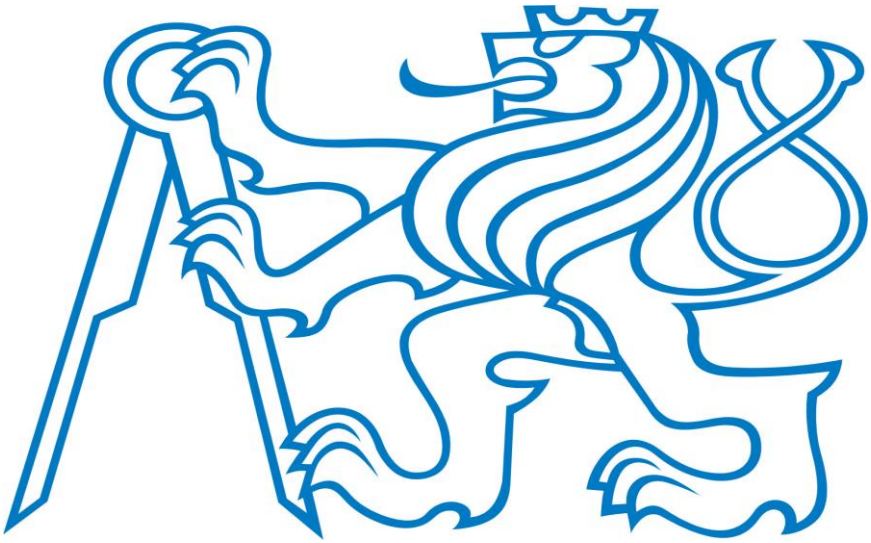
Czech Technical University in Prague
FACULTY OF CIVIL ENGINEERING



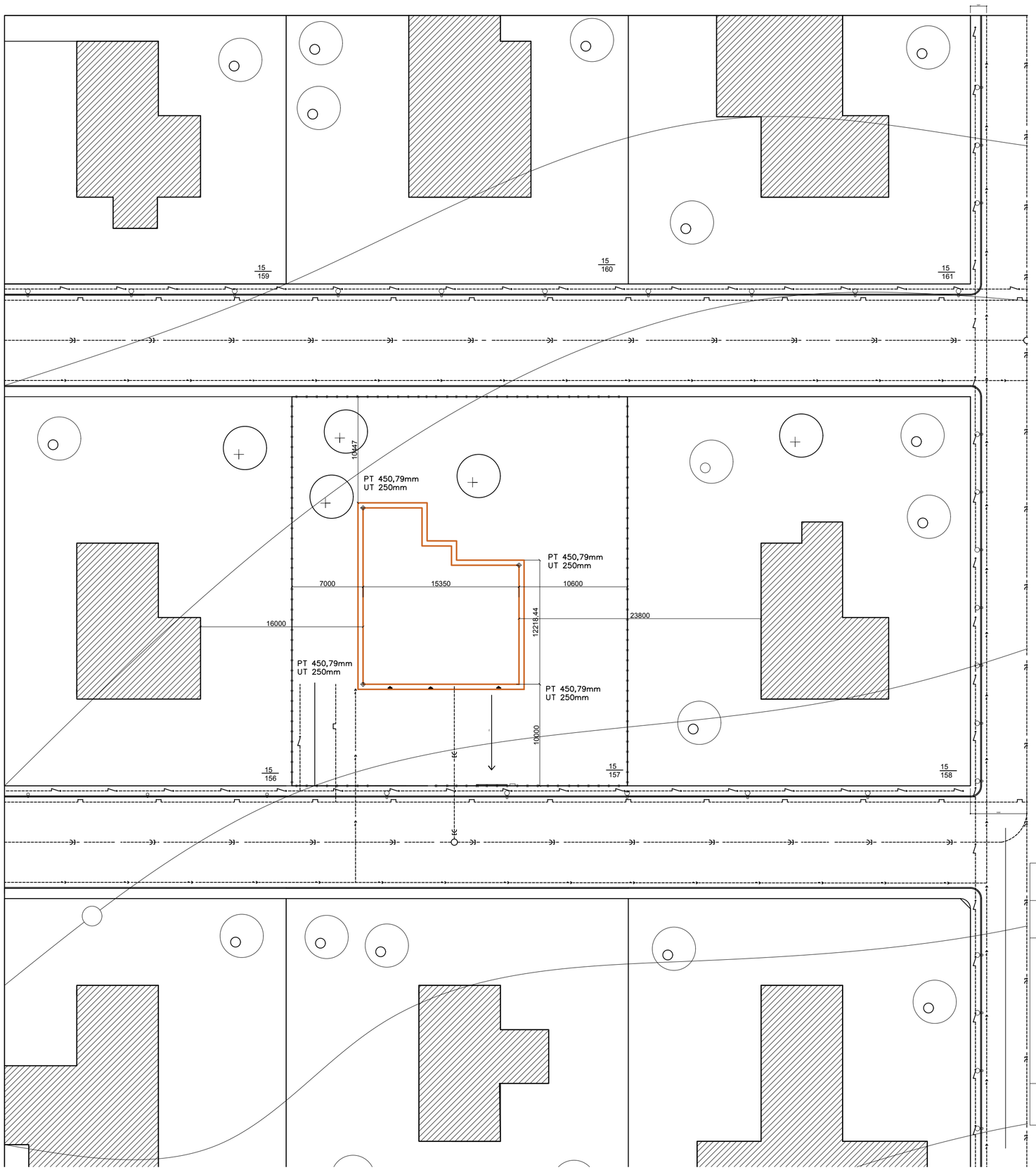
Building structure technical report

Thesis

RESIDENTIAL APARTMENT BUILDING

Name:Yosufi Mohammad Fayez
Supervisor: doc Ing Hana Gattermayrova CSc
Accademic year:2016/17

Signature:



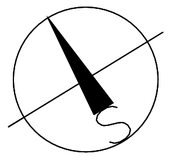
EXISTING NETWORKS
LEGEND:

- EXISTING UNDERGROUND ELECTRICAL WIRING
- EXISTING WATER PIPELINE
- TELECOMMUNICATION - TELEPHONE , TV , INTERNET
- EXISTING SANITARY SEWER PIPE FROM CONCRETE
- EXISTING GAS PIPE LINE

NEW NETWORKS LEGEND:

- NEW UNDERGROUND ELECTRICAL WIRING 3X32A
- NEW WATER PIPELINE SYSTEM DN 32
- TELECOMMUNICATION - TELEPHONE , TV , INTERNET
- NEW SANITARY SEWER PIPE FROM PVC DN 125
- NEW DESIGNED OF RAIN DRAINAGE PIPE FROM PVC DN 125
- GAS PIPE SYSTEM STAINLESS STEEL DIAMETER 100mm

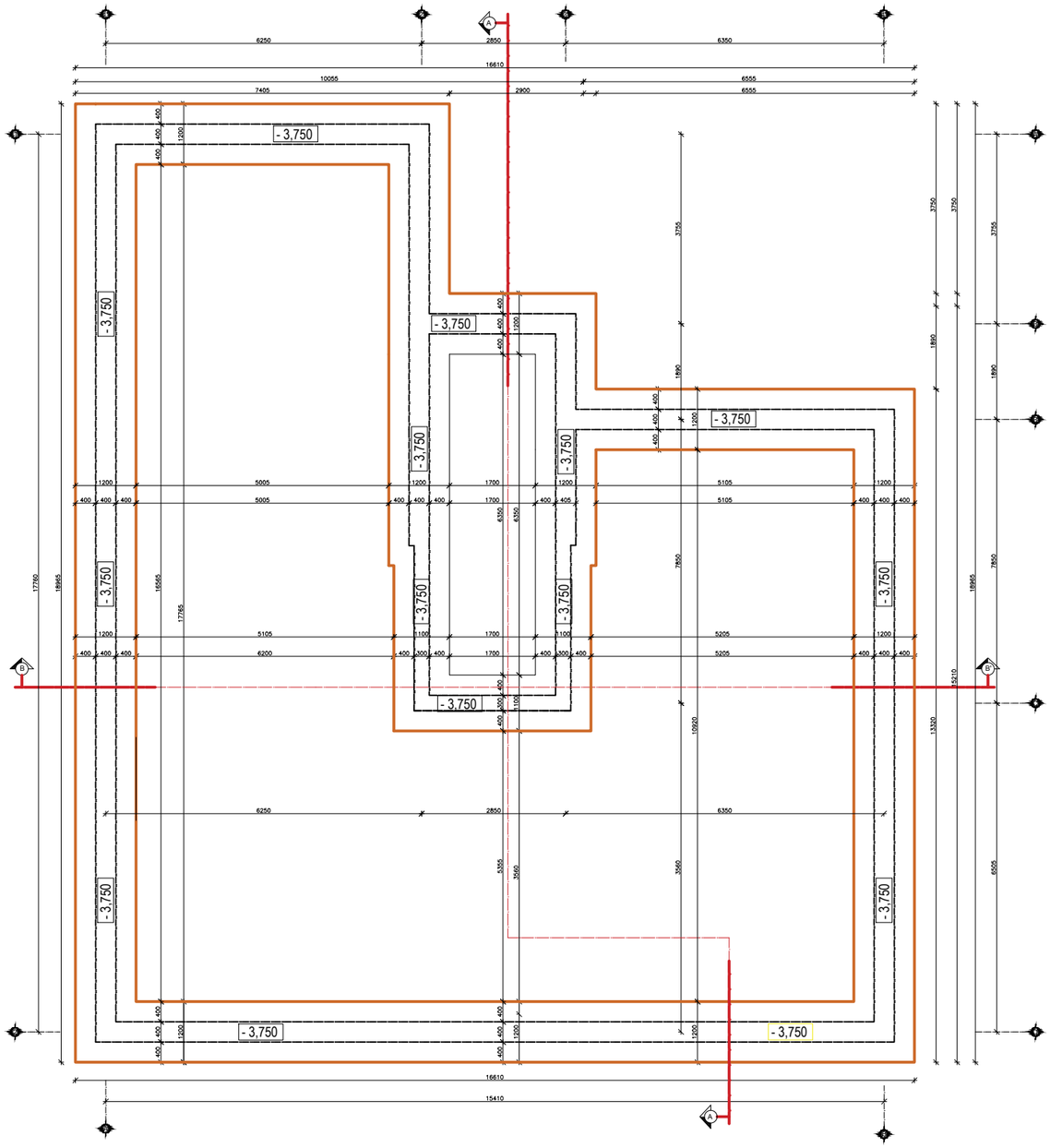
- EXISTING TREE
- DESIGNED TREE
- PUBLIC LIGHTING
- 15/157 VERIFICATION OF HOUSES. PLOT NUMBER OF THE HOUSE 245m^2
  NEW SANITARY SEWER PIPE FROM PVC DN

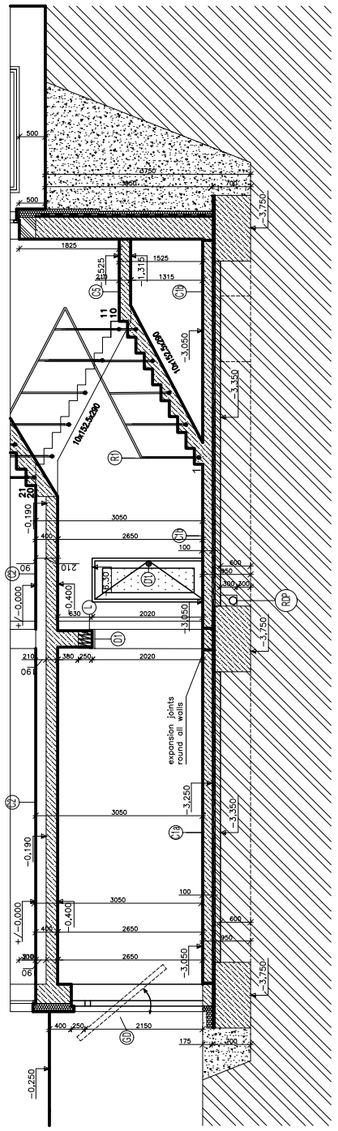


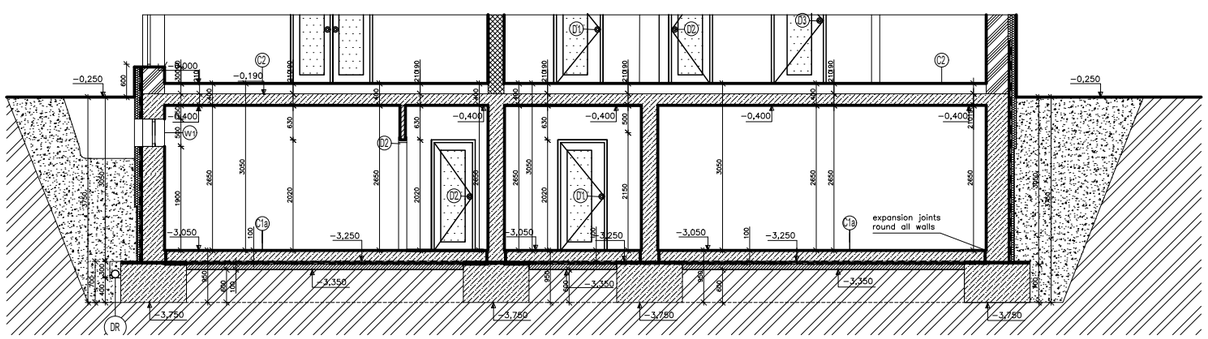
DEVELOPED BY: Yosufi mohammad fayez	CONTROLLED: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineering ČVUT	
General Purpose: Apartment house (multifunction)		
Attachment name: Site plan		

Fakulta stavební
ČVUT

Format:	A2
Date:	13/10.2016
Purpose	Building permit
Archive issues	----------
Scale. 1:300	Drawing No. 01







