



ECO2.1

# Flexibility and adaptability



## Objective

This criterion is aimed at making the building's design as flexible as possible and creating the greatest possible potential for conversion.

## Benefits

The ease with which a building can be adapted to changing requirements helps raise user satisfaction; it can prolong the building's service life and reduce costs incurred throughout its life cycle. Flexibility and adaptability reduce the risk of vacancy and contributes to the long-term economic success of a building.

## Contribution to overriding sustainability goals



CONTRIBUTION TO SUSTAINABLE DEVELOPMENT  
GOALS (SDGS) OF UNITED NATIONS (UN)

CONTRIBUTION TO THE GERMAN  
SUSTAINABILITY STRATEGY

	CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF UNITED NATIONS (UN)		CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY	
 <b>Moderate</b>	11.3	Inclusive and sustainable urbanisation	11.1.a/c	Land use
	8.4	Improve resource efficiency in consumption and production	7.1.a/b	Resource conservation
 <b>Low</b>	12.2	Sustainable management and use of natural resources	8.1	Resource conservation
	12.5	Substantially reduce waste generation		



## Outlook

In light of social change, for most types of buildings, flexibility and adaptability to other types of usage are key future themes that we should address. Demographic change, Work 4.0, Industry 4.0 and digitalisation will substantially change our building demands. This criterion will become increasingly important and it will be adapted to incorporate future technological advancements.

## Share of total score

	SHARE	WEIGHTING FACTOR
Office	7.5%	3
Education		
Residential	9.6%	3
Hotel		
Consumer market		
Shopping centre		
Department stores	9.6%	3
Logistics		
Assembly buildings	9.6%	3
Production		



## EVALUATION

The aim here should be to achieve a high proportion of usable floor area relative to the total floor area of the building, building depths that allow for conversion to other usages, a good ratio between the floor area and number of building access cores, aspects affording flexibility to the floor plans, a highly flexible structural design and highly adaptable technical building services. In this criterion, a maximum of 100 points can be achieved in total without bonuses, or a maximum of 110 points including bonuses. In indicator 6, **Assembly buildings** are differentiated into different building types. These types are described under the chapter “IV. Usage-specific description”.

NO.	INDICATOR	POINTS
<b>1</b>	<b>Space efficiency</b>	
1.1	<b>Space efficiency</b> Space efficiency factor: Proportion of usable floor area (UA) / gross floor area (GFA) [T&D_04]	
	<b>Office</b> ≤ 0.48 – ≥ 0.75	1–10
	<b>Education</b> ≤ 0.48 – ≥ 0.75	1–30
	<b>Hotel</b> ≤ 0.43 – ≥ 0.70	1–30
	<b>Residential</b> ≤ 0.60 – ≥ 0.80	1–20
	<b>Consumer market</b> ≤ 0.70 – ≥ 0.90	1–20
	<b>Shopping centre</b> Category I: ≤ 0.55 – ≥ 0.65 Category II: ≤ 0.50 – ≥ 0.60	1–20
	<b>Department stores</b> ≤ 0.50 – ≥ 0.70	1–20
	<b>Logistics</b> and <b>production</b>	<b>Max. 20</b>
	Proportion values documented under a)	1
	Proportion values documented under a) and b) or c)	14
	Proportion values documented under a), b) and c)	20
	See "Method": a): Cost optimisation b): Environmental optimisation c): Contribution towards social optimisation	
	<b>Assembly buildings</b> not included	



NO.	INDICATOR	POINTS
1.2	<b>Multi-use of areas</b>	
	<b>Assembly buildings</b>	<b>20</b>
	The possibility of multiple use of a relevant usable building area (UA) [T&D_04] was implemented in accordance with the area utilisation concept.	20
	<b>Office stores</b> <b>Education</b> <b>Residential</b> <b>Hotel</b> <b>Consumer market</b> <b>Shopping centre</b> <b>Department stores</b> <b>Logistics</b> <b>Production</b> not included	
<b>2</b>	<b>Ceiling height</b>	
2.1	<b>Shell dimension</b>	
	<b>Office</b>	<b>10</b>
	≥ 3.00 m	
	<b>Education</b>	<b>15</b>
	≥ 3.00 m	
	<b>Residential</b>	<b>7–10</b>
	≥ 2.50 m – ≥ 2.75 m	
	<b>Hotel</b>	
	> 2.50 m (hotel rooms) and ≥ 3.25 m (general areas)	<b>10</b>
	<b>Consumer market</b>	<b>10</b>
	≥ 3.25 m (rented space)	
	<b>Shopping centre</b>	
	≥ 3.90 m (rented space)	<b>10</b>
	<b>Logistics</b>	
	≥ 6.00 m – ≥ 10.50 m	<b>5–10</b>
	<b>Assembly buildings</b> , <b>Production</b> and <b>Department stores</b> not included	
<b>3</b>	<b>Building depth</b>	
3.1	<b>Building case 1: Standard scenario (external wall – external wall)</b> <b>Building case 2: Building access core (external wall – core)</b>	
	<b>Office</b> <b>Hotel</b>	<b>Max. 10</b>
	■ Building case 1	
	10.00 m ≤ building depth ≤ 16.50 m	5
	12.50 m ≤ building depth ≤ 14.50 m	10
	■ Building case 2	
	5.00 m ≤ building depth ≤ 8.25 m	5
	6.25 m ≤ building depth ≤ 7.25 m	10



NO.	INDICATOR	POINTS
	<b>Residential</b>	<b>Max. 10</b>
	<ul style="list-style-type: none"> <li>Building case 1</li> <li>11.50 m ≤ building depth ≤ 13.50 m, uniform building depth</li> <li>11.50 m ≤ building depth ≤ 13.50 m, varying building depth</li> <li>Building case 2</li> <li>5.75 m ≤ building depth ≤ 6.75 m, uniform building depth</li> </ul>	5 10 5
	6.25 m ≤ building depth ≤ 6.75 m, varying building depth	10

Re 3 **INNOVATION AREA**

Explanation: conceptual model of alternative approaches that show that alternative building depths allow the building to be easily converted to other uses.



