

# Hvad står der i direktivet om indeklima og indeklimadata

## Måle og kontrolsystemer

- Nul-emissions-bygninger, skal udstyres med måle- og kontrolsystemer til overvågning og regulering af kvaliteten af indeklimaet hvis det er teknisk og økonomisk muligt.

## Bygningsautomatik, ikke beboelse

- Bygningsautomatik skal fra maj 2026 være i stand til at måle indeklimaet

## Automatisk lysstyring, ikke beboelse

- Større bygninger skal have automatisk lysstyring med zoneinddeling og tilstedeværelsessensorer

# Annex 10 – guideline om TBS

Table 10 – Examples of relevant parameters for indoor environmental quality

|                    | Indicator                   | D                | C | M <sup>(*)</sup> | I <sup>(*)</sup> | Description and references                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|-----------------------------|------------------|---|------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermal Comfort    | Operative temperature       | X                |   | (X)              |                  | Possible alternative to air temperature in the monitoring stage. Uniform temperature of an imaginary black enclosure in which an occupant would exchange the same amount of heat by radiation plus convection as in the actual non-uniform environment. Ranges are provided as a function of building type, season, and dependent on the cooling system (with or without) by the predicted mean vote (PMV) and adaptive comfort models. (EN ISO 7730, EN ISO 7726).                                                                                                                                           |
|                    | Air temperature             | X                | X | X                | X                | Required in the assessment of other indicators. Air temperature can be used in long-term measurements if corrected for large hot or cold surfaces to determine the operative temperature. Indoor temperatures above 18 °C during the heating season will have significant health benefits. (EN ISO 7730, EN ISO 7726).                                                                                                                                                                                                                                                                                        |
|                    | Air velocity                | X                |   |                  |                  | It influences general thermal comfort and local thermal discomfort due to draught. Comfortable air velocity generally below 0.2 m/s. In buildings with mechanical cooling artificially increased air velocity under personal control (e.g. fans) can be used to compensate for increased air temperature under summer comfort conditions (operative temperature >25 °C). (EN 16798-1, EN ISO 7726). A comfort area for increased air velocity (<0.8 m/s) without personal control for temperatures above 25.5 °C is defined in ASHRAE 55 <sup>(b)</sup> .                                                     |
|                    | Relative humidity           | X                |   | X                |                  | Composition of the air in terms of water vapour in relation to the maximum amount it can hold at a given temperature. It also influences air quality. Very low RH (<20%) can cause irritation of eyes, nose, and throat and increase sensitiveness to infections. Persistent dampness, condensation, and excess moisture (RH > 70%) can cause building damage and microbial growth. It is recommended to limit absolute humidity to 12 g/kg (EN 16798-1, EN ISO 7726).                                                                                                                                        |
| Indoor air quality | Ventilation rate            | X                | X |                  | X                | To be addressed as part of system inspections pursuant to Article 23. Supply or removed air from space for the purpose of controlling air contaminant levels, humidity, perceived air quality or temperature within the space (EN 16798-1). If critical sources for health are identified, it must be checked that they remain below the health threshold values. Minimum 4 l/s per person is prescribed during occupied hours; 0.15 l/s per m <sup>2</sup> during unoccupied hours. Typically measured from supply and extract terminals.                                                                    |
|                    | Carbon dioxide              | X                |   | X                |                  | Proxy for ventilation effectiveness in spaces where people are the main source of pollution. Indoor CO <sub>2</sub> concentration should be adjusted according to the outdoor CO <sub>2</sub> concentration. It should not exceed 1350 ppm above outdoor concentration. Typically measured in extract terminals. (EN 16798).                                                                                                                                                                                                                                                                                  |
|                    | PM <sub>2.5</sub>           | X <sup>(c)</sup> |   | X <sup>(d)</sup> |                  | Particulate matter where particles have an aerodynamic diameter equal to or less than 2.5 µm. It can be generated indoors from combustion appliances or outdoors and has harmful effects on human health. Air filtration is required to control particulate matter from outdoor sources. Indoor particulate matter is controlled by reducing emission sources (e.g. electric instead of gas stoves) and adequate ventilation. Preferably below an annual mean of 10 µg/m <sup>3</sup> . Incremental steps are proposed for PM <sub>2.5</sub> limits (35, 25, 15, 10, 5 µg/m <sup>3</sup> ) (EN 16798-1, WHO). |
|                    | Formaldehyde <sup>(e)</sup> | X <sup>(f)</sup> |   |                  |                  | Major sources are building materials and consumer products (e.g. furniture, cleaning). It can cause sensory irritation and respiratory health risks. Use of labelled low-emitting building and finishing materials and products can reduce exposure. Measured near potential sources such as furniture and flooring (EN 16798-1, WHO).                                                                                                                                                                                                                                                                        |
|                    | Nitrogen dioxide            | X <sup>(f)</sup> |   |                  |                  | Originating from combustion. Indoor contamination may be possible from attached garages and indoor combustion sources, in which cases sensors and/or measuring requirements would be recommended. It poses health risks related to the respiratory system. Measured near potential sources such as kitchens and garages. A 1 h mean limit of 200 µg/m <sup>3</sup> and annual mean of 40 µg/m <sup>3</sup> are proposed (EN 16798-1, WHO).                                                                                                                                                                    |
|                    | Radon                       | X <sup>(f)</sup> |   |                  |                  | Human carcinogen, originating from decay of radium in soil and rocks. Reference level of 100 Bq/m <sup>3</sup> (or 300 Bq/m <sup>3</sup> based on prevailing country-specific conditions). Measured in the lowest occupied level of the building (EN 16798-1, WHO).                                                                                                                                                                                                                                                                                                                                           |
|                    | Carbon monoxide             | X <sup>(f)</sup> |   |                  |                  | Originating from combustion. Acute exposure-related reduction of exercise tolerance and increase in symptoms of ischaemic heart disease. A 24-hour mean limit of 4 mg/m <sup>3</sup> is proposed with an interim target of 7 mg/m <sup>3</sup> (EN 16798-1, WHO).                                                                                                                                                                                                                                                                                                                                             |

