

003513-220015-7



Esforços e armaduras de pilares, paredes, cortinas e muros

Ampliação - Imunizadora

Data: 22/09/22



1.- ESFORÇOS EM PILARES, PILARES-PAREDES E MUROS POR HIPÓTESE

• Tramo: Nível inicial / nível final do tramo entre pisos.

• Nota:

Esforços em relação aos eixos locais do pilar.

ENG. ELENORA ESPINHO LIMA
M.F. 153648-1 - CREA 137873
- Porto Alegre - URS

Pilar	Piso	Dimensão (cm)	Tramo (m)	Hipótese	Base						Ext. Sup.					
					N (kN)	Mx (kN-m)	My (kN-m)	Qx (kN)	Qy (kN)	T (kN-m)	N (kN)	Mx (kN-m)	My (kN-m)	Qx (kN)	Qy (kN)	T (kN-m)
P1	Piso 5	25x25	5.00/7.15	Peso próprio	0.3	1.0	-2.2	0.3	-2.1	-0.0	-1.3	0.3	0.5	0.5	-2.1	-0.0
				Cargas permanentes	0.4	1.4	-2.1	0.3	-1.5	-0.0	0.4	0.2	0.2	0.2	0.8	-1.5
				Sobrecarga	0.0	0.0	-0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0
				Vento +X	-0.0	-3.4	0.0	-1.8	0.0	-0.0	-0.0	-0.7	-0.0	-1.8	0.0	0.0
				Vento -X	0.0	2.4	-0.0	1.8	-0.0	-0.0	0.0	0.7	0.0	1.8	-0.0	-0.0
				Vento +Y	0.4	0.0	-1.0	0.0	-1.1	-0.0	0.4	0.0	0.6	0.0	-1.1	-0.0
				Vento -Y	-0.4	-0.0	1.0	-0.0	1.1	-0.0	-0.4	-0.0	-0.6	-0.0	1.1	0.0
	Piso 4	25x25	3.25/5.50	Peso próprio	20.3	0.7	-1.7	0.6	-1.5	-0.0	15.0	-0.7	1.7	0.6	-1.5	-0.0
				Cargas permanentes	26.1	0.8	-2.8	0.8	-3.1	-0.0	25.1	-0.5	3.3	0.8	-3.1	-0.0
				Sobrecarga	0.2	0.0	-0.1	0.0	-0.0	-0.0	3.2	-0.0	0.0	0.0	-0.0	-0.0
				Vento +X	-4.1	-2.5	0.0	-2.2	0.0	-0.0	-4.1	2.4	-0.0	-2.2	0.0	-0.0
				Vento -X	4.1	2.5	0.0	2.2	-0.0	-0.0	4.1	-2.4	0.0	2.2	-0.0	0.0
				Vento +Y	2.2	-0.0	-2.2	-0.0	-2.0	-0.0	2.2	0.0	2.4	-0.0	-2.0	-0.0
				Vento -Y	-2.2	0.0	2.2	0.0	2.0	-0.0	-2.2	-0.0	-2.4	0.0	2.0	0.0
	Piso 3	25x25	0.50/2.75	Peso próprio	34.8	0.6	-1.3	0.5	-1.3	-0.0	31.3	-0.7	1.6	0.5	-1.3	-0.0
				Cargas permanentes	57.7	0.8	-3.5	0.5	-3.4	-0.0	52.7	-0.5	4.1	0.5	-3.4	-0.0
				Sobrecarga	0.6	0.0	-0.1	0.0	-0.1	-0.0	3.6	-0.0	0.1	0.0	-0.1	-0.0
				Vento +X	-9.5	-3.2	0.2	-2.8	0.1	-0.0	-9.5	3.1	-0.1	-2.8	0.1	0.0
				Vento -X	9.5	3.2	-0.2	2.8	-0.1	-0.0	9.5	-3.1	0.1	2.8	-0.1	0.0
				Vento +Y	4.5	-0.2	-3.1	-0.2	-2.6	-0.0	4.5	0.2	2.6	-0.2	-2.6	-0.0
				Vento -Y	-4.5	0.2	3.1	0.2	2.6	-0.0	-4.5	-0.2	-2.6	0.2	2.6	-0.0
	Piso 2	25x25	-0.63/-0.00	Peso próprio	46.5	-0.0	0.3	0.7	-3.0	-0.0	45.0	-0.5	2.2	0.7	-3.0	-0.0
				Cargas permanentes	90.3	0.0	0.7	1.4	-6.3	-0.0	90.3	-0.5	4.7	1.4	-6.3	-0.0
				Sobrecarga	1.0	0.0	0.0	0.0	-0.1	-0.0	1.0	-0.0	0.1	0.0	-0.1	-0.0
				Vento +X	-14.9	-0.4	0.0	-3.2	-0.1	-0.0	-14.9	1.0	0.1	-3.2	-0.1	0.0
				Vento -X	14.9	0.4	-0.0	3.2	0.1	-0.0	14.9	-1.0	-0.1	3.2	0.1	-0.0
				Vento +Y	5.7	-0.0	-0.5	-0.5	-1.7	-0.0	5.7	0.0	-0.5	-0.5	-1.7	-0.0
				Vento -Y	-5.7	0.0	0.5	0.5	1.7	-0.0	-5.7	-0.0	0.5	0.5	1.7	-0.0
	Piso 1	25x25	-1.20/-0.63	Peso próprio	47.6	0.4	-1.4	0.7	-3.0	-0.0	45.9	-0.0	0.3	0.7	-3.0	-0.0
				Cargas permanentes	90.3	0.8	-2.5	-1.4	-6.3	-0.0	90.3	0.0	0.7	1.4	-6.3	-0.0
				Sobrecarga	1.0	0.0	-0.1	0.0	-0.1	-0.0	1.0	0.0	0.0	0.0	-0.1	-0.0
				Vento +X	-14.9	-2.2	-0.1	-2.2	-0.1	-0.0	-14.9	-2.1	0.0	-2.2	-0.1	0.0
				Vento -X	14.9	2.2	0.1	2.2	0.1	-0.0	14.9	2.1	-0.0	2.2	0.1	-0.0
				Vento +Y	5.7	-0.4	-1.5	-0.5	-1.7	-0.0	5.7	-0.0	-0.5	-0.5	-1.7	-0.0
				Vento -Y	-5.7	0.4	1.5	0.5	1.7	-0.0	-5.7	0.0	0.5	0.5	1.7	-0.0
P2	Piso 4	25x25	3.25/5.50	Peso próprio	39.9	1.4	-4.0	0.9	-2.8	-0.0	35.4	-0.7	2.2	0.9	-2.8	-0.0
				Cargas permanentes	11.6	1.1	-0.4	0.5	-0.5	-0.0	1.8	-0.2	0.2	0.5	-0.5	-0.0
				Sobrecarga	0.7	0.1	-0.2	0.3	-0.1	-0.0	0.7	-0.0	0.1	0.0	-0.1	-0.0
				Vento +X	3.4	-2.6	0.0	-1.8	0.0	-0.0	3.4	1.3	-0.0	-1.8	0.0	-0.0
				Vento -X	-3.4	2.6	-0.0	1.8	-0.0	-0.0	-3.4	-1.3	0.0	1.8	-0.0	0.0
				Vento +Y	3.6	0.0	-1.7	0.3	-1.2	-0.0	3.6	-0.0	1.0	0.0	-1.2	-0.0
				Vento -Y	-3.6	-0.0	1.7	-0.3	1.2	-0.0	-3.6	0.0	-1.0	-0.0	1.2	-0.0
	Piso 3	25x25	0.50/2.75	Peso próprio	79.8	1.5	-3.5	1.4	-3.7	-0.0	76.3	-1.5	4.5	1.4	-3.7	-0.0
				Cargas permanentes	59.2	2.1	-0.1	1.9	-0.1	-0.0	59.2	-2.2	0.2	1.9	-0.1	-0.0
				Sobrecarga	2.5	0.1	0.2	0.1	-0.2	-0.0	2.5	-0.1	0.3	0.1	-0.2	-0.0
				Vento +X	5.3	-4.0	0.0	-3.6	0.3	-0.0	6.3	4.0	-0.0	-3.6	0.0	-0.0
				Vento -X	-5.3	4.0	-0.0	3.6	-0.3	-0.0	-6.3	-4.0	0.0	3.6	-0.0	0.0
				Vento +Y	3.3	-0.3	-3.2	-0.2	-2.8	-0.0	3.3	0.3	3.0	-0.2	-2.8	-0.0
				Vento -Y	-3.3	0.3	3.2	0.2	2.8	-0.0	-3.3	-0.3	-3.0	0.2	2.8	-0.0
	Piso 2	25x25	-0.63/-0.00	Peso próprio	115.3	-0.2	0.7	2.4	-6.8	-0.0	115.4	-1.7	5.3	2.4	-6.8	-0.0
				Cargas permanentes	104.1	-0.2	0.1	3.9	-0.4	-0.0	104.1	-2.5	0.4	3.9	-0.4	-0.0
				Sobrecarga	4.3	-0.0	0.0	0.1	-0.4	-0.0	4.3	-0.1	0.3	0.1	-0.4	-0.0
				Vento +X	9.5	-3.3	0.0	-4.4	0.0	-0.0	9.5	2.5	0.3	-4.4	0.0	-0.0
				Vento -X	-9.5	3.3	-0.0	4.4	0.0	-0.0	-9.5	-2.5	-0.3	4.4	0.0	-0.0
				Vento +Y	5.6	-0.0	-0.4	-0.6	-1.8	-0.0	5.6	0.4	0.7	-0.6	-1.8	-0.0
				Vento -Y	-5.6	0.0	0.4	0.6	1.8	-0.0	-5.6	-0.4	-0.7	0.6	1.8	-0.0
	Piso 1	25x25	-1.20/-0.63	Peso próprio	117.2	1.2	-3.2	2.4	-6.8	-0.0	116.3	-0.2	0.7	2.4	-6.8	-0.0
				Cargas permanentes	124.1	2.0	-2.1	3.0	-0.1	-0.0	124.1	-0.1	0.1	3.0	-0.1	-0.0
				Sobrecarga	4.3	0.1	-0.2	0.1	-0.4	-0.0	4.3	-0.0	0.3	0.1	-0.4	-0.0
				Vento +X	9.5	-2.3	-0.0	-4.4	-0.0	-0.0	9.5	-0.3	0.0	-4.4	-0.0	-0.0
				Vento -X	-9.5	2.3	0.0	4.4	0.0	-0.0	-9.5	0.3	-0.0	4.4	0.0	-0.0
				Vento +Y	5.5	-0.4	-1.5	-0.6	-1.8	-0.0	5.6	-0.0	-0.6	-0.6	-1.8	-0.0
				Vento -Y	-5.5	0.4	1.5	0.6	1.8	-0.0	-5.6	0.0	0.6	0.6	1.8	-0.0
P3	Piso 4	25x25	3.25/5.50	Peso próprio	22.4	-2.3	-2.5	-1.4	-1.8	-0.0	16.9	1.2	1.5	-1.4	-1.8	-0.0
				Cargas permanentes	2.0	-1.8	-2.8	-0.9	-1.5	-0.0	2.0	0.2	0.6	-0.9	-1.5	-0.0
				Sobrecarga	0.4	-0.1	-0.1	-0.1	-0.1	-0.0	0.4	0.0	0.0	-0.1	-0.1	-0.0
				Vento +X	0.5	-1.3	-0.3	-1.2	-0.0	-0.0	0.6	1.0	0.0	-1.2	-0.0	-0.0
				Vento -X	-0.5	1.3	0.3	1.2	0.0	-0.0	-0.6	-1.0	-0.0	1.2	0.0	0.0
				Vento +Y	0.5	0.1	-1.5	0.0	-1.2	-0.0	0.6	-0.0	0.9	0.0	-1.2	-0.0
				Vento -Y	-0.5	-0.1	1.5	-0.0	1.2	-0.0	-0.6	0.0	-0.9	0.0	1.2	-0.0