As in  
3.1

Does not apply to

**Education** **Consumer market** **Shopping centre** **Department stores** **Logistics**  
**Production** **Assembly buildings**

**4 Vertical access**

4.1 **Relationship between the gross floor area and the number of building access cores, on a per-storey basis [GFAs-storey / n building access cores]**

**Office** **Hotel** **Assembly buildings**

≤ 1200 m<sup>2</sup> to ≤ 400 m<sup>2</sup>

**1–10**

**Education**

≤ 1200 m<sup>2</sup> to ≤ 400 m<sup>2</sup>

**1–15**

NO. INDICATOR

POINTS

Re 4 **INNOVATION AREA**

Explanation: Conceptual model of alternative approaches that show that the vertical infrastructure allows the building to be easily converted to other uses.



See  
above

Does not apply to

**Residential** **Consumer market** **Shopping centre** **Department stores** **Logistics**  
**Production**

**5 Floor layout**

5.1 **Flexibility aspects of the floor plan**

**Office**

- Sanitary facilities or connections (shaft) provided for retrofitting for subsequent separation into units ≤ 400 m<sup>2</sup>

**10**

**Residential**

**Max. 15**

- The living spaces in every housing unit consist of non-dedicated rooms (e.g. 3 x 3 m, ideally 4 x 4 m)
- Load-bearing and non-load-bearing walls within a specified structure allow the

+10

+5



layout to be changed as required

<b>Logistics</b>		<b>Max. 20</b>
■	Sanitary facilities or connections (shaft) provided for retrofitting for subsequent separation into smaller units	+10
■	For separation into smaller units, separate infrastructure and use (separate billing or rental units) is possible	+10
<b>Production</b>		
■	For separation into smaller units, separate infrastructure and use (separate billing or rental units) is possible	<b>10</b>
<b>Assembly buildings</b>		<b>Max. 20</b>
■	Rooms / halls can be divided (e.g. by means of a floor-to-ceiling curtain or mobile floor-to-ceiling wall elements)	+4
■	Rooms can be used flexibly	+4
■	Sufficient storage spaces are available so that at least 50% of the rooms can be emptied	+4
■	The water supply systems and connections are designed flexible enough to retrofit area into other types of use	+4
■	The distributions and connections of the electrical equipment are designed flexible enough also for temporary events (e.g. for exhibitions or video installations etc.)	+4
■	Sanitary facilities or connections (shaft) provided for retrofitting and subsequent separation into the smaller units	+4
■	For separation into smaller units, separate infrastructure and use (separate billing or rental units) is possible	+4
■	Separate use of main usage and catering areas through different opening times / usage scenarios is possible	+4
■	Building documentation is available in a form presented in the Appendix 2 or documentation for use of a facility as an emergency shelter is available.	+4

Re 5 **INNOVATION AREA**



See above

Explanation: Conceptual model of alternative approaches that show that the rooms can be easily adapted for different uses.

Does not apply to

- Hotel** **Consumer market** **Shopping centre** **Department stores** **Education**



NO.	INDICATOR	POINTS
<b>6</b>	<b>Structure</b>	
6.1	<b>Flexibility aspects of the structure</b>	
	<b>Office</b>	<b>Max. 10</b>
	<ul style="list-style-type: none"> <li>■ The majority of internal partitions is not load-bearing +2.5</li> <li>■ Partition walls can be installed on each façade axis without intervention in the floor or ceiling +2.5</li> <li>■ Partition walls can be re-used. +2.5</li> <li>■ Structural engineering provides sufficient contingencies to allow for increased loads arising from potential conversions. +2.5</li> </ul>	
	<b>Education</b>	<b>Max. 40</b>
	<ul style="list-style-type: none"> <li>■ The majority of internal partitions are not load bearing +10</li> <li>■ Partition walls can be installed on each façade axis without intervention in the floor or ceiling +10</li> <li>■ Partition walls can be re-used. +10</li> <li>■ Structural engineering provides sufficient contingencies to allow for increased loads arising from potential conversions. +10</li> </ul>	
	<b>Residential</b>	<b>Max. 5</b>
	<ul style="list-style-type: none"> <li>■ The majority of internal partitions are not load bearing +2.5</li> <li>■ Shaft configuration allows for flexibility in the planning of kitchen and sanitary connections in a concentrated indoor area. +2.5</li> </ul>	
	<b>Hotel</b>	<b>Max. 40</b>
	<ul style="list-style-type: none"> <li>■ The majority of internal partitions are not load bearing +10</li> <li>■ Partition walls can be installed on each façade axis without intervention in the floor or ceiling +10</li> <li>■ Space is provided that can be flexibly separated into conference and catering areas as required. +10</li> <li>■ Structural engineering provides sufficient contingencies to allow for increased loads arising from potential conversions. +10</li> </ul>	
	<b>Consumer market</b>	<b>Max. 30</b>
	<p>Structural engineering provides sufficient contingencies to allow for increased loads arising from potential conversions. Alternatively: the structural system permits subsequent modifications in load-bearing ceiling/wall areas (in case of interventions in the load-bearing structure, a static calculation must be carried out). +10</p> <ul style="list-style-type: none"> <li>■ Installation areas are provided for tenant installations (e.g. refrigeration units) with corresponding payload/area reserve capacities. +10</li> <li>■ There is potential for expansion (e.g. expansion of lift installations and lifting equipment) for delivery purposes. A logistics concept exists that shows the reserve capacities that can be used (e.g. when switching to new product lines/tenants). +10</li> </ul>	



