$q_p(z) = c_e(z) * q_b$ per EN 1991-1-4 Section 4.5 (1) Expression (4.8)

The National Annex may give other rules for the determination of $q_{p(z)}$.

Air density   per EN 1991-1-4 Section 4.5 Note 2 - Reccomended value is 1.25

$\rho =$ 1.25 kg/m^3 Other values may be specified by the National Annex

Fundamental value of the basic wind velocity

$v_{b,0} =$ 30   m/sec   Value specified in the National Annex

Basic wind velocity calculation

$c_{dir} =$ 1   directional factor   per EN 1991-1-4 Section 4.2 Note 2 - Reccomended value is 1.0

Other values may be specified by the National Annex

$c_{season} =$ 1   season factor   per EN 1991-1-4 Section 4.2 Note 3 - Reccomended value is 1.0

Other values may be specified by the National Annex

$v_b = c_{dir} * c_{season} * v_{b,0} =$ **30**   **m/sec**   per EN 1991-1-4 Section 4.2 (1)P Expression (4.1)

Basic velocity pressure

$q_b = 1/2 * \rho * v_b^2 =$ **562.5** N/m^2 per EN 1991-1-4 - Section 4.5 (1) Expression (4.10)

Terrain category: III   per EN 1991-1-4 - Table 4.1

=> $z_0 =$ 0.3   m ;   roughness lengths

$z_{min} =$ 5   m

Terrain roughness: per EN 1991-1-4 Section 4.3.2

$c_r(z) = k_r * \ln(z/z_0)$ for $z_{min} < z < z_{max}$ per EN 1991-1-4 Section 4.3.2 (1) Expression (4.4)

$c_r(z) = c_r(z_{min})$ for $z < z_{min}$

$z_{0,II} =$ 0.05   m   per EN 1991-1-4 Section 4.3.2 Expression (4.5) - roughness length for terrain cat. II

$z_{max} =$ 200   m   per EN 1991-1-4 Section 4.3.2 Expression (4.5) - max. roughness length to be taken as 200m

$k_r = 0.19*(z_0/z_{0,II})^{0.07} =$ **0.2154**   per EN 1991-1-4 Section 4.3.2 Expression (4.5) terrain factor depending on z_0

Terrain orography: per EN 1991-1-4 Section 4.3.1 Note 1

$c_o(z) =$ 1   for flat terrain $c_o(z) = 1.0$ for other types of terrain see section 4.3.3 & Annex A.3

Wind turbulence   per EN 1991-1-4 Section 4.4 (1)

$k_I =$ 1   - turbulence factor;   recommended value is 1.0, other values may be specified by the National Annex

$I_v(z) = k_I /(c_0(z)*\ln(z/z_0))$ for $z_{min} < z < z_{max}$ per EN 1991-1-4 Section 4.4 (1) Expression (4.7)

$I_v(z) = I_v(z_{min})$ for $z < z_{min}$

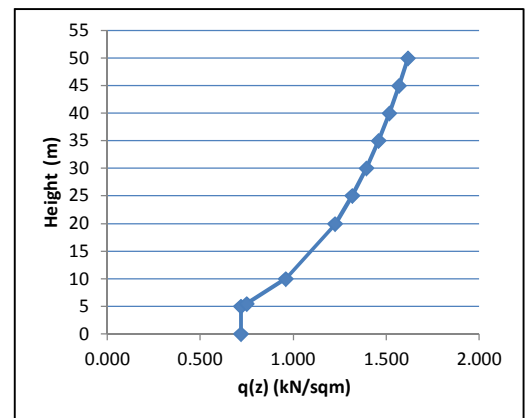**Mean wind velocity**

$v_m(z) = c_r(z)*c_0(z)*v_b$ per EN 1991-1-4 Section 4.4 (1) Expression (4.7)

Peak velocity pressure   per EN 1991-1-4 Section 4.4 (1) Expression (4.7)

$q_p(z) = c_e(z)*q_b$ where $c_e(z) = [1+7*I_v(z)]*c_r(z)*c_o(z)$

z (m)	$I_v(z)$	$c_o(z)$	$c_r(z)$	$c_e(z)$	$q_p(z)$ (kN/sqm)
0	-	-	-	-	0.720
5 - Zmin	0.355	1	0.606	1.281	0.720
5.5	0.344	1	0.627	1.337	0.752
10	0.285	1	0.755	1.709	0.961
20	0.238	1	0.905	2.182	1.227
25	0.226	1	0.953	2.344	1.318
30	0.217	1	0.992	2.479	1.395
35	0.210	1	1.025	2.596	1.460
40	0.204	1	1.054	2.700	1.519
45	0.200	1	1.079	2.792	1.570
50	0.195	1	1.102	2.876	1.618

References:

EN 1991-1-4:2005 - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions