Wind and Snow Loads

The information in this documents supplements the documentation of our Roof and ST7 software applications.

Note: *The present document describes the Eurocode-specific application.*

Contents

Wind and snow loads

This dialog allows you to define impounding wind pressure or velocity pressure and regular or ground snow loads in accordance with the semi-probabilistic safety concept.

The following standards are currently implemented:

- EN 1991-1-1:2002, EN 1991-1-3:2003, EN 1991-1-4:2005/AC:2009
- EN 1991-1-1:2010-12, EN 1991-1-3:2010-12, EN 1991-1-4:2010-12

- DIN EN 1991-1-1/NA:2009-02, DIN EN 1991-1-3/NA:2007-04, DIN EN 1991-1-4/NA:2008-09
- DIN EN 1991-1-1/NA:2010-12, DIN EN 1991-1-3/NA:2010-12, DIN EN 1991-1-4/NA:2010-12

- ÖNORM B 1991-1-1:2006-01, ÖNORM B 1991-1-3:2006-04, ÖNORM B 1991-1-4:2009-04

- NA to BS EN 1991-1-1:2002, NA to BS EN 1991-1-3:2003, NA to BS EN 1991-1-4:2005

- NTC 3.1, NTC 3.3, NTC 3.4

as well as

- *DIN 1055-3:1971-07, DIN 1055-4-A1:1987-06, DIN 1055-5-A1:1994-04*
- *DIN 1055-3:2006-03, DIN 1055-4:2006-03, DIN 1055-5:2005-07*

In order to ease the increased workload involved in the determination of the basic loads in accordance with the Eurocode, additional input windows are implemented to support the user in this task.

As before, you can enter the basic loads manually, if suitable maps or tables are not available for this building.

Up-to-date tables about the assignment of communities to wind and snow zones are available on the internet site of the German Competence Center in Civil Engineering DIBT (https://www.dibt.de/, News section).

The governmental lists applicable in the respective country or federal state are always legally binding, not the lists issued by Institutes such as the DIBt.

In the case of doubt, you should always check the list applicable in the respective country or federal state.

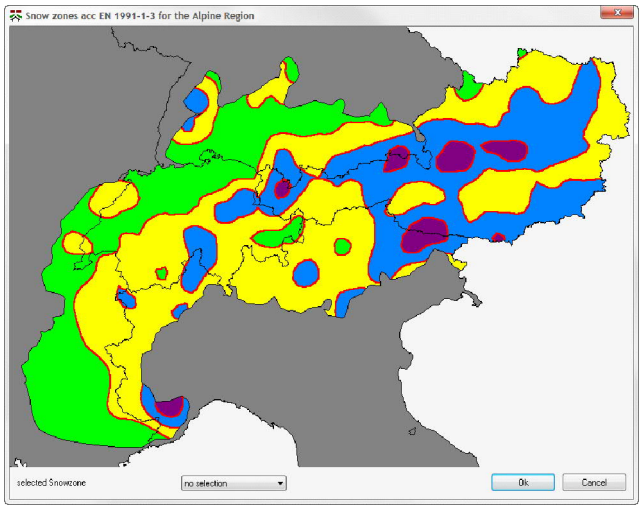
EN 1991-1

Snow loads as per EN 1991-1-3:2010-12

Alternatively to EN 1991-1-3:2010-1, you can still select the former DIN EN 1991-1-3:2004 to check older items.

The regular snow load is determined in dependence of the altitude in the respective snow zone.

Depending on the selected climatic region, different snow zone maps are available:



In the associated software applications, the roof snow load s_i can be calculated with the help of the regular snow load s_k as follows:

Roof snow load $s_i = \mu_i \cdot s_k$

Snow load on the eaves $S_e = k \cdot \frac{s_i^2}{\gamma}$

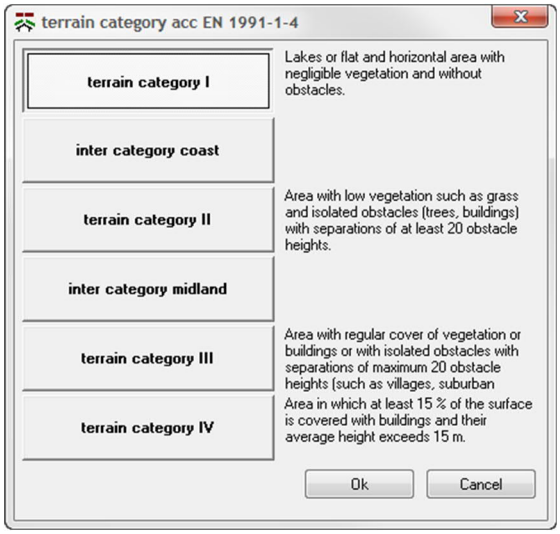
Values as per standard — if you uncheck this option, you can specify a user-defined value for the regular snow load s_k. Keep in mind that increased values may apply in some areas of zone 3.