NO.	INDICATOR	POINTS
	<b>Shopping centre</b>	<b>Max. 30</b>
	Structural engineering provides sufficient contingencies to allow for increased loads arising from potential conversions. Alternatively: the structural system permits subsequent modifications in load-bearing ceiling/wall areas (in case of interventions in the load-bearing structure, a static calculation must be carried out).	+5
	<ul style="list-style-type: none"> <li>■ Installation areas are provided for tenant installations (e.g. refrigeration units) with corresponding payload/area reserve capacities. +5</li> <li>■ There is potential for expansion for delivery purposes. A logistics concept exists that shows the reserve capacities. +10</li> <li>■ For remodelling, interior finishing and installation work or the adding of spatial boundaries between the rented spaces and the shopping street (shop façades), installation- and removal-friendly connection points are provided as part of the structural design of the building's interior finishing +10                             <ul style="list-style-type: none"> <li>■ Connection to the façade: In the ceiling area, there are connection possibilities for the tenant façade</li> <li>■ Connection to the floor: there is a finishing strip on the floor at the boundary to the rented area</li> <li>■ Connection to the sides: removal-friendly side coverings with substructure for sideways fastening of the shop façade</li> </ul> </li> </ul>	
	<b>Department stores</b>	<b>Max. 30</b>
	Structural engineering provides sufficient contingencies to allow for increased loads arising from potential conversions. Alternatively: the structural system permits subsequent modifications in load-bearing ceiling/wall areas (in case of interventions in the load-bearing structure, a static calculation must always be carried out).	+5
	<ul style="list-style-type: none"> <li>■ Installation areas are provided for tenant installations (e.g. refrigeration units) with corresponding payload/area reserve capacities. +5</li> <li>■ There is potential for expansion for delivery purposes. A logistics concept exists that shows the reserve capacities. +10</li> <li>■ Rental units can be divided and remodelled without significant building work (such as changing the façade design/layout). The structural design solutions provided here are incorporated into the planning. +10</li> </ul>	
	<b>Logistics</b>	<b>Max. 30</b>
	<ul style="list-style-type: none"> <li>■ Building expansion can be implemented without modifying the existing load-bearing structure. +10</li> <li>■ Expansion of the building can also be implemented vertically (e.g. supports for mezzanine floors). +10</li> <li>■ Payload reserves for converting buildings for alternative uses have been taken into account in the structural analysis and have been provided. +10</li> </ul>	





NO.	INDICATOR	POINTS
	<b>Production</b>	<b>Max. 20</b>
	■ Building expansion can be implemented without modifying the existing load-bearing structure.	+5
	■ Expansion of the building can also be implemented vertically.	+5
	■ The support grid is laid out such that sufficient spans are available should the production processes be changed or expanded.	+5
	■ Payload reserves for converting buildings for alternative uses have been taken into account in the structural analysis and have been provided.	+5
	<b>Assembly buildings Type I and II</b>	<b>Max. 25</b>
	■ A separation and redesign of area units of the building can be done without great structural effort (e.g. changing the facade design). Intended constructive solutions were taken into account in already the planning (e.g. in the conversion concept and / or fire protection concept).	+2.5
	■ At least one public area is equipped with a large door suitable for large exhibition items / furniture (width 2.50 mx height 2.50 m).	+2.5
	■ In the exhibition rooms / halls there is sufficient load capacity for moving and displaying large exhibition items / furniture <ul style="list-style-type: none"> <li>▪ Type I at least 2 tons of floor load</li> <li>▪ Type II at least 5 tons of floor load</li> </ul>	+2.5
	■ There is expansion potential for delivery. A logistics concept with a representation of the reserves is available.	+2.5
	<b>Type I</b>	
	■ There are alternative delivery routes in the building so that the assembly and dismantling of e.g. exhibition items, catering and foyer areas do not cross.	+2.5
	■ Avoidance of load-bearing interior walls	+2.5
	■ Exhibition areas have sufficiently large openings / truck gates (at least 2.50 m wide x 5.00 m high), which are suitable for passing of large exhibits / furniture.	+2.5
	■ In the exhibition rooms for multifunctionality the payload reserves to transfer large exhibition items are available as well for the ground floor (at least 2 tons)	+2.5
	■ The walls are designed in a way that they can withstand the constant change of exhibition items, i.e. walls are robust, easy to repair and easy to paint	+2.5
	■ The gradation in the auditorium can be changed without interfering with structural components, as e.g. the platforms are designed as built-in components.	+2.5
	<b>Type II</b>	
	■ Every hall and every divisible area of the hall has at least one truck gate with the following minimum dimensions: <ul style="list-style-type: none"> <li>▪ at least two truck gates (each divisible area at least one truck gate) with a width <math>\geq 4.0\text{m} \times 5.0\text{m}</math> +2.5</li> <li>▪ at least two truck gates (each divisible area at least one truck gate) with a width <math>\geq 5.0\text{m} \times 5.0\text{m}</math> +5</li> </ul>	
	■ The load capacity of the ground floor level is suitable for trucks to drive through. <ul style="list-style-type: none"> <li>▪ The static design is carried out up to <math>\geq</math> heavy goods vehicles of 30 t +1</li> <li>▪ The static design is carried out up to <math>\geq</math> heavy goods vehicles of 60 t +5</li> </ul>	+1 – 5
	■ Suspension loads of the ceiling construction of the main usable area for the trade fair installations have to be considered in the following way:	



- Suspension points with a maximum individual load of 5kN and a resulting surface load of 0.2 kN / m<sup>2</sup> +2.5
- Suspension points with a maximum individual load of 10kN and a resulting surface load of 0.3 kN / m<sup>2</sup> +5

Re 6 **INNOVATION AREA**



See above

Explanation: conceptual model of alternative approaches that show that the structural design is flexible.

