



Environmental criteria for sustainable public procurement of

Office Buildings (New Construction)

1. Scope/definition

The Office Buildings (New Construction) product group comprises criteria for the design and construction of new office buildings. Falling under this product group are only buildings of which over 55% of the use function is intended for office functions. The criteria apply only to the office function. The design and construction of buildings may form part of an integrated contract in which other services may also be included. The criteria in this document are also applicable to this type of contract.

2. Most significant environmental effects

The government opts for a performance-based approach to the procurement of new office buildings. The table in annex 1 has been developed to facilitate this. The table addresses the following themes:

- energy conservation
- materials use
- health in buildings/interior environment

Annex 1 also includes explanatory notes for each theme, and summarises the calculation methods. Annex 2 lists the premises assumed at the time of drafting this document.

A number of other themes are relevant, but no criteria for these themes have been drafted; for those themes, this is left for the contracting authority to consider doing. They include:

- materials with low emissions of volatile organic compounds (VOCs)
- view in each working area
- water management
- openable windows in each working area
- individually adjustable sun blinds
- individually adjustable temperature
- total accessibility

3. Points of attention/suggestions

Devoting attention to the opportunities and possibilities for the most sustainable procurement possible in the preparation phase will lead to specifications that are more ambitious or of different types than the standard minimum requirements and award criteria set out in this document. The following table presents points for attention and suggestions for promoting sustainability in procurement within this product group.

No.	Points of attention/suggestions (AS)
AS1	Specifics of adaptive capacity or future value The performance criterion adaptive capacity or future value is on the agenda, but is not yet fully worked out in detail. The goal of this criterion is to be able to say something in design and specifications about the preservation of substances in the process, such as the expected construction and waste flows during the use and conversion. Part of this involves a cohesive approach to the entire life cycle of the building. For example, the design takes into account the degree to which the building is suitable for a redesigned or different use function. VNO/NCW and MKB-Nederland have been working closely with the construction sector and governmental agencies to operationalise this criterion. Their results have been published on http://www.adaptief Vermogen.nl/ .
AS2	Ask architect to provide evidence of experience with environmentally friendly construction projects The architect can be asked to demonstrate sufficient experience with the design of environmentally friendly construction projects. The architect could refer to experts that have been partnered with on current or past projects, such as advisory engineers for heating and/or cooling systems. This could be obtained by asking for references.
AS3	Ask tenderer to demonstrate technical capacity for implementation of environmental management measures Tenderers may be asked to demonstrate that they are technically capable (based on expertise within their organisation or through cooperation with external experts) of implementing specific

	environmental management measures relevant to the execution of the construction works.
AS4	Educate the building manager about energy efficiency After handover of the construction/renovation work, the building manager can be educated about energy efficiency in the use of the building. The tenderer may be requested to provide a description of the content of this material.
AS5	Introduce bio-based products Explore the options for giving priority to bio-based supplies. This could initially be done on a small scale, to gain experience in a test environment and to not overburden the market in this as yet not fully developed segment. More information on bio-based procurement can be found on the PIANOo website.
AS6	Transport, recycling and waste management of construction materials The contract party can be asked to take steps to prevent construction waste, or to separate and reuse construction waste, such as: <ul style="list-style-type: none"> contract party must indicate a minimum and target level for the use of reusable packaging and/or containers for the transport of the required construction materials from and to the construction site. suppliers of construction materials must indicate a minimum and target level for packaging waste (to be achieved through measures such as a system for collection, recycling and reuse of packaging material supplied). The contract party must take appropriate measures to limit the waste produced during the demolition and construction works, and to reclaim any such waste through reuse or recycling). A minimum of a certain percentage (to be defined) of the total weight must be reclaimed (through reuse or recycling).

4. Selection criteria

Not defined for this product group.