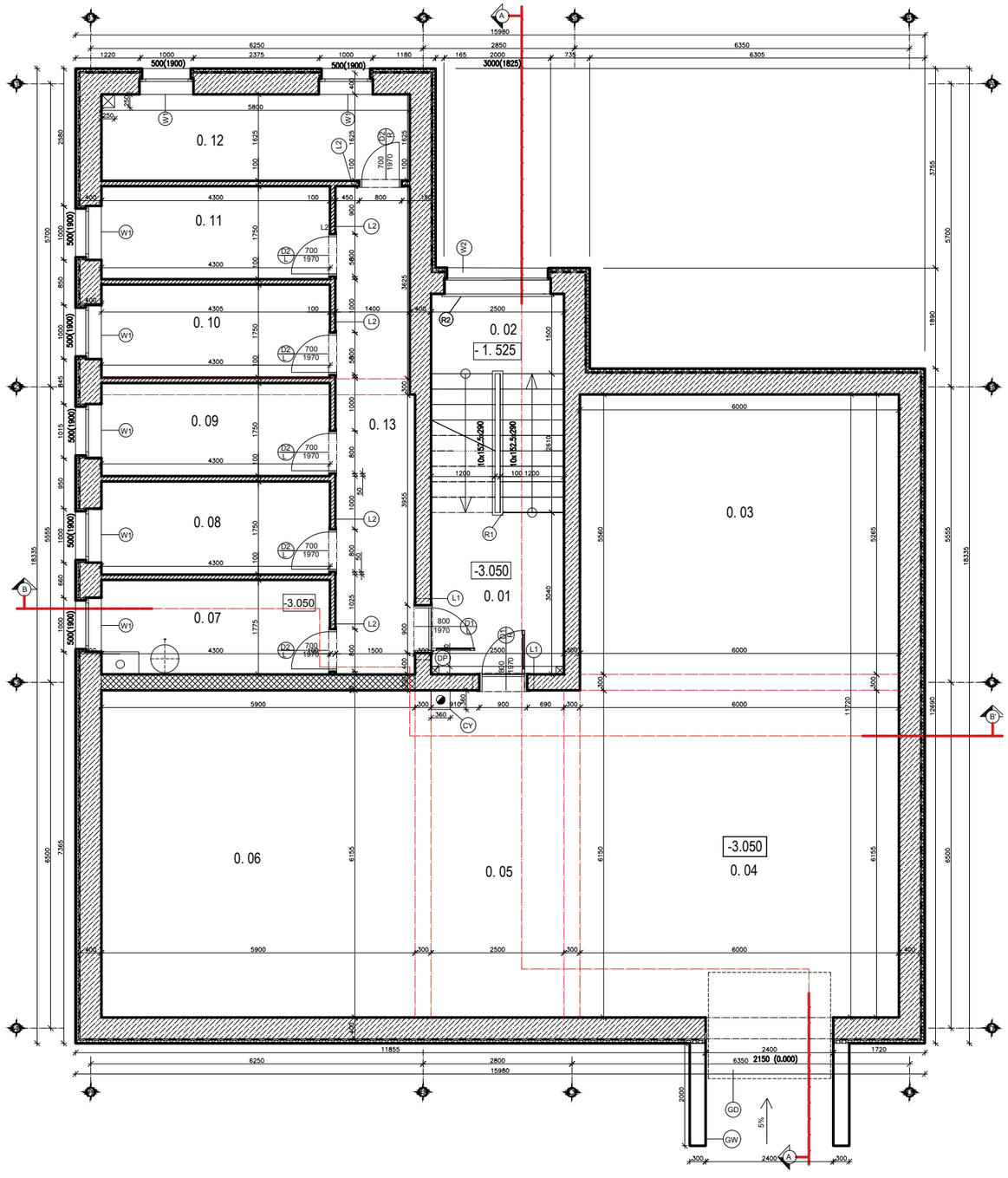
LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE WALL,SLABS t = 300mm , C 25/30 B500B
  WALLS b = 300mm ,400mm ,SLAB hs = 100mm. FOOTING b = 1200mm, h = 700mm
- POROTHERM 30 P15 T 300mm PROFILE M 10 NON LOAD
  BEARING WALL WITH AN ADDITIONAL MORTAR.
  POROTHERM FOR INTERNAL WALLS T = 300mm.
- POROTHERM 40 P15 T = 400mm PROFI M 10 LOAD BEARING
  WALL WITH AN ADDITIONAL MORTAR.
- EPS FOR THERMAL INSULATION. t = 60mm.
- 2 x 4 mm BITUMEN WATER PROOFING. t = 8mm
- BACKFILL SOIL
- ORIGINAL SOIL
- EXPANSION JOINTS 40x100mm

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Jan Salak . CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)		PARE:	
Attachment name: Foundation plan			Scale. 1:100 / Drawing No. 02

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----



Area table

Room#	Function	M 2	Flooring	Notes
0. 01	STAIRCASE	10.28	COLOR	
0. 02	CORRIDOR	7.6	concrete cladding	10mm
0. 03	PARKING	33.36	Bautch car praking finishes	
0. 04	PARKING	36.9	Bautch car praking finishes	
0. 05	PARKING	19.07	Bautch car praking finishes	
0. 06	PARKING	36.29	Bautch car praking finishes	
0. 07	BOILER ROOM	7.64	concrete cladding	10mm
0. 08	STORAGE ROOM	7.64	concrete cladding	
0. 09	STORAGE ROOM	7.64	concrete cladding	
0. 10	STORAGE ROOM	7.64	concrete cladding	
0. 11	STORAGE ROOM	7.64	concrete cladding	
0. 12	VENTILATION ROOM	9.43	concrete cladding	
0. 13	CORRIDOR	13.371	concrete cladding	

SPECIFICATION OF THE LINTELS

NUMBERS	TOTAL LENGTH (mm)	D.ON THE SUPPORT (mm)	PIECES IN THE ASSEMBLY	LINTEL TYPE
L1	238x70x1250	125	2	PORO. 7
L2	85x70x1250	125	6	PORO. 7

LEGEND OF THE MATERIALS:

REINFORCE CONCRETE WALL t = 400mm ,300mm
C 30/37 B500B hs=210mm,hB=500mm,bB=300mm.

XPS for thermal insulations t = 60mm

POROTHERM 8 P 8 T 100mm profi M 10
YTONG FOR PARTITION t = 110mm.

POROTHERM 30 P15 T 300mm PROFI M 10
POROTHERM FOR INTERNAL BARRIERS t = 300mm.

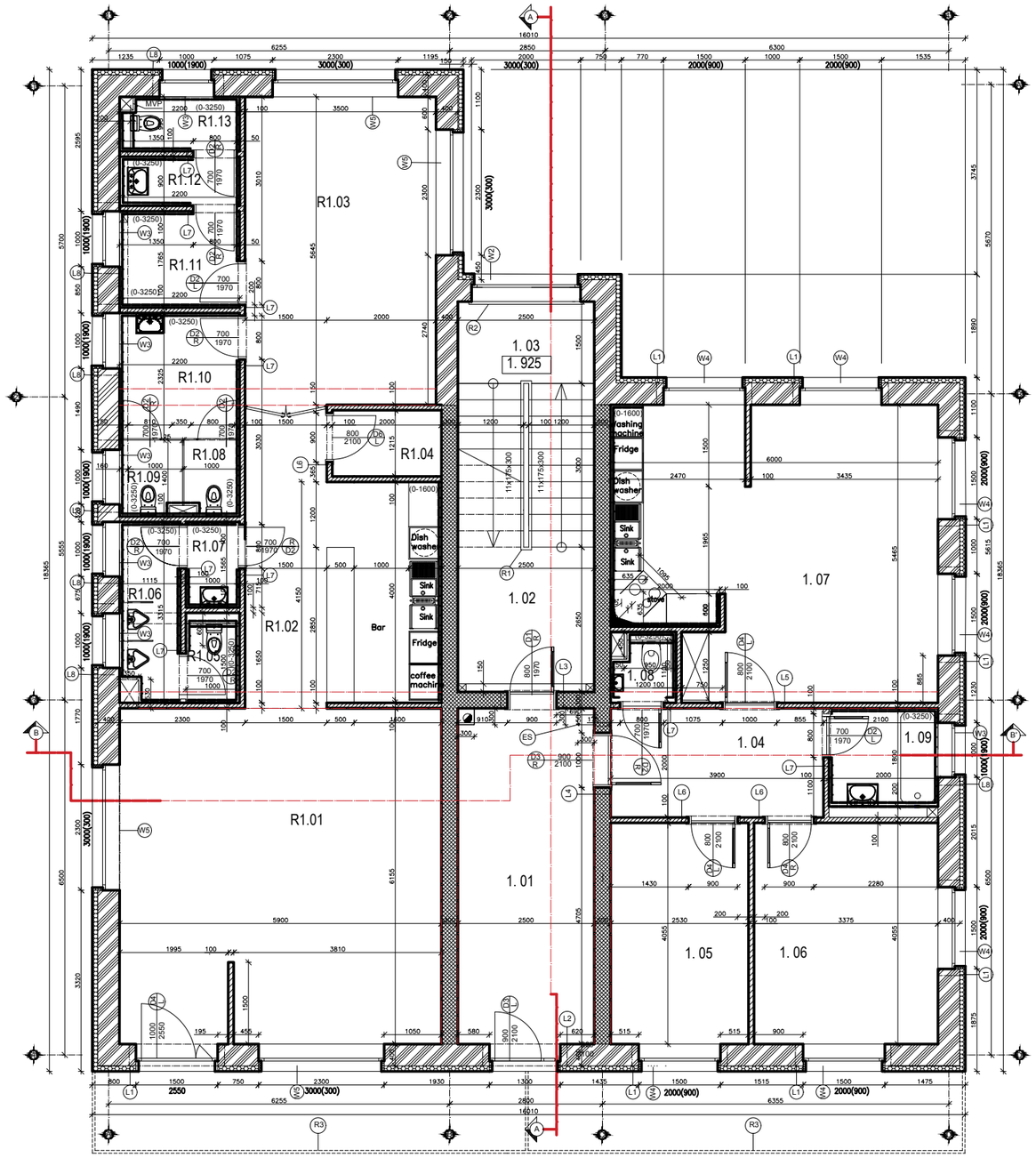
2 x 4 mm bitumen water proofing

SYMBOLS:

GD GARAGE DOOR MAIN ENTRANCE FOR CARS
W1 WINDOW EQUIPPED WITH SAFETY GLASS
W2 WINDOW EQUIPPED WITH SAFETY GLASS
GW GRAVITY CONCRETE WALL
CY CHIMNEY
DP VERTICAL DRAINAGE PIPES

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)		PARE:	Format: A3
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: Basement Plan			Scale. 1:100 / Drawing No. 03



Area table

Room#	Function	M 2	Flooring	Notes
1. 01	CORRIDOR	15.39	CERAMIC TILES	30X60
1. 02	CORRIDOR	6.625	CERAMIC TILES	30X60
1. 03	STAIRCASE	11.25	EPOXY LAYER	3mm
1. 04	CORRIDOR	7.76	pure gray color	-
1. 05	BED ROOM 1	11.52	PVC plank wooden color	4mm, 2.2kg/m2
1. 06	BED ROOM 2	13.69	PVC plank wooden color	4mm, 2.2kg/m2
1. 07	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
1. 08	TOILET	1.32	CERAMIC TILES	22.5X45
1. 09	BATHROOM	3.7	CERAMIC TILES	22.5X45
R1.01	COFFEE ROOM	36.17	CERAMIC TILES	45X45
R1.02	BAR	14.58	CERAMIC TILES	45X45
R1.03	TEA ROOM	19.76	CERAMIC TILES	45X45
R1.04	TECHNICAL ROOM	2.43	CERAMIC TILES	45X45
R1.05	MEN TOILET	1.5	CERAMIC TILES	22.5X45
R1.06	MEN TOILET	3.67	CERAMIC TILES	22.5X45
R1.07	CORRIDOR	1.565	CERAMIC TILES	22.5X45
R1.08	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.09	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.10	CORRIDOR	4.65	CERAMIC TILES	22.5X45
R1.11	CORRIDOR	3.883	CERAMIC TILES	22.5X45
R1.12	WASHROOM	1.98	CERAMIC TILES	22.5X45
R1.13	TOILET	2.189	CERAMIC TILES	22.5X45

SPECIFICATION OF THE LINTELS

NUMBERS	TOTAL LENGTH (mm)	D.ON THE SUPPORT (mm)	PIECES IN THE ASSEMBLY	LINTEL TYPE
L1	338x70x1750	125	8	PORO. 7 + 150mm EPS
L2	338x70x1500	125	1	PORO. 7 + 150mm EPS
L3	238x70x1250	125	1	PORO. 7
L4	238x70x1250	125	1	PORO. 7
L5	85x70x1250	125	1	PORO. 7
L6	85x70x1250	125	3	PORO. 7
L7	85x70x1250	125	9	PORO. 7
L8	338x70x1250	125	9	PORO. 7 + 150mm EPS

EXPLANATION OF THE SYMBOLS:

- MVP Mechanical ventilation DN = 150 mm
- R1 STAIRCASE RAILING. t = 50mm,h = 1000mm
- R2 LANDING OF STAIRCASE. t = 50mm,h = 1000mm
- R2 BALCONY RAILING. t = 50mm,h = 1200mm
- W2 WINDOWS EQUIPPED WITH SAFETY GLASS.
- W2 WINDOWS EQUIPPED WITH SAFETY GLASS.
- ES EXHAUST STACK
- CERAMIC TILES 22.5X45 WITH ELEVATION OF 0-3250.