**7 Technical building services**

**7.1 Flexibility aspects of the technical building services**

<b>Office Residential Consumer market</b>	<b>Max. 40</b>
<b>Production</b>	<b>Max. 50</b>
<b>Logistics</b>	<b>Max. 20</b>
<b>Assembly buildings</b>	<b>Max. 25</b>

In case of modifications in the room situation or restructuring the distribution systems and connections can be adapted.

7.1.1	Ventilation/HVAC		<b>+Max. 10</b>
		<b>Assembly buildings</b>	<b>+Max. 5</b>
	■ Only with significant structural amendments		1
	■ With minor structural amendments		7
		<b>Assembly buildings</b>	2.5
	■ Does not require structural amendments		10
		<b>Assembly buildings</b>	5
7.1.2	Cooling		<b>+Max. 10</b>
		<b>Assembly buildings</b>	<b>+Max. 5</b>
	■ Only with significant structural amendments		1
	■ With minor structural amendments		7
		<b>Assembly buildings</b>	2.5
	■ Does not require structural amendments		10
		<b>Assembly buildings</b>	5
7.1.3	Heating		<b>+Max. 10</b>
		<b>Assembly buildings</b>	<b>+Max. 5</b>
	■ Only with significant structural amendments		1
	■ With minor structural amendments		7
		<b>Assembly buildings</b>	2.5
	■ Does not require structural amendments		10
		<b>Assembly buildings</b>	+5
7.1.4	Water – Vertical WC connections		<b>+Max. 10</b>
		<b>Assembly buildings</b>	<b>+Max. 5</b>
	■ Only with significant structural amendments		1
	■ With minor structural amendments		7
		<b>Assembly buildings</b>	2.5
	■ Does not require structural amendments		10



NO.	INDICATOR	POINTS
	<b>Assembly buildings</b>	+5
	<b>Production</b>	+Max. 10
	<b>Assembly buildings</b>	+Max. 5
7.1.5	Electrics	
	<ul style="list-style-type: none"> <li>■ Only with significant structural amendments</li> <li>■ With minor structural amendments</li> <li>■ Does not require structural amendments</li> </ul>	<p style="text-align: right;">1</p> <p style="text-align: right;">7</p> <p style="text-align: right;">2.5</p> <p style="text-align: right;">10</p> <p style="text-align: right;">5</p>
		<p style="text-align: right;"><b>Production</b></p> <p style="text-align: right;"><b>Assembly buildings</b></p> <p style="text-align: right;"><b>Production</b></p> <p style="text-align: right;"><b>Assembly buildings</b></p>
	<b>Logistics</b> Heating and electrics only	
	<b>Shopping centre</b>	<b>Max. 40</b>
	<b>Department stores</b>	<b>Max. 50</b>
	<p>QL 1: The building services are in the form of a fixed transfer point for the rental units. Adaptation work may be necessary if the room situation is changed, or if the room or building is remodelled. Adjustment/regulation work has been undertaken; distribution and generation reserve capacities are not retained.</p> <p>QL 2: The building services are configured such that, thanks to distribution reserve capacities, it is easier to respond to increases in demand, e.g. an increase in power if the room situation is changed, or if the room or building is remodelled.</p> <p>QL 3: The building services are configured such that, thanks to generation and distribution reserve capacities, it is very easy to respond to increases in demand, e.g. an increase in power if the room situation is changed, or if the room or building is remodelled.</p>	
7.1.6	Cooling: Cooling supply system	<b>+Max. 10</b>
	<ul style="list-style-type: none"> <li>■ QL 1</li> <li>■ QL 2</li> <li>■ QL 3</li> </ul>	<p style="text-align: right;">1</p> <p style="text-align: right;">6</p> <p style="text-align: right;">10</p>
7.1.7	Heating: Heating supply system	<b>+Max. 10</b>
	<ul style="list-style-type: none"> <li>■ QL 1</li> <li>■ QL 2</li> <li>■ QL 3</li> </ul>	<p style="text-align: right;">1</p> <p style="text-align: right;">6</p> <p style="text-align: right;">10</p>
7.1.8	Water: Water supply and waste water system	<b>+Max. 10</b>
	<ul style="list-style-type: none"> <li>■ QL 1</li> <li>■ QL 2</li> <li>■ QL 3</li> </ul>	<p style="text-align: right;">1</p> <p style="text-align: right;">6</p> <p style="text-align: right;">10</p>
7.1.9	Electrics: Electricity supply system	<b>+Max. 10</b>
	<ul style="list-style-type: none"> <li>■ QL 1</li> <li>■ QL 2</li> <li>■ QL 3</li> </ul>	<p style="text-align: right;">1</p> <p style="text-align: right;">6</p> <p style="text-align: right;">10</p>
	<b>Department stores</b>	
7.1.10	Ventilation/HVAC	<b>+Max. 10</b>



- QL 1 rental units 1
- QL 2 distribution systems and connections 6
- QL 3 generation systems, distribution systems and connections 10

Re 7 **INNOVATION AREA**



See  
above

Explanation: Conceptual model of alternative approaches that show that the technical building services are flexible.

Does not apply to **Education** **Hotel**

NO. INDICATOR

POINTS

8 **CIRCULAR ECONOMY BONUS – HIGH INTENSITY OF USE**



+10

Explanation: For a significant proportion of the building's usable area (at least 50%), area usage concepts that allow for a higher intensity of use in terms of a higher number of users and different usage times have been implemented (e.g. hot desking/desk sharing, business club, etc.)