5. Technical specifications

No.	Technical specifications (ME)
ME1	Sustainability performance The tenderer will complete a building that is in compliance with level C for every sustainability category as set out in the table in annex 1 and described in more detail in the explanatory notes to that table. The tenderer will include with the tender a description of the performance offered and will substantiate this with corresponding calculations. These calculations must be carried out in accordance with the appropriate calculation methods as described in the explanatory notes to the table in annex 1. The text above could be incorporated into the schedule of requirements, and the annex could be added in its entirety to the schedule of requirements. <i>Verification</i> For documentation for the purposes of the handover, see contract clause 1.

6. Award criteria

No.	Award criteria (GC)
GC1	Higher sustainability performance The higher the individual aspects of building performance as described in the table in schedule 1, the higher the tender will be rated. <i>Explanation</i> This award criterion is a supplement to the minimum requirement. See the explanatory notes. You

	<p>must assign the rating yourself. The table identifies different classes and suggests point allocations. The background to the breakdown into classes is included in annex 1.</p> <p>Naturally, other methods of rating are also possible. If you expect tenders to score very close together, or if you expect a tender to score higher than the highest class on the table, one option would be to use a sliding scale. In this case you would not be working with classes, but you would rate a higher score with a percentage of the maximum number of points that you wish to assign to the building performance in question. For this, you must define a maximum score or compare tenders against each other. However you do this, you must describe your procedure clearly, in advance, in the tender documents.</p> <p><i>Verification</i> For documentation for the purposes of the handover, see contract clause 1.</p>
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7. Contract provisions

No.	Contract provisions (CB)
CB1	<p>Documentation of sustainability performance For the purposes of the handover of the building the contractor will supply documentation of the performance level achieved, with calculations and measurement data where relevant.</p>
CB2	<p>Maintenance plan and operations guide Upon handover of the building the contractor will supply a maintenance plan setting out the maintenance steps to be taken over the lifetime of the building. The maintenance plan will include at least the following components:</p> <ul style="list-style-type: none"> • description of the components and materials used • description of the inspection and maintenance intervals for the entire building, including systems, with corresponding instructions (at a minimum, description of inspection points, methods, maintenance activities and required materials) • description of the way in which materials and components can be removed or demolished in an environmentally responsible way <p>In addition, an operations guide will be provided. This guide explains how to use the building in the most sustainable manner. The operations guide will include at least the following components:</p> <ul style="list-style-type: none"> • description of the intended use of the systems in the building (configuration, automatic settings, options for optimisation during use period, etc.), and • description of the sustainable materials and components used and the way to handle them during the operations period.

Annex 1 – Details of minimum requirement, award criterion and contract clauses

	Energy		Materials	Health in buildings				
	Energy performance	Own generation of sustainable energy	Environmental performance	Noise in work areas, workspaces	Indoor Air Quality, ventilation capacity	Airflow ventilation	Thermal comfort,	Natural light incidence in workspace for long-term use > 2 hours
Level A1.	100 % better than base value x points	50 % independent generation x points	30 % better than level C x points	Class A (see explanatory notes) x points	No higher level specified	6 dm ³ /s per m ² of working area x points	Class A x points	100% of workspaces designated for long-term occupancy min. DF > 3.0% x points
Level A2.	80 % better than base value x points		25 % better than level C x points					
Level B1.	65 % better than base value x points	25 % independent generation x points	20 % better than level C x points	Class B (see explanatory notes) x points				100% of workspaces designated for long-term occupancy min. DF > 2.0% x points
Level B2.	50 % better than base value x points	10 % independent generation	15 % better than level C x points					
Level C	35 % better than base value 0 points	No level specified	€1.00 /m ² GFA 100% Sustainable Procurement of wood 0 points	Class C (see explanatory notes) 0 points				8.3 dm ³ /s. pp 0 points
Basic level	Buildings Decree	No level specified	No level specified Calculation required in Buildings Decree	Buildings Decree	Buildings Decree	No level specified	No level specified	Buildings Decree

Explanatory notes to table 1

With Sustainable Procurement, the government opts for a performance-based approach. The table is based on the assumption that the effects can be quantified using generally accepted calculation methods, so that the level of performance achieved can be determined simply and in a verifiable manner. Wherever possible, this has been done using calculation methods stipulated in other legislation.

