more than 20 countries worldwide

Certification system for sustainable buildings and districts

Global benchmark for sustainability



Translating sustainability into practice

DGNB Certification

Global Benchmark for Sustainability



More than a system

DGNB quality during the entire life cycle

Use

DGNB certification for buildings in use
(recertification)

Existing buildings | renovations

DGNB certification for existing buildings
DGNB certification for renovations
DGNB certification for building interiors



Deconstruction

DGNB certification for deconstruction

Planning

DGNB precertification for new buildings
DGNB precertification for sustainable districts
DGNB certification for sustainable districts
(planning/infrastructure)

Construction

DGNB certification for new buildings
DGNB certification for building interiors
DGNB certification for sustainable districts

Use

DGNB certification for buildings in use

DGNB criteria: New Construction



ENVIRONMENTAL QUALITY

- ENV1.1 **Building life cycle assessment**
- ENV1.2 **Local environmental impact**
- ENV1.3 Sustainable resource extraction
- ENV2.2 Potable water demand and waste water volume
- ENV2.3 Land use
- ENV2.4 Biodiversity at the site



ECONOMIC QUALITY

- ECO1.1 Life cycle cost
- ECO2.1 Flexibility and adaptability
- ECO2.2 Commercial viability



SOCIOCULTURAL AND FUNCTIONAL QUALITY

- SOC1.1 Thermal comfort
- SOC1.2 **Indoor air quality**
- SOC1.3 Acoustic comfort
- SOC1.4 Visual comfort
- SOC1.5 **User control**
- SOC1.6 Quality of indoor and outdoor spaces
- SOC1.7 Safety and security
- SOC2.1 Design for all



TECHNICAL QUALITY

- TEC1.2 Sound insulation
- TEC1.3 Quality of the building envelope
- TEC1.4 Use and integration of building technology
- TEC1.5 Ease of cleaning building components
- TEC1.6 Ease of recovery and recycling
- TEC1.7 Immissions control
- TEC3.1 Mobility infrastructure



PROCESS QUALITY

- PRO1.1 Comprehensive project brief
- PRO1.4 **Sustainability aspects in tender phase**
- PRO1.5 Documentation for sustainable management
- PRO1.6 Urban planning and design procedure
- PRO2.1 Construction site/construction process
- PRO2.2 **Quality assurance of the construction**
- PRO2.3 Systematic commissioning
- PRO2.4 User communication
- PRO2.5 FM-compliant planning



SITE QUALITY

- SITE1.1 Local environment
- SITE1.2 Influence on the district
- SITE1.3 Transport access
- SITE1.4 Access to amenities

Goal: Prooven high indoor air quality

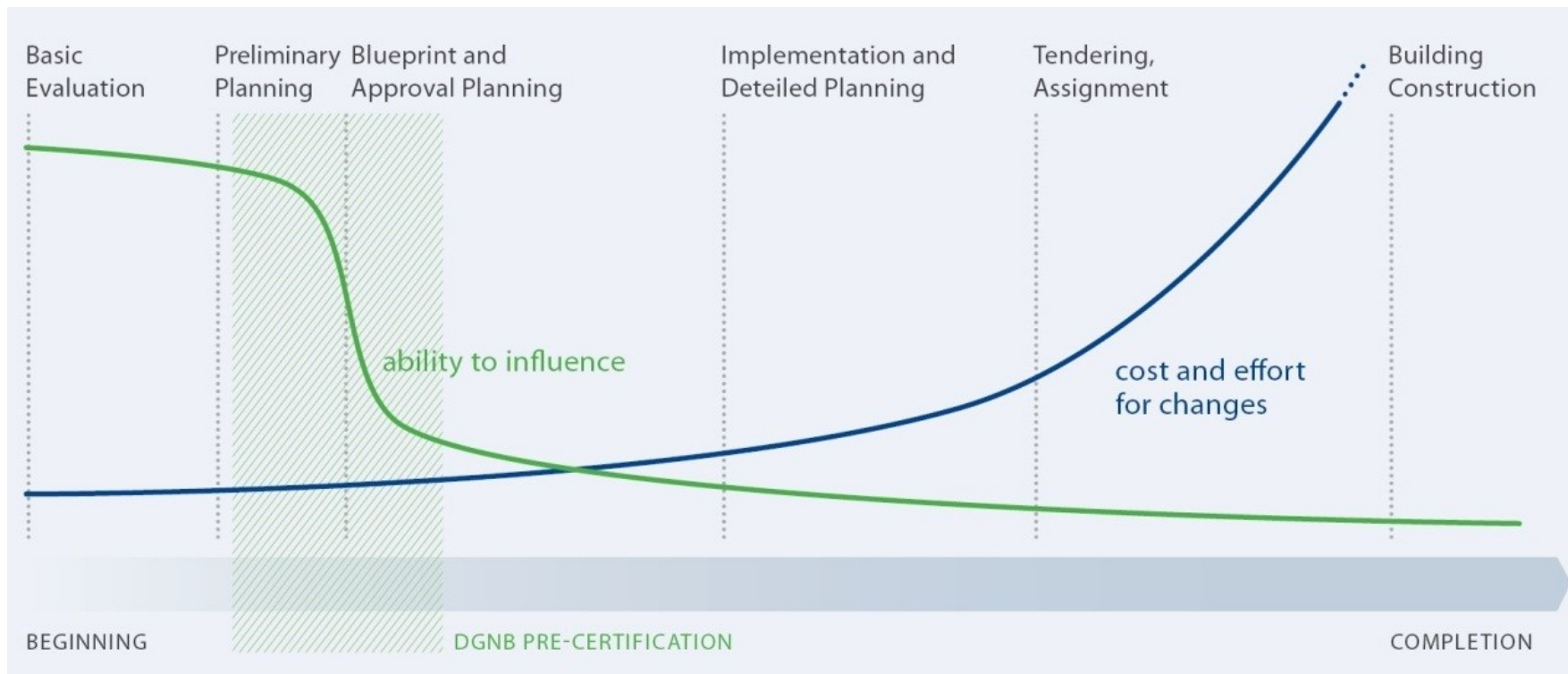
Certification prerequisite:
TVOC & formaldehyde test
results must not exceed
limit values (SOC 1.2)

Criterion: Local
environmental impacts
(ENV 1.2) – 4.5% - 5%

Criterion: Tendering
(PRO1.4)
1.6%

Criterion: QA
(PRO2.2)
1.6%

Criterion: Indoor Air
Quality (SOC 1.2)
– 4.5% to 5.4%



Local environmental impacts (ENV1.2): High-risk material and substance groups

- Halogenated and partially halogenated refrigerants and propellants
- Heavy metals
- Substances that fall under the Biocidal Products Directive (528/2012/EC)
- Substances that fall under the Persistent Organic Pollutants Regulation (850/2004/EC)
- Hazardous substances in accordance with the CLP Regulation (1272/2008/EC)
- Organic solvents and plasticisers
- Substances of very high concern (SVHC in accordance with the European Chemicals Regulation (REACH) (1907/2006/EC))