## SUSTAINABILITY REPORTING AND SYNERGIES

### Sustainability reporting

The space efficiency factor, the ceiling height in the shell state, the building depth and the gross floor area/number of building access cores are good key performance indicators (KPIs) to report. For the EU's Level(s) reporting framework [T&D\_02], information from the designers on support spacing, wall systems and area layout can be used.

NO.	KEY PERFORMANCE INDICATORS (KPIs)	UNIT
KPI 1	Proportion of usable floor area (UA) / gross floor area (GFA) [T&D_04]	[m <sup>2</sup> /m <sup>2</sup> ]
KPI 2	Shell dimension	[m]
KPI 3	Building depth	[m]
KPI 4	Gross floor area (GFA) [T&D_04] / number of building access cores	[m <sup>2</sup> GFA]
KPI 5	Flexibility for the user: Support spacing [m], non-load-bearing internal wall system [flexible/inflexible], potential for areas to be divided [m <sup>2</sup> ], in accordance with Level(s), indicator 2.2 (Level 1) [T&D_02]	[-]

### Synergies with DGNB system applications

- **DGNB DISTRICTS:** The information on the GFA [T&D\_04] can be used in criterion ECO2.3 from the schemes for urban districts and business districts.
- **DGNB RENOVATED BUILDINGS:** High synergies with criterion ECO2.1 from the scheme for renovated buildings.



## APPENDIX A – DETAILED DESCRIPTION

### I. Relevance

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### II. Additional explanation

Technical and social developments impact on the built environment for work, housing and leisure. This requires highly efficient, flexible and adaptable buildings. The need for adaptation may arise from changes within the building use, or by conversion to a different use (e.g. by a new tenant).

In economic terms, the evaluation of the building's space efficiency is based on the proportion of usable and rentable space in relation to the total area of the building.

This criterion is closely related to TEC1.4, which is focused on the adaptability of technical systems.

### III. Method

#### Definitions

Space efficiency is assessed from an economic point of view. As an indicator of how cost-effective the use of the space is, the relationship between usable/rentable areas and the total area of the building is taken into consideration.

#### Flexibility:

The slight adaptation of the building structure to changes still within the existing use (e.g. individual offices becoming open-plan offices – a fulfilment centre becoming a warehouse)

#### Suitability for conversion:

The adaptation of the building structure to a different use (e.g. office use to hotel use, logistics facility to production facility)

The following indicators are evaluated:

#### Building geometry:

##### Indicator 1: Space efficiency

To determine how efficiently the space is used, in accordance with the scheme and common practice in the market segment, the proportion of the GFAs [T&D\_04] that can be considered usable area (as per the relevant definition) is calculated as follows:

#### UAs / GFAs [T&D\_04]

For this purpose, the following must be noted:

- Circulation areas within units that can be used without restriction are part of the usable area.
- Necessary corridors leading to emergency exit stairwells used by two units are part of the circulation



- area.
- Corridors within a unit leading to an emergency exit stairwell are part of the usable area (exclusive use by one unit).
- Foyer areas for which there is evidence that they can be used as assembly buildings (provided they comply with the requirements of the building regulations) can be wholly included as part of the usable area.

When calculating the space efficiency factor, it is rounded to two decimal places.

### Indicator 1.2: Multi-use of areas

(only for **Assembly buildings**)

The diverse usability of buildings is already determined in the first planning phases. Multiple use concepts of areas (space sharing concepts) enable an increase in the intensity of use and a reduction in land consumption. If the planning creates the prerequisites that building areas can be used by different types of use and if the associated functionalities are taken into account in the planning, then sharing concepts can create ecological, social and economic opportunities for building or room users / building owners and operators. In addition to spatial structures, intelligent sharing concepts also require (management) systems and structures that regulate access to rooms and the necessary facility management.

If concept of multi-purpose area uses as well as the plan for building area optimization/utilisation was implemented in the planning and the execution phases, with involvement of (specialist) planners and, if necessary, user groups, this will lead to positive evaluation. In addition, clarification and assignment of liabilities, tenancy and property regulations into the corresponding (rental) contracts will fulfil the requirements of optimal building use.

It is assessed whether the usage concept has been implemented for a relevant portion of the usable building area. The relevance of certain use must be presented and justified based on the building type.

Building use-concept have to address at least the following topics:

- Types of use (as well as consideration of special requirements for these uses)
- User groups
- Utilization concept (beyond the regular usage times of the main usage)
- Room booking platforms / access management systems
- Requirements for facility management

The "[DGNB Report Circular Economy](#)", which among other things contains a checklist for the multiple use of buildings, provides assistance.

#### Shopping centre

Category I: Plots with simple requirements

- 1–2 storey retail buildings plus 1 additional use level (parking, office, etc.) and
- Few urban planning requirements

Category II: Plots with significant requirements

- Building with  $\geq 3$  sales levels plus 2 additional use levels (parking, office, etc.) or
- Major urban planning restrictions or
- Challenging plots that require a high proportion of access and circulation areas (e.g. in parallel,



round and triangular shopping centres)

## Logistics Production

Proportion values documented:

- a): Cost optimisation: The construction and operating costs are reduced by efficient area layout; the areas that are difficult to use are dispensed with
- b): Environmental optimisation: The environmental impact of running a property is decreased by reducing the heating, ventilation and cooling system equipment on the premises (through high space efficiency, the sealing of natural soils can be reduced.)
- c): Contribution towards social optimisation: The working environment is positively influenced by well-proportioned spaces and a clear layout (e.g. connecting office and social areas, clearly laid out mezzanine floors, optimised circulation routes)

### Indicator 2: Ceiling height

In a project, the height can either be determined from the plans or by measuring. If the room height varies within a room, e.g. in the attic, the average room height must be used.

