



BRNO UNIVERSITY OF TECHNOLOGY

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

FACULTY OF CIVIL ENGINEERING

FAKULTA STAVEBNÍ

INSTITUTE OF BUILDING STRUCTURES

ÚSTAV POZEMNÍHO STAVITELSTVÍ

MUNICIPAL CENTRE IN NIVNICE

MUNICIPAL CENTRE IN NIVNICE

D.1.3.06 CALCULATIONS

MASTER'S THESIS

DIPLOMOVÁ PRÁCE

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CALCULATION OF
COEFFICIENT a

Room		Area Si		pni				psi				pn	ps			P	
No.	Name of the room	(m2)	Flooring	kg/m2	pni*Si	ani	pni*Si*ani	kg/m2	psi*Si	asi	psi*Si*asi	kg/m2	kg/m2	an	as	kg/m2	a
FC P0.01/N2												31,69	4,52	0,92	0,90	36,21	0,91
0.01	DEPOSITORY	10,14	Epoxy	120	1217	0,7	851,76	2	20,28	0,9	18,252						
0.04	FURNITURE STORAGE	23,92	Epoxy	75	1794	1	1794	2	47,84	0,9	43,056						
0.05	ARCHIVE	16,19	Epoxy	120	1943	0,7	1359,96	2	32,38	0,9	29,142						
0.06	HALLWAY	16,9	Epoxy	5	84,5	0,8	67,6	2	33,8	0,9	30,42						
0.07	STAIRCASE	13,95	Epoxy	5	69,75	0,8	55,8	0	0	0,9	0						
0.08	ELEVATOR SHAFT	3,47	Epoxy	5	17,35	0,8	13,88	0	0	0,9	0						
0.09	CLEANING ROOM	5,38	Epoxy	5	26,9	0,7	18,83	2	10,76	0,9	9,684						
1.08	WC WOMEN	9,29	Ceramic tiles	5	46,45	0,7	32,515	3,5	32,52	0,9	29,2635						
1.09	BATHROOM WOMEN	3,27	Ceramic tiles	5	16,35	0,7	11,445	2	6,54	0,9	5,886						
1.10	WC DISABLED WOMAN	3,87	Ceramic tiles	5	19,35	0,7	13,545	3,5	13,55	0,9	12,1905						
1.11	WC DISABLED MEN	3,87	Ceramic tiles	5	19,35	0,7	13,545	3,5	13,55	0,9	12,1905						
1.12	BATHROOM MEN	3,18	Ceramic tiles	5	15,9	0,7	11,13	2	6,36	0,9	5,724						
1.13	WC MEN	6,66	Ceramic tiles	5	33,3	0,7	23,31	3,5	23,31	0,9	20,979						
1.14	STORAGE/CHANGING ROOM	15,79	Ceramic tiles	75	1184	1,1	1302,675	3,5	55,27	0,9	49,7385						
1.16	HALLWAY WITH WAITING ROOM	52,33	Ceramic tiles	10	523,3	0,8	418,64	3,5	183,2	0,9	164,8395						
1.17	SUBMISSION OFFICE	9,72	Vinyl flooring	40	388,8	1,1	427,68	8,5	82,62	0,9	74,358						
1.18	ELEVATOR	3,47	Epoxy	5	17,35	0,7	12,145	0	0	0,9	0						
1.19	STAIRCASE	13,94	Ceramic tiles	5	69,7	0,7	48,79	3,5	48,79	0,9	43,911						
2.01	MAYORS OFFICCE	23,22	Vinyl flooring	40	928,8	1	928,8	8,5	197,4	0,9	177,633						
2.02	MEETING ROOM	31,05	Vinyl flooring	20	621	0,9	558,9	8,5	263,9	0,9	237,5325						

2.03	SECRETARY	12,06	Vinyl flooring	40	482,4	1	482,4	8,5	102,5	0,9	92,259
2.04	KITCHEN	10,14	Ceramic tiles	15	152,1	1,1	159,705	3,5	35,49	0,9	31,941
2.05	STIARCASE	13,95	Ceramic tiles	5	69,75	0,8	55,8	1,5	20,93	0,9	18,8325
2.06	ELEVATOR	3,47	Epoxy	5	17,35	0,8	13,88	0	0	0,9	0
2.07	WC MEN	4,76	Ceramic tiles	5	23,8	0,7	16,66	3,5	16,66	0,9	14,994
2.08	WC WOMEN	4,32	Ceramic tiles	5	21,6	0,7	15,12	3,5	15,12	0,9	13,608
2.09	BATHROOM MEN	1,99	Ceramic tiles	5	9,95	0,7	6,965	2	3,98	0,9	3,582
2.10	BATHROOM WOMEN	3,6	Ceramic tiles	5	18	0,7	12,6	2	7,2	0,9	6,48
2.11	HALLWAY	22,77	Ceramic tiles	5	113,9	0,8	91,08	2	45,54	0,9	40,986
2.12	OFFICE	9,9	Vinyl flooring	40	396	1	396	8,5	84,15	0,9	75,735
2.13	OFFICE PRINTING	10,79	Vinyl flooring	40	431,6	1	431,6	8,5	91,72	0,9	82,5435
2.14	ROOM/STORAGE	10,46	Vinyl flooring	90	941,4	1,1	988,47	8,5	88,91	0,9	80,019
2.15	VICE MAYORS OFFICE	13,12	Vinyl flooring	40	524,8	1	524,8	8,5	111,5	0,9	100,368
2.16	OFFICE	18,17	Vinyl flooring	40	726,8	1	726,8	8,5	154,4	0,9	139,0005
TOTAL		409,11			12965		11886,83		1850		1665,148