Esforços e armaduras de pilares, paredes, cortinas e muros

Ampliação - Inimuzadura

Data: 22/09/15



Eng.º ELIANA EUGÊNIO LIMA
R. Func. 380/106-1 - CREAR 380/106-1
- Porto Alegre - RS

Pilar	Planta	Dimensão (cm)	Tamanho (m)	Hipótese	Base						Ext. Sup.					
					N (kN)	M _x (kN-m)	M _y (kN-m)	Q _x (kN)	Q _y (kN)	T (kN-m)	N (kN)	M _x (kN-m)	M _y (kN-m)	Q _x (kN)	Q _y (kN)	T (kN-m)
P4	Piso 3	25x25	0.50/2.75	Peso próprio	46.4	-1.9	-2.3	-1.8	-2.2	-0.0	43.0	2.2	2.6	-1.8	-2.2	-0.0
				Cargas permanentes	47.5	-3.4	-4.2	-3.2	-4.0	-0.0	47.9	3.9	4.6	-3.2	-4.0	-0.0
				Sobrecarga	1.3	-0.1	-0.1	-0.1	-0.1	-0.0	1.3	0.1	0.1	-0.1	-0.1	-0.0
				Vento +X	3.1	-2.9	-0.2	-2.5	-0.2	-0.0	3.1	2.7	0.2	-2.5	-0.2	-0.0
				Vento -X	-3.1	2.9	0.2	2.5	0.2	0.0	-3.1	-2.7	-0.2	2.5	0.2	0.0
				Vento +Y	2.9	-0.1	-3.0	-0.1	-2.5	0.0	2.9	0.1	2.6	-0.1	-2.5	0.0
				Vento -Y	-2.9	0.1	3.0	0.1	2.5	-0.0	-2.9	-0.1	-2.6	0.1	2.5	-0.0
	Piso 2	25x25	-0.63/-0.30	Peso próprio	63.0	0.4	0.5	-3.4	-3.9	3.0	67.1	2.3	2.8	-3.4	-3.9	0.0
				Cargas permanentes	55.6	0.7	0.8	-5.7	-7.1	-3.0	55.6	4.3	5.2	-5.7	-7.1	-0.0
				Sobrecarga	2.2	0.0	0.0	-0.2	-0.2	3.0	2.2	0.1	0.1	-0.2	-0.2	0.0
				Vento +X	5.3	-0.5	-0.0	-2.3	0.1	3.0	5.3	-1.0	-0.1	-2.3	0.1	0.0
				Vento -X	-5.3	0.5	0.0	2.3	-0.1	-3.0	-5.3	1.0	0.1	2.3	-0.1	-0.0
				Vento +Y	4.9	-0.1	-0.4	-0.3	-5.4	3.0	4.9	0.2	0.5	-0.3	-1.4	0.0
P5	Piso 1	25x25	-1.20/-0.63	Peso próprio	68.9	-1.6	-1.7	-3.4	-3.8	3.0	58.3	0.4	0.5	-3.4	-3.8	0.0
				Cargas permanentes	55.6	-2.6	-3.4	-5.7	-7.1	-3.0	35.5	0.7	0.8	-5.7	-7.1	-0.0
				Sobrecarga	2.2	-0.1	-0.1	-0.2	-0.2	3.0	2.2	0.0	0.0	-0.2	-0.2	0.0
				Vento +X	5.3	-1.6	0.1	-2.3	0.1	3.0	5.3	-0.5	-0.1	-2.3	0.1	0.0
				Vento -X	-5.3	1.6	0.1	2.3	-0.1	-3.0	-5.3	0.5	0.1	2.3	-0.1	-0.0
				Vento +Y	4.9	-0.3	-1.2	-0.3	-1.4	3.0	4.9	-0.1	-0.4	-0.3	-1.4	0.0
	Piso 5	25x25	6.00/7.45	Peso próprio	8.9	-0.3	1.5	-0.1	1.5	-0.0	8.7	-0.1	-0.7	-0.1	1.5	-0.0
				Cargas permanentes	-2.1	-0.7	1.5	-0.4	1.3	-0.0	-2.1	-0.1	-0.4	-0.4	1.3	-0.0
				Sobrecarga	-0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	-0.0	0.0	0.0	-0.0
				Vento +X	0.0	-3.1	0.0	-1.7	0.0	0.0	0.0	-0.7	-0.0	-1.7	0.0	0.0
				Vento -X	-0.0	3.1	-0.0	1.7	-0.0	-0.0	-0.0	0.7	0.0	1.7	-0.0	-0.0
				Vento +Y	0.5	-3.0	-1.9	-0.0	-1.9	-0.0	0.5	-0.3	0.9	-3.0	-1.9	-0.0
P6	Piso 4	25x25	5.25/5.53	Peso próprio	28.7	0.5	1.9	0.5	1.7	-0.0	25.2	-0.5	-2.9	0.5	1.7	-0.0
				Cargas permanentes	30.3	-3.7	3.1	-0.6	2.6	-0.0	30.0	0.7	-2.7	-3.6	2.6	-3.0
				Sobrecarga	0.2	0.0	0.1	0.0	0.1	-0.0	0.2	-0.0	-0.1	0.0	0.1	-0.0
				Vento +X	-4.2	-2.5	3.1	-2.2	0.1	-0.0	-4.2	2.4	-0.1	-2.2	0.1	-0.0
				Vento -X	4.2	2.5	-3.1	2.2	-0.1	0.0	4.2	-2.4	0.1	2.2	-0.1	0.0
				Vento +Y	1.9	-0.0	-3.5	-0.0	-3.5	-0.0	1.9	0.0	3.5	-0.0	-3.5	-0.0
	Piso 3	25x25	0.53/2.75	Peso próprio	51.4	0.6	1.4	0.6	1.3	-0.0	47.9	-0.6	-1.5	0.6	1.3	-0.0
				Cargas permanentes	58.3	-0.2	2.3	-0.2	2.4	-0.0	66.3	0.3	-3.1	-0.2	2.4	-0.0
				Sobrecarga	0.8	0.0	0.1	0.0	0.1	-0.0	0.8	-0.0	-0.1	0.0	0.1	-0.0