A standard floor must be defined and applied for the evaluation. Where it is not possible to clearly define a standard floor, documentary evidence must be provided to prove that 80% of the area complies with the height used for the evaluation. Service storeys and underground car park are to be disregarded for the purposes of this aspect of this assessment.

In this criterion, the ceiling height is the shell **dimension** = upper edge of the unfinished floor to the lower edge of the bare ceiling.

### Indicator 3: Building depth

A standard floor must be defined and applied for the evaluation.

The building depth must be available between the two façades of the standard floor for 70% of the usable area. The rooms to be assessed are highlighted in bold in Annex 1 of this criterion.

The building depth can either be determined from the plans or, depending on the progress of the construction work, by measuring.

There are two different scenarios:

**Scenario 1:** As a general rule (with single-loaded or multi-loaded infrastructure), the entire building depth is measured from the inner edge of one external wall to the inner edge of the opposite external wall.

**Scenario 2:** Near building access cores (e.g. in point (tower) blocks and frontage buildings), the building depth is measured from the front of the core, that is to say, it is the distance between the outer edge of the core wall and the inner edge of the external wall.

Exceptional cases must be presented and assessed in line with scenario 1 or 2.

### Documentary evidence regarding floor plan layout:

If the building depths in the building differ from those listed for building case 1 and building case 2 and if the architect commissioned has drawn up a concept that makes the building flexible and suitable for conversion, this can be used





as documentary evidence for the indicator. The concept must show the building's flexibility and suitability for conversion to other conceptual approaches (e.g. in the case of offices: open-plan, cellular, combination office layouts).

#### Potential for division into multiple units:

##### Indicator 4: Vertical access

The placement of stairs and lifts has an influence on the building's flexibility in terms of the possible unit sizes and the scope for efficient access to other uses such as offices or residential. The GFAs [T&D\_04] of the typical floor plan per vertical access core should be calculated. The smaller this ratio is, the easier it is to subdivide the building into smaller units. Only fire escape access cores should be considered. In buildings with more than three floors, only access cores with lifts should be considered.

Exceptional cases must be clearly and logically presented and evaluated.

##### Indicator 5: Floor layout– Flexibility aspects of the floor layout

Depending on the layout, subsequent subdivision into smaller units may require additional sanitary units.

These should be provided from the outset, or relevant service access should be put in place in order to facilitate their subsequent addition.

It should be possible to convert the building services without significant structural amendments (e.g. zoning thermo-active building components).

##### Indicator 6: Structure

The structural design is examined in terms of individual components, the quality of which influences the conversion of buildings:

- internal walls
- partition walls
- load reserves

##### Indicator 7: Technical building services

The adaptability of the technical building services is examined on the basis of the following parameters:

- ventilation/HVAC
- cooling
- heating
- water
- electrics

For this indicator, the amount of structural amendments required in terms of remodelling/changes to rooms within the individual units (flexibility) is taken into consideration. If any of the services under evaluation is not present, points can be awarded.

Definitions:

- **Significant structural amendments** = e.g. requires masonry work or the removal of reinforced concrete building components
- **Minor structural amendments** = assembly openings, doors and corridors are sufficiently large and



are adequately provided. Accessibility is good. Components can be transported and replaced, e.g. through dry construction work.

**Indicator 8: CIRCULAR ECONOMY BONUS - high intensity of use**

Land use concepts have been implemented for a significant proportion of the building's usable area, which enable a higher intensity of use in relation to a higher number of users and different usage times (e.g. based on a utilization concept beyond the regular usage times of the main use). The land use concept supports the diverse use and optimization of the building load (e.g. through non-territorial offices / desk sharing, business club). It is assessed whether the present usage concept has been implemented for at least 50% of the usable area. Checklists in the DGNB Report Circular Economy (see [www.dgnb.de/de/themen/circular-economy/index.php](http://www.dgnb.de/de/themen/circular-economy/index.php)) can support the creation of such concepts.



## IV. Usage-specific description

-

### Indicator 1: Space efficiency

Certain factors (such as number of floors, access points etc.) can have a significant impact on the space efficiency of buildings. Therefore, certain factors in different schemes have to be taken in account:

#### Shopping centre

Category I: plot of land with simple requirements

- Buildings with 1-2 storey sales area and 1 additional usage (parking, office, etc.) and
- low urban planning requirements

Category II: plot of land with high requirements

- buildings with  $\geq 3$  storey sales area and 2 further usage (parking, office, etc.) or
- large urban planning restrictions/limitations or
- Difficult property layouts that require a high proportion of access areas (e.g. parallel mall, round mall, triangle)

#### Logistics Production

Documentation of ratio values:

- a): Cost-related optimization: Reduction of construction and operating costs through efficient division of space, poorly usable spaces are avoided
- b): Environment-related optimization: Reduction of the environmental impact of a property in operation by reducing the heating, ventilation and cooling system technology of the premises. With an increased area efficiency, the sealing of natural soils can be reduced.
- c): Contribution to optimization in the social area: positive influence on the working environment through well-proportioned areas and clear design (e.g. connection of office and social areas, clear mezzanine areas, optimized traffic routes)

### Indicator 5: Floor layout– Flexibility aspects of the floor layout

#### Assembly buildings

Functionality of some Assembly buildings require large openings (e.g. elevators, passageways, entrances) to enable accommodation of the large items and/or furniture. Elevators, exhibition and traffic areas are to be designed with extra load bearing capacities e.g. for heavy exhibition units / furniture / tribunes. The possible use of a Assembly buildings as an emergency shelter can be evaluated positively if an appropriately prepared project documentation is available.