Annex 10, Technical building systems, indoor environmental quality and inspections (Article 13, 23 and 34)

Approval of the content of the draft Commission Notice providing guidance on new or substantially modified provisions of the recast Energy Performance of Buildings Directive (EU) 2024/1275

# Annex 10 – guideline om TBS

Table 11 – Example of optimal indoor environment limits for new buildings based on a medium expectation of occupants

|                 | Parameter                                             | Examples of optimal ranges                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          | Deviation during occupancy for design outdoor conditions                                                                 |
|-----------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Thermal comfort | -                                                     | Heating season <sup>(a)</sup><br>( $T_{rm} \leq 10 \text{ }^{\circ}\text{C}$ )                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Cooling season <sup>(a)</sup><br>( $15 \text{ }^{\circ}\text{C} \leq T_{rm} \leq 30 \text{ }^{\circ}\text{C}$ ) |                                                                          | Transition season <sup>(a)</sup><br>( $10 \text{ }^{\circ}\text{C} < T_{rm} < 15 \text{ }^{\circ}\text{C}$ ) |                                                                          | Yearly: 6% and 3%<br>Monthly: 25% and 12%<br>Weekly: 50% and 20%<br>Outside Category II and III, respectively (EN 16798) |
|                 | Operative temperature<br>( $T_{op}$ )( <sup>d</sup> ) | With mechanical cooling <sup>(c)</sup>                                                                                                       | Without mechanical cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | With mechanical cooling                                                                                         | Without mechanical cooling                                               | With mechanical cooling                                                                                      | Without mechanical cooling                                               |                                                                                                                          |
|                 | Draught rate <sup>(e)</sup><br>(Air velocity)         | DR 20%<br>(ISO 7730)                                                                                                                         | DR 20%<br>(ISO 7730)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | DR 20%<br>(ISO 7730)                                                                                            | Openable window <sup>(f)</sup><br>$T_o \geq 10 \text{ }^{\circ}\text{C}$ | DR 20%<br>(ISO 7730)                                                                                         | Openable window <sup>(f)</sup><br>$T_o \geq 10 \text{ }^{\circ}\text{C}$ |                                                                                                                          |
|                 | Relative humidity                                     | 25 - 60% <sup>(h)</sup>                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          | Weekly: 50% and 20%<br>Outside Category II and III, respectively (EN 16798)                                              |
|                 | Air quality                                           | Ventilation rate (q) <sup>(i)</sup>                                                                                                          | Supply air flow rate, $q = q_p \cdot n + q_b \cdot A$ , where A is the area of the space, $q_p$ is 7 l/s per person for <i>non-adapted</i> and 2.5 l/s per person for <i>adapted</i> , and $q_b$ is 0.7 l/s per m <sup>2</sup> (non-residential) <sup>(k)</sup> and 0.15 l/s per m <sup>2</sup> (residential) <sup>(l)</sup> . Extract air flow rates: 15 l/s for bathroom/toilet, 10 l/s for kitchen, and 10 l/s for other wet room. A 75% odour extraction from cooking hoods is considered as optimum for boost air flow rate from kitchen hoods (EN 13141-3) |                                                                                                                 |                                                                          |                                                                                                              |                                                                          |                                                                                                                          |
|                 | Carbon dioxide                                        | $\Delta CO_2 \leq 800$ ppm above outdoor CO <sub>2</sub> concentration, if people are the main source of pollution <sup>(j)</sup> (EN 16798) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          | 5% <sup>(l)</sup>                                                                                                        |
|                 | PM <sub>2.5</sub> <sup>(m)</sup>                      | Below an annual mean of 10 µg/m <sup>3</sup> and a 24-hour mean of 25 µg/m <sup>3</sup>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          | Dependent on outdoor concentration and human behaviour                                                                   |
|                 | Formaldehyde <sup>(m)</sup>                           | 30-minute mean: 100 µg/m <sup>3</sup>                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          |                                                                                                                          |
|                 | Nitrogen dioxide <sup>(m)</sup>                       | 1 h mean: 200 µg/m <sup>3</sup> ; Annual mean: 40 µg/m <sup>3</sup>                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          |                                                                                                                          |
|                 | Radon <sup>(m)</sup>                                  | Reference level of 100 Bq/m <sup>3</sup> (or 300 Bq/m <sup>3</sup> depending on prevailing country-specific conditions)                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          |                                                                                                                          |
|                 | Carbon monoxide <sup>(m)</sup>                        | 15-minute mean: 100 mg/m <sup>3</sup> ; 1 h mean: 35 mg/m <sup>3</sup> ; 8 h mean: 10 mg/m <sup>3</sup> ; 24 h mean: 4 mg/m <sup>3</sup>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                          |                                                                                                              |                                                                          |                                                                                                                          |