				Vento +X	-12.6	-3.7	0.3	-3.2	0.2	-0.0	-12.6	3.4	-0.3	-3.2	0.2	-0.0
				Vento -X	12.6	3.7	-0.3	3.2	-0.2	0.0	12.6	-3.4	0.3	3.2	-0.2	0.0
				Vento +Y	4.2	-0.3	-4.4	-0.0	-4.9	0.0	4.2	0.0	4.3	-0.3	-4.9	0.0
P7	Piso 2	25x25	-0.15/-0.30	Peso próprio	77.9	-1.6	-0.9	-1.7	-0.1	-0.0	77.6	-1.5	-0.9	-1.2	-0.1	-0.0
				Cargas permanentes	104.5	-0.5	-1.1	-3.8	21.7	0.0	104.5	-0.3	-2.2	-3.9	21.7	0.0
				Sobrecarga	1.5	-0.1	-0.1	-0.1	0.6	-0.0	1.5	-0.1	-0.1	-0.1	0.0	-0.0
				Vento +X	-21.3	2.3	0.0	-1.1	0.7	-0.0	-21.2	2.4	0.0	-1.1	0.7	-0.0
				Vento -X	21.3	-2.3	0.0	1.1	-0.7	0.0	21.3	-2.4	-0.0	1.1	-0.7	0.0
				Vento +Y	7.7	0.1	2.4	-0.5	-3.6	0.0	7.7	0.1	2.6	-0.3	-3.6	0.0
	Piso 1	25x25	-1.20/-0.15	Peso próprio	79.5	1.4	0.7	2.9	1.0	-0.0	73.9	-1.0	-0.6	2.9	1.6	-0.0
				Cargas permanentes	104.5	0.5	1.1	1.6	2.1	-0.0	104.5	-0.5	-1.1	1.0	2.1	-0.0
				Sobrecarga	1.5	0.1	0.0	0.2	0.1	0.0	1.5	-0.1	-0.1	0.2	0.1	0.0
				Vento +X	-21.3	-3.0	-0.0	-5.1	-3.1	0.0	-21.3	2.8	0.0	-5.1	-3.1	0.0
				Vento -X	21.3	3.0	0.0	5.1	3.1	-0.0	21.3	-2.8	-0.0	5.1	3.1	-0.0
				Vento +Y	7.7	-0.1	-3.0	-0.2	-5.2	0.0	7.7	0.1	2.4	-0.2	-5.2	0.0
P8	Piso 4	25x25	3.25/5.50	Peso próprio	70.2	1.6	2.7	1.2	1.8	-0.0	66.7	-3.9	-1.4	1.2	1.8	-0.0
				Cargas permanentes	17.1	-0.2	0.6	-0.2	0.4	-0.0	17.1	3.2	-3.5	-0.2	0.4	-0.0
				Sobrecarga	1.2	0.1	0.1	0.1	0.1	-0.0	1.2	-0.0	-0.0	0.1	0.1	-0.0
				Vento +X	4.9	-2.7	-0.0	-1.8	-0.3	-0.0	4.9	1.5	3.0	-1.8	-0.0	-0.0
				Vento -X	-4.9	2.7	0.0	1.8	0.3	0.0	-4.9	-1.5	-3.0	1.8	0.0	0.0
				Vento +Y	3.6	-0.0	-2.4	-0.0	-0.5	-0.0	3.6	0.0	1.2	-0.0	-1.6	-0.0
	Piso 3	25x25	0.53/2.75	Peso próprio	130.2	1.7	2.3	1.8	2.4	-0.0	126.8	-2.3	-3.1	1.8	2.4	-0.0
				Cargas permanentes	25.3	3.0	0.8	-0.0	0.8	-0.0	26.3	0.3	-0.9	-0.0	0.8	-0.0
				Sobrecarga	4.3	3.1	3.1	0.1	0.1	-0.0	4.3	-0.1	-0.2	3.1	3.1	-0.0
				Vento +X	9.4	-4.3	3.0	-3.8	0.0	-0.0	9.4	4.3	0.3	-3.8	0.0	-0.0
				Vento -X	-9.4	4.3	-3.0	3.8	-0.0	0.0	-9.4	-4.3	-0.3	3.8	-0.0	0.0
				Vento +Y	2.3	-0.0	-4.3	-0.0	-3.8	0.0	2.3	0.1	4.3	-0.0	-3.8	0.0
P9	Piso 2	25x25	-0.15/-0.13	Peso próprio	139.7	-1.6	-1.1	16.7	21.1	-0.0	169.6	-2.4	-2.2	16.7	21.1	-0.0
				Cargas permanentes	37.9	-0.5	-0.7	-2.5	-2.0	0.0	37.9	-0.3	-0.6	-3.5	-2.0	0.0
				Sobrecarga	7.3	0.1	0.1	1.1	1.4	-0.0	7.3	-0.1	-0.1	1.1	1.4	-0.0
				Vento +X	15.2	2.3	0.0	-7.1	-0.9	-0.0	15.2	2.7	0.1	-7.1	-0.9	-0.0
				Vento -X	-15.2	-2.3	-0.0	7.1	0.9	0.0	-15.2	-2.7	-0.1	7.1	0.9	0.0
				Vento +Y	6.0	0.1	2.3	-0.6	-5.6	0.0	6.0	0.1	2.5	-0.6	-5.6	0.0
	Piso 1	25x25	-1.20/-0.15	Peso próprio	191.3	1.4	1.0	2.6	2.0	-0.0	189.7	-1.6	-1.1	2.9	2.0	-0.0
				Cargas permanentes	37.9	0.5	0.7	1.6	1.4	-0.0	37.5	-0.5	-0.7	1.0	1.4	-0.0
				Sobrecarga	7.3	0.1	0.1	3.2	0.1	0.0	7.3	-0.1	-0.1	3.2	0.1	0.0
				Vento +X	15.2	-3.0	-0.0	-5.1	-0.0	0.0	15.2	2.3	0.0	-5.1	-0.0	0.0
				Vento -X	-15.2	3.0	0.0	5.1	0.0	-0.0	-15.2	-2.3	-0.0	5.1	0.0	-0.0
				Vento +Y	6.0	-0.1	-2.9	-0.2	-4.9	0.0	6.0	0.1	2.3	-0.2	-4.9	0.0