### Indicator 6: Structure

#### Assembly buildings

For the assessment in this indicator, Assembly buildings are divided into the following building types:



- Type I: Congress buildings, theatres and concert halls, museums, cultural, civic centres and libraries
- Type II: Trade fair and city halls

Note: Assembly buildings that are not listed here as a building type, can be assigned to one of the above-mentioned types. If an assignment is not possible, we ask for direct communication with the DGNB office.



## APPENDIX B – DOCUMENTATION

### I. Required documentation

Examples of possible evidence include the following items. The allocation of points for individual indicators must be backed up by comprehensive and plausible evidence.

#### Indicator 1: Space efficiency

- Calculation of the UAs [T&D\_04] and a list of related floor space
- Calculation of the GFAs [T&D\_04] and a list of related floor space
- Calculation of the space efficiency factor

#### Indicator 1.2: Multi-use of areas

(only for **Assembly buildings**)

- Concept for the multiple use of areas with information on different uses, user groups and regulations on aspects of liability and tenancy and property law;
- Representation in floor plans as well as details of the areas that allow multiple uses, with explanations of types of use and user groups;
- Utilization concept;
- Description of the supporting management systems;

#### Indicator 2: Ceiling height

- Presentation of the heights using extracts from the cross-sectional plans

#### Indicator 3: Building depth

- Presentation of the building depth using floor plans and/or cross-sectional plans with explanations and a list of the related floor areas
- Documentary evidence regarding floor plan layout: Concept (architect) that shows alternative approaches for making the building flexible and suitable for conversion using floor plans and sections with a brief written and conceptual justification

#### Indicator 4: Vertical access

- Presentation in floor plans with explanations
- Calculation of the ratio GFAs [T&D\_04] / number of building access cores

#### Indicator 5: Floor layout

- Presentation using floor plans with explanations  
**Assembly buildings** Prepared project data according to the Appendix 2 or corresponding plan documentation for use as an emergency shelter



#### **Indicator 6: Structure**

- Presentation of the load-bearing and non-load-bearing components using floor plans with explanations
- Photo documentation with explanations
- Detailed drawings of the ceiling and floor connections, proof of product
- Plausible proof of the calculation of payload reserves

#### **Indicator 7: Technical building services**

- Excerpts from the technical building services plans with reference to distribution systems and connections for ventilation/HVAC, cooling, heating and sanitary systems with explanations
- Photo documentation with explanations

#### **Indicator 8: CIRCULAR ECONOMY BONUS - high intensity of use**

- Use concept for the multiple use of areas with details of different uses
- Representation in floor plans with details of the areas and explanations of types of use and user groups
- Utilization concept
- Photo documentation with explanations



## APPENDIX C – LITERATURE

### I. Version

#### Change log based on Version 2018

PAGE	EXPLANATION	DATE
all	General, Evaluation, Method and documentation: scheme “Assembly buildings” has been added	16.09.2021
297	Appendix 2 for the project documentation has been added	16.09.2021
all	Evaluation and documentation for Indicator 8: additional information / clarification has been added	16.09.2021

### II. Literature

- ISO 9836:2017: <https://www.sis.se/api/document/preview/922406/>



## Annex 1

### Indicator 3: Building depth

The rooms to be assessed are highlighted in bold (see also [T&D\_04])

SCHEME	TYPE OF USABLE FLOOR AREA (UA) FOR WHICH DOCUMENTARY EVIDENCE IS REQUIRED FOR INDICATOR 3	
	USE GROUP	FLOOR AREAS AND ROOMS
<b>Office</b>	2 – Office work	<b>2.1 Office rooms</b> <b>2.2 Open-plan offices</b> 2.3 Meeting rooms 2.4 Design rooms 2.5 Rooms with counter(s) (e.g. ticket office) 2.6 Control rooms 2.7 Surveillance rooms
<b>Consumer market</b> <b>Shopping centre</b>	4 – Sales and distribution (excl. storage)	4.4 Acceptance and distribution areas (where these are permanent working areas) <b>4.5 Sales rooms</b> 4.6 Showrooms 3.2 Workshops (where these are permanent working areas)
<b>Logistics</b> <b>Production</b>	2 – Office work (with proportion of administration)  3 – Production, manual and machine work, experiment (with proportion of industrial work)	<b>2.1 Office rooms</b> <b>2.2 Open-plan offices</b> 2.3 Meeting rooms 2.4 Design rooms 2.5 Rooms with counter(s) 2.6 Control rooms 2.7 Surveillance rooms  <b>3.1 Workshops (where these are permanent working areas)</b> 3.2 Technological laboratories 3.3 Physics, engineering physics and electrical engineering laboratories 3.4 Chemistry, bacteriology and morphology laboratories





<b>Residential</b>	1 – Residing and occupying	<b>1.1 Living spaces</b> 1.2 Common rooms 1.3 Break rooms 1.4 Waiting rooms 1.5 Dining rooms
<b>Hotel</b>	1 – Staying and occupying (with percentage of hotel rooms)	<b>1.1 Living spaces</b> 1.2 Common rooms 1.3 Break rooms 1.4 Waiting rooms 1.5 Dining rooms
	2 – Office work (with percentage of offices)	2.1 Office rooms
<b>Education</b>	5 – Education, teaching and culture	<b>5.1 Classrooms with fixed seating</b> <b>5.2 General classrooms and practice rooms without fixed seating</b> 5.4 Dedicated classrooms and practice rooms without fixed seating 5.5 Library rooms 5.6 Assembly rooms or areas 5.7 Stages, studios 5.8 Exhibition rooms



## APPENDIX 2

Project details (according to Düsseldorf district government. Emergency shelters of the state of NRW: Requirements for structural facilities).