LEGEND OF THE MATERIALS:

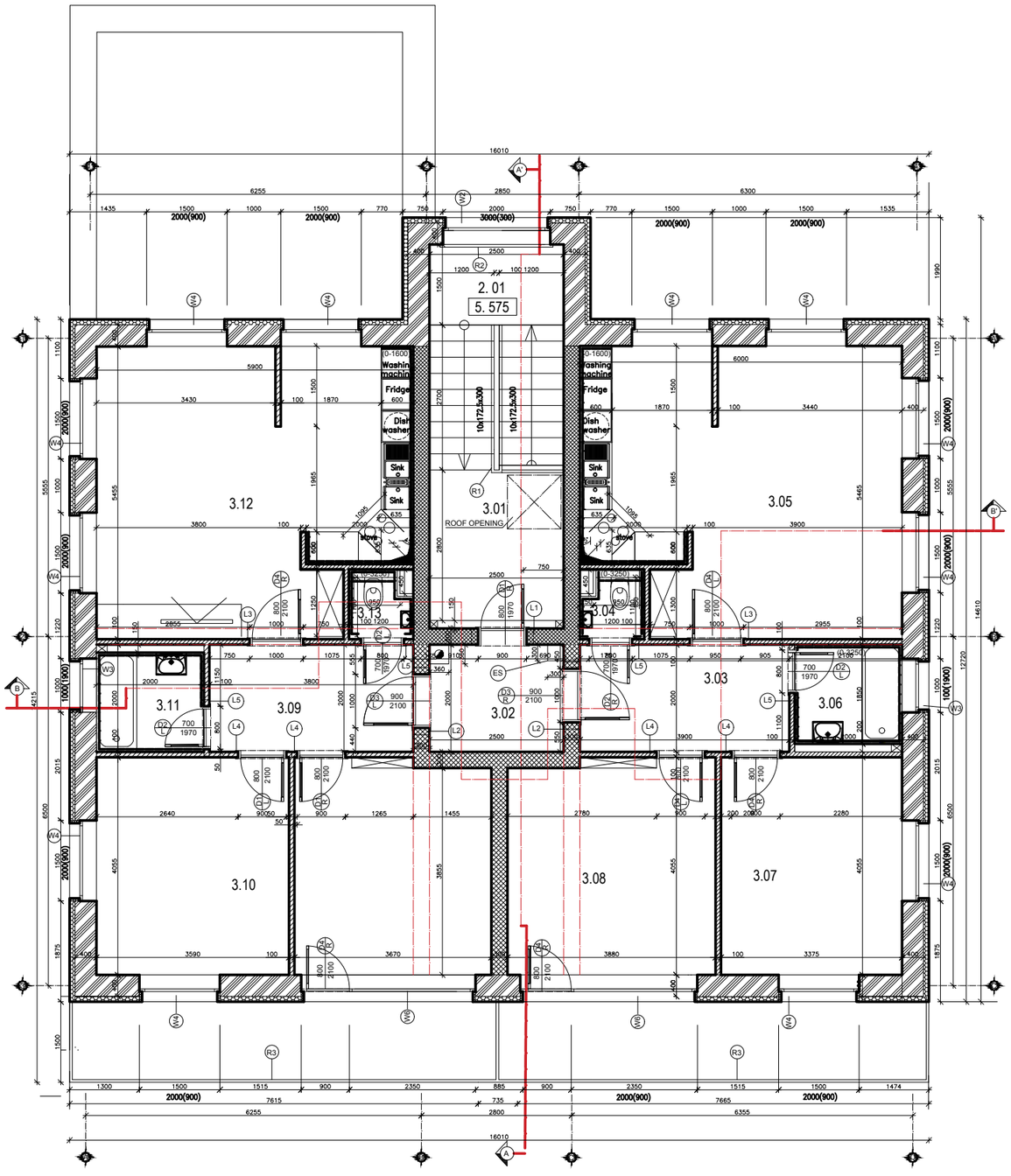
- POROTHERM 30 P15 T 300mm PROFILE M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR ROUND THE STAIRCASE. POROTHERM FOR INTERNAL WALLS T = 300mm.
- POROTHERM 30 P15 T 300mm PROFILE M 10 NON LOAD BEARING WALL WITH AN ADDITIONAL MORTAR. POROTHERM FOR INTERNAL WALLS T = 300mm.
- POROTHERM 40 P15 T = 400mm PROFI M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR.
- EPS FOR THERMAL INSULATION. t =100mm,150mm
- POROTHERM 8 P 8 T 100mm POROTHERM PROFI M 10 GYPSUM BOARD IS USED ROUND THE INSTALLATION SHAFT.

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		PARE:
Attachment name: Ground floor Plan		Scale. 1:100 / Drawing No. 04

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----



Area table

Room#	Function	M 2	Flooring	Notes
3. 01	CORRIDOR	7	CERAMIC TILES	30X60
3. 02	CORRIDOR	5	CERAMIC TILES	30X60
3. 03	CORRIDOR	7.8	PVC plank wooden color	4mm, 2.2kg/m2
3. 04	TOILET	1.32	CERAMIC TILES	22.5X45
3. 05	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
3. 06	BATHROOM	3.70	CERAMIC TILES	22.5X45
3. 07	BED ROOM 1	13.67	PVC plank wooden color	4mm, 2.2kg/m2
3. 08	BED ROOM 2	15.74	PVC plank wooden color	4mm, 2.2kg/m2
3. 09	CORRIDOR	7.6	PVC plank wooden color	4mm, 2.2kg/m2
3. 10	BED ROOM	14.56	PVC plank wooden color	4mm, 2.2kg/m2
3. 11	BATHROOM	4	CERAMIC TILES	22.5X45
3. 12	KITCHEN ROOM	28.09	PVC plank wooden color	4mm, 2.2kg/m2
3. 13	TOILET	1.32	CERAMIC TILES	22.5X45

SPECIFICATION OF THE LINTELS

NUMBERS	TOTAL LENGTH (mm)	D.ON THE SUPPORT (mm)	PIECES IN THE ASSEMBLY	LINTEL TYPE
L1	238x70x1250	125	1	PORO. 7
L2	238x70x1250	125	1	PORO. 7
L3	85x70x1250	125	1	PORO. 7
L4	85x70x1250	125	1	PORO. 7
L5	85x70x1250	125	1	PORO. 7

LEGEND OF THE MATERIALS:

POROTHERM 30 P15 T 300mm PROFILE M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR ROUND THE STAIRCASE. POROTHERM FOR INTERNAL WALLS T = 300mm.

POROTHERM 30 P15 T 300mm PROFILE M 10 NON LOAD BEARING WALL WITH AN ADDITIONAL MORTAR. POROTHERM FOR INTERNAL WALLS T = 300mm.

POROTHERM 40 P15 T = 400mm PROFI M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR.

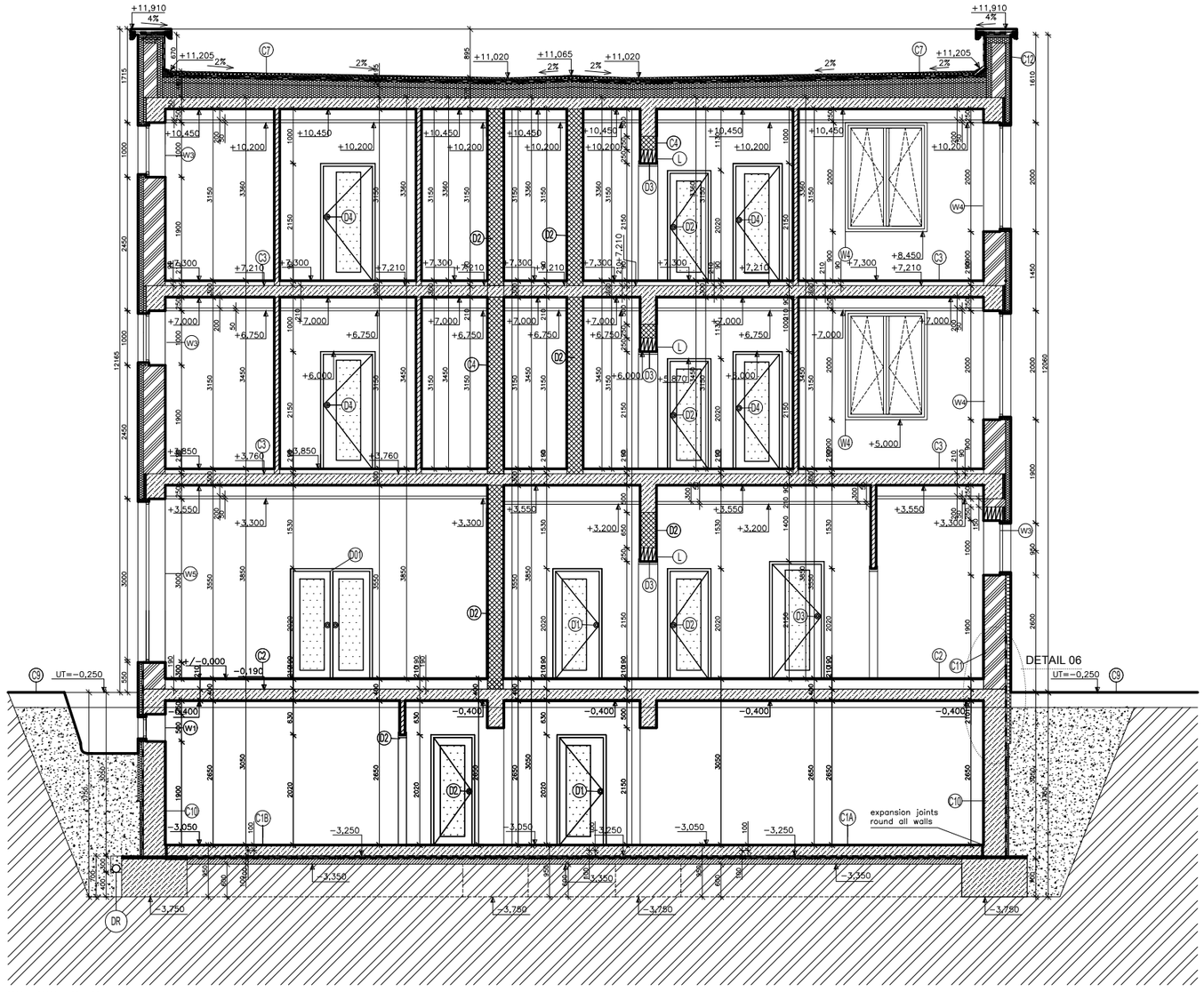
EPS FOR THERMAL INSULATION. t = 150mm. 100mm

POROTHERM 8 P 8 T 100mm POROTHERM PROFI M 10

W2 WINDOWS EQUIPPED WITH SAFETY GLASS.
W3 WINDOWS EQUIPPED WITH SAFETY GLASS.
W4 WINDOWS EQUIPPED WITH SAFETY GLASS.
W6 WINDOWS EQUIPPED WITH SAFETY GLASS.
ES EXHAUST STACK

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)		PARE:	Format: A3
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: 2nd and 3th floors plan			Scale. 1:100 / Drawing No. 05



LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE WALL,SLABS t = 300mm , C 30/37 B500B BEAM b = 300mm SLAB hs = 210mm.
- POROTHERM 30 P15 T 300mm PROFILE M 10 NON LOAD BEARING WALL WITH AN ADDITIONAL MORTAR. POROTHERM FOR INTERNAL WALLS T = 300mm.
- POROTHERM 40 P15 T = 400mm PROFI M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR.
- EPS FOR THERMAL INSULATION. t = 150mm. 100mm
- POROTHERM 8 P 8 T 100mm POROTHERM PROFI M 10
- 2 x 4 mm BITUMEN WATER PROOFING. t = 8mm

EXPLANATION OF THE SYMBOLS:

- (W3) WINDOWS EQUIPPED WITH SAFETY GLASS.
- (W4) WINDOWS EQUIPPED WITH SAFETY GLASS.
- (W5) WINDOWS EQUIPPED WITH SAFETY GLASS.
- (L) LINTELS ABOVE EACH OPENING. tl.250mm
- (RO) ROOF OPENING.
- (DR) DRAINAGE PIPES.
- (D#) DOORS.

COMPOSITION C1A:

SLAB ON GRADE BASEMENT PARKING COMPOSITIONS.

-BAUTCH CAR PARKING FINISHED	tl.10mm	
-MONOLITHIC RC SLAB	tl.100mm	
-BITUMEN WATER PROOFING A 500H	tl.8 mm	1,02Kgmsq
-LEVELING CONCRETE	tl.100mm	
TOTAL TL.	218mm	

COMPOSITIO C4:

- INTERNAL PLASTER	5mm
- POROTHERM	300mm
- PLASTER	5mm
TOTAL.....	310mm

COMPOSITION C1B:

SLAB ON GRADE BASEMENT STAIRCASE COMPOSITIONS.

CONCRETE CLADDING	tl.10mm	
-MONOLITHIC RC SLAB	tl.100mm	
-BITUMEN WATER PROOFING A 500H	tl.8 mm	1,02Kgmsq
-LEVELING CONCRETE	100mm	
TOTAL TL.	218mm	

ROOF COMPOSITION:C7

- PLASTER	tl.5mm
- CONCRETE SLAB	tl.210mm
- LEVELING SLOPE BY EPS	tl.(150-275mm)
- POLYSTYRENE FOAMS XPS	tl.150mm
- BITUMEN WATER PROOFING	tl.8mm 2.2kg/m2
- GRAVEL	tl.50mm
TOTAL	tl.573mm

COMPOSITION C2:

TYPICAL GROUND FLOOR COMPOSITIONS.

-PVC PLANK FOR FLOOR FINISHED	tl.4mm, 2.2kg/m2
-LEVELING CONCRETE	tl.50 -60mm
-IMPACT SOUND INSULATION - REGIFLOOR	tl.126mm
-MONOLITHIC RC SLAB	tl.210mm
TOTAL TL.	tl.400mm

TERRAIN COMPOSITION:C9

1. PAVEMENT	100 mm
2. FRACTION BED LAYERS	50mm
3. FRACTION CRUSHER	100mm
4. FRACTION CRUSHER	150mm
5. BACK FILL SOIL	
TOTAL TL.	318mm

COMPOSITION C3:

TYPICAL FLOOR COMPOSITIONS.

-PVC PLANK FINAL FINISHED	tl.4mm, 2.2kg/m2
-LEVELING CONCRETE	tl.30mm
-IMPACT SOUND INSULATION - FOAM GLASS	tl.56mm
-MONOLITHIC RC SLAB	tl.210mm
-AIR GAP	tl.200mm
-PLASTER BOARD CEILING	tl.50mm
TOTAL TL.	tl.540mm

COMPOSITION OF C10,C11,C12 CAN BE PLOT IT MY EACH SPECIFIED DETAILS.

