



TEC1.7

Immissions control



Objective

Our objective is to minimise disruption to the immediate surroundings of the building due to sound and light emissions. In addition, we wish to prevent negative impacts on people and nature due to noise and light from buildings.

Benefits

Measures to prevent/reduce sound emissions and adverse light conditions have a positive impact on the health and well-being of users and the surrounding environment. This increases the productivity of building users and reduces absenteeism. Preventing light pollution supports the stability of ecosystems and can reduce the subsequent social costs incurred as a result of damage.

Contribution to overriding sustainability goals



	CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF THE UNITED NATIONS (UN)		CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY	
1 Low	3.4	Reduction of premature death, promotion of good health/well-being	15.1	Biodiversity
	15.5	Natural habitats		



Outlook

Thanks to new research and solutions, the technical options available are becoming increasingly sophisticated and tailored more closely to the needs of people and nature. In the industrial sector, the impacts and immissions can to a great extent already be partially contained and prevented (e.g. urban factory). The DGNB monitors these developments and will update the indicators of this criterion as required.

Share of total score

	SHARE	WEIGHTING FACTOR
Office Education Residential Hotel	0.8%	1
Consumer market Shopping centre	1.8%	2
Business premises		
Logistics Production	1.7%	2



EVALUATION

A total of two indicators are specified for the evaluation. There is a total of 110 points in this criterion, of which a maximum of 100 points can actually be awarded.

NO.	INDICATOR	POINTS
1	Noise immissions – immissions guide values	
1.1	Noise pollution reduction measures <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Consumer market buildings Shopping centre Business premises Logistics Production </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Office Education Residential Hotel </div>	Max. 70
	<ul style="list-style-type: none"> ■ Compliance with the immissions guide values in accordance with the Technical instructions on protection against noise (TA Lärm) throughout the day and the night. 20 ■ Immissions values that fall below the immissions guide values in accordance with the Technical instructions on protection against noise (TA Lärm) by at least 6 dB throughout the day and the night. 40 ■ Immissions values that fall below the immissions guide values in accordance with the Technical instructions on protection against noise (TA Lärm) by at least 10 dB throughout the day and the night. 70 	
2	Light pollution	
2.1	Light pollution reduction measures <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Consumer market buildings Shopping centre Business premises Logistics Production </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Office Education Residential Hotel </div>	Max. 30
	<ul style="list-style-type: none"> ■ There is an implemented lighting concept that explicitly examines the issue of light pollution and its prevention, and focuses on minimising light trespass into neighbouring areas, for instance due to outdoor advertising, outdoor lighting, façade lighting and indoor lighting with an external impact (excluding required safety lighting). +15 ■ At least 80% of all illuminants or lights with an external impact are designed to prevent upwards and lateral light scattering. +5 ■ At least 80% of all illuminants or lights with an external impact are switched off or dimmed automatically or are equipped with motion detectors. +5 ■ For all illuminants, care has been taken to reduce distracting glare effects. +5 ■ A simulation has been carried out and the resulting potential for optimisation has been implemented +10 	



SUSTAINABILITY REPORTING AND SYNERGIES

Sustainability reporting

Appropriate key performance indicators (KPIs) for communication include using the lighting concept described in indicator 2.

NO.	KEY PERFORMANCE INDICATORS (KPIs)	UNIT
KPI 1	Overfulfilment of the immissions control values in accordance with the Technical instructions on protection against noise (TA Lärm) (throughout the day and night)	[dB]
KPI 1	Share of the exterior illuminants where the issue of light pollution has been explicitly taken into account	[%]

Synergies with DGNB system applications

- **DGNB district:** Indicator 2 largely corresponds to indicator 8. "Light pollution reduction measures" in the criterion SOC1.9 Emissions/immissions for the Urban district scheme (UD16) and Business district scheme (BD16).



APPENDIX A – DETAILED DESCRIPTION

I. Relevance

The productivity and satisfaction of users and neighbours are closely linked to influence and sensory perceptions from the surrounding environment. The important factors for the highest possible acceptance are ensuring the lowest possible negative impact due to noise and distracting lights.

II. Additional explanation

The existing statutory immissions regulations should be complied with wherever possible. In addition, potential improvements for optimisation should be evaluated.

Definition of emissions

In accordance with the German Federal Immission Control Act (BImSchG), any air pollution, odours, noises and similar occurrences emanating from technical systems, commercial and industrial facilities or vehicles are referred to as emissions.

Definition of immissions

Conversely, immissions are defined by the Act as air pollution, noises, odours and similar environmental effects that affect people, animals and plants. In most cases, any emissions also result in immissions.

III. Method

Indicator 1. Immissions guide values

The following values are taken into consideration:

- Noise emissions level NEL in dB(A)
- Sound power level SPL in dB(A)
- Sound power level with immission effect in dB(A)
- Operational period of the systems
- Assessed level as additional pollution
- Immissions guide value (IGV) in dB(A)

The evaluation is carried out via the difference established between the determined value and the immissions guide value from the Technical instructions on protection against noise (TA Lärm). Noise protection measures that go beyond the minimum noise protection requirements result in a better evaluation for this criterion.

The difference between the determined value and the immissions guide value is determined via a noise protection expert report (noise immission projection) in accordance with the Technical instructions on protection against noise (TA Lärm).

Planning measures for minimising sound immissions include, for example, the positioning of sound sources in relation to neighbouring areas that require protection, the use of particularly quiet systems and planning required additional structural measures, if necessary. Such measures include silencers, enclosures, encapsulation and noise protection walls and barriers.