Object details	
Location: <input type="checkbox"/> Corridor, parcel, district	
Building type: <input type="checkbox"/> Hall, administration building, house	
Owner: <input type="checkbox"/> Address & contact details	
Operator: <input type="checkbox"/> Address & contact details	
Supervision association: <input type="checkbox"/> Address & contact details	
Security service: <input type="checkbox"/> Address & contact details	
Building management: <input type="checkbox"/> Address & contact details	
Current building permit: <input type="checkbox"/> use	
Entry with connivance possible	
Move-in date	
Requirements for use: <input type="checkbox"/> Leasing, green waste, etc.	
Service life	
Suitability as emergency accommodation	
Area of the site: <input type="checkbox"/> Length measure for fencing	
Expansion possible	
<b>Contact person circle</b>	
Construction supervision: <input type="checkbox"/> Accessibility (phone & E-Mail)	
Fire protection department: <input type="checkbox"/> Accessibility (phone & E-Mail)	



Health Department: <input type="checkbox"/> Accessibility (phone & E-Mail)	
<b>Contact municipality</b>	
Construction supervision: <input type="checkbox"/> Accessibility (phone & E-Mail)	
Fire protection department: <input type="checkbox"/> Accessibility (phone & E-Mail)	

Health Department: <input type="checkbox"/> Accessibility (phone & E-Mail)		
		<b>Remarks</b>
Enclosure existing:		
Soil contamination:		
Soil condition:		
Drainage wastewater:		
Vegetation:		
Extension areas:		
	<b>Infrastructure - plans available?</b>	<b>Attached as Annex 1, 2, 3 ...</b>
Drinking water pipe network:	<input type="checkbox"/>	<input type="checkbox"/>
Sewage pipe network:	<input type="checkbox"/>	<input type="checkbox"/>
Power lines:	<input type="checkbox"/>	<input type="checkbox"/>
Gas pipe:	<input type="checkbox"/>	<input type="checkbox"/>
Telecommunications:	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Supply and plumbing</b>	<b>Remarks</b>
Drinking water:		<input type="checkbox"/>
Electricity:		<input type="checkbox"/>
Lighting on the site:		<input type="checkbox"/>
Lighting in buildings:		<input type="checkbox"/>
Kitchen & Cooking:		<input type="checkbox"/>
Sewage sewer connection:		<input type="checkbox"/>
Waste water container solution:		<input type="checkbox"/>
Showers (1x / 10 people):		<input type="checkbox"/>
Number of toilets: 1 toilet per unit (6-10 people)		<input type="checkbox"/>



washroom:		<input type="checkbox"/>
<b>Object or area specification</b>		
Access (construction vehicles 34 t):		
Alternative (access)		
Outskirts:		
Industrial Estate:		
Industrial area:		<input type="checkbox"/>
Nature reserve:		<input type="checkbox"/>
Water protection area:		<input type="checkbox"/>
Distance to rail traffic:		<input type="checkbox"/>
Distance to motorway:		<input type="checkbox"/>
Distance to inland shipping:		<input type="checkbox"/>
<b>Defensive fire protection</b>		
Responsible municipality:		
Arrival times at the object:		
Number of employees		
Extinguishing water supply:		
<b>Manpower requirements</b>		
<b>Details can be found in the service description about standards of accommodation facilities in North Rhine-Westphalia</b>		
Management:		
technical staff:		
Medical corps:		
Security staff:		
Supervising staff:		
<b>Initiated or necessary procurement</b>		
Residential and office container:	<input type="checkbox"/>	
Thermal insulation winter: roofing and floor for tent or container	<input type="checkbox"/>	
Lighting:	<input type="checkbox"/>	
Buildings and warehouses	<input type="checkbox"/>	



Fabrics and tarpaulins for hanging out the private areas	<input type="checkbox"/>
Stand walls / exhibition boxes:	<input type="checkbox"/>
Number of beds:	<input type="checkbox"/>
Number of chairs:	<input type="checkbox"/>
Number of tables:	<input type="checkbox"/>
Number of desks:	<input type="checkbox"/>

Number of office chairs:	<input type="checkbox"/>
Number of filing shelves:	<input type="checkbox"/>
Number of storage shelves:	<input type="checkbox"/>
Smoking area:	<input type="checkbox"/>
Privacy protection outside:	<input type="checkbox"/>

**Sports, leisure & religion**

Play opportunities - children:	<input type="checkbox"/>
Space for religion and culture:	<input type="checkbox"/>
Table tennis:	<input type="checkbox"/>
Multimedia:	<input type="checkbox"/>
Ball sports:	<input type="checkbox"/>
Others:	<input type="checkbox"/>

**Offices / organizations already involved in the planning**

Authorities:	
Integration:	
Representative religion:	
Psychosocial support:	
separate victim support:	
Other institutions:	

**Further building information**

Spaces	Number	m <sup>2</sup> per room
Bedroom		
Common room		



management		
storage		
First aid room		
quarantine		
Gate		
childcare		
Classroom		
Clothes closet		
staff		
Supply / technology		
Dining room		
Tea kitchen		
big kitchen		
Social space		
Sports		
Prayer room		
TV & Internet		
<b>Technical requirements</b>		
Fire alarm system (FAS) Category, DIN, activation control center	<input type="checkbox"/>	
Maintenance according to Test-Building Ordinance expert FAS carried out? Operational safety,	<input type="checkbox"/>	
Plant fire protection Sprinkler system, wall hydrants	<input type="checkbox"/>	
Organizational fire protection Fire protection regulations Fire protection officer	<input type="checkbox"/>	
Structural fire protection requirements of building law are complied with	<input type="checkbox"/>	



<b>Known deviations</b>	
<b>Building permit</b>	
Showers (1/10)	
Toilets (1/10)	
Escape and emergency routes	
Flooring	
Carpet, concrete, PVC etc.	
Room separation (privacy)	