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	

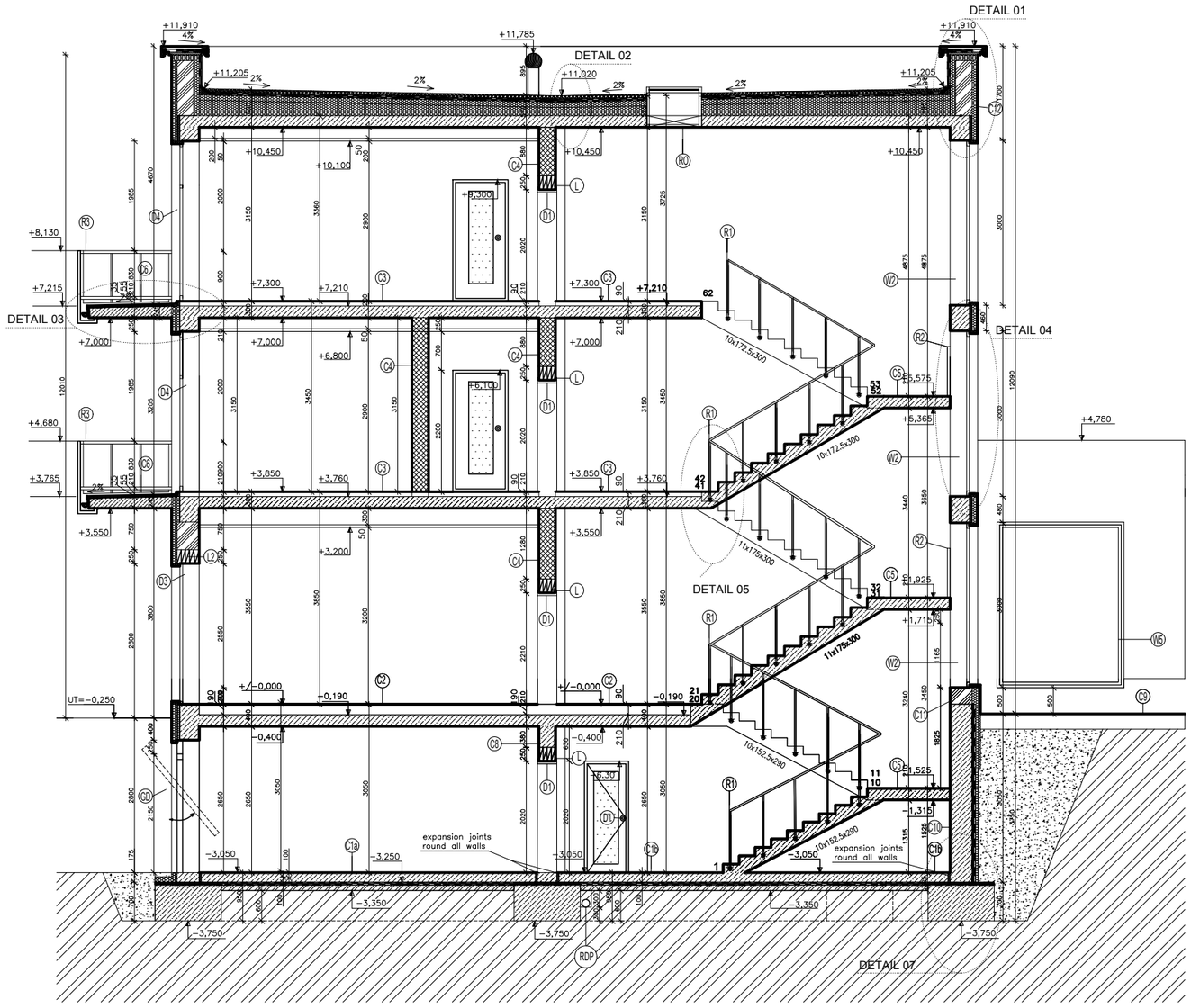
General Purpose: Apartment house (multifunction)

PARE:

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----
Scale. 1:100	Drawing No. 06

Attachment name: Section B-B



LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE WALL,SLABS t = 300mm , C 30/37 B500B BEAM b = 300mm SLAB hs = 210mm.
- POROTHERM 30 P15 T 300mm PROFILE M 10 NON LOAD BEARING WALL WITH AN ADDITIONAL MORTAR. POROTHERM FOR INTERNAL WALLS T = 300mm.
- POROTHERM 40 P15 T = 400mm PROFI M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR.
- EPS FOR THERMAL INSULATION. t = 150mm. 100mm
- POROTHERM 8 P 8 T 100mm POROTHERM PROFI M 10
- 2 x 4 mm BITUMEN WATER PROOFING. t = 8mm

EXPLANATION OF THE SYMBOLS:

- (R1) STAIRCASE RAILING. t = 50mm,h = 1000mm
- (R2) BALCONY RAILING. t = 50mm,h = 1000mm
- (W2) WINDOWS EQUIPPED WITH SAFETY GLASS.
- (W6) WINDOWS EQUIPPED WITH SAFETY GLASS.
- (L) LINTELS ABOVE EACH OPENING. tl.250mm
- (RO) ROOF OPENING.

COMPOSITION C1A:

SLAB ON GRADE BASEMENT PARKING COMPOSITIONS.

-BAUTCH CAR PARKING FINISHED	tl.10mm
-MONOLITHIC RC SLAB	tl.100mm
-BITUMEN WATER PROOFING A 500H	tl.8 mm 1,02Kgmsq
-LEVELING CONCRETE	tl.100mm
TOTAL TL.	218mm

COMPOSITIO C4:

- INTERNAL PLASTER	5mm
- POROTHERM	300mm
- PLASTER	5mm
TOTAL.....	310mm

ROOF COMPOSITION:C7

- PLASTER	tl.5mm
- CONCRETE SLAB	tl.210mm
- LEVELING SLOPE BY EPS	tl.(150-275mm)
- POLYSTYRENE FOAMS XPS	tl.150mm
- BITUMEN WATER PROOFING	tl.8mm 2.2kg/m2
- GRAVEL	tl.50mm
TOTAL	tl.573mm

COMPOSITION C1B:

SLAB ON GRADE BASEMENT STAIRCASE COMPOSITIONS.

-CERAMIC TILES + ADHESIVE SEALANT	tl.10mm
-MONOLITHIC RC SLAB	tl.100mm
-BITUMEN WATER PROOFING A 500H	tl.8 mm 1,02Kgmsq
-LEVELING CONCRETE	100mm
TOTAL TL.	218mm

COMPOSITION C5:

TYPICAL STAIRS LANDING COMPOSITIONS.

-EPOXY PAINT	tl.5mm
-LANDING RC SLAB	tl.210mm
- PLASTER	tl.5mm
TOTAL TL.	220mm

COMPOSITIO C8:

- INTERNAL PLASTER	5mm
- REINFORCED WALL	300mm
- PLASTER	5mm
TOTAL.....	310mm

COMPOSITION C2:

TYPICAL GROUND FLOOR COMPOSITIONS.

-PVC PLANK FOR FLOOR FINISHED	tl.4mm, 2.2kg/m2
-LEVELING CONCRETE	tl.50 -60mm
-IMPACT SOUND INSULATION - REGIFLOOR	tl.126mm
-MONOLITHIC RC SLAB	tl.210mm
TOTAL TL.	tl.400mm

BALCONY COMPOSITION:C6

- WEAR LAYER- FROST RESISTANCE CERAMIC TILES TO CEMENT. tl.15-20mm
- SYSTEM SCHLUTER. tl.30mm
- REINFORCED CONCRETE SLAB SCHOCK ISOKORB TYPE K. tl.210mm
- ADHESIVE WITH REINFORCED NETWORK.
- DISCOLOURATION FACADE GRAVEL.

TERRAIN COMPOSITION:C9

1. PAVEMENT	100 mm
2. FRACTION BED LAYERS	50mm
3. FRACTION CRUSHER	100mm
4. FRACTION CRUSHER	150mm
5. BACK FILL SOIL	
TOTAL TL.	318mm

COMPOSITION OF C10,C11,C12 CAN BE PLOT IT MY EACH SPECIFIED DETAILS.

COMPOSITION C3:

TYPICAL FLOOR COMPOSITIONS.

-PVC PLANK FINAL FINISHED	tl.4mm, 2.2kg/m2
-LEVELING CONCRETE	tl.30mm
-IMPACT SOUND INSULATION - FOAM GLASS	tl.56mm
-MONOLITHIC RC SLAB	tl.210mm
-AIR GAP	tl.200mm
-PLASTER BOARD CEILING	tl.50mm
TOTAL TL.	tl.550mm

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	

Fakulta stavební ČVUT

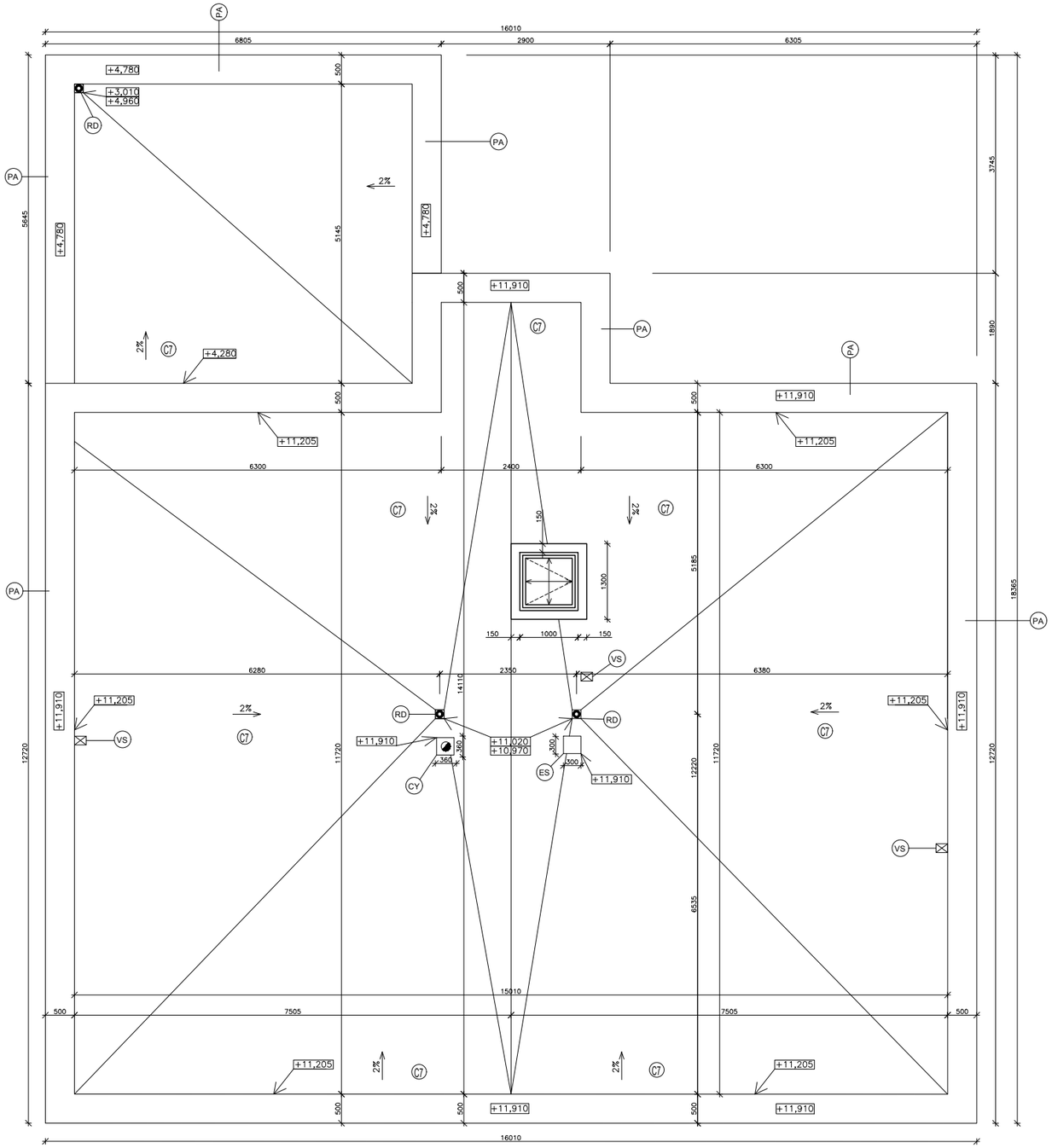
General Purpose: Apartment house (multifunction)

PARE:

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----

Attachment name: Section A-A

Scale. 1:100 | Drawing No. 07



DR

RAIN DRAINAGE SCUPPERS LORO-RAINSTAR®
ATTIC WITH EMERGENCY GLUE

VS

VENTILATION STACKS
-VIV 8/200 ; Ø 200mm
TOTAL COMPLETE OF THE HEAD 400mm

PA

PARAPET OF THE ATTIC WITH
SLOPE OF 4%

CY

CHIMNEY WITH ELEVATION OF 785mm

C7

- CONCRETE SLAB	tl.210mm
- LEVELING SLOPE BY EPS	tl.(150-275mm)
- POLYSTYRENE FOAMS XPS	tl.150mm
- BITUMEN WATER PROOFING	tl.8mm 2.2kg/m2
- GRAVEL	tl.50mm
TOTAL	tl.563mm