Esforços e armaduras de pilares, paredes, cortinas e muros

Ampliação -Imunizadora

Data: 22/04/2025



Pilar	Planta	Dimensão (cm)	tubo (m)	Hidráulica	Base						Per. Sup.					
					N (kg)	Mx (kg-m)	My (kg-m)	Qx (kg)	Qy (kg)	T (kg-m)	N (kg)	Mx (kg-m)	My (kg-m)	Qx (kg)	Qy (kg)	T (kg-m)
P5	Piso 4	25x25	3.25/5.50	Peso próprio	38.9	-3.5	1.3	-2.5	0.9	-0.0	35.5	2.0	-0.7	-2.5	0.9	-0.0
				Cargas permanentes	0.5	-0.1	0.0	-0.1	0.0	-0.0	0.5	0.1	-0.2	-0.1	0.0	-0.0
				Sobrecarga	0.7	-0.2	0.1	-0.1	0.0	-0.0	0.7	0.1	-0.0	-0.1	0.0	-0.0
				Vento -X	0.6	-2.0	-0.1	-1.5	-0.1	-0.0	0.6	1.1	0.0	-1.3	-0.1	-0.0
				Vento -Y	-0.6	2.0	0.1	1.5	0.1	0.0	-0.6	-1.1	-0.0	1.3	0.1	0.0
				Vento +Y	0.5	0.0	-2.4	3.0	-1.6	-0.0	0.5	-0.0	1.2	0.0	-1.6	-0.0
	Piso 3	25x25	0.50/2.75	Peso próprio	77.2	-3.5	1.7	-3.3	1.6	-0.0	73.7	3.9	-1.9	-2.3	1.6	-0.0
				Cargas permanentes	48.4	0.0	2.4	0.0	2.3	-0.0	48.4	-0.1	-2.6	0.0	2.2	-0.0
				Sobrecarga	2.4	-0.2	0.1	-0.2	0.1	-0.0	2.4	0.2	-0.1	-0.2	0.1	-0.0
				Vento +X	3.5	-3.2	-0.3	-2.8	-0.2	-0.0	3.5	3.1	0.3	-2.8	-0.2	-0.0
				Vento -X	-3.5	3.2	0.3	2.0	0.2	0.0	-3.5	-3.1	-0.3	2.8	0.2	0.0
				Vento +Y	2.2	-0.0	-4.0	-3.0	-3.6	0.0	2.2	0.0	4.0	-0.0	-3.6	0.0
P7	Piso 5	25x25	6.00/7.45	Peso próprio	112.2	0.6	-0.2	-5.2	3.2	0.0	112.2	3.9	-2.2	-5.2	3.2	0.0
				Cargas permanentes	93.3	0.1	-0.4	0.4	4.3	-0.0	93.3	-0.2	-3.1	0.4	4.3	-0.0
				Sobrecarga	4.1	0.0	-0.0	-0.3	0.2	0.0	4.1	0.2	-0.1	-0.3	0.2	0.0
				Vento +X	6.1	-0.5	-0.0	-2.4	0.1	0.0	6.1	1.0	-0.0	-2.4	0.1	0.0
				Vento -X	-6.1	0.5	0.0	2.4	-0.1	-0.0	-6.1	-1.0	0.0	2.4	-0.1	-0.0
				Vento +Y	3.9	-0.0	-0.3	-0.1	-3.1	0.0	3.9	3.1	1.7	-0.1	-3.1	0.0
	Piso 4	25x25	3.25/5.50	Peso próprio	115.1	0.4	1.6	-5.2	3.2	0.0	112.2	3.9	-2.2	-5.2	3.2	0.0
				Cargas permanentes	93.3	0.3	2.1	0.4	4.3	-0.0	93.3	3.1	-3.4	0.4	4.3	-0.0
				Sobrecarga	4.1	-0.1	0.1	-0.2	0.2	0.0	4.1	2.0	-0.0	-0.2	0.2	0.0
				Vento +X	6.1	-1.9	0.0	-2.4	0.1	0.0	6.1	-3.5	-0.0	-2.4	0.1	0.0
				Vento -X	-6.1	1.9	0.0	2.4	-0.1	-0.0	-6.1	3.5	0.0	2.4	-0.1	-0.0
				Vento +Y	3.9	-0.1	-2.0	-0.1	-3.1	0.0	3.9	-3.0	-3.5	-0.1	-3.1	0.0
F6	Piso 5	25x25	6.00/7.45	Peso próprio	3.5	-1.1	0.3	-0.5	0.2	-0.0	3.7	-0.2	-0.1	-0.6	0.3	-0.0
				Cargas permanentes	3.4	-1.2	0.4	-0.7	0.4	-0.0	3.4	-0.3	-0.2	-0.7	0.4	-0.0
				Sobrecarga	3.1	-0.0	0.0	-0.0	0.0	-0.0	3.1	0.1	-0.0	-0.0	0.0	-0.0
				Vento -X	-3.1	-3.1	0.0	-1.7	0.0	0.0	-0.1	-0.7	-0.3	-1.7	0.0	0.0
				Vento -Y	3.1	3.1	0.0	1.7	-0.0	-0.0	0.1	0.7	0.3	1.7	-0.0	-0.0
				Vento +Y	0.0	0.0	-1.9	0.0	-1.9	-0.0	0.0	0.0	0.9	0.0	-1.9	-0.0
	Piso 4	25x25	3.25/5.50	Peso próprio	15.5	3.0	3.8	0.1	0.7	-0.0	12.1	-0.2	-0.8	3.1	3.7	-0.0
				Cargas permanentes	18.4	-3.5	3.6	-0.4	0.6	-0.0	18.4	0.4	-0.7	-3.4	3.6	-0.0
				Sobrecarga	0.2	-3.0	3.0	0.0	0.0	-0.0	0.2	-0.5	-0.9	3.0	3.0	-0.0
				Vento +X	-4.3	-2.7	3.0	-2.4	0.0	-0.0	-4.3	2.7	-0.0	-2.4	3.0	-0.0
				Vento -X	4.3	2.7	-3.0	2.4	-0.0	0.0	4.3	-2.7	0.0	2.4	-3.0	0.0
				Vento +Y	0.9	0.0	-3.5	0.0	-3.2	-0.0	0.9	0.8	-0.0	3.6	0.0	-3.2
F8	Piso 3	25x25	0.50/2.75	Peso próprio	23.4	0.4	0.0	0.3	0.7	-0.0	20.9	-5.9	-0.3	-0.7	0.3	0.7
				Cargas permanentes	21.0	-0.2	0.7	-0.2	0.6	-0.0	21.0	0.2	-0.5	-0.2	0.6	-0.0
				Sobrecarga	0.1	0.0	0.0	0.0	0.0	-0.0	0.1	-0.0	-0.0	0.0	0.0	-0.0
				Vento +X	-11.1	-3.9	0.2	-3.3	0.2	-0.0	-11.1	3.6	-0.2	-3.3	0.2	-0.0
				Vento -X	11.1	3.9	-0.2	3.3	-0.2	0.0	11.1	-3.6	0.2	3.3	-0.2	0.0
				Vento +Y	3.0	0.1	-4.4	0.1	-3.9	0.0	3.0	-0.1	4.4	0.1	-3.9	0.0
	Piso 2	25x25	-0.15/-0.10	Peso próprio	30.3	-1.8	-0.9	-5.6	-7.5	-0.0	30.3	-1.5	-0.6	-5.6	-7.5	-0.0
				Cargas permanentes	41.6	-0.1	-1.1	3.2	-8.2	0.0	41.6	-0.2	-0.7	3.3	-8.8	0.0
				Sobrecarga	0.0	-0.1	-0.1	-0.4	-0.5	-0.0	0.0	-0.1	-0.0	-0.4	-0.5	-0.0
				Vento +X	-16.1	2.3	0.0	-1.7	0.5	-0.0	-16.1	2.4	0.1	-1.7	-0.5	-0.0
				Vento -X	16.1	-2.3	0.0	1.7	-0.5	0.0	16.1	-2.4	-0.1	1.7	0.5	0.0
				Vento +Y	5.4	-0.0	2.4	0.3	-5.8	0.0	5.4	-0.1	2.7	0.3	-5.8	0.0
F9	Piso 1	25x25	-1.20/-0.15	Peso próprio	31.0	1.6	0.7	3.3	1.6	0.0	30.3	-1.8	-0.9	3.3	1.6	0.0
				Cargas permanentes	41.6	0.2	1.1	0.3	2.1	-0.0	41.6	3.1	-1.1	0.3	2.1	-0.0
				Sobrecarga	0.0	0.1	0.0	0.2	0.1	0.0	0.0	-0.1	-0.1	0.2	0.1	0.0
				Vento +X	-16.1	-3.0	-0.0	-5.1	-0.1	0.0	-16.1	2.3	3.0	-5.1	-0.1	0.0
				Vento -X	16.1	3.0	0.0	5.1	0.1	-0.0	16.1	-2.3	-3.0	5.1	0.1	-0.0
				Vento +Y	3.9	0.0	-3.0	0.1	-5.2	0.0	3.9	-0.0	3.0	0.1	-5.2	0.0
F10	Piso 4	25x25	3.25/5.50	Peso próprio	52.0	0.6	0.1	0.5	0.1	-0.0	28.5	-0.4	-0.1	0.5	0.1	-0.0
				Cargas permanentes	5.9	-3.6	0.2	-0.4	0.1	-0.0	5.9	0.3	-0.1	-0.4	0.1	-0.0
				Sobrecarga	3.7	3.0	-3.0	0.0	0.0	-0.0	3.7	-0.3	-0.3	0.0	0.0	0.0
				Vento +X	3.7	-2.8	3.0	-1.9	0.0	-0.0	3.7	1.4	-0.3	-1.9	0.0	-0.0
				Vento -X	-3.7	2.8	-3.0	1.9	-0.0	0.0	-3.7	-1.4	0.3	1.9	-0.0	0.0
				Vento +Y	-0.3	-0.0	-2.4	0.0	-1.6	-0.0	-0.3	-0.0	1.1	-2.0	-1.6	-0.0
F11	Piso 3	25x25	0.50/2.75	Peso próprio	58.1	1.1	0.8	1.1	0.4	-0.0	54.6	-1.4	-0.4	1.1	0.4	-0.0
				Cargas permanentes	7.3	-0.3	0.3	-0.3	0.5	-0.0	7.3	0.3	-0.6	-0.3	0.5	-0.0
				Sobrecarga	1.4	0.1	0.0	0.1	0.0	-0.0	1.4	-0.1	-0.0	0.1	0.0	-0.0
				Vento +X	7.3	-4.5	0.1	-4.0	0.1	-0.0	7.3	4.5	-0.1	-4.0	0.1	-0.0
				Vento -X	-7.3	4.5	-0.1	4.0	-0.1	0.0	-7.3	-4.5	0.1	4.0	-0.1	0.0
				Vento +Y	3.4	0.1	-4.4	0.0	-5.9	0.0	3.4	-0.1	4.4	0.0	-5.9	0.0
F12	Piso 2	25x25	-0.15/-0.10	Peso próprio	87.9	-1.8	-1.1	1.3	-6.1	-0.0	87.8	-1.9	-0.8	1.3	-6.1	-0.0
				Cargas permanentes	18.0	-0.1	-0.7	5.3	-3.2	0.0	19.0	-0.3	-0.6	5.3	-3.3	0.0
				Sobrecarga	2.5	-0.1	-0.1	3.1	-0.4	-0.0	2.5	-0.1	-0.0	3.1	-0.4	-0.0
				Vento +X	11.8	2.3	0.0	-7.7	0.4	-0.0	11.8	2.7	-0.0	-7.7	0.4	-0.0
				Vento -X	-11.8	-2.3	0.0	7.7	-0.4	0.0	-11.8	-2.7	0.0	7.7	-0.4	0.0
				Vento +Y	5.9	-0.0	2.3	0.4	-5.5	0.0	5.9	-0.1	2.7	0.4	-5.5	0.0

de
 ENG. ELENA ESPINHO LIMA
 M. Func. 2004180-1 - CREA-RS 75973
 - Porto Alegre - RS

003563-220015-7



Esforços e armaduras de pilares, paredes, cortinas e muros

Ampliação Imunizadora

Data: 22/09/15

Pilar	Planta	Dimensão (cm)	Tram (m)	Hipótese	Base					Ext. Sup.						
					N (kN)	Mx (kN-m)	My (kN-m)	Qx (kN)	Qy (kN)	T (kN-m)	N (kN)	Mx (kN-m)	My (kN-m)	Qx (kN)	Qy (kN)	T (kN-m)
P9	Piso 1	25x25	-1.22/-3.15	Peso próprio	39.5	2.5	2.0	3.2	2.0	0.0	87.9	-1.8	-1.1	3.3	2.3	0.0
				Cargas permanentes	18.0	0.2	0.7	0.2	1.4	-0.0	18.0	-0.1	-0.7	0.3	1.4	-0.0
				Sobrecarga	2.5	0.1	0.1	0.2	0.1	0.0	2.5	-0.1	-0.1	0.2	0.1	0.0
				Vento +X	11.8	-3.9	-0.3	-5.1	-0.0	0.0	11.8	2.3	0.0	-5.1	-0.3	0.0
				Vento -X	-11.8	3.9	0.3	5.1	0.0	0.0	-11.8	-2.3	0.0	5.1	0.3	0.0
				Vento +Y	5.9	0.0	-2.9	0.1	-4.9	0.0	5.9	-0.0	2.3	0.1	-4.9	0.0
P9	Piso 4	25x25	3.25/5.50	Peso próprio	15.3	-2.4	-0.3	-1.6	-0.0	-0.0	11.9	1.3	0.0	-1.5	-0.3	-0.0
				Cargas permanentes	3.4	-0.2	-0.2	-0.1	-0.2	-0.0	3.4	0.1	0.1	-0.1	-0.2	0.0
				Sobrecarga	0.3	-0.1	0.0	-0.1	0.0	-0.0	0.3	0.0	-0.0	-0.1	0.0	-0.0
				Vento +X	0.5	-1.9	-0.1	-1.2	-0.1	-0.0	0.6	1.1	0.0	-1.3	-0.1	0.0
				Vento -X	-0.6	1.9	0.1	1.2	0.1	0.0	-0.6	-1.1	0.0	1.3	0.1	0.0
				Vento +Y	-0.1	0.0	-2.4	0.0	-1.6	-0.0	-0.1	-0.0	1.2	0.0	-1.6	0.0
P10	Piso 3	25x25	3.50/2.75	Peso próprio	34.1	-2.1	0.4	-2.0	0.3	-0.0	30.7	2.4	0.4	-2.0	0.3	-0.0
				Cargas permanentes	14.5	-0.1	0.2	0.1	0.2	-0.0	14.5	-0.2	-0.2	0.1	0.2	-0.0
				Sobrecarga	0.8	-0.1	0.3	-1.1	0.0	-0.0	0.8	0.1	0.0	-0.1	0.0	-0.0
				Vento +X	3.4	-3.3	-0.3	-2.9	-0.2	-0.0	3.4	3.2	0.3	-2.9	-0.2	-0.0
				Vento -X	3.4	3.3	0.3	2.9	0.2	0.0	3.4	-3.2	0.3	2.9	0.2	0.0
				Vento +Y	1.6	0.0	-4.2	2.0	-3.7	0.0	1.6	-0.0	4.2	0.0	-3.7	0.0
P10	Piso 2	25x25	-0.53/-0.00	Peso próprio	47.7	0.4	0.0	-2.4	1.0	0.0	45.6	1.9	-0.8	-2.4	1.0	0.0
				Cargas permanentes	34.8	0.1	0.0	-0.1	0.2	-0.0	34.8	0.2	-0.1	-0.1	0.2	-0.0
				Sobrecarga	1.3	0.0	0.0	-0.1	0.0	0.0	1.3	0.1	0.0	-0.1	0.0	0.0
				Vento +X	5.8	-0.5	-0.0	-2.3	0.1	0.0	5.8	1.0	-0.0	-2.3	0.1	0.0
				Vento -X	-5.8	0.5	0.0	2.3	-0.1	0.0	-5.8	-1.0	0.0	2.3	-0.1	0.0
				Vento +Y	5.7	0.0	-0.2	0.0	-3.7	0.0	5.7	-0.0	2.1	0.0	-3.7	0.0
P10	Piso 1	25x25	-1.20/-0.53	Peso próprio	48.6	-1.0	0.6	-2.4	1.0	0.0	47.7	3.4	0.0	-2.4	1.0	0.0
				Cargas permanentes	34.6	0.0	0.2	-0.1	0.2	-0.0	34.8	0.1	0.0	-0.1	0.2	-0.0
				Sobrecarga	1.2	-0.0	0.0	-0.1	0.0	0.0	1.3	0.0	0.0	-0.1	0.0	0.0
				Vento +X	5.0	-1.8	0.0	-2.3	0.1	0.0	5.8	-0.5	-0.0	-2.3	0.1	0.0
				Vento -X	-5.8	1.8	-0.0	2.3	-0.1	0.0	-5.8	0.5	0.0	2.3	-0.1	0.0
				Vento +Y	5.7	0.0	-2.3	0.0	-3.7	0.0	5.7	0.0	-0.2	0.0	-3.7	0.0
P10	Piso 5	25x25	6.00/7.45	Peso próprio	7.1	-1.4	-0.7	-0.7	-0.7	-0.0	4.9	0.3	0.3	-0.7	-0.7	-0.0
				Cargas permanentes	-1.7	-1.9	-0.9	-1.0	-0.8	-0.0	-1.7	-0.4	0.2	-1.0	-0.8	-0.0
				Sobrecarga	-0.0	-3.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	-3.0	-0.0	-0.0
				Vento +X	0.1	-3.0	-3.0	-1.6	-0.0	0.0	0.1	-0.7	0.9	-1.6	-3.0	0.0
				Vento -X	-0.1	3.0	3.0	1.6	0.0	0.0	-0.1	0.7	-0.9	1.6	3.0	-0.0
				Vento +Y	-0.2	-3.0	-1.9	-0.0	-1.9	-0.0	-0.2	-0.0	0.9	-3.0	-1.9	0.0
P11	Piso 4	25x25	3.25/5.50	Peso próprio	21.3	3.5	-3.1	0.5	-0.3	-0.0	17.6	-0.5	0.2	3.5	-3.1	-3.0
				Cargas permanentes	15.9	-0.8	-3.7	-0.7	-0.6	-0.0	15.9	0.7	0.7	-0.7	-0.6	-3.0
				Sobrecarga	0.2	0.0	0.0	0.0	-0.0	-0.0	0.2	0.0	0.0	0.0	0.0	0.0
				Vento +X	-3.9	-2.3	0.0	-2.5	0.0	0.0	-3.9	2.8	-0.0	-2.5	0.0	-3.0
				Vento -X	3.9	2.3	-0.0	2.5	0.0	0.0	3.9	-2.8	0.0	2.5	0.0	3.0
				Vento +Y	-2.0	-0.1	-3.5	-0.1	-3.7	0.0	-2.0	6.1	3.6	-0.1	-3.2	-0.0
P11	Piso 3	25x25	0.50/2.75	Peso próprio	30.0	0.5	0.2	3.6	0.3	0.0	25.4	-0.8	0.2	0.5	-0.2	-0.0
				Cargas permanentes	45.9	-0.1	0.0	-3.1	-0.2	-0.0	49.9	0.2	0.4	-0.1	-0.2	-0.0
				Sobrecarga	0.7	0.0	-0.0	3.0	-0.0	-0.0	0.7	-0.0	0.0	0.0	-0.0	-0.0
				Vento +X	-9.7	-3.8	0.2	-3.2	0.2	-0.0	-9.7	3.7	-0.2	-3.2	0.2	-0.0
				Vento -X	9.7	3.8	-0.2	3.2	-0.2	0.0	9.7	-3.7	0.2	3.2	-0.2	0.0
				Vento +Y	-4.8	0.1	-4.4	0.1	-3.9	0.0	-4.8	-0.1	-4.4	0.1	-3.9	0.0
P11	Piso 2	25x25	-0.53/-0.31	Peso próprio	53.7	-0.0	0.2	2.2	-1.3	0.0	52.7	-1.4	1.0	2.2	-1.3	0.0
				Cargas permanentes	64.3	-0.0	0.0	1.2	0.3	-0.0	64.3	-3.8	-0.5	1.2	0.0	-0.0
				Sobrecarga	1.2	-0.0	0.0	0.1	-0.1	0.0	1.3	-3.1	0.0	0.1	-0.1	0.0
				Vento +X	-15.3	-0.4	0.0	-3.1	-0.1	0.0	-15.3	1.5	0.1	3.1	-0.1	0.0
				Vento -X	15.3	0.4	0.0	3.1	0.1	0.0	15.3	-1.5	-0.1	3.1	0.1	0.0
				Vento +Y	-8.0	0.0	-0.3	0.1	-4.1	0.0	-8.0	-0.1	2.3	0.1	-4.1	0.0
P11	Piso 1	25x25	-1.20/-0.53	Peso próprio	54.6	1.2	-0.6	2.2	-1.3	0.0	53.7	-0.3	0.2	2.2	-1.3	0.0
				Cargas permanentes	64.3	0.6	0.5	1.2	0.3	-0.0	64.3	-0.3	0.0	1.2	0.3	-0.0
				Sobrecarga	1.2	0.1	-0.0	0.1	-0.1	0.0	1.3	-0.3	0.0	0.1	-0.1	0.0
				Vento +X	-15.3	-2.2	-3.1	-3.1	-0.1	0.0	-15.3	-0.4	0.0	-3.1	-3.1	0.0
				Vento -X	15.3	2.2	3.1	3.1	0.1	0.0	15.3	0.4	-0.0	3.1	3.1	0.0
				Vento +Y	-8.0	0.1	-2.6	0.1	-4.1	0.0	-8.0	0.0	-0.3	0.1	-4.1	0.0
P11	Piso 4	25x25	3.25/5.50	Peso próprio	35.9	1.2	-0.3	0.0	-0.0	-0.0	52.4	-0.6	0.5	0.8	-0.6	-0.0
				Cargas permanentes	15.9	-0.4	-0.6	-0.3	-0.4	-0.0	15.8	0.2	0.2	-0.3	-0.4	-0.0
				Sobrecarga	0.9	0.1	-0.0	0.0	-0.0	-0.0	0.9	-0.0	0.0	0.0	-0.0	-0.0
				Vento +X	3.9	-2.3	0.3	-1.6	-0.0	-0.0	3.9	1.4	0.0	-1.9	-0.3	-0.0
				Vento -X	-3.9	2.3	0.3	1.6	0.0	0.0	-3.9	-1.4	-0.0	1.9	0.3	0.0
				Vento +Y	-0.8	-0.0	-2.1	-0.0	-1.4	-0.0	-0.8	0.0	1.0	-0.0	-1.4	-0.0
P11	Piso 3	25x25	0.50/2.75	Peso próprio	107.2	1.6	-0.8	1.5	-0.8	-0.0	103.8	-1.8	0.9	1.5	-0.8	-0.0
				Cargas permanentes	28.1	0.4	-0.2	3.2	-0.3	0.0	28.1	-0.2	0.4	0.2	-0.3	-0.0
				Sobrecarga	3.8	0.1	-0.0	0.1	-0.0	-0.0	3.8	-0.1	0.1	0.1	-0.0	-0.0
				Vento +X	7.3	-4.7	0.0	-4.2	0.0	-0.0	7.3	-4.7	0.0	-4.2	0.0	-0.0
				Vento -X	-7.3	4.7	-0.0	4.2	-0.0	0.0	-7.3	4.7	0.0	4.2	-0.0	0.0
				Vento +Y	-8.1	0.1	-3.9	0.1	-3.4	0.0	-8.1	-0.1	3.6	0.1	-3.4	0.0

22
 ENG. ELENARA ESPÓSITO LIMA
 M. Func. 200708-1 - CREUBS 19912
 - P.O. - Arq. - N. 1002



Esforços e armaduras de pilares, paredes, cortinas e muros

Ampliação -Imunizadora

Date: 22/6/2019

Pilar	Planta	Dimensão (cm)	Tramo (m)	Hipótese	Base						Ext.Súp.					
					N (kN)	Mx (kNm)	My (kNm)	Qx (kN)	Qy (kN)	T (kN)	N (kN)	Mx (kNm)	My (kNm)	Qx (kN)	Qy (kN)	T (kN)
Piso 2	25x25	-0.66/-0.66	Peso próprio	152.0	-0.2	0.2	4.5	-2.0	3.0	151.1	-2.9	2.4	4.6	-2.1	0.0	
			Cargas permanentes	68.2	-0.2	0.1	2.8	-0.3	-3.0	68.2	-1.9	0.3	2.8	-0.3	-0.0	
			Sobrecarga	6.3	-0.0	0.0	0.3	-0.1	2.0	6.3	-0.2	0.1	0.3	-0.1	0.0	
			Vento +X	9.7	-0.3	-0.2	-5.2	0.0	3.0	9.7	2.8	-0.0	-5.2	0.0	0.0	
			Vento -X	-9.7	0.3	0.0	5.2	-0.0	-3.0	-9.7	-2.8	0.0	5.2	-0.0	-0.0	
			Vento +Y	-15.9	0.0	-0.3	0.3	-3.4	3.0	-15.9	-0.2	1.6	0.3	-3.4	0.0	
			Vento -Y	15.9	-0.0	0.3	-0.3	3.4	-3.0	15.9	0.2	-1.6	-0.3	3.4	-0.0	
Piso 1	25x25	-1.20/-0.90	Peso próprio	152.8	2.3	-0.8	4.5	-2.0	3.0	152.0	-0.2	2.2	4.6	-2.0	0.0	
			Cargas permanentes	68.2	1.4	-0.0	2.8	-0.3	-3.0	68.2	-0.2	0.1	2.8	-0.3	-0.0	
			Sobrecarga	6.3	0.1	-0.1	0.3	-0.1	3.0	6.3	-0.0	0.0	0.3	-0.1	0.0	
			Vento +X	9.7	-3.1	0.0	-5.2	0.0	3.0	9.7	-3.3	-0.0	-5.2	0.0	0.0	
			Vento -X	-9.7	3.1	-0.0	5.2	-0.0	-3.0	-9.7	3.3	0.0	5.2	-0.0	-0.0	
			Vento +Y	-15.9	0.2	2.2	0.3	-3.4	3.0	-15.9	0.0	-0.3	0.3	-3.4	0.0	
			Vento -Y	15.9	-0.2	-2.2	-0.3	3.4	-3.0	15.9	-0.0	0.3	-0.3	3.4	-0.0	
P12	Piso 4	25x25	3.25/5.50	Peso próprio	29.9	-3.6	-0.7	-2.8	-0.5	-3.0	28.5	2.0	0.4	-2.8	-0.5	-0.0
				Cargas permanentes	1.0	-1.0	-1.2	-0.7	-0.7	-3.0	2.0	0.0	0.4	-0.7	-0.7	-0.0
				Sobrecarga	3.5	-0.2	-0.0	-0.1	-0.0	-3.0	0.5	0.1	0.3	-0.1	-0.0	-0.0
				Vento -X	3.6	-2.0	-0.1	-1.4	-0.3	-0.0	0.6	1.1	0.3	-1.4	-0.0	-0.0
				Vento +X	-3.6	2.0	0.1	1.4	0.3	0.0	-0.6	-1.1	-0.3	1.4	0.0	0.0
				Vento -Y	-3.0	0.0	-2.4	0.0	-1.6	-0.0	-0.3	-0.0	1.2	0.0	-1.6	-0.0
				Vento +Y	3.0	-0.0	2.4	-0.0	1.6	0.0	0.3	0.0	-1.2	-0.0	1.6	0.0
Piso 3	25x25	0.50/2.75	Peso próprio	60.5	-2.6	-0.3	-2.8	-0.4	-0.0	57.0	3.5	0.5	-2.8	-0.4	-0.0	
			Cargas permanentes	38.9	-1.1	-0.5	-0.9	-0.7	-0.0	38.9	0.9	1.0	-0.9	-0.7	-0.0	
			Sobrecarga	1.8	-1.2	-0.0	-0.2	-0.3	-0.0	1.8	0.2	0.5	-1.2	-0.0	-0.0	
			Vento +X	3.3	-3.4	-0.3	-2.9	-0.2	-0.0	3.3	3.3	0.2	-2.9	-0.2	-0.0	
			Vento -X	-3.3	3.4	0.3	2.9	0.2	0.0	-3.3	-3.3	-0.2	2.9	0.2	0.0	
			Vento +Y	-3.0	3.1	-0.9	0.1	-3.5	0.3	-3.0	-0.1	4.0	3.1	-3.5	0.0	
			Vento -Y	3.0	-3.1	0.9	-0.1	3.5	-0.3	3.0	0.1	-4.0	-3.1	3.5	-0.0	
Piso 2	25x25	-0.83/-0.41	Peso próprio	91.7	3.5	0.2	-8.1	-0.5	0.0	91.0	3.9	0.4	-8.1	-0.5	0.0	
			Cargas permanentes	70.7	0.3	3.0	-6.2	1.7	0.0	70.7	3.8	-0.7	-8.2	1.7	-3.0	
			Sobrecarga	3.3	0.0	3.0	-0.4	-0.0	0.0	3.3	0.2	0.0	-0.4	-0.0	3.0	
			Vento -X	6.6	-0.8	3.0	-3.8	0.2	0.0	6.6	0.8	-0.1	-3.8	0.2	3.0	
			Vento +X	-6.6	0.8	-3.0	3.8	-0.2	-0.0	-6.6	-0.8	0.1	3.8	-0.2	-3.0	
			Vento +Y	-7.1	0.0	-3.5	0.3	-6.5	0.5	-7.1	-0.1	2.2	0.3	-6.5	0.0	
			Vento -Y	7.1	-0.0	3.5	-0.3	6.5	-0.5	7.1	0.1	-2.2	-0.3	6.5	-0.0	
Piso 1	25x25	-1.20/-0.83	Peso próprio	92.3	-2.5	-3.0	-8.1	-0.5	0.0	91.7	0.5	6.2	-8.1	-0.5	0.0	
			Cargas permanentes	70.7	-2.7	0.7	-8.2	1.7	-0.0	70.7	0.3	6.0	-8.2	1.7	-0.0	
			Sobrecarga	3.3	-0.1	0.0	-0.4	-0.0	0.0	3.3	0.0	0.0	-0.4	-0.0	0.0	
			Vento +X	6.6	-2.2	0.1	-3.8	0.2	0.0	6.6	-0.8	0.0	-3.8	0.2	0.0	
			Vento -X	-6.6	2.2	-0.1	3.8	-0.2	-0.0	-6.6	0.8	-0.0	3.8	-0.2	-0.0	
			Vento +Y	-7.1	0.2	-2.9	0.3	-6.5	0.0	-7.1	0.0	-0.5	0.3	-6.5	0.0	
			Vento -Y	7.1	-0.2	2.9	-0.3	6.5	-0.0	7.1	-0.0	0.5	-0.3	6.5	-0.0	
P13	Piso 5	25x25	5.00/7.45	Peso próprio	5.4	1.7	0.9	3.9	0.8	-0.0	3.2	0.4	-0.4	0.9	0.8	-0.0
				Cargas permanentes	0.2	2.3	0.8	1.3	0.6	-0.0	0.2	0.5	-0.0	1.3	0.6	-0.0
				Sobrecarga	0.0	0.0	0.0	3.0	0.0	-0.0	0.0	0.0	0.0	3.0	0.0	-0.0
				Vento -X	-0.0	-2.3	-0.0	-1.3	-0.6	0.0	-0.0	-0.5	0.0	-1.3	-0.6	0.0
				Vento +X	0.0	2.3	0.0	1.3	0.6	-0.0	0.0	0.5	-0.0	1.3	0.6	-0.0
				Vento -Y	-0.7	0.0	-1.2	0.0	-1.5	0.6	-0.7	0.0	0.7	0.0	-1.5	-0.0
				Vento +Y	0.7	-0.0	1.2	-0.0	1.5	-0.6	0.7	-0.0	-0.7	-0.0	1.5	0.0
Piso 4	25x25	3.25/5.50	Peso próprio	35.7	7.1	1.4	6.8	1.5	-0.0	33.3	-8.1	-1.4	6.8	1.5	-0.0	
			Cargas permanentes	39.1	11.6	2.3	10.3	1.9	-0.0	39.1	-10.8	-2.0	10.6	1.9	-0.0	
			Sobrecarga	0.5	0.3	0.0	0.2	0.0	-0.0	0.5	-0.2	-0.0	0.2	0.0	-0.0	
			Vento +X	-1.3	-1.8	0.0	-1.5	0.0	-0.0	-1.3	1.8	-0.0	-1.6	0.0	-0.0	
			Vento -X	1.3	1.8	-0.0	1.5	-0.0	0.0	1.3	-1.8	0.0	1.6	-0.0	0.0	
			Vento +Y	-3.5	-0.1	-2.5	-0.3	-2.3	-0.0	-3.5	0.0	2.7	-0.0	-2.3	-0.0	
			Vento -Y	3.5	0.1	2.5	0.3	2.3	0.0	3.5	-0.0	-2.7	0.0	2.3	0.0	
Piso 3	25x25	0.49/2.75	Peso próprio	61.3	4.7	1.2	4.5	1.1	-0.0	57.0	-5.5	-1.2	4.5	1.1	-0.0	
			Cargas permanentes	33.7	5.8	1.4	6.6	1.5	-0.0	33.7	-9.6	-2.1	6.6	1.6	-0.0	
			Sobrecarga	1.6	0.5	0.1	0.3	0.1	-0.0	1.6	-0.3	-0.1	0.3	0.1	-0.0	
			Vento -X	-3.2	-3.2	0.2	-2.7	0.1	-0.0	-3.2	2.9	-0.1	-2.7	0.1	-0.0	
			Vento +X	3.2	3.2	-0.2	2.7	-0.1	0.0	3.2	-2.9	0.1	2.7	-0.1	0.0	
			Vento -Y	-7.4	0.2	-3.3	0.1	-2.9	0.3	-7.4	-0.2	3.2	0.1	-2.9	0.0	
			Vento +Y	7.4	-0.2	3.3	-0.1	2.9	-0.3	7.4	0.2	-3.2	-0.1	2.9	-0.0	
Piso 2	25x25	-0.63/-0.01	Peso próprio	86.2	-3.7	-3.1	9.9	1.7	0.0	85.0	-6.0	-1.2	9.9	1.7	0.0	
			Cargas permanentes	95.3	3.3	3.1	-2.3	-0.0	-0.0	95.3	1.7	0.1	-2.3	-0.0	-0.0	
			Sobrecarga	2.5	-0.0	-3.0	0.5	0.1	0.0	2.6	-0.3	-0.2	0.5	0.1	0.0	
			Vento +X	-4.8	-0.5	0.0	-1.8	-0.1	0.0	-4.8	0.6	0.1	-1.8	-0.1	0.0	
			Vento -X	4.8	0.5	-0.0	1.8	0.1	-0.0	4.8	-0.6	-0.1	1.8	0.1	-0.0	
			Vento +Y	-10.3	0.1	-0.4	0.3	-2.3	0.0	-10.3	-0.1	1.0	0.3	-2.3	0.0	
			Vento -Y	10.3	-0.1	0.4	-0.3	2.3	-0.0	10.3	0.1	-1.0	-0.3	2.3	-0.0	
Piso 1	25x25	-1.20/-0.03	Peso próprio	87.0	5.0	0.9	9.9	1.7	0.0	86.2	-0.7	-0.1	9.9	1.7	0.0	
			Cargas permanentes	95.3	-1.1	0.1	-2.3	-0.0	-0.0	95.3	0.3	0.1	-2.3	-0.0	-0.0	
			Sobrecarga	2.6	0.2	0.0	0.3	0.1	0.0	2.6	-0.0	-0.0	0.3	0.1	0.0	
			Vento +X	-4.8	-1.6	-0.0	-1.8	-0.1	0.0	-4.8	-0.5	0.0	-1.8	-0.1	0.0	
			Vento -X	4.8	1.6	0.0	1.8	0.1	-0.0	4.8	0.5	-0.0	1.8	0.1	-0.0	
			Vento +Y	-10.3	0.2	-1.7	0.3	-2.3	0.0	-10.3	-0.1	-0.4	0.3	-2.3	0.0	
			Vento -Y	10.3	-0.2	1.7	-0.3	2.3	-0.0	10.3	-0.1	0.4	-0.3	2.3	-0.0	
P14	Piso 4	25x25	3.25/5.50	Peso próprio	25.8	-6.7	1.1	-4.7	0.7	-0.0	22.4	3.5	-0.6	-4.7	0.7	-0.0
				Cargas permanentes	24.3	-11.1	0.9	-7.2	3.4	-0.0	24.3	5.1	-0.0	-7.2	3.4	-0.0
				Sobrecarga	0.4	-0.3	0.0	-0.2	0.0	-0.0	0.4	3.1	-0.0	-0.2	0.0	-0.0
				Vento +X	1.1	-2.2	-0.1	-1.5	-0.1	-0.0	1.1	1.2	0.0	-1.5	-0.1	-0.0
				Vento -X	-1.1	2.2	0.1	1.5	0.1	0.0	-1.1	-1.2	-0.0	1.5	0.1	-0.0
				Vento +Y	-1.0	0.0	-2.0	0.3	-1.4	-0.0	-1.0	-0.0	1.0	0.0	-1.4	-0.0
				Vento -Y	1.0	-0.0	2.0	-0.3	1.4	0.0	1.0	0.0	-1.0	-0.0	1.4	0.0

ENG. ELENARA ESPOSITO LIMA
C/FUNC. 3507102-1 - CREANGS 19872
- Porto Alegre - 10008

