

# 1. Basic data

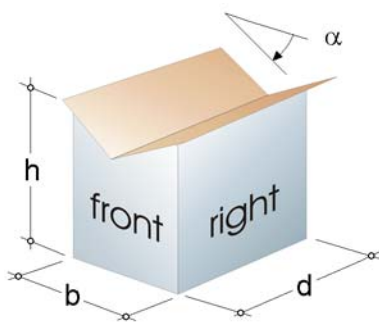
BUILDING PROJECT:	<b>Tankstelle in Hamburg EC</b>		
STANDARD:	Eurocode: wind:	DIN EN 1991-1-4:2010-12 in conjunction with National Annex "Deutschland" here: DIN EN 1991-1-4:2010-12/NA (protected) subsequently named EC1-1-4	
	snow:	DIN EN 1991-1-3:2010-12 in conjunction with National Annex "Deutschland" here: DIN EN 1991-1-3:2010-12/NA (protected) subsequently named EC1-1-3	
LOCATION:	Hamburg, Freie and Hansestadt		
AMTL. GEMEINDESCHLÜSSEL:	02000000		
TYPE:	Kreisfreie Stadt		
DISTRICT:	no information		
FEDERAL STATE:	Hamburg		
ALT. ABOVE SEA LEVEL:	6 m		
WIND ZONE:	2	⇒	$v_{b,0} = 28.00 \text{ m/s}$
SNOW LOAD ZONE:	2	⇒	$s_k = 0.85 \text{ kN/m}^2$

## important notes

The specified location is part of the North German low-land. If these locations are part of snow load zones 1 or 2, additional to the design calculation of the permanent and transient design situation a design calculation has to be executed for an accidental design situation with the 2.3-times characteristic snow loads.

# 2. Wind actions

## 2.1 Input data



**building model:**  
 type: duopitch roof (angle negative)  
 $h = 7.00 \text{ m}$   
 $b = 20.00 \text{ m}$   
 $d = 30.00 \text{ m}$   
 $\alpha = 30.00^\circ$

**loc.:** inland  
**orography:** general rule

protr. roofs	front	right	back	left
in m	0.00	0.00	0.00	0.00

## 2.2 Height-dependent peak velocity pressure

### peak velocity pressures

$z$  = height above ground,  $v_{mf}(z)$  and  $I_{vf}(z)$  acc. to EC1-1-4/NA Tab NA.B.2 resp. NA.B.4,  $v_m(z)$  acc. to (NA.B.9),  $I_v(z)$  acc. to (NA.B.10) peak velocity pressures  $q_p(z)$  acc. to (NA.B.11) mit  $\rho = 1.25 \text{ kg/m}^3$ , orography factor:  $c_o(z) = 1.0$  (general rule)

$z$ m	$v_{mf}(z)$ m/s	$I_{vf}(z)$ -	$v_m(z)$ m/s	$I_v(z)$ -	$q_p(z)$ kN/m <sup>2</sup>
7.00	22.12	0.240	22.12	0.240	0.75

## 2.3 Wind from front side

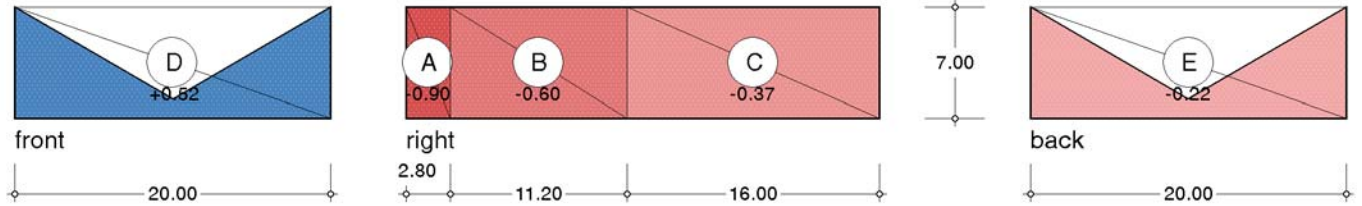
characteristic values:  $e = \min(b, 2h) = 14.00 \text{ m}$  type:  $e < d$   $h/d = 0.23$