As basic value, the table adopts the legal standard for new construction (wherever one is available). For the purposes of Sustainable Procurement, a performance requirement in excess of this statutory basic value is selected for a number of aspects. Level C in the table is the minimum requirement. Secondly, the class breakdown presents a clear picture of the performance to be delivered in order to achieve an added value. This relies on either the class breakdown as already used in practice (for example, thermal comfort) or an indication of the percentage of the basic value. Award criteria may be specified for level B2 and above.

Several levels are indicated, to give the purchaser/user a level of choice. To be able to compare the descriptions objectively, points may be assigned to the individual levels.

The individual themes are quantified using the following calculation methods:

	Theme	Calculation method for new construction
Energy	Energy performance	NEN7120*, including NVN7125 (April 2011)
	Own generation of sustainable energy	$x\% = (E_{ownparcel}/E_{p,adm,tot,nb}) * 100\%$ according to NEN 7120*
Materials	Environmental Performance	Calculation method for Environmental Performance Buildings and Groundwork, Road and Hydraulic Engineering works, with associated environmental database [SBK]
	Wood	www.inkoopduurzaamhout.nl
Health	Noise in workspaces	Quality levels according to the NVBV** Handbook of Building-Physical Quality of Office Space with reference to NEN 5077
	Indoor Air Quality, ventilation capacity	NEN 1087 and NVBV Handbook of Building-Physical Quality of Office Space
	Thermal comfort	ATG according to ISSO 74, NVBV Handbook of Building-Physical Quality of Office Space and ISSO 32.
	Natural lighting incidence	Daylight factor [DF] = $E_{room}/E_{open\ field} * 100\%$ -Design phase: calculation using daylight simulation programmes with a CIE-overcast sky.

* For all standards, the version applicable at the moment of the announcement of the tendering procedure applies.

** *Nederlands Vlaamse Bouwfysica Vereniging* (Netherlands-Flanders Association of Building Physics)

Further explanation of each theme is provided below.

Energy performance

Objective of requirements

The goal of this requirement is to improve the energy performance of buildings with respect to the legal minimum standard.

Explanation of calculation method

Calculation method: NEN7120, including NVN7125: $EPC_{usi} < (100\% - x\%) * EPC_{usi}$.

The percentage "better than base value" is evaluated. The scale provided refers to the percentage improvement in performance over the legally required basic level.

Explanation of Sustainable Purchasing threshold

The underlying goal is the reduction of the use of fossil fuels. This is pursued by improving the energy performance; this energy performance must be demonstrated prior to the application for the integrated environmental permit. Looking at the trends at the European level (EU 2020 and Green Public Procurement), it would be advisable to strive for an energy performance at least 20% below the standard in the law. Because in many cases it is a matter of years between the moment of procurement and the handover of a project, the threshold for Sustainable Procurement has already been set at 35% below the legal standard, this in consideration of the national ambition to have all new construction be energy-neutral by 2020 (for government buildings, this target goes into effect starting 2019).

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate that the agreed energy performance is attained. This can be done with an energy label in accordance with the applicable standards. The contractor must also demonstrate that the building is constructed in accordance with the substantive content of the calculation (construction-technical and systems-technical).

Own generation of sustainable energy

Objective of requirements

The goal of this requirement is to promote the use of renewable energy sources that generate capacity at the location itself or in the immediate vicinity.

Explanation of calculation method

Calculation method: NEN7120, including NVN 7125: $x\% = (E_{ownparcel} / E_{p,adm,tot,nb}) * 100\%$ The energy generated at the space ($E_{ownparcel}$ [MJ]) in relation to the permissible characteristic energy consumption ($E_{p,adm,tot,nb}$ [MJ] in accordance with NEN7120, including NVN 7125) is evaluated. The amount of energy generated at the space consists of an item for the electricity generated at the space ($E_{pr;el;gi}$) and the contribution to sustainable energy generation as described in section 5.4.4 of NEN7120:2011.

