

PROPOSED CHANGE: Outdoor Design Conditions and Air Cleaning

CHANGE NUMBER: 2018-BCBC-10-Outdoor Design Conditions

CODE REFERENCE: 2015 National Building Code - Division B - Articles 6.2.1.2. and 6.3.2.14.

DESCRIPTION OF THE PROPOSED AMENDMENT:

It is proposed to adopt formerly excluded Articles 6.2.1.2. and 6.3.2.14. from the 2015 National Building Code of Canada (NBC) regarding outdoor design conditions and air cleaning.

PROBLEM/BACKGROUND:

The British Columbia Building Code (BCBC) is based substantially on the model NBC. The NBC is updated about every five years and British Columbia adopts most of the NBC requirements into the next edition of the BCBC. The 2018 BCBC will be based on the 2015 NBC with some changes specific to British Columbia.

Similar requirements from the 2010 NBC were not adopted into the 2012 BCBC due to a perceived lack of clarity and potential enforcement challenges. As such, the BCBC does not contain any requirements for outdoor design conditions related to air quality and air cleaning. The NBC requirements have been further developed to minimize any clarity and enforcement issues.

The code language shown below is the proposed final code language that will appear in the 2018 BCBC. Comments submitted should focus on the changes noted. Changes from the 2012 BCBC to the 2015 NBC are not identified.

2018 PROPOSED BRITISH COLUMBIA CODE LANGUAGE (~~Deleted text~~ / Added text):

6.2.1.2. Outdoor Design Conditions

1) The outdoor conditions to be used in designing heating, ventilating and air-conditioning systems shall be determined in conformance with Subsection 1.1.3.

2) Except as provided in Sentence 6.3.2.14.(1), the outdoor air quality conditions of the geographic area of the *building* site to be used in designing ventilation systems shall conform to appropriate provincial or territorial requirements or, in the absence of such requirements, shall be equal to or less than the maximum acceptable levels stated in the Canada-wide Standards for Particulate Matter (PM) and Ozone as follows:

a) a 24 hour average of 30 µg/m³ for particulate matter that is 2.5 µm or less in diameter (PM_{2.5}), and

b) an 8 hour average of 65 ppb for ground-level ozone.
(See Note A-6.2.1.2.(2).)

3) The outdoor air quality conditions of the local area of the *building* site to be used in designing ventilation systems shall conform to appropriate provincial or territorial requirements or, in the absence of such requirements, to the requirements of Sentence 6.3.2.14.(2).
(See Note A-6.2.1.2.(3).)

6.3.2.14. Cleaning Devices

1) Where outdoor air quality conditions do not meet the requirements of Sentence 6.2.1.2.(2), ventilation required by Sentence 6.3.1.1.(1) shall be provided by a ventilation system designed to include devices that reduce particles and gases to the maximum acceptable levels described in Sentence 6.2.1.2.(2) prior to the introduction of outdoor air to indoor occupied spaces.

2) Where contaminants of concern are present in the outdoor air of the local area of the *building* site, ventilation required by Sentence 6.3.1.1.(1) shall be provided by a ventilation system designed to include devices that reduce the concentrations of contaminants to those permitted in the ACGIH's "Industrial Ventilation: A Manual of Recommended Practice for Design" prior to the introduction of outdoor air to indoor occupied spaces.

A-6.2.1.2.(2) Outdoor Design Conditions

In the past, the practice of ventilating buildings with outdoor air assumed that the outdoor air was of better quality than the indoor air. It has become evident that the outdoor air in some areas of Canada may not be of an acceptable quality for ventilating buildings unless certain particles and gases are first removed or reduced. For particulate matter, the maximum acceptable level is the 98th percentile of the average 24 hour values; for ozone, the maximum acceptable level is the average of the average 8 hour values. A recent estimate suggests that many Canadians are exposed to contaminated outdoor air via buildings' ventilation systems, which may lead to health problems such as cardiovascular and cerebral vascular diseases, respiratory irritation and illnesses, asthma, allergies, cancer, mucus membrane disorders and possibly death.

In order to manage the air quality of a building's indoor environment, thus reducing the potential for adverse effects on occupants' health, the quality of outdoor air for building ventilation purposes must be addressed. The air pollutants for which standards have been developed are particulate matter and ground-level ozone. Sentence 6.2.1.2.(2) sets limits on the maximum acceptable levels of these particles and gas that a building's ventilation system should introduce directly to the indoor environment. These limits form part of the Canada-wide Standards for Particulate Matter (PM) and Ozone, which were established pursuant to the 1998 Canada-wide Accord on Environmental Harmonization of the Canadian Council of Ministers of the Environment (CCME) and its Canada-wide Environmental Standards Sub-Agreement. Information on related regulations is available from Environment Canada and the provincial/territorial ministries of the environment. A database of particle measurements for certain Canadian locations is available from the National Air Pollution Surveillance Network (NAPS), which is run by Environment Canada in conjunction with the provinces and territories. (See Subsection 1.3.2. for contact information for CCME, Environment Canada and NAPS.)

A-6.2.1.2.(3) Outdoor Design Conditions

The outdoor air at the local area of the building site, including its immediate surroundings, should be assessed to identify the levels of contaminants that may be of concern if allowed to enter the building. Examples of contaminants of concern include the following:

- irritants from restaurant and dumpster emissions
- visible plumes from cooling towers and incinerators
- combustion exhaust from vehicles on loading docks and highways
- other visible sources of contaminants on site and from adjoining properties (e.g. manufacturing plants)

Factors that can influence the infiltration of contaminants, such as the building's geometry and prevailing winds and seasonal activity in the local area, should also be considered. Features can be incorporated in the design of the building to mitigate the effects of the identified contaminants of concern to the building occupants.

RATIONALE FOR CHANGE:

To limit the probability that, as a result of the design of the ventilation system, a person in the building will be exposed to an unacceptable risk of illness due to inadequate indoor air quality.

JUSTIFICATION/EXPLANATION:

The following is an excerpt from the 2008 NBC public review regarding these changes (some content has been removed that is no longer applicable in the 2015 NBC):

“Currently there are no requirements regarding what constitutes acceptable air for building ventilation purposes with respect to the concentration of particles and gases. The past practice of ventilating buildings assumed that the air being introduced to the indoor building environment was acceptable. It has become evident that, in some areas in Canada, the quality of the air being introduced may not be acceptable to ventilate buildings unless particles and gasses are first removed or reduced. It has recently been estimated that 30% of Canadians are exposed to poor air quality via the building ventilation system. Since using contaminated air to ventilate a building may create adverse health effects on the occupants, the Task Group on the Development of Explicit Ventilation Requirements - NBC Part 6 has developed proposed code changes to set maximum levels of particulate matter and ground-level ozone for building ventilation purposes. This will limit the probability that, as a result of the design of the ventilation system, a person in the building will be exposed to an unacceptable risk of illness due to inadequate indoor air quality (OH1.1).”