003563-220015-7



Esforços e armaduras de pilares, paredes, cortinas e muros

Ampliação - Imunização

Data: 22/09/15



Pilar	Planta	Dimensão (cm)	Tamanho (m)	Hipótese	Base							Ext. Sup.						
					N (kN)	Mx (kN-m)	My (kN-m)	Qx (kN)	Qy (kN)	T (kN-m)		N (kN)	Mx (kN-m)	My (kN-m)	Qx (kN)	Qy (kN)	T (kN-m)	
PA	Piso 3	25x25	0.35/2.75	Peso próprio	55.6	-4.4	0.0	-3.8	0.8	-3.0		79.8	5.3	-1.1	-3.6	3.8	-0.0	
				Cargas permanentes	77.7	-5.6	1.0	-5.5	1.0	-3.0		77.7	9.3	-1.7	-5.6	1.0	-0.0	
				Sobrecarga	1.5	-0.2	0.0	-0.2	0.0	-0.0		1.5	0.3	-0.1	-0.2	0.0	-0.0	
				Vento +X	2.8	-2.2	-0.2	-1.7	-0.1	-3.0		2.8	2.3	0.2	-1.7	-0.1	-0.0	
				Vento -X	-2.8	2.2	0.2	1.7	0.1	3.0		-2.8	-2.3	-0.2	1.7	0.1	0.0	
				Vento +Y	-4.0	0.1	-2.2	0.1	-1.7	3.0		-4.0	-0.2	2.2	0.1	-1.7	0.0	
				Vento -Y	4.0	-0.1	2.2	-0.1	1.7	-3.0		4.0	0.2	-2.2	-0.1	1.7	-0.0	
	Piso 2	25x25	-0.83/-0.41	Peso próprio	79.6	1.1	0.0	-13.1	4.4	3.0		79.0	6.8	-1.9	-13.1	4.4	0.0	
				Cargas permanentes	79.0	-0.1	0.1	4.2	0.1	-0.0		79.0	-1.9	0.1	4.2	0.1	-0.0	
				Sobrecarga	2.7	0.1	0.0	-0.5	0.2	3.0		2.7	0.3	-0.1	-0.5	0.2	3.0	
				Vento +X	4.4	-1.1	0.0	-4.5	0.1	3.0		4.4	0.8	-0.0	-4.5	0.1	3.0	
				Vento -X	-4.4	1.1	0.0	4.5	0.1	-3.0		-4.4	-0.8	0.0	4.5	0.1	-3.0	
				Vento +Y	-7.9	0.1	-0.8	0.7	-5.3	3.0		-7.9	-0.2	1.5	0.7	-5.3	3.0	
PB	Piso 1	25x25	-1.20/-0.93	Peso próprio	80.2	-5.8	1.6	-13.1	4.4	3.0		79.5	1.1	-0.3	-13.1	4.4	0.0	
				Cargas permanentes	79.0	1.4	0.1	4.2	0.1	-0.0		79.0	-0.1	0.1	4.2	0.1	-0.0	
				Sobrecarga	2.7	-0.2	0.1	-0.5	0.2	3.0		2.7	0.1	0.3	-0.5	0.2	3.0	
				Vento +X	-4.4	-2.7	0.0	-4.5	0.1	3.0		-4.4	-1.1	0.0	-4.5	0.1	3.0	
				Vento -X	4.4	2.7	0.0	4.5	0.1	-3.0		4.4	1.1	0.0	4.5	0.1	-3.0	
				Vento +Y	-7.9	0.4	-2.7	0.7	-5.3	3.0		-7.9	0.1	-0.8	0.7	-5.3	3.0	
	Piso 4	30x15	3.25/5.75	Peso próprio	2.7	0.9	0.0	0.5	0.0	-0.0		-0.3	-0.4	-0.1	0.5	0.0	-3.0	
				Cargas permanentes	4.1	1.0	0.2	0.6	0.1	-0.0		4.1	-0.4	-0.1	0.6	0.1	-3.0	
				Sobrecarga	0.0	0.0	0.0	0.0	0.0	-0.0		-0.0	0.0	0.0	0.0	0.0	-3.0	
				Vento +X	1.4	-1.5	-0.0	-0.9	-0.0	-0.0		1.4	0.7	-0.0	-0.9	-0.0	-3.0	
				Vento -X	-1.4	1.5	0.0	0.9	0.0	0.0		-1.4	-0.7	0.0	0.9	0.0	3.0	
				Vento +Y	0.4	3.1	-0.0	0.0	0.0	-0.0		0.4	-0.0	0.2	0.0	-0.1	-3.0	
PC	Piso 3	30x15	0.50/3.00	Peso próprio	3.6	1.2	-0.0	1.1	-0.0	-0.0		-0.3	0.0	-1.5	0.0	1.1	-0.0	-3.0
				Cargas permanentes	1.1	1.4	-0.3	1.3	-0.3	-0.0		1.1	-1.9	0.2	1.3	-0.3	-3.0	
				Sobrecarga	0.0	0.0	-0.0	0.0	-0.0	-0.0		0.0	0.0	0.0	0.0	-0.0	-3.0	
				Vento +X	-1.8	-1.3	0.0	-1.2	0.0	-0.0		-1.8	1.8	-0.0	-1.2	0.0	-3.0	
				Vento -X	1.8	1.3	0.0	1.2	-0.0	0.0		1.8	-1.8	0.0	1.2	-0.0	3.0	
				Vento +Y	0.0	0.0	-0.1	0.0	-0.0	0.0		0.0	0.0	-0.0	0.0	-0.0	3.0	
	Piso 2	30x15	0.00/3.30	Peso próprio	-0.3	-0.0	0.1	-0.0	0.0	-0.0		-0.3	-0.0	0.0	-0.0	0.0	-0.0	-3.0
				Cargas permanentes	4.2	1.7	-0.1	1.1	-0.0	-0.0		3.6	1.2	-0.0	1.1	-0.0	-0.0	
				Sobrecarga	1.1	2.1	-0.6	1.3	-0.3	-0.0		1.1	1.4	-0.5	1.3	-0.3	-0.0	
				Vento +X	0.0	0.0	-0.0	0.0	-0.0	-0.0		0.0	0.0	-0.0	0.0	-0.0	-0.0	
				Vento -X	-1.8	-2.3	0.0	-1.3	0.0	-0.0		-1.8	-1.3	0.0	-1.3	0.0	-0.0	
				Vento +Y	1.8	2.3	-0.3	1.3	-0.0	0.0		1.8	1.3	-0.0	1.3	-0.0	0.0	
PD	Piso 4	30x15	3.25/5.75	Peso próprio	0.0	0.1	0.3	0.0	-0.3	0.0		0.0	0.0	-0.1	0.0	-0.3	0.0	
				Cargas permanentes	-0.0	-0.1	0.3	-0.0	0.3	-0.0		-0.0	-0.0	0.1	-0.0	0.3	-0.0	
				Sobrecarga	1.1	0.3	0.1	0.7	0.0	-0.0		1.6	-0.1	-0.1	0.2	0.0	-0.0	
				Vento +X	-4.2	-0.3	0.3	-3.2	0.2	-0.0		-4.2	0.2	-0.1	-3.2	0.2	-0.0	
				Vento -X	4.2	0.3	-0.3	3.2	-0.2	0.0		4.2	-0.2	0.1	-3.2	-0.2	0.0	
				Vento +Y	-2.9	-1.6	-0.0	-1.0	0.0	-0.0		-2.9	0.8	-0.0	-1.0	0.0	-0.0	
	Piso 3	30x15	0.50/3.00	Peso próprio	2.0	1.6	0.0	1.0	-3.0	0.0		2.9	-3.8	0.0	1.0	-0.0	0.0	
				Cargas permanentes	0.1	0.0	-0.0	0.0	-3.1	-0.0		3.1	-3.0	0.2	0.0	-0.1	-0.0	
				Sobrecarga	-0.1	-0.0	0.0	-0.0	3.1	0.0		-0.1	3.0	-0.2	-0.0	3.1	0.0	
				Vento +X	1.1	-0.1	-0.1	0.2	-0.0	-0.0		-1.7	0.8	-3.1	0.2	-0.2	-0.0	
				Vento -X	-1.1	0.1	0.1	-0.2	0.0	0.0		1.7	-0.8	3.1	-0.2	0.2	0.0	
				Vento +Y	0.0	0.0	-0.0	0.0	-0.0	-0.0		0.0	-0.0	0.0	0.0	-0.0	-0.0	
PE	Piso 2	50x15	0.30/6.50	Peso próprio	1.6	0.2	-0.1	0.2	-0.3	-3.0		1.1	0.1	-0.1	0.2	-0.3	-3.0	
				Cargas permanentes	-4.1	-0.2	-0.9	-0.1	0.4	-3.0		-4.1	-0.1	-0.7	-0.1	0.4	-3.0	
				Sobrecarga	0.0	0.0	-0.0	0.0	-0.0	-0.0		0.0	0.0	-0.0	0.0	-0.0	-3.0	
				Vento +X	1.4	-2.1	0.0	-1.4	0.0	-0.0		1.4	0.0	-1.4	0.0	-0.0	-3.0	
				Vento -X	-1.4	2.1	0.0	1.4	-0.0	0.0		-1.4	0.0	1.4	-0.0	0.0	3.0	
				Vento +Y	-0.0	-0.0	-0.1	-0.3	-0.3	0.0		-0.0	-0.0	-0.0	-0.3	-0.3	3.0	
	Piso 1	50x15	0.30/6.50	Peso próprio	0.0	0.0	0.1	0.3	0.3	-3.0		0.0	-0.0	0.3	0.3	3.0	-3.0	
				Cargas permanentes	1.6	0.2	-0.1	0.2	-0.3	-3.0		1.1	0.1	-0.1	0.2	-0.3	-3.0	
				Sobrecarga	-4.1	-0.2	-0.9	-0.1	0.4	-3.0		-4.1	-0.1	-0.7	-0.1	0.4	-3.0	
				Vento +X	0.0	0.0	-0.0	0.0	-0.0	-0.0		0.0	0.0	-0.0	0.0	-0.0	-3.0	
				Vento -X	1.4	-2.1	0.0	-1.4	0.0	-0.0		1.4	0.0	-1.4	0.0	-0.0	-3.0	
				Vento +Y	-0.0	-0.0	-0.1	-0.3	-0.3	0.0		-0.0	-0.0	-0.0	-0.3	-0.3	3.0	

al
 ENG. ELENAIRA ESPPOSITO LIMA
 M.º Eng. 366/104-1 - CREA/RS 19913
 - Porto Alegre - RS

NO
 DOC
 P/ELABORAR ORÇAMENTO
 EM 24.08.2015