Passive solar energy, utilisation of natural light for lighting and thermal solar energy (see also section 5.4.4 of NEN7120:2011) are not included here. For the calculation of the quantity of electricity generated at the space ($E_{pr;el;gi}$), see section 5.4.5 of NEN7120:2011.

Explanation of Sustainable Purchasing threshold

Setting a requirement on the generation of renewable energy at the space promotes not only energy-efficient construction but also on-site generation of sustainable energy. "Renewable energy sources" are defined as wind, solar, ambient air/surface water/geothermal heat, energy from the oceans, hydroelectric power, biomass, landfill gas, sewage treatment gas and biogas, all as defined in section 1, paragraph 1(t) of the Electricity Act 1998.

Documentation (this must be included in the contract)

Upon handover, the contractor must submit the calculations demonstrating that the percentage of energy generated on-site is attained. The contractor must also demonstrate that the building is constructed in accordance with the substantive content of the calculation (construction-technical and systems-technical).

Environmental performance of materials

Objective of requirements

The goal of the requirement is the reduction of the environmental impact as a result of the material used of the construction and the building-specific systems.

Explanation of calculation method

Calculation method: Environmental Performance of Buildings and Groundwork, Road and Hydraulic Engineering Works Calculation Method published by SBK (Construction Quality Foundation), including the underlying environmental databases for determining the shadow price. This shadow price is the performance to be delivered. Within BREEAM certifications, a certain amount of experience has now been gained in calculating the shadow prices of a building. Based on a number of projects, in 2012 the DGBC resolved to adjust the shadow price within BREEAM from €0.80/m² GFA to €1.30/m² GFA. At present (January 2013), there is still not enough data available to draw a reliable conclusion from the harmonised database for materials about the shadow price of buildings. This is why the choice is made here to adopt the reference value for the shadow price from the BREEAM methodology.

Explanation of Sustainable Purchasing threshold

Drafting a calculation of the maximum shadow price encourages optimisation of design and construction based on a calculation of the environmental impact.

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate that the agreed shadow price is achieved. This is demonstrated using the calculation of the shadow costs based on the materials actually used.

Sustainable Timber

Objective of requirements

Wood to be used in the building and in products to be delivered, where this wood remains in the work, must be wood that is demonstrably sustainably produced.

Explanation of Sustainable Purchasing threshold

Raw wood to be supplied, or wood incorporated into wood products or other products to be supplied, must meet the Dutch Procurement Criteria for Timber set out in the TPAS (Timber Procurement Assessment System). The wood must be in compliance with at least 7 of the 9 principles for sustainable forest management.

Documentation

Wood will be assumed to meet the criteria if it is certified in accordance with a system approved by the TPAC (Timber Procurement Assessment Committee).

The tenderer may also furnish other evidence, accompanied by extensive, documented and verifiable data and information demonstrating that the set minimum requirement is met.

A list of approved certification systems can be found on the website: <http://www.tpac.smk.nl/170/about/judgements.html>

Explanation

More information on the procurement of sustainably produced wood and paper can be found on: www.inkoopduurzaamhout.nl. An example of specifications defined for sustainably produced wood can be found on: www.inkoopduurzaamhout.nl/bestek.

General information on the prescription and verification of sustainably produced wood can be found on: www.houtdatabase.nl. The complete TPAS criteria can be found on the website:

<http://www.tpac.smk.nl/Public/TPAC%20documents/DutchProcurementCriteriaMAR2014.pdf>

Noise in work areas, workspaces

Objective of requirements

The goal of the requirement is to prevent and limit nuisance from noise, in order to promote a healthy and comfortable work environment.