ES EXHAUST STACK

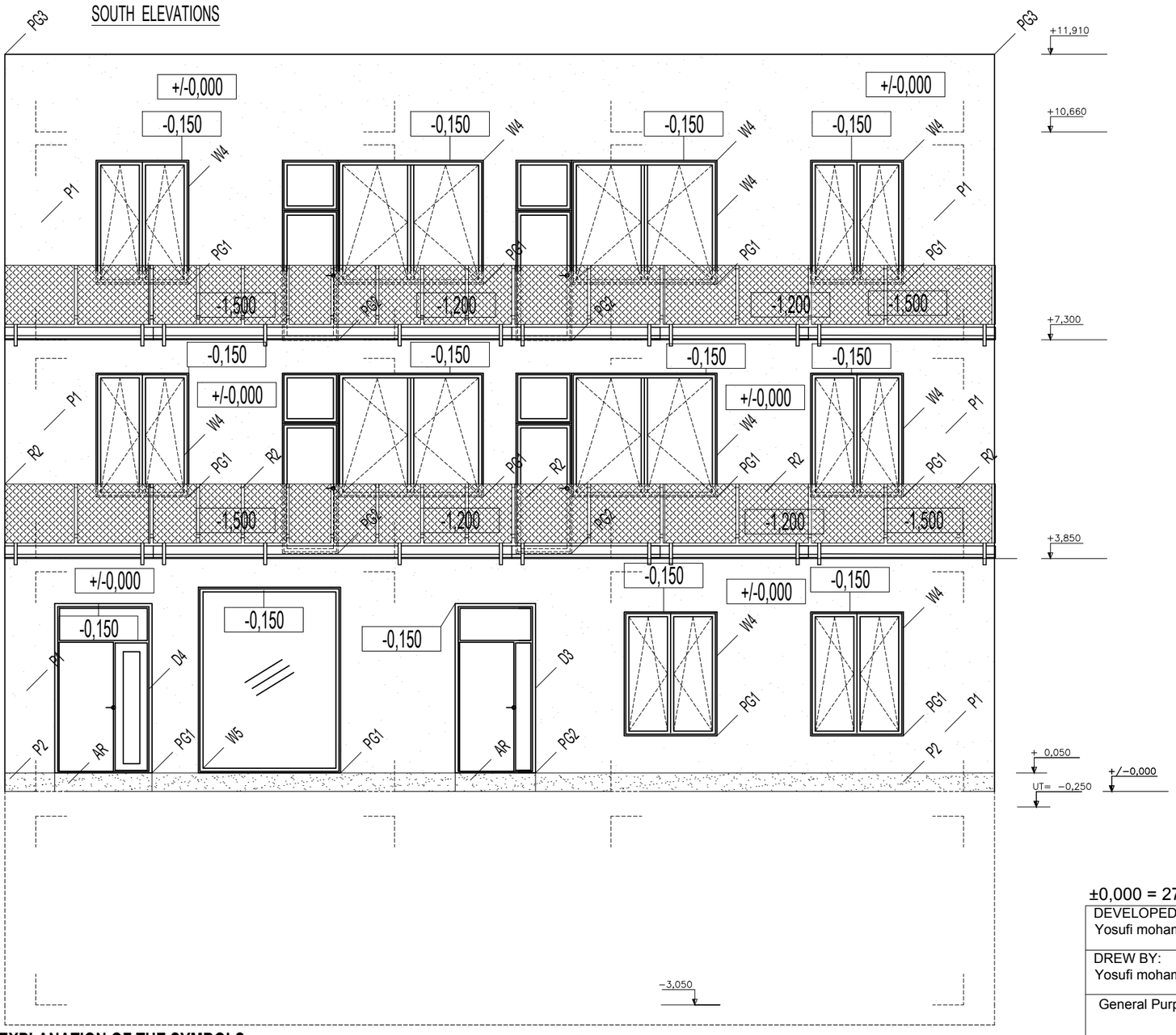
±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)	PARE:	
Attachment name: Roof plan		

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----
Scale. 1:100	Drawing No. 08

SOUTH ELEVATIONS



EXPLANATION OF THE SYMBOLS:

FACADE OF THE BUILDING:

- (P1) -weber.pas aqua Balance thin plaster
  Easily workable colored pasty plaster, comprising an organic binder
  silicone silicate thin plaster progressive self-cleaning effect -light gray. TL= 5mm
- (P2) -Similar process but a bit different color weber.pas aqua Balance thin plaster
  Easily workable colored pasty plaster, comprising an organic binder
  silicone silicate thin plaster progressive self-cleaning effect -dark brown.
- (AR) -Existing ramping
- (PG#) - PARAPET GALVANIZED
- (PG1) -Seal of the windows tl=0.7mm
- (PG2) -Seal of the doors tl=0.7mm
- (PG3) -Seal of the roof attic
- (W4) Aluminium window equipped with safety glass
- (PG5) Aluminium window equipped with safety glass.
- (R2) Baloney rails tl =1200mm.
- (UT) Designed terrain (topsoil removal)
- (D3) -Glass door with aluminum frame and safety rails- main entrance of the building.
- (D4) -Glass door with aluminum frame and safety rails- main entrance of the cafeteria and buffet.

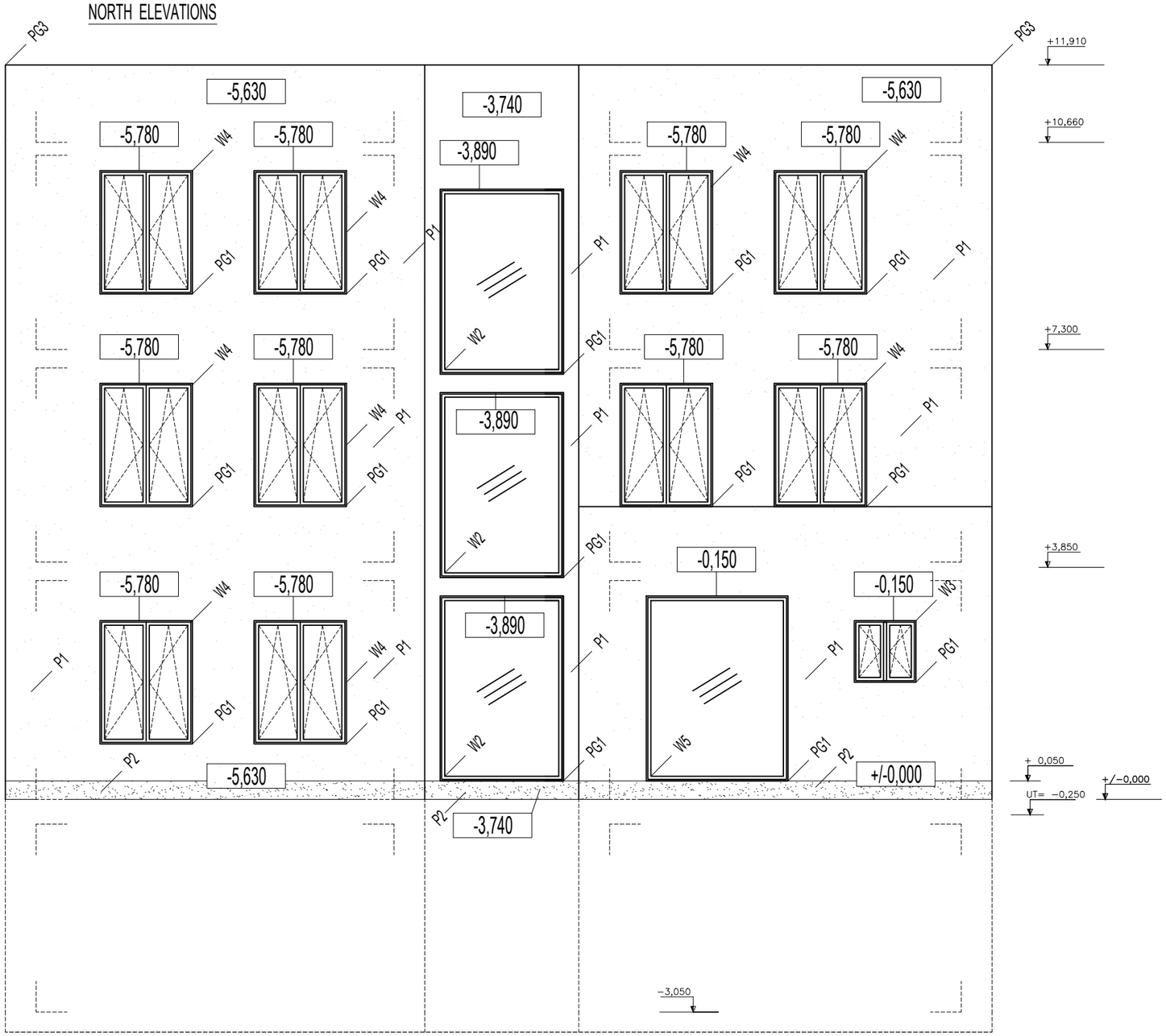
±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		PARE:
Attachment name: south elevation		

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----
Scale. 1:100	Drawing No. 09

NORTH ELEVATIONS



EXPLANATION OF THE SYMBOLS:

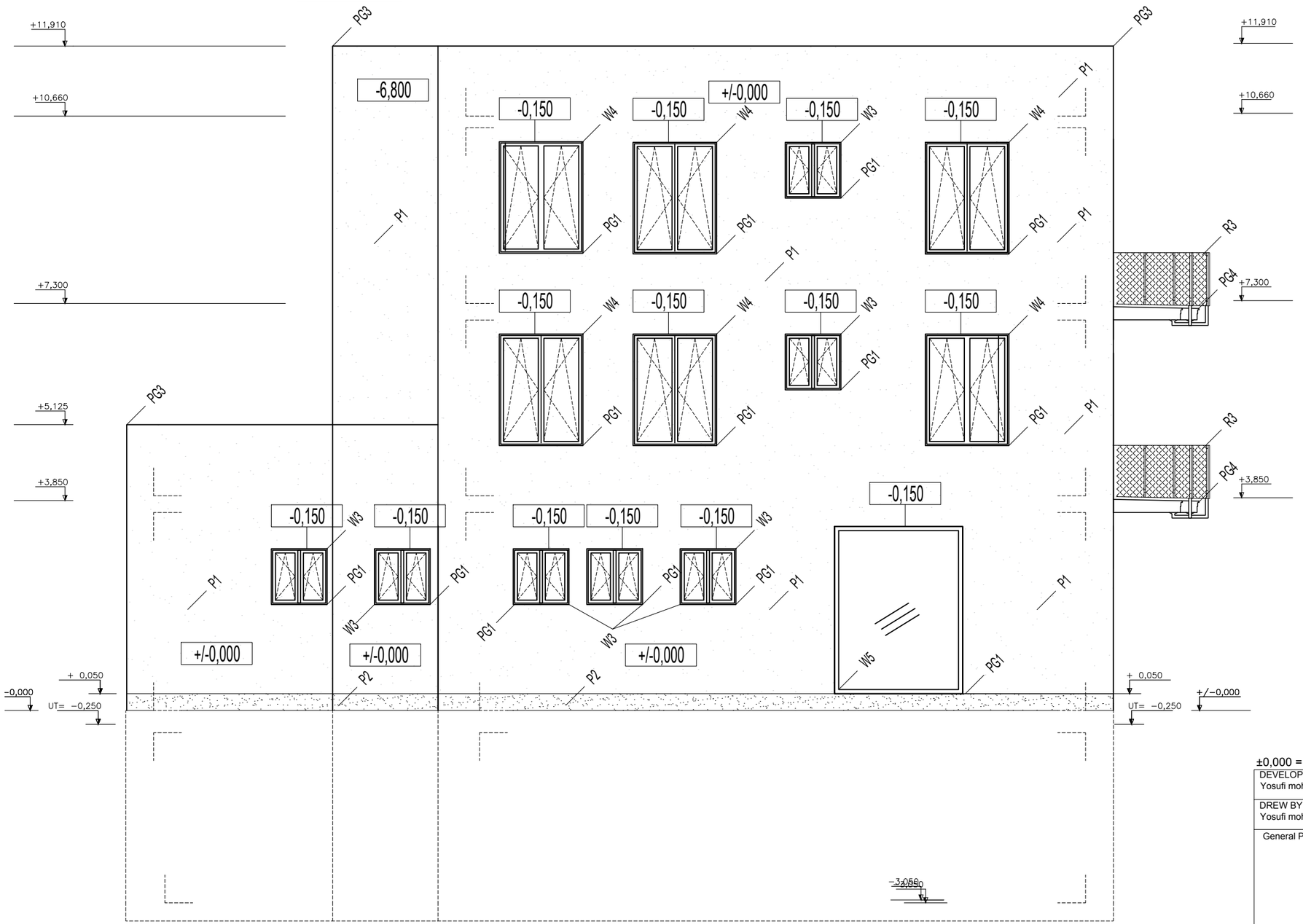
FACADE OF THE BUILDING:

- (P1) -weber.pas aqua Balance thin plaster Easily workable colored pasty plaster, comprising an organic binder silicone silicate thin plaster progressive self-cleaning effect -light gray. TL= 5mm
- (P2) -Similar process but a bit different color weber.pas aqua Balance thin plaster Easily workable colored pasty plaster, comprising an organic binder silicone silicate thin plaster progressive self-cleaning effect -dark brown.
- (W2&5) Aluminium window equipped with safety glass.
- (PG#) - PARAPET GALVANIZED
- (PG1) -Seal of the windows tl=0.7mm
- (PG2) -Seal of the doors tl=0.7mm
- (PG3) -Seal of the roof attic
- (W3-4) Aluminium window equipped with sa
- (R2) Baloney rails tl =1200mm.
- (UT) Designed terrain (topsoil removal)

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)		PARE:	Format: A3
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: north elevation			Scale. 1:100 / Drawing No. 10

WEST ELEVATIONS



EXPLANATION OF THE SYMBOLS:

FACADE OF THE BUILDING:

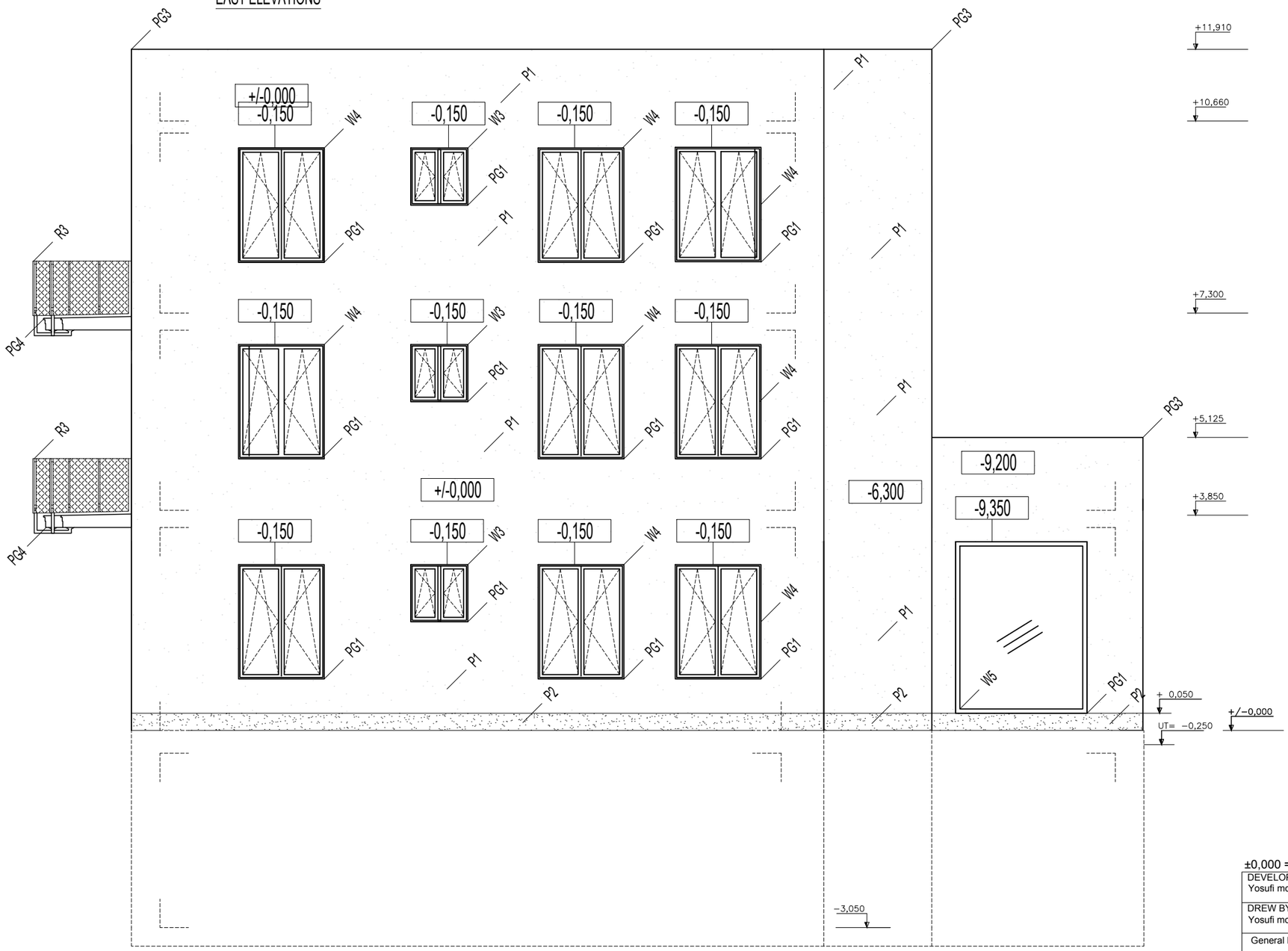
- P1 -weber.pas aqua Balance thin plaster
  Easily workable colored pasty plaster, comprising an organic binder
  silicone silicate thin plaster progressive self-cleaning effect -light gray. TL= 5mm
- P2 -Similar process but a bit different color weber.pas aqua Balance thin plaster
  Easily workable colored pasty plaster, comprising an organic binder
  silicone silicate thin plaster progressive self-cleaning effect -dark brown.
- W3-4 -Aluminium window equipped with safety glass.
- PG5 Aluminium window equipped with safety glass.
- R3 Baloney rails tl =1200mm.
- UT Designed terrain (topsoil removal)

- PG# - PARAPET GALVANIZED
- PG1 -Seal of the windows tl=0.7mm
- PG2 -Seal of the doors tl=0.7mm
- PG3 -Seal of the roof attic
- PG4 -Seal of the balcony tl=0.7mm

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)		PARE:	Format: A3
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: west elevation			Scale. 1:100 / Drawing No. 11

EAST ELEVATIONS



EXPLANATION OF THE SYMBOLS:

FACADE OF THE BUILDING:

- P1 -weber.pas aqua Balance thin plaster
  Easily workable colored pasty plaster, comprising an organic binder
  silicone silicate thin plaster progressive self-cleaning effect -light gray. TL= 5mm
- P2 -Similar process but a bit different color weber.pas aqua Balance thin plaster
  Easily workable colored pasty plaster, comprising an organic binder
  silicone silicate thin plaster progressive self-cleaning effect -dark brown.
- W3-4 -Aluminium window equipped with safety glass.
- PG5 Aluminium window equipped with safety glass.
- R3 Baloney rails tl =1200mm.
- UT Designed terrain (topsoil removal)

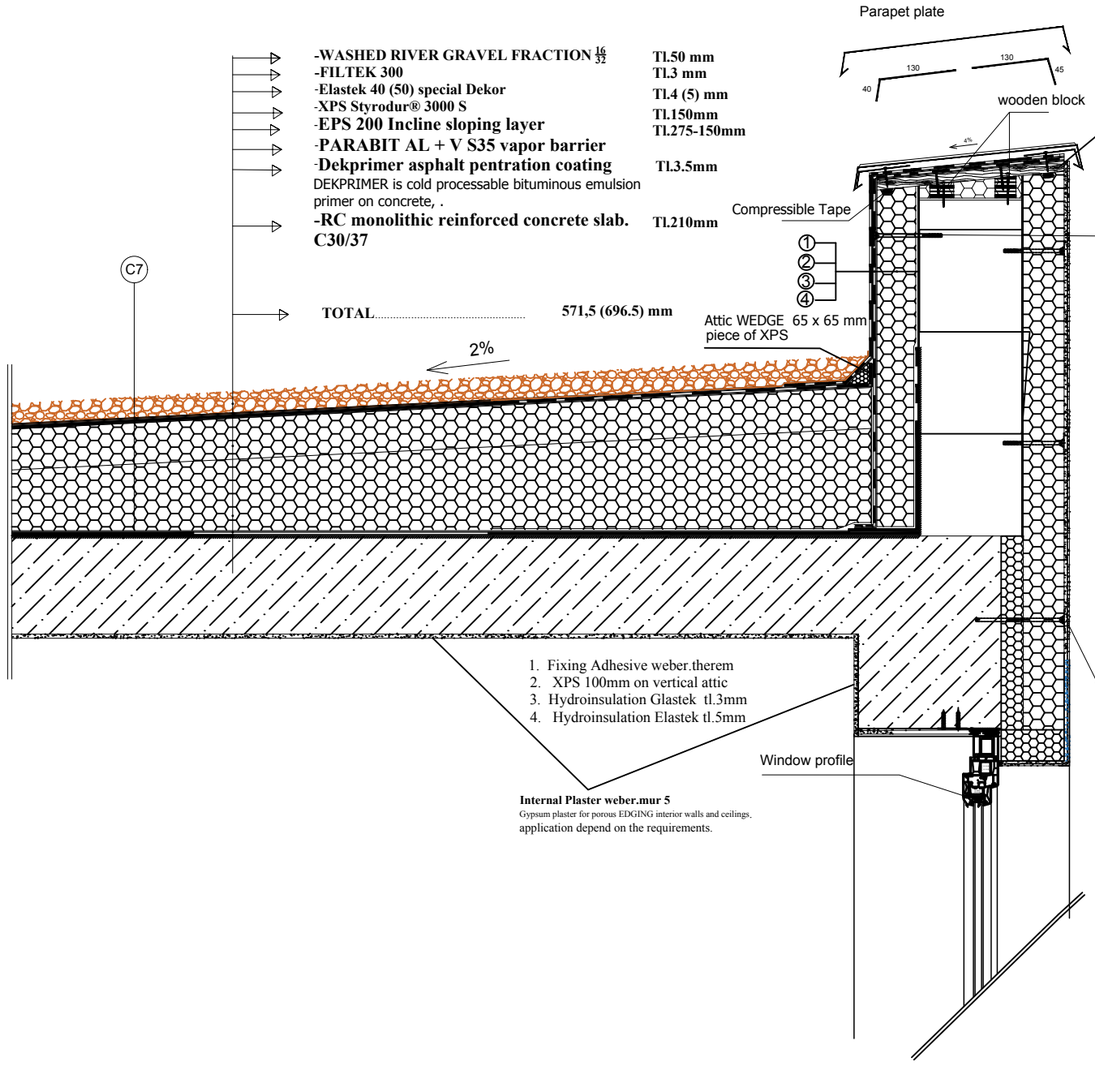
- PG# - PARAPET GALVANIZED
- PG1 -Seal of the windows tl=0.7mm
- PG2 -Seal of the doors tl=0.7mm
- PG3 -Seal of the roof attic
- PG4 -Seal of the balcony tl=0.7mm

±0,000 = 278,55 m ASL

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)	PARE:	
Attachment name: east elevation		

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----
Scale. 1:100	Drawing No. 12



-WASHED RIVER GRAVEL FRACTION $\frac{16}{32}$ **Tl.50 mm**
-FILTEK 300 **Tl.3 mm**
-Elastek 40 (50) special Dekor **Tl.4 (5) mm**
-XPS Styrodur® 3000 S **Tl.150mm**
-**EPS 200 Incline sloping layer** **Tl.275-150mm**
-**PARABIT AL + V S35 vapor barrier**
-**Dekprimer asphalt pentration coating** **Tl.3.5mm**
DEKPRIMER is cold processable bituminous emulsion primer on concrete, .
-RC monolithic reinforced concrete slab. C30/37 **Tl.210mm**

TOTAL..... **571,5 (696.5) mm**

Internal Plaster weber.mur 5
Gypsum plaster for porous EDGING interior walls and ceilings, application depend on the requirements.

mechanical fasteners.
profile depend on the specific requirements.

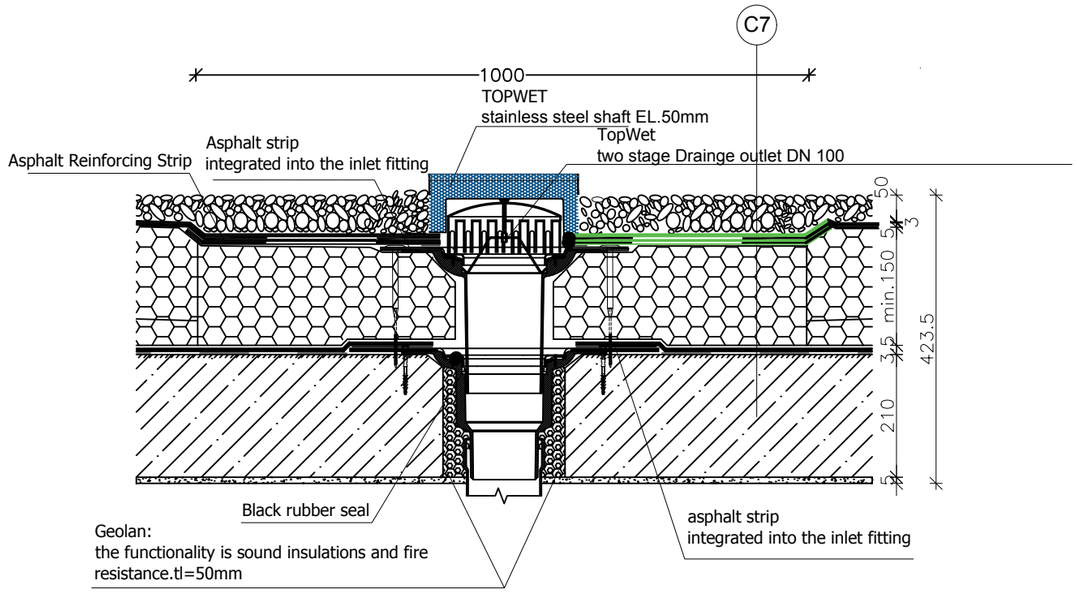
External finishing

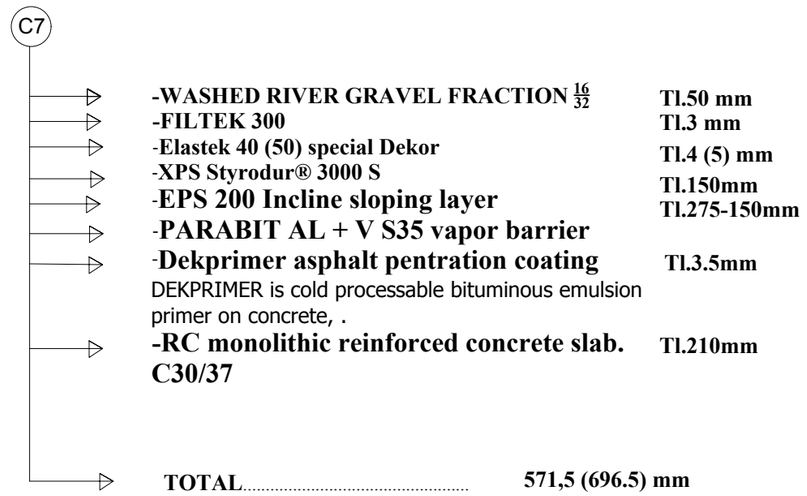
-POROTHERM 30 P15 PROFILE M 10 with an additional morter. **Tl.300mm**
-First Layer Adhesive Dektherm Standard. the component is one adhesive cement with amount of 40% and the plate surface is 4kg/msq. **Tl.10mm**
-**Facade polystyrene EPS 70F.** high quality and less water absorption capacity which makes a positive functionality. **Tl.100mm**
-Base Layer with Reinforcing fabric mesh. the amount of glass fiber is 145g/msq and can be implemented by a vertex R117 then penetrated to layer of backfilling DECK THERM STANDARD. **Tl.6mm**
-Coating under Plaster UNI. the colored primer based on the acrylate dispersion for the uniform absorption and also color of substrate the total consumption is 0.18kg/msq.
-**weber.pas aqua Balance thin plaster . can be implemented very easily workable colored pasty plaster and compressed with organic binder silicone silicate self-cleaning.** **Tl.5mm**

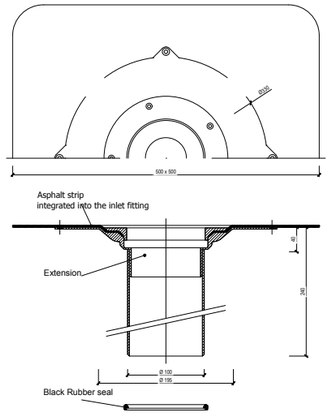
TOTAL.....421mm

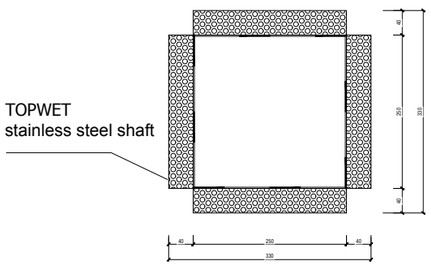
COMMENTARY:
for further justification of the thermal performance please have a look to the calculations parts of the U value.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: A3
			Date: 13/10.2016
			Purpose building permit
			Archive Issues -----
Attachment name: D01 roof attic details			Scale. 1:10 Drawing No.D01

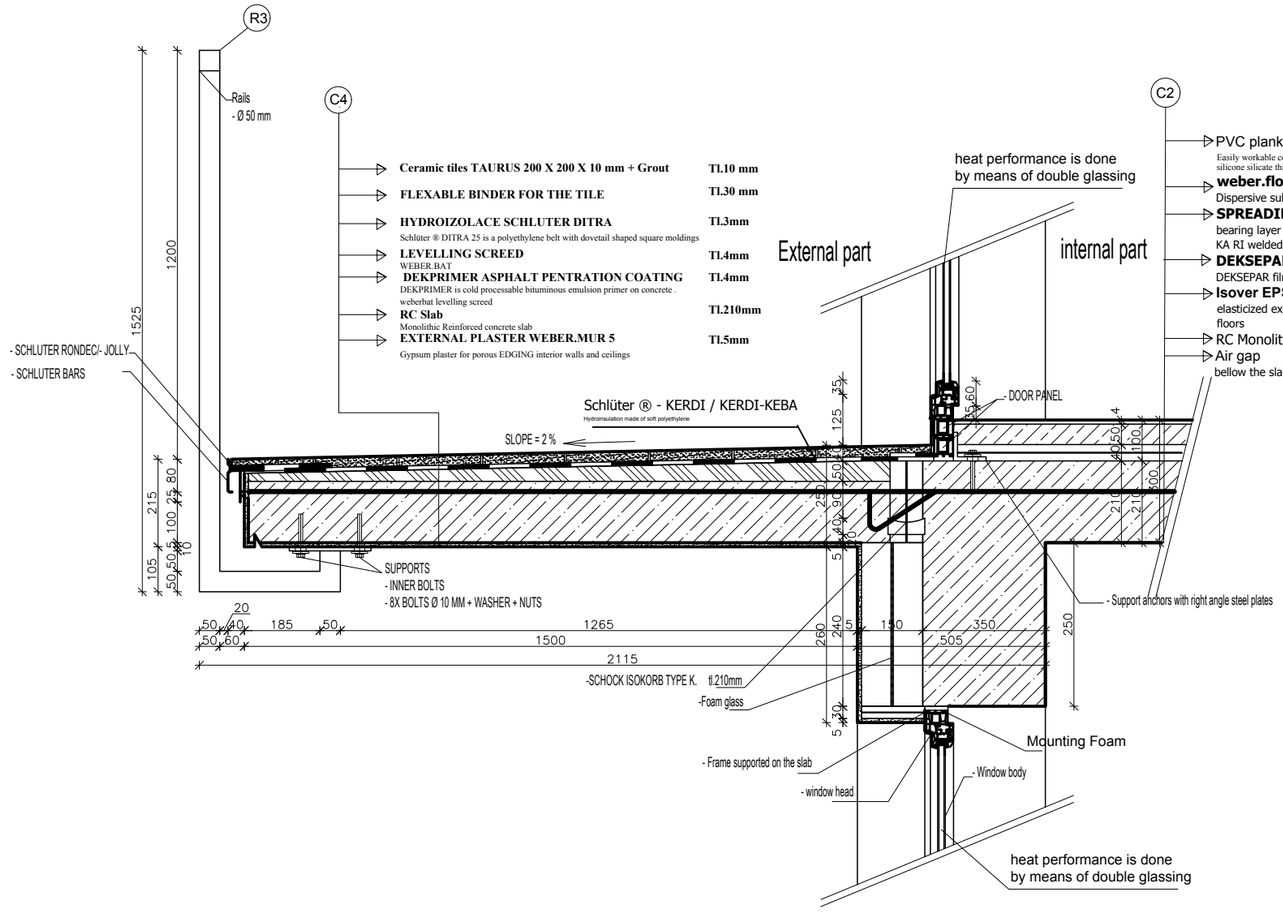








DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: A3
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: D02 roof drainage pipes			Scale. 1:10 / Drawing No. D02



-weber.pas aqua Balance thin plaster
Easily workable colored pasty plaster, comprising an organic binder
silicone silicate thin plaster progressive self-cleaning effect

-Coating under Plaster UNI
colored primer based on acrylate dispersion for the uniform
absorption and color of the substrate (consumption of 0.18 kg / m2)

-Base Layer + Reinforcing fabric mesh
glass fiber reinforcing fabric of 145 g / m2 (Verter R 117) is pushed into the layer of backfilling DEKTHERM STANDARD

-Facade polystyrene EPS 100 NEO
Facade polystyrene EPS 70 F is thermal insulation of facades. low weight,
good workability, very low water absorption

-First Layer Adhesive Dektherm Standard
one-component adhesive cement materials (amount is 40% of the plate
surface which is 4 kg / m2)

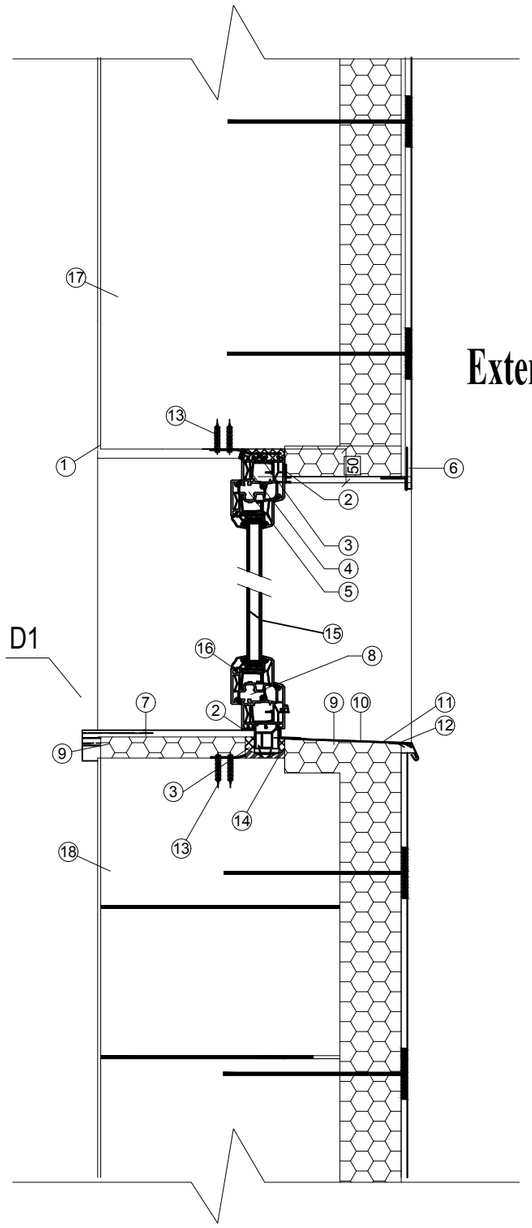
-Reinforced concrete slab C30/37

-INTERNAL PLASTER WEBER.MUR 5
Gypsum plaster for porous EDGING interior walls and ceilings

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		
Attachment name: D03 Balcony details		

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----
Scale. 1:10	Drawing No. D03



External + Internal Finishing

1 indoor plaster
2 sealant tape
3 polyurethane foam
4 elastic sealant
5 window system
6 window head
7 wooden parapet
8 window system
9 insulation layer
10 metal parapet
11 waterproof tape
12 elastic sealant
13 mechanically fastened anchors
14 wooden wedges
15 Double glassing
16 frame of the sash
17 RC concrete slab
18 porothem brick

COMPOSITIONS:

Internal Plaster weber.mur 5 Gypsum plaster for porous EDGING interior walls and ceilings	**Tl.5mm**
Porotherm Masonry 40 Profi Polished brick block thickness. wall 40 cm for thin mortar joints	**Tl.400mm**
First Layer Adhesive Dektherm Standard one-component adhesive cement materials (amount is 40% of the plate surface which is 4 kg / m2)	
Facade polystyrene EPS 70 Facade polystyrene EPS 70 F is thermal insulation of facades. low weight, good workability, very low water absorption	**Tl.100mm**
Base Layer + Reinforcing fabric mesh glass fiber reinforcing fabric of 145 g / m2 (Vertex R 117) is pushed into the layer of backfilling DEKTHERM STANDARD	**Tl.6mm**
Coating under Plaster UNI colored primer based on acrylate dispersion for the uniform absorption and color of the substrate (consumption of 0.18 kg / m2)	
weber.pas aqua Balance thin plaster Easily workable colored pasty plaster, comprising an organic binder silicone silicate thin plaster progressive self-cleaning effect	**Tl.5mm**
TOTAL	**516mm**

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: A3 Date: 13/10.2016 Purpose: building permit Archive Issues: -----
Attachment name: D04 window details			Scale. 1:10 Drawing No. D04

C2a

FATRA THERMOFIX Tl.5mm
heterogeneous floor covering based polyvinylchloride with inserted glass fleece and a protective layer of polyurethane varnish (pvc)

weber.floor 4815 Tl.340g/m2
Dispersive substance, solvent-free liquid consistency, ready to use.

SPREADING CONCRETE SCREED Tl.35mm
bearing layer of concrete reinforced with steel
KA RI welded networks 150/150/4

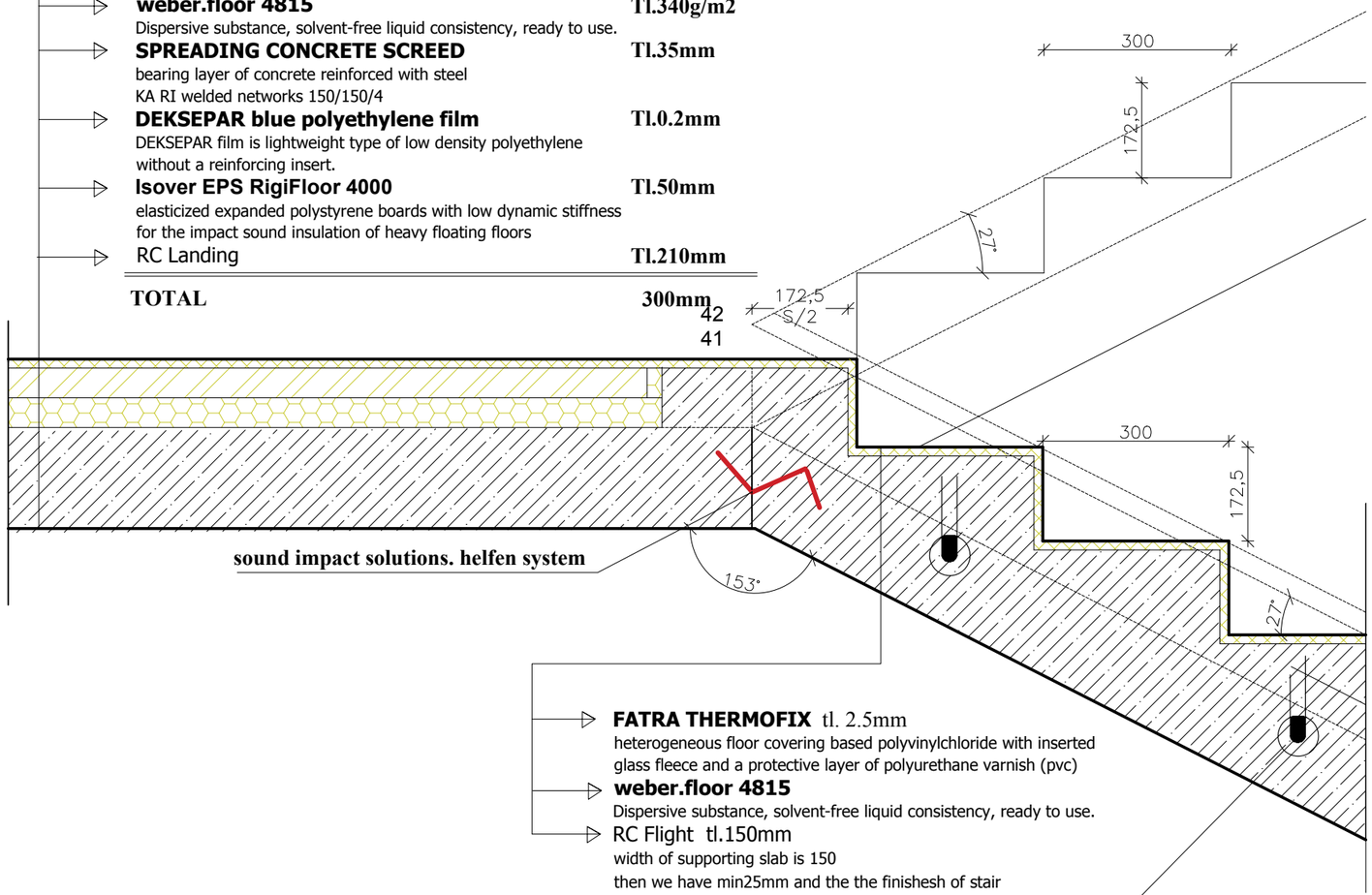
DEKSEPAR blue polyethylene film Tl.0.2mm
DEKSEPAR film is lightweight type of low density polyethylene without a reinforcing insert.

Isover EPS RigiFloor 4000 Tl.50mm
elasticized expanded polystyrene boards with low dynamic stiffness for the impact sound insulation of heavy floating floors

RC Landing Tl.210mm

TOTAL 300mm

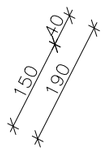
42
41



FATRA THERMOFIX tl. 2.5mm
heterogeneous floor covering based polyvinylchloride with inserted glass fleece and a protective layer of polyurethane varnish (pvc)

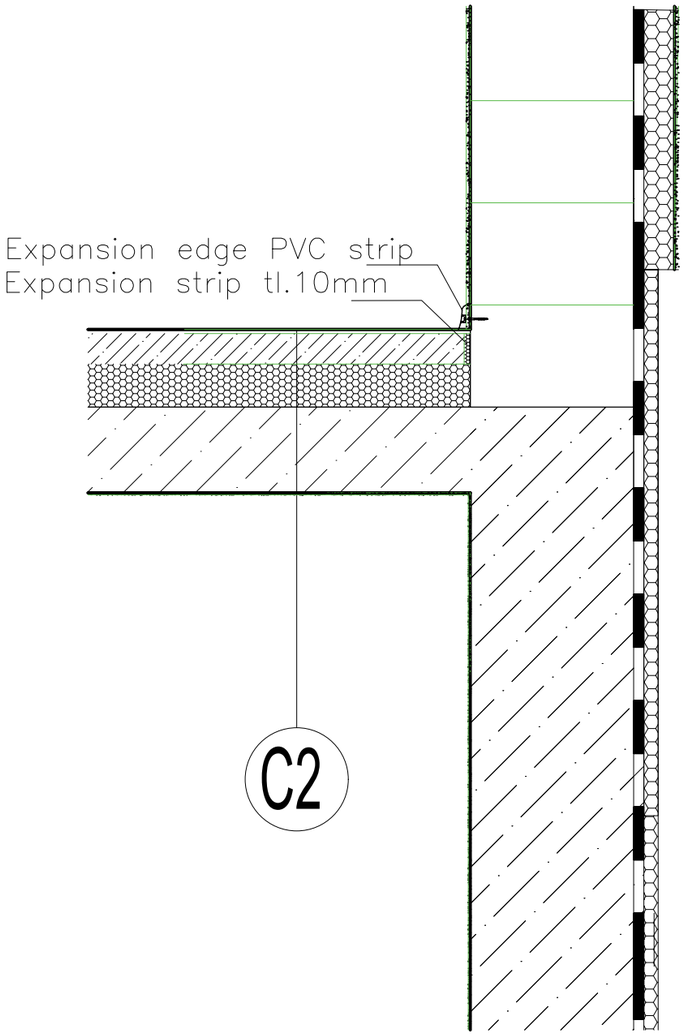
weber.floor 4815
Dispersive substance, solvent-free liquid consistency, ready to use.