Wind loads as per EN 1991-1-4:2010-12

Alternatively to EN 04/01/1991:2010-12, you can still select the former DIN EN 04/01/1991:2005 to check older projects.

The velocity pressure is calculated with consideration to the topographical border conditions.

In addition to the terrain categories, various coefficients such as the directional factor, the season coefficient or topographic influence due to exposed locations or shadow effects can optionally be taken into account.



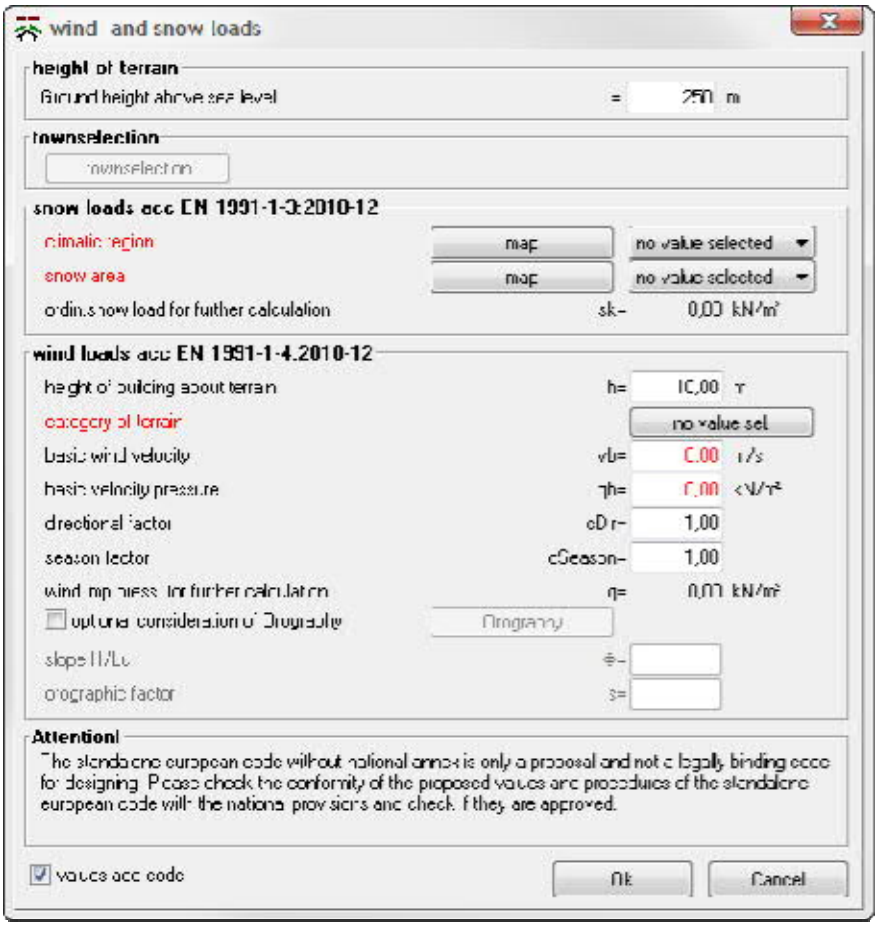
The velocity pressure q is determined for the maximum building height z in accordance with EN 1991-1-4, 4.

In the associated software applications, the wind load w_e can be calculated with the help of the velocity pressure q as follows:

Wind load $w_e = c_{pe} \cdot q$

with the aerodynamic coefficients c_{pe} as per EN 1991-1-4, 7.2

Values as per standard if you uncheck this option, you can specify a user-defined value for the velocity pressure, if you want to calculate a building in an exposed location for instance.



DIN EN 1991-1/NA

Snow loads as per DIN EN 1991-1-3/NA:2010-12

Alternatively to DIN EN 1991-1-3/NA:2010-12, you can still select the former DIN EN 1991-1-3/NA:2007-04 to check older projects.

DIN EN uses its own division of snow load zones together with its own formula for the calculation of the soil snow load sk.