### 2.3.1 Loading of vertical walls (wind from front side)

external pressure coefficients and load ordinates acc. to EC1-1-4 / Tab. 7.1

ordinate =  $c_{pe,10} * q(h)$ , (+) = pressure

area	A	B	C	D	E	note
$c_{pe,10}$	-1.20	-0.80	-0.50	+0.70	-0.30	interpolated
ordinates	-0.90	-0.60	-0.37	+0.52	-0.22	kN/m <sup>2</sup>



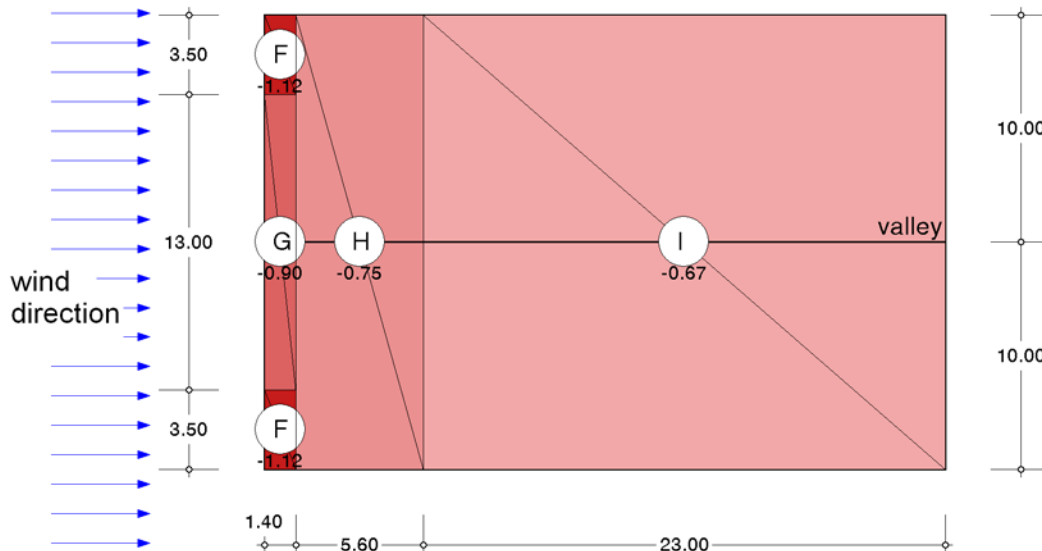
the values described here in level of the roof edge are also effective for the lower surface of the roof area in the region of protruding roofs

### 2.3.2 Loading of roof area (wind from front side)

external pressure coefficients and load ordinates for dupitch roofs acc. to EC1-1-4 / Tab. 7.4b ( $\theta=90^\circ$ )

ordinate =  $c_{pe,10} * q(h)$ , (+) = pressure

area	F	G	H	I	J	note
$c_{pe,10}$	-1.50	-1.20	-1.00	-0.90	-	interpolated
ordinates	-1.12	-0.90	-0.75	-0.67	-	kN/m <sup>2</sup>



## 2.4 Wind from righthand

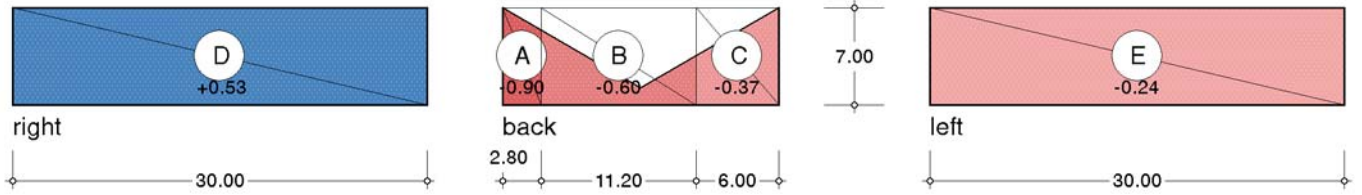
characteristic values:  $e = \min(d, 2h) = 14.00 \text{ m}$  type:  $e < b$   $h/b = 0.35$