ENV1.2 – Criteria matrix



No.	RELEVANT COMPONENTS/ CONSTRUCTION MATERIALS/ SURFACES	SCOPE	SUBSTANCES/ASPECTS CONSIDERED	REFERENCE STANDARD	QUALITY LEVEL 0	QUALITY LEVEL 1	QUALITY LEVEL 2	QUALITY LEVEL 3	QUALITY LEVEL 4	TYPE OF DOCUMENTATION	SCOPE OF APPLICATION AND VERIFICATION	NOTES REGARDING DEFINITIONS/EXPLANATIONS/ FOOTNOTES	FOCUS OF IMPACT OF THE SUBSTANCES/ASPECTS CONSIDERED OVER THE INDIVIDUAL STAGES IN THE LIFE OF A BUILDING (MODULES IN ACCORDANCE WITH DIN EN 15978)				
	Where specifically does this apply?	Product type	Explanation	Definition	Limit value 10 points	Sub-Reference 30 points (verification via building elements catalogue)	Reference 50 points (verification via building elements catalogue)	Sub-target 75 points (verification via building elements catalogue)	Target value 100 points (verification via building elements catalogue)	Requirement for verification of the individual aspects (only documentation containing values that are to be verified should be submitted)	The requirement applies to the following components		Raw materials extraction (A1)	Production of the product (A3)	Construction of the building (A5)	Operation/use of the building (B1)	Dismantling of the building (C1-C4 and D)
<p>General information:</p> <p>1) For all standards, references, test seals, etc. listed below, legally valid proof of equivalence with regard to the substance or aspect considered (see column 4) will be accepted. This legally valid proof can be provided by the manufacturer or the authority responsible for awarding the test seal.</p> <p>2) The requirements of the specified "reference standards" (see column 5) generally apply to the statutory requirements that are predominantly shown in quality level 0 and 1. Requirements outside of this do not always refer to the reference standard. <u>The requirements of a higher quality level in each case incorporate all requirements listed for the lower levels</u>; higher quality levels (QL) may require additional requirements and quality standards.</p>												Reference to the DGNB criterion					
												Legally valid proof					
1	Coatings on non-mineral subsurfaces : Metals, wood, plastics (Factory and building site)	This refers to decorative liquid coating materials; Paints/varnishes with primer coats. Effect coatings (such as metallic paints) are an exception to this	VOC/ Lead, cadmium	VOC definition in accordance with Directive 2004/42/EC	No use of lead and cadmium compounds (< 0.1%)	< 300 g/l – (Category D - Solvent-borne coatings (SB) in accordance with Directive 2004/42/EC)	< 130 g/l – (Water-borne coatings (WB))Cat. D in accordance with Directive 1004/42/EC)	< 100 g/l	< 100 g/l	Technical data sheet and/or SDS and/or manufacturer declaration and/or test certificate and/or reference product labels in the DGNB System	All relevant components and construction products	Please note: Coatings applied at the factory	Risk minimisation in solvent manufacturing			Indoor air hygiene	

This refers to decorative liquid coating materials: paints/varnishes with primer coats.

VOC definition in accordance with Directive 2004/42/EC

No use of lead and cadmium compounds (< 0.1%)	< 300 g/l – (Category D - Solvent-borne coatings (SB) in accordance with Directive 2004/42/EC)	< 130 g/l – (Water-borne coatings (WB))Cat. D in accordance with Directive 1004/42/EC)	< 100 g/l	< 100 g/l
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All substances considered in the criteria matrix must be tested for the desired quality level!

Process quality

PRO1.4 Sustainability aspects in tender phase

- Sets incentives to integrate sustainability into tendering extensively

PRO2.2 Quality assurance of the construction

- Sets incentives to manage the construction site based on the requirements lists drawn up for the construction products
- and a continuous comparison between target material use and actual material used (as required) is conducted and site management has produced documentation to demonstrate this in the form of site inspection report

Indoor Air Quality IAQ (SOC1.2)