Further explanation of classes

Class A: The office building is designed for a high level of acoustic comfort, with attention to speech intelligibility and conversational discretion at the relevant workspaces. Additionally, all furnished and unfinished office spaces are in compliance with the requirements for echo and all workspaces are in compliance with tables 34-38 of the Handbook of Building-Physical Quality of Office Space, and the noise nuisance from on-site systems is limited.

Class B: All workspaces are in compliance with tables 34-38 of the Handbook of Building-Physical Quality of Office Space.

Class C: All furnished and unfinished office spaces are in compliance with the requirements for echo in the Handbook of Building-Physical Quality of Office Space. At least 60% of the workspaces in all categories meet the acoustic quality requirements of tables 34-38 of the Handbook of Building-Physical Quality of Office Space, and these spaces are identified as such.

Explanation of calculation method

NEN5077, NVBV Handbook of Building-Physical Quality of Office Space

Explanation of Sustainable Purchasing threshold

The buildings decree does not set requirements on the noise comfort level of a space. For Sustainable Procurement, the class breakdown is based on the quality levels defined in the NVBV Handbook of Building-Physical Quality of Office Space. For further elaboration of the acoustic requirements in the building, see this Handbook. The minimum level for sustainable procurement is Class C. If desired, higher classes may be required or rated more highly in the tendering procedure.

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate that the agreed performance levels on the prevention and limitation of noise nuisance are attained. This must be demonstrated based on measurements of the result.

Indoor Air Quality, ventilation capacity

Objective of requirements

The goal of the requirement is to improve air quality in work areas, in order to promote a healthy and comfortable work environment.

Explanation of calculation method

Calculation method NEN1087

The required volume of air circulation per person must be calculated based on the number of persons in the integrated environmental permit application.

Explanation of Sustainable Purchasing threshold

Sustainable Procurement assumes a volume of 8.3 dm³/s per person. This figure is adopted from previous studies and quality levels maintained in other publications (including the Handbook of Building-Physical Quality of Office Space). Increasing the ventilation capacity further is not included in the criteria for Sustainable Procurement. Other aspects such as ventilation efficiency, draft-free air circulation, etc., play a more important role in further increasing the sustainability of this aspect. At present, these cannot be easily and objectively quantified. For the time being, the higher levels will be left undefined.

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate that the agreed performance on the ventilation capacity is obtained. This will be demonstrated by measurements coordinated for the maximum occupancy of the spaces.

Indoor Air Quality, airflow capacity

Objective of requirements

The goal of this requirement is to achieve an airflow capacity such that the users can temporarily influence the air quality in work areas to promote a healthy and comfortable work environment. Building users are given adequate options to influence the supply of fresh air, to allow them to efficiently clear out any incidental increased air contamination.

Explanation of calculation method

Calculation method: NEN1087. The availability of adequate airflow capacity for the square footage of a work area and/or occupied space of an office function must be demonstrated.

Explanation of Sustainable Purchasing threshold

Sustainable Procurement assumes 3 dm³/s per m² of work area or 6 dm³/s per m² of occupied space. The airflow ventilation features must be placed in each individual space/area. The requirements are set on the work areas or spaces of an office function. Meeting rooms, reception desk areas, gatehouses, etc., may be disregarded for the calculation. If there are no changes made to the airflow features, demonstration of compliance with these requirements is not required.

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate that the agreed performance on airflow capacity is obtained. The contractor must also demonstrate that the building is constructed in accordance with the substantive content of the calculation.

Thermal comfort

Objective of requirements

The goal of the requirement is to improve thermal comfort in work areas, in order to promote a healthy and comfortable work environment.

Explanation of calculation method

Handbook of Building-Physical Quality of Office Space, ISSO 74 and ISSO 32.

The ATG value is a predictor of the number of persons with issues relating to the thermal comfort.