### 2.4.1 Loading of vertical walls (wind from righthand)

external pressure coefficients and load ordinates acc. to EC1-1-4 / Tab. 7.1

ordinate =  $c_{pe,10} * q$ , (+) = pressure

area	A	B	C	D	E	note
$c_{pe,10}$	-1.20	-0.80	-0.50	+0.71	-0.33	interpolated
ordinates	-0.90	-0.60	-0.37	+0.53	-0.24	kN/m <sup>2</sup>

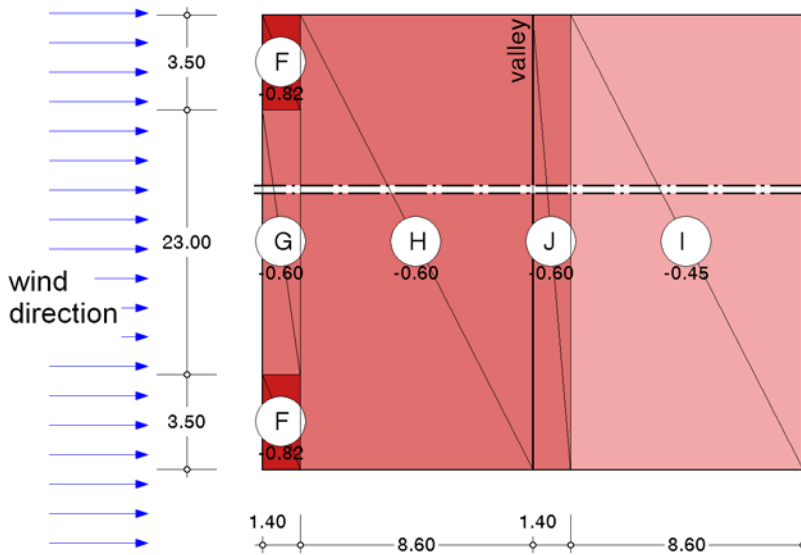


the values described here in level of the roof edge are also effective for the lower surface of the roof area in the region of protruding roofs

## 2.4.2 Loading of roof area (wind from righthand)

external pressure coefficients and load ordinates for duopitch roofs acc. to EC1-1-4 / Tab. 7.4a ( $\ominus=0^\circ$ )  
 ordinate =  $c_{pe,10} * q(h)$ , (+) = pressure

area	F	G	H	I	J	note
$c_{pe,10}$	-1.10	-0.80	-0.80	-0.60	-0.80	interpolated
ordinates	-0.82	-0.60	-0.60	-0.45	-0.60	kN/m <sup>2</sup>



## 3. Snow loads

### 3.1 Basic loading

$$\alpha = 7.00^\circ$$

$$h = 1.50 \text{ m}$$

$$\mu_1 = 0.80$$

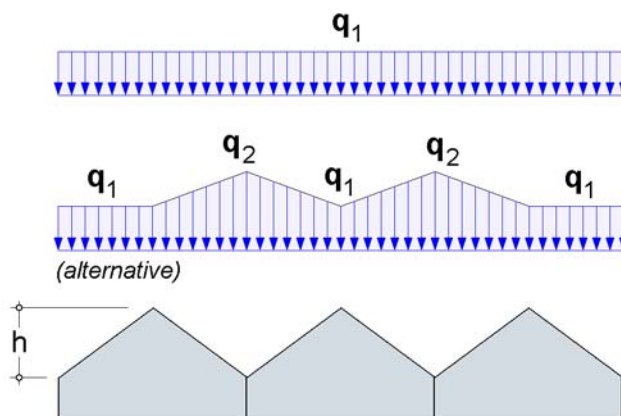
$$\mu_2 = 0.99$$

$$q_1 = 0.68 \text{ kN/m}^2$$

$$q_2 = 0.84 \text{ kN/m}^2$$

particular condition:  
 $\mu_2 \leq \gamma h / s_k + \mu_1$   
 with  $\gamma = 2 \text{ kN/m}^3$

symmetrical duopitch roof (in a row)



$\mu$ -coefficients acc. to EC 1-1-3 / Tab. 5.2