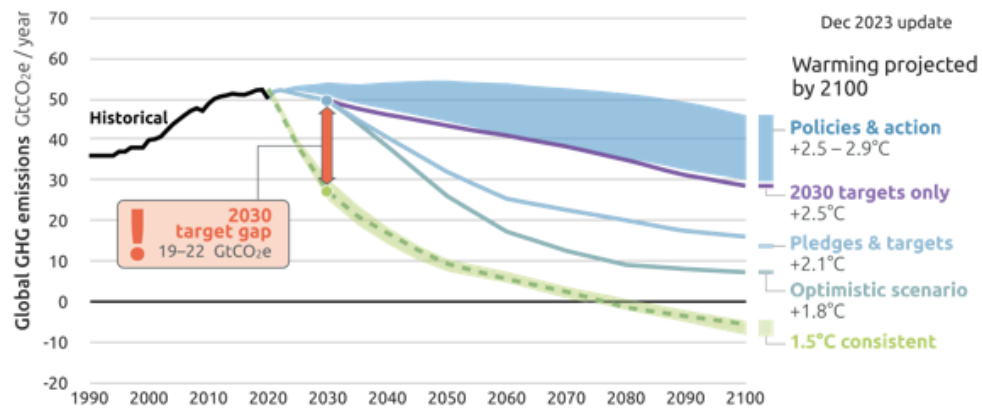
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# Ekstreme forhold

We are facing a climate emergency, and with buildings being responsible for **39%** of global carbon emissions, it is our responsibility to deliver a future which minimises these impacts for our future generations.

We need to act now, and embrace rapid decarbonisation strategies to minimise future global warming impacts



Source: Climate Action Tracker: projected warming based on current pledges and policies

| HI                                                       | Response        | General effect                                                                                            |
|----------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------|
| $26.7^{\circ}\text{C} \leq HI \leq 32.2^{\circ}\text{C}$ | Caution         | Fatigue possible with prolonged exposure and/or activity                                                  |
| $32.2^{\circ}\text{C} < HI \leq 39.4^{\circ}\text{C}$    | Extreme caution | Sunstroke and heat cramps or heat exhaustion possible with prolonged exposure or activity                 |
| $39.4^{\circ}\text{C} < HI \leq 51.7^{\circ}\text{C}$    | Danger          | Sunstroke, heat cramps or heat exhaustion likely; heatstroke possible with prolonged exposure or activity |
| $51.7^{\circ}\text{C} < HI$                              | Extreme danger  | Heat/Sunstroke highly likely with continued exposure                                                      |

| Air Quality Index                                                                           | Response       |
|---------------------------------------------------------------------------------------------|----------------|
| $0 < PM_{2.5} < 10\mu\text{g}/\text{m}^3$<br>$0 < PM_{10} < 20\mu\text{g}/\text{m}^3$       | Good           |
| $10 < PM_{2.5} < 20\mu\text{g}/\text{m}^3$<br>$20 < PM_{10} < 40\mu\text{g}/\text{m}^3$     | OK             |
| $20 < PM_{2.5} < 25\mu\text{g}/\text{m}^3$<br>$40 < PM_{10} < 50\mu\text{g}/\text{m}^3$     | Acceptable     |
| $25 < PM_{2.5} < 50\mu\text{g}/\text{m}^3$<br>$50 < PM_{10} < 100\mu\text{g}/\text{m}^3$    | Poor           |
| $50 < PM_{2.5} < 75\mu\text{g}/\text{m}^3$<br>$100 < PM_{10} < 150\mu\text{g}/\text{m}^3$   | Very poor      |
| $75 < PM_{2.5} < 800\mu\text{g}/\text{m}^3$<br>$150 < PM_{10} < 1200\mu\text{g}/\text{m}^3$ | Extremely poor |