Explanation of Sustainable Purchasing threshold

Sustainable Procurement assumes a minimum of 80% persons without issues (class B). Use the flowchart of ISSO 74 to determine the building/climate type for making this calculation. The class breakdown is based on the quality levels as defined in the Handbook of Building-Physical Quality of Office Space. The Handbook and ISSO 32 also provide premises for this calculation. For further elaboration of the thermal comfort requirements in the building, see these publications. The requirements are set on all workspaces intended for long-term (= more than two hours) use.

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate with calculations that the agreed performance level for thermal comfort is attained. The contractor must also demonstrate that the building is constructed in accordance with the substantive content of the calculation.

Natural lighting incidence

Objective of requirements

The goal of the requirement is to improve natural light incidence in work areas, in order to promote a healthy and comfortable work environment.

Explanation of calculation method

The daylight factor (DF) is calculated using natural light simulation programmes with a CIE-overcast sky. Daylight factor: relationship between the illumination strength at a point in the room as compared to the horizontal illumination strength in open space under an overcast sky. The calculations for this requirement are based on workspaces at a horizontal plane 800 mm above the floor.

$$DF = E_{\text{room}}/E_{\text{open field}} * 100\%$$

Assumptions to be used in the calculations:

light reflection factors maximum: walls = 0.5; ceiling = 0.7; floor = 0.1.

Explanation of Sustainable Purchasing threshold

For Sustainable Procurement, an additional requirement for a healthy and comfortable work environment is set above the natural light incidence requirement of the Buildings Decree. For all workspaces in an office function intended for long-term use (more than 2 hours), compliance with the set requirements for daylight factor must be demonstrated.

Sustainable Procurement assumes a minimum daylight factor of 1% on the workspaces (horizontal plane at height of 800 mm above the floor).

Documentation (this must be included in the contract)

Upon handover, the contractor must demonstrate that the agreed performance on natural light incidence is obtained. Calculations must be used to demonstrate that the daylight factor is adequate. The contractor must also demonstrate that the agreed natural light features are actually present.

Annex 2 - Assumptions

The following premises were assumed in the creation of this document:

- Sustainability is becoming an increasingly important principle in the quality policy pursued within the construction sector. Sustainability is a broad concept. Under the three Ps of sustainable development (People, Planet, Profit), new aspects are emerging alongside older and more familiar ones as elements of "sustainability" in office buildings and building systems. The goal is to reduce the environmental effects of material and energy use over the entire life cycle of a building or construction work, without compromising the quality of the indoor environment in the process. Reuse of buildings and materials is part of this.
- A performance-based approach, in which the sustainability effects across the entire lifetime are considered, and built on the prescriptions and calculation methods of the Buildings Decree 2012, is called for. The trend in construction is to work under integrated contracts and with functional and performance-based requirements at the building-level (solution-free). Working with performance requirements is preferable to working with a checklist or list of measures.
- This means commitments with the parties in the construction process on reductions and threshold values to be achieved.
- An important point of attention here is using consistent calculation methods for the various environmental themes, in order to allow clarity and verifiability for all parties. Wherever possible, this must be done using calculation methods already stipulated in other legislation. One calculation can be used for several purposes. This leads to a minimum of administrative burden and offers opportunities for benefits to the business sector and society. Parties and institutions can then build on these to create their own quality classes. A national classification system should emerge to foster a level playing field and clear communication, and prevent undue administrative burden.
- The performance-based focus at the level of building or construction offers design freedom and opportunities for innovation. This type of approach depends on the environmental effects of energy and material use being clearly and verifiably calculated, and that the aspects of health and comfort in the indoor environment can be tested. This way, sustainability values can be declared and expressed in joint contracts, Sustainable Purchasing, building certifications, etc. This performance-based approach is in keeping with the European policy agenda on the individual construction products and complete construction works (including activities within CEN/TC 350 "Sustainability of Construction works"). The performance-based approach is also being further pursued in consultations at the European level.

Based on the foregoing, performance criteria have been drafted for:

- energy conservation
- materials use
- health in buildings