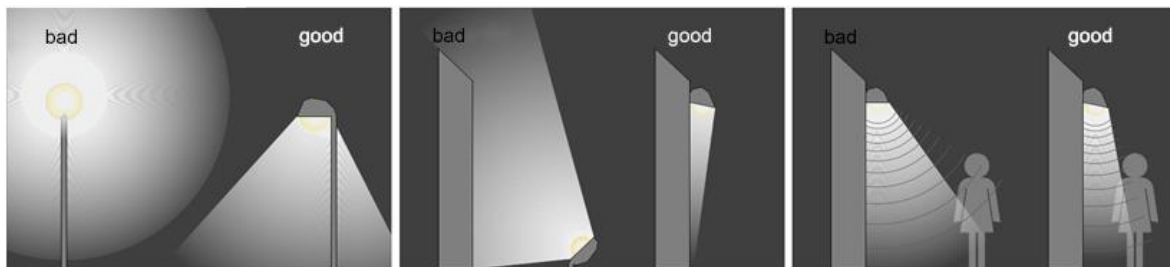
Indicator 2. Light pollution

Light pollution reduction measures

Light trespass is defined as the intolerable illumination of a living or working area inside a building and increased illumination of outdoor areas by external light sources. Residential buildings in the immediate vicinity of a commercial building, for instance, are particularly affected by this.

Light pollution at the site is evaluated in qualitative terms. Outdoor lighting systems and indoor lighting systems with an external impact are evaluated. The objective is to prevent light scattering upwards and to the side as far as possible. The illuminance should also be adjusted to the actual light conditions. Consequently, lights that feature low upwards and lateral light scattering and can automatically adjust their light intensity to suit the surrounding conditions are classified as good. In addition, motion detectors, for instance, should be positioned to prevent unnecessary activation.

A lighting concept should explicitly examine the issue of light pollution and its prevention. The objective is to ensure the lowest possible illumination due to outdoor advertising, outdoor lighting, façade lighting and indoor lighting with an external impact (excluding required safety lighting), for example.



Lighting examples (source: Büro Faerber based on Przygoda)

It is not always possible to ensure sufficient illumination and also prevent disruptive effects. Different measures may lead to compliance with these comfort values, such as preventing direct lines of sight to light sources by selecting an appropriate site, ensuring that lights are positioned at optimal heights, ensuring that lights have suitable angles of inclination or implementing screening measures. Light emissions can also be reduced by limiting the times at which lights are switched on, using many distributed smaller lights in place of a single larger light or dimming measures. Details regarding wildlife conservation can also be found in the guidelines "Bird-Friendly Building with Glass and Light", Schmid, H., W. Doppler, D. Heynen & M. Rössler (2012): Bird-Friendly Building with Glass and Light. Second, revised edition., Swiss Ornithological Institute, Sempach"

Required safety lighting is excluded from these provisions.

IV. Usage-specific description

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APPENDIX B – DOCUMENTATION

I. Required documentation

A range of different/alternative forms of documentation is listed below. The documentation submitted must comprehensively and clearly demonstrate compliance with the requirements for the target evaluation of the individual indicators.

Indicator 1. Immissions guide values

- Noise protection expert report
- Expert report regarding noise, in which the projected noise immissions from the building into neighbouring areas are specified as an assessed level in dB(A) and, if necessary, the additional pollution is determined. The report must state whether the minimum level of noise protection, i.e. the immissions guide values in the Technical instructions on protection against noise (TA Lärm), have been met or the extent to which the noise protection achieved falls below this minimum level.
- Declaration by an expert indicating that the immission locations are outside of the exposure zone of the system.

Indicator 2. Light pollution

- Documentation of measures against light pollution
- Proof of the lighting systems installed to date by means of data sheets and photo documentation
- Lighting concept
- If applicable, simulation results and presentation of the methodology



APPENDIX C – LITERATURE

I. Version

Change log based on version 2017

PAGE	EXPLANATION	DATE
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II. Literature

- German Federal Immission Control Act (Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnliche Vorgänge – BImSchG). 26th September 2002 (BGBl. I No. 71 published 04.10.2002, P. 3830), last amended by Article 1 of the Act published 21st July 2011 (BGBl. I P. 1474)
- Sixth General Administrative Regulation to the Federal Immission Control Act (Technical instructions on protection against noise), published 26th August 1998; Gemeinsames Ministerialblatt (Joint Ministerial Gazette), 49th year, no. 26, published 28th August 1998
- DIN ISO 9613-2. Attenuation of sound during propagation outdoors – General method of calculation. Berlin: Beuth Verlag. October 1999
- RLS-90: "Richtlinien für den Lärmschutz an Straßen" [Guidelines for noise protection on roads], published 1990, introduced via letter no. 8/1990 – StB 11/14.86.22-01/25 Va 90 by the Bundesminister für Verkehr (Federal Minister for Transport) on 10th April 1990.
- DIN EN 12354-4. Estimation of acoustic performance of buildings from the performance of elements – Part 4: Transmission of indoor sound to the outside. Berlin: Beuth Verlag. April 2001
- Przygoda, Carsten (2013): Leuchtmittel und Lichtlenkung [Illuminants and light redirection]. URL: <http://www.funnytakes.de/lichtverschmutzung/leuchtmittel-und-lichtlenkung.html>
- Bird-Friendly Building with Glass and Light, Schmid, H., W. Doppler, D. Heynen & M. Rössler (2012): Bird-Friendly Building with Glass and Light. Second, revised edition, Swiss Ornithological Institute, Sempach, ISBN no.: 978-3-9523864-0-8