Indicator „Volatile organic compounds (VOCs)“

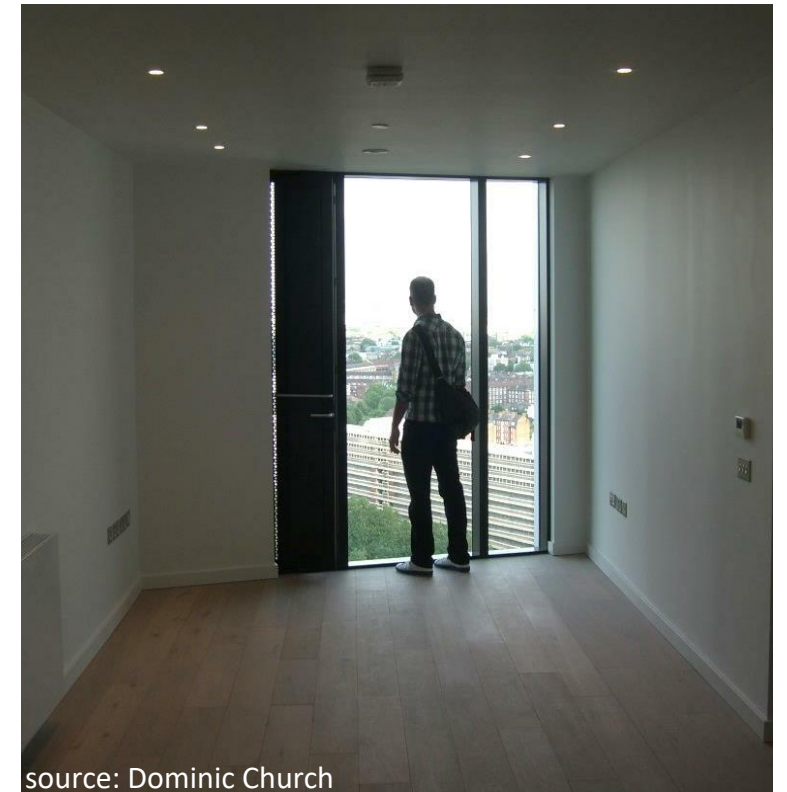
Measuring TVOC and formaldehyde emissions (offices, schools, residential, hotels etc.)

Chemical analysis of indoor air:

- within four weeks of completion (postponed measurement leads to the point reduction)
- measurement excluding furnishings

Based on random sample of rooms, depending on:

- total number of rooms in building
- number of different room types



source: Dominic Church

IAQ indicator: Volatile organic compounds (VOCs)

1 Indoor air quality – Volatile organic compounds (VOCs)

1.1 Measurement of volatile organic compounds

Office Education Hotel

- Evaluation of the indoor air concentration of volatile organic compounds according to the [redacted] standards

TVOC [$\mu\text{g}/\text{m}^3$]	Formaldehyde [$\mu\text{g}/\text{m}^3$]	Max. 50
> 3000	> 100	0
≤ 1000	≤ 60	25
≤ 500	≤ 30	50

Alternatively:

- Evaluation of incomparable VOC measurements according to the [redacted] -3 standards (measured more than four weeks after completion)

TVOC [$\mu\text{g}/\text{m}^3$]	Formaldehyde [$\mu\text{g}/\text{m}^3$]	Max. 25
> 3000	> 100	0
≤ 300	≤ 30	25

Minimum 5 points are DGNB certification prerequisite

Overall weighting of the criterion: 4.5 – 5.4 %

Alternative standards are allowed (different values, less points):

Environmental Protection Agency (EPA) U.S.: **TO-1, TO-15, TO-17** and **TO11A** (Formaldehyde)

ASHRAE 189.1-2014 (TVOC reporting shall be in accordance with CDPH (California Department of Public Health) Standard Method V1.1)

Your contact at DGNB



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TVOC: Requirements for individual substances

New Construction Benchmarks for evaluation of individual substances as part of VOC measurements ISO 16000-3,-6 (Annex 2):

CAS NO.	SUBSTANCE NAME	NEW CONSTRUCTION BENCHMARKS[$\mu\text{g}/\text{m}^3$]	GUIDELINES 1 [$\mu\text{g}/\text{m}^3$]	GUIDELINES 2 [$\mu\text{g}/\text{m}^3$]
57-55-6	propane-1,2-diol	95		
107-98-2	1,2-Propylene glycol monomethyl ether, 1-methoxy-2-propanol		1000	10,000
1569-02-4	2-Propylene glycol-1-ethyl ether		300	3000
57018-52-7	2-Propylene glycol-1-tert-butyl ether		300	3000
...				...