You can also use the "Community selection" function to determine the snow zone:

In the associated software applications, the roof snow load s_i can be calculated with the help of the regular snow load s_k as follows:

Roof snow load	$s_i = \mu_i \cdot s_k$, Attention! DIN EN uses partly a different μ_i!
Snow load on the eaves	$S_e = k \cdot \frac{s_i^2}{\gamma}$ with k=0.4 or k=0 if snow guards are fitted
Values as per standard	if you uncheck this option, you can specify a user-defined value for the regular snow load s_k. Keep in mind that increased values may apply in some areas of zone 3.

Snow loads as per DIN EN 1991-1-4/NA:2010-12

Alternatively to DIN EN 1991-1-4/NA:2010-12, you can still select the former DIN EN 1991-1-4/NA:2008-09 to check older projects.

The velocity pressure is determined in accordance with DIN EN 1991-1-4/NA, 4.2 or Annex NA.A and depends on the topographic border conditions.

The directional factor and the season coefficient are included with a value of 1.0 as defined by DIN EN 1991-1-4/NA, 4.2.

The wind and snow zones are determined with the help of the selection of the community in accordance with the list issued by the German Competence Center in Civil Engineering DIBt.

The velocity pressure q is determined for the maximum building height z.

In the associated software applications, the wind load w_e can be calculated with the help of the velocity pressure q as follows:

Wind load	$w_e = c_{pe} \cdot q$ with the aerodynamic coefficients c_{pe} as per DIN EN 1991-1-4/NA, 7
Values as per standard	if you uncheck this option, you can specify a user-defined value for the velocity pressure, if you want to calculate a building in an exposed location for instance.

ÖNORM B 1991-1

Snow loads as per ÖNORM B 1991-1-3:2006-04

ÖNORM standards use their own division of snow load zones together with their own formula for the calculation of the soil snow load sk.

For particular communities listed in the Annex to ÖNORM, snow and wind loads can also be determined by selecting a community.

Selection from the ZAMG list

Alternatively, you can select the zones from a list issued by the central Austrian office for meteorology & geodynamics (ZMAG).

In the associated software applications, the roof snow load s_i can be calculated with the help of the regular snow load s_k as follows:

Roof snow load	$s_i = \mu_i \cdot s_k$, Attention! ÖNORM uses it own μ_i!
Snow load on the eaves	$S_e = 0{,}5 \cdot s_i$
Values as per standard	if you uncheck this option, you can specify a user-defined value for the regular snow load s_k. Keep in mind that increased values may apply in some areas of zone 3.

Wind loads as per ÖNORM B 1991-1-4:2009-04

The velocity pressure is determined in accordance with ÖNORM B 191-1-4, 4.2 and depends on the topographic border conditions.

The directional factor and the season coefficient are included with a value of 1.0 as defined by ÖNORM B 1991-1-4, 4.2.2.

The velocity pressure q is determined for the maximum building height z in accordance with ÖNORM B 1991-1-4, 4.2.

In the associated software applications, the wind load w_e can be calculated with the help of the velocity pressure q as follows:

Wind load	$w_e = c_{pe} \cdot q$ with the aerodynamic coefficients c_{pe} as per ÖNORM B 1991-1-4, 4.6.
Values as per standard	if you uncheck this option, you can specify a user-defined value for the velocity pressure, if you want to calculate a building in an exposed location for instance.

NA to BS EN 1991-1

Snow loads as per NA to BS EN 1991-1-3:2003

NA to BS EN 1991-1-3 uses its own division of snow load zones (Figure NA.1) together with its own formula for the calculation of the soil snow load sk.

In the associated software applications, the roof snow load s_i can be calculated with the help of the regular snow load s_k as follows:

Roof snow load $s_i = \mu_i \cdot s_k$, Attention! NA to BS EN uses its own μ_i!

Snow load on the eaves $S_e = \frac{s_i^2}{\gamma}$

Values as per standard if you uncheck this option, you can specify a user-defined value for the regular snow load s_k. Keep in mind that increased values may apply in some areas of zone 3.

Wind loads as per NA to BS EN 1991-1-4:2005

The velocity pressure is determined in accordance with NA to BS EN 1991-1-4, NA 2.17 and depends on the topographic border conditions.

The United Kingdom uses its own wind zones and the coefficients depend on the distance to the sea shore or the border of the town or village.

The velocity pressure q is determined for the maximum building height z in accordance with NA to BS EN 1991-1-4, NA.2.17.

In the associated software applications, the wind load w_e can be calculated with the help of the velocity pressure q as follows:

Wind load $w_e = c_{pe} \cdot q$

with the aerodynamic coefficients c_{pe} as per NA to BS EN 1991-1-4, NA.2.29.

Values as per standard if you uncheck this option, you can specify a user-defined value for the velocity pressure, if you want to calculate a building in an exposed location for instance.