FC P0.02										15	2	0,9	0,9	17	0,9
0.02	HVAC ROOM	20,38	Epoxy	15	305,7	0,9	275,13	2	40,76	0,9	36,684				
TOTAL		20,38			305,7		275,13		40,76		36,684				

FC P0.03										15	2	0,9	0,9	17	0,9
0.03	TECHNICAL ROOM	24,74	Epoxy	15	371,1	0,9	333,99	2	49,48	0,9	44,532				
TOTAL		24,74			371,1		333,99		49,48		44,532				

FC																	
N01.01												69,69	2,80	1,10	0,90	72,50	1,09

1.01	CUSTOMER AREA	18,8	Ceramic tiles	40	752	1,1	827,2	3,5	65,8	0,9	59,22						
1.02	SERVICE AREA	12,12	Ceramic tiles	40	484,8	1,1	533,28	3,5	42,42	0,9	38,178						
1.03	KITCHEN	5,4	Ceramic tiles	15	81	1,1	85,05	3,5	18,9	0,9	17,01						
1.04	STORAGE	29,73	Epoxy	120	3568	1,1	3924,36	2	59,46	0,9	53,514						
1.05	CLEANING ROOM	1,44	Ceramic tiles	5	7,2	0,7	5,04	3,5	5,04	0,9	4,536						
1.06	TOILET	1,26	Ceramic tiles	5	6,3	0,7	4,41	2	2,52	0,9	2,268						
1.07	BATHROOM	1,66	Ceramic tiles	5	8,3	0,7	5,81	2	3,32	0,9	2,988						
TOTAL		70,41			4907		5385,15		197,5		177,714						

FC																	
N01.02												20	8,5	0,9	0,9	28,5	0,9

1.15	CEREMONY HALL	72,96	Wooden flooring	20	1459	0,9	1313,28	8,5	620,2	0,9	558,144						
TOTAL		72,96			1459		1313,28		620,2		558,144						

CALCULATION OF COEFFICIENT b

Fire compart.	S = Area of FC(m2)	So=Area of openings	hs=clear height FC	ho= opening height	n value	S max	k coefficient	b	b taken	
P0.01/N2	409,11	51,78	2,66	1,72	0,157	52	0,035	0,211	0,5	
P0.02	20,38	0	2,64	0	0,005	20	0,009	1,108	1,11	without openings
P0.03	24,74	0	2,64	0	0,005	25	0,010	1,231	1,23	without openings
N01.01	70,41	11,51	3,04	2,04	0,200	30	0,040	0,171	0,17	
N01.02	72,96	0	6,35	0	0,005	73	0,014	1,111	1,11	fixed windows

FC P0.01/N2

Room No.	Name of the room	Si = Area of room (m2)	opening width (m)	hoi=opening height (m)	Soi= opening area (m)	Pieces	Soi*hoi	hsi=clear h. (m)	Si*hsi	
0.01	DEPOSITORY	10,14	0	0	0	0	0	2,64	26,77	
0.04	FURNITURE STORAGE	23,92	0	0	0	0	0	2,64	63,15	
0.05	ARCHIVE	16,19	0	0	0	0	0	2,64	42,74	
0.06	HALLWAY	16,9	0	0	0	0	0	2,64	44,62	
0.07	STAIRCASE	13,95	0	0	0	0	0	-	-	No window
0.08	ELEVATOR SHAFT	3,47	0	0	0	0	0	2,68	9,3	
0.09	CLEANING ROOM	5,38	0	0	0	0	0	2,64	14,2	
1.08	WC WOMEN	9,29	1	1	1	1	1	2,7	25,08	
1.09	BATHROOM WOMEN	3,27	0	0	0	0	0	2,7	8,829	
1.10	WC DISABLED WOMAN	3,87	1	1	1	1	1	2,7	10,45	
1.11	WC DISABLED MEN	3,87	1	1	1	1	1	2,7	10,45	
1.12	BATHROOM MEN	3,18	0	0	0	0	0	2,7	8,586	
1.13	WC MEN	6,66	1	1	1	1	1	2,7	17,98	
1.14	STORAGE/CHANGING ROOM	15,79	1	1	2	2	2	2,7	42,63	
1.16	HALLWAY WITH WAITING ROOM	52,33	2	2,25	4,5	1	10,125	2,9	151,8	
			2	2,59	5,18	1	13,4162			glass door
1.17	SUBMISSION OFFICE	9,72	2	0,8	1,6	1	1,28	2,9	28,19	
1.18	ELEVATOR	3,47	0	0	0	0	0	-	-	
1.19	STAIRCASE	13,94	0	0	0	0	0	2,68	37,36	Fixed window
2.01	MAYORS OFFICCE	23,22	2	1,75	3,5	1	6,125	2,95	68,5	
2.02	MEETING ROOM	31,05	2	1,75	7	2	12,25	2,95	91,6	

CALCULATION OF pv

Fire compart.	p (kg/m2)	a	b	c	pv (kg/m2)
FC P0.01/N2	36,21	0,91	0,5	1	16,476
FC P0.02	17	0,9	1,11	1	16,983
FC P0.03	17	0,9	1,23	1	18,819
FC N01.01	72,5	1,09	0,17	1	13,434
FC N01.02	28,5	0,9	1,11	1	28,472

ESCAPE PERSON No.

FC P0.01/N2

No.	Name of the room	Si = Area of room (m2)	m2/person	coefficient	E=No of escape persons	E rounded
0.01	DEPOSITORY	10,14	0	-	0	
0.04	FURNITURE STORAGE	23,92	0	-	0	
0.05	ARCHIVE	16,19	0	-	0	
0.06	HALLWAY	16,9	0	-	0	
0.07	STAIRCASE	13,95	0	-	0	
0.08	ELEVATOR SHAFT	3,47	0	-	0	
0.09	CLEANING ROOM	5,38	0	-	0	
1.08	WC WOMEN	9,29	0	-	0	
1.09	BATHROOM WOMEN	3,27	0	-	0	
1.10	WC DISABLED WOMAN	3,87	0	-	0	
1.11	WC DISABLED MEN	3,87	0	-	0	
1.12	BATHROOM MEN	3,18	0	-	0	
1.13	WC MEN	6,66	0	-	0	
1.14	STORAGE/CHANGING ROOM	15,79	0	-	0	
1.16	HALLWAY WITH WAITING ROOM	52,33	0	-	0	
1.17	SUBMISSION OFFICE	9,72	5	-	1,944	2
1.18	ELEVATOR	3,47	0	-	0	
1.19	STAIRCASE	13,94	0	-	0	
2.01	MAYORS OFFICCE	23,22	5	-	4,644	5
2.02	MEETING ROOM	31,05	1,5	-	20,7	21

2.03	SECRETARY	12,06	5	-	2,412	3
2.04	KITCHEN	10,14	0	-	0	
2.05	STIARCASE	13,95	0	-	0	
2.06	ELEVATOR	3,47	0	-	0	
2.07	WC MEN	4,76	0	-	0	
2.08	WC WOMEN	4,32	0	-	0	
2.09	BATHROOM MEN	1,99	0	-	0	
2.10	BATHROOM WOMEN	3,6	0	-	0	
2.11	HALLWAY	22,77	0	-	0	
2.12	OFFICE	9,9	5	-	1,98	2
2.13	OFFICE PRINTING	10,79	5	-	2,158	3
2.14	ROOM/STORAGE	10,46	0	-	0	
2.15	VICE MAYORS OFFICE	13,12	5	-	2,624	3
2.16	OFFICE	18,17	5	-	3,634	4
TOTAL		409,11				43

FC P0.02						
0.02	HVAC ROOM	20,38	0	-	0	0
TOTAL		20,38				0

FC P0.03						
0.03	TECHNICAL ROOM	24,74	0	-	0	0
TOTAL		24,74				0

FC N01.01						
1.01	CUSTOMER AREA	18,8	3	-	6,27	7
1.02	SERVICE AREA	12,12	5	-	2,42	3
1.03	KITCHEN	5,4	0	-	0	
1.04	STORAGE	29,73	0	-	0	
1.05	CLEANING ROOM	1,44	0	-	0	
1.06	TOILET	1,26	0	-	0	
1.07	BATHROOM	1,66	0	-	0	

1.NP	1.08	WC WOMEN	9,29	1
	1.10	WC DISABLED WOMAN	3,87	1
	1.11	WC DISABLED MEN	3,87	1
	1.13	WC MEN	6,66	1
	1.14	STORAGE/CHANGING ROOM	15,79	2
2.NP	2.02	MEETING ROOM	31,05	7
	2.04	KITCHEN	10,14	1
	2.08	WC WOMEN	4,32	1
	2.10	BATHROOM WOMEN	3,6	1
	2.14	PRINTING ROOM/STORAGE	10,46	3,5
	2.15	VICE MAYORS OFFICE	13,12	3,5
TOTAL				23

FC P0.02 WITHOUT OPENINGS

FC P0.03 WITHOUT OPENINGS

FC N01.01 pv=13,434kg/m2

North -east facade 12,691 2,59 7,2 18,648 68,06 68 2,25

1.NP	1.01	CUSTOMER AREA	18,8	7,511
	1.04	STORAGE	29,73	5,18
TOTAL				12,691

South-east facade 13,475 2,45 5,5 13,475 100 100 2,99

1.NP	1.01	CUSTOMER AREA	18,8	13,475
TOTAL				13,475

FC N01.02 pv=28,472kg/m2

North-west facade 16,6 7 4,2 29,05 57,14 57 7,34

1-2.NP	1.15	CEREMONY HALL	72,96	16,6
TOTAL				16,6