RC Flight tl.150mm
width of supporting slab is 150
then we have min25mm and the the finishesh of stair



anchors to support the staircase rails.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2xA4
			Date: 13/10.2016
			Purpose building permit
			Archive Issues -----
Attachment name: D05 staircase details			Scale. 1:10 Drawing No. D05



UT=-0,250

C

-Internal Plaster weber.mur 5 **Tl.5mm**
Gypsum plaster for porous EDGING interior walls and ceilings

-Porotherm Masonry 40 Profi **Tl.400mm**
Polished brick block thickness. wall 40 cm for thin mortar joints

-2X Bitumen hydroinsulations **Tl.8mm**

-First Layer Adhesive Dektherm Standard
one-component adhesive cement materials (amount is 40% of the plate surface which is 4 kg / m2)

-Facade polystyrene EPS 70 **Tl.100mm**
Facade polystyrene EPS 70 F is thermal insulation of facades. low weight, good workability, very low water absorption

-Base Layer + Reinforcing fabric mesh **Tl.6mm**
glass fiber reinforcing fabric of 145 g / m2 (Vertex R 117) is pushed into the layer of backfilling DEKTHERM STANDARD

-Coating under Plaster UNI
colored primer based on acrylate dispersion for the uniform absorption and color of the substrate (consumption of 0.18 kg / m2)

-weber.pas aqua Balance thin plaster **Tl.5mm**
Easily workable colored pasty plaster, comprising an organic binder silicone silicate thin plaster progressive self-cleaning effect

TOTAL **524mm**

C2

PVC PLANK WOODEN COLOR **Tl.4mm**
Easily workable colored pasty plaster, comprising an organic binder silicone silicate thin plaster progressive self-cleaning effect

weber.floor 4815 **Tl.6mm**
Dispersive substance, solvent-free liquid consistency, ready to use.

SPREADING CONCRETE SCREED **Tl.50-60mm**
bearing layer of concrete reinforced with steel
KA RI welded networks 150/150/4

DEKSEPAR blue polyethylene film **Tl.4mm**
DEKSEPAR film is lightweight type of low density polyethylene without a reinforcing insert.

Isover EPS RigiFloor 4000 **Tl.126mm**
elasticized expanded polystyrene boards with low dynamic stiffness for the impact sound insulation of heavy floating floors

RC Monolithic Concrete slab C30/37 **Tl.210mm**

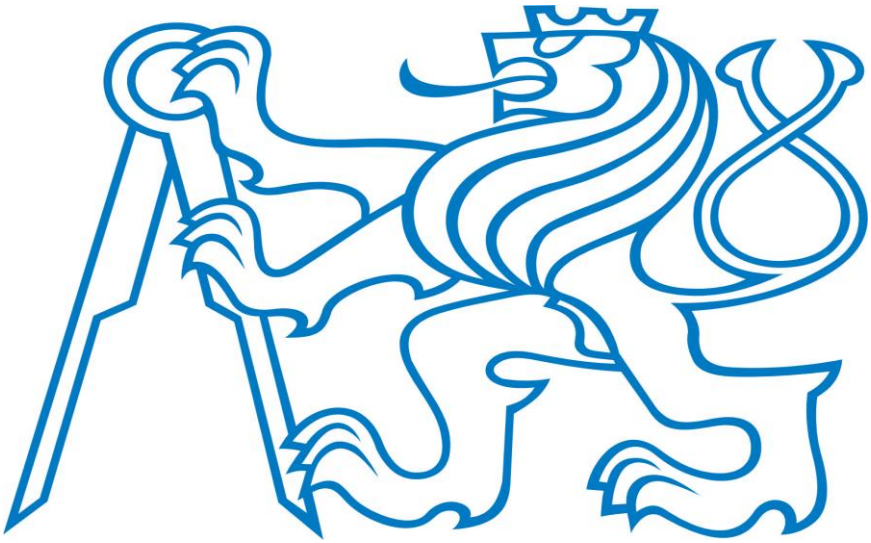
TOTAL **Tl.400mm**

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc . Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)	PARE:	
Attachment name: D06 plinth details		

Fakulta stavební ČVUT

Format:	A3
Date:	13/10.2016
Purpose	building permit
Archive Issues	-----
Scale. 1:10	Drawing No. D06

Czech Technical University in Prague
FACULTY OF CIVIL ENGINEERING



Hygrothermall Calculation

Thesis

RESIDENTIAL APARTMENT BUILDING

Name:Yosufi Mohammad Fayez
Supervisor: doc Ing Hana Gattermayrova CSc
Accademic year:2016/17

Signature:

KOMPLEXNÍ POSOUZENÍ SKLADBY STAVEBNÍ KONSTRUKCE Z HLEDISKA ŠÍRENÍ TEPLA A VODNÍ PÁRY

podle EN ISO 13788, EN ISO 6946, CSN 730540 a STN 730540

Teplo 2014 EDU

Název úlohy : **basement 123**
Zpracovatel : PC
Zakázka :
Datum : 12/24/2016

ZADANÁ SKLADBA A OKRAJOVÉ PODMÍNKY :

Typ hodnocené konstrukce : Stena suterénní
Korekce soucinitele prostupu dU : 0.000 W/m2K

Skladba konstrukce (od interiéru) :

Císlo	Název	D [m]	Lambda [W/(m.K)]	c [J/(kg.K)]	Ro [kg/m3]	Mi [-]	Ma [kg/m2]
1	Baumit jádrová	0.0050	0.8300	790.0	2000.0	25.0	0.0000
2	Železobeton 3	0.4000	1.7400	1020.0	2500.0	32.0	0.0000
3	Elastodek 40 M	0.0080	0.2100	1470.0	1200.0	30000.0	0.0000
4	Austrotherm 50	0.0600	0.0300	2060.0	35.0	200.0	0.0000

Poznámka: D je tloušťka vrstvy, Lambda je návrhová hodnota tepelné vodivosti vrstvy, C je merná tepelná kapacita vrstvy, Ro je objemová hmotnost vrstvy, Mi je faktor difúzního odporu vrstvy a Ma je pocátecní zabudovaná vlhkost ve vrstve.

Císlo	Kompletní název vrstvy	Interní výpocet tep. vodivosti
1	Baumit jádrová omítka	---
2	Železobeton 3	---
3	Elastodek 40 Medium Mineral	---
4	Austrotherm 50 XPS-G/030	---

Okrajové podmínky výpoctu :

Tepelný odpor pri prestupu tepla v interiéru Rsi : 0.13 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rsi : 0.25 m2K/W
Tepelný odpor pri prestupu tepla v exteriéru Rse : 0.00 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rse : 0.00 m2K/W

Návrhová venkovní teplota Te : 7.9 C
Návrhová teplota vnitrního vzduchu Tai : 10.0 C
Návrhová relativní vlhkost venkovního vzduchu RHe : 100.0 %
Návrhová relativní vlhkost vnitrního vzduchu RHi : 75.0 %

Mesíc	Délka [dny]	Tai [C]	RHi [%]	Pi [Pa]	Te [C]	RHe [%]	Pe [Pa]
1	31	10.0	99.0	1215.0	3.6	100.0	790.2
2	28	10.0	99.0	1215.0	2.7	100.0	741.4
3	31	10.0	99.0	1215.0	3.5	100.0	784.7
4	30	10.0	99.0	1215.0	5.4	100.0	896.5
5	31	10.0	99.0	1215.0	7.8	100.0	1057.7
6	30	10.0	99.0	1215.0	10.3	100.0	1252.2
7	31	10.0	99.0	1215.0	11.9	100.0	1392.6
8	31	10.0	99.0	1215.0	12.7	100.0	1467.8
9	30	10.0	99.0	1215.0	12.4	100.0	1439.2
10	31	10.0	99.0	1215.0	10.6	100.0	1277.5
11	30	10.0	99.0	1215.0	8.1	100.0	1079.5
12	31	10.0	99.0	1215.0	5.4	100.0	896.5

Poznámka: Tai, RHi a Pi jsou prum. mesícní parametry vnitrního vzduchu (teplota, relativní vlhkost

a částecný tlak vodní páry) a Te, RHe a Pe jsou prum. mesícní parametry v prostredí na vnejší strane konstrukce (teplota, relativní vlhkost a částecný tlak vodní páry).

Prumerná mesícní venkovní teplota Te byla vypoctena podle cl. 4.2.3 v EN ISO 13788 (vliv tepelné setrvacnosti zeminy).

Pro vnitrní prostredí byla uplatnena prirážka k vnitrní relativní vlhkosti : 5.0 %

Výchozí mesíc výpoctu bilance se stanovuje výpoctem podle EN ISO 13788.
Pocet hodnocených let : 1

VÝSLEDKY VÝPOCTU HODNOCENÉ KONSTRUKCE :

Tepelný odpor a soucinitel prostupu tepla podle EN ISO 6946:

Tepelný odpor konstrukce R : 2.274 m2K/W
Soucinitel prostupu tepla konstrukce U : **0.416 W/m2K**

Soucinitel prostupu zabudované kce U,kc : 0.44 / 0.47 / 0.52 / 0.62 W/m2K
Uvedené orientacní hodnoty platí pro ruznou kvalitu rešení tep. mostu vyjádrenou približnou prirážkou podle poznámek k cl. B.9.2 v CSN 730540-4.

Difúzní odpor a tepelne akumulacní vlastnosti:

Difuzní odpor konstrukce ZpT : 1.4E+0012 m/s

Teplotní útlum konstrukce Ny* podle EN ISO 13786 : 507.0
Fázový posun teplotního kmitu Psi* podle EN ISO 13786 : 14.0 h

Teplota vnitrního povrchu a teplotní faktor podle CSN 730540 a EN ISO 13788:

Vnitrní povrchová teplota v návrhových podmínkách Tsi,p : 9.79 C
Teplotní faktor v návrhových podmínkách f,Rsi,p : **0.901**

Císlo mesíce	Minimální požadované hodnoty pri max. rel. vlhkosti na vnitrním povrchu:				Vypoctené hodnoty		
	--------- 80% ---------		-------- 100% --------				
	Tsi,m[C]	**f,Rsi,m**	**Tsi,m[C]**	**f,Rsi,m**	**Tsi[C]**	**f,Rsi**	**RHsi[%]**
1	13.2	1.503	9.9	0.977	9.4	0.901	100.0
2	13.2	1.441	9.9	0.979	9.3	0.901	100.0
3	13.2	1.496	9.9	0.977	9.4	0.901	100.0
4	13.2	1.700	9.9	0.967	9.5	0.901	100.0
5	13.2	2.464	9.9	0.932	9.8	0.901	100.0
6	13.2	------	9.9	------	10.0	0.901	98.8
7	13.2	------	9.9	------	10.2	0.901	97.8
8	13.2	------	9.9	------	10.3	0.901	97.2
9	13.2	------	9.9	------	10.2	0.901	97.4
10	13.2	------	9.9	------	10.1	0.901	98.6
11	13.2	2.696	9.9	0.921	9.8	0.901	100.0
12	13.2	1.700	9.9	0.967	9.5	0.901	100.0

Poznámka: RHsi je relativní vlhkost na vnitrním povrchu, Tsi je vnitrní povrchová teplota a f,Rsi je teplotní faktor.

Difúze vodní páry v návrh. podmínkách a bilance vodní páry podle CSN 730540:
(bez vlivu zabudované vlhkosti a slunecní radiace)

Prubeh teplot a částecných tlaku vodní páry v návrhových okrajových podmínkách:

rozhraní:	**i**	**1-2**	**2-3**	**3-4**	**e**
theta [C]:	9.9	9.9	9.7	9.6	7.9
p [Pa]:	920	921	927	1056	1063
p,sat [Pa]:	1218	1217	1201	1198	1063

Poznámka: theta je teplota na rozhraní vrstev, p je predpokládaný částecný tlak vodní páry na rozhraní vrstev a p,sat je částecný tlak nasycené vodní páry na rozhraní vrstev.

Pri venkovní návrhové teplote nedochází v konstrukci ke kondenzaci vodní páry.

Množství difundující vodní páry Gd : -1.074E-0010 kg/(m2.s)

Bilance zkondenzované a vyparené vodní páry podle EN ISO 13788:

Rocní cyklus c. 1

V konstrukci dochází behem modelového roku ke kondenzaci.

Kondenzacní zóna c. 1

Mesíc	Hranice kondenzacní zóny levá [m]	pravá	Akt.kond./vypar. Mc [kg/m2s]	Akumul.vlhkost Ma [kg/m2]
2	0.0000	0.4050	3.55E-0008	0.0859
3	0.0000	0.4050	2.60E-0008	0.1555
4	0.0000	0.4050	8.46E-0009	0.1775
5	0.0050	0.4050	-3.43E-0009	0.1683
6	0.0050	0.0050	-2.19E-0008	0.1116
7	0.0050	0.0050	-3.38E-0008	0.0210
8	---	---	-3.98E-0008	0.0000
9	---	---	---	---
10	---	---	---	---
11	---	---	-1.85E-0009	0.0000
12	0.0000	0.4130	4.20E-0009	0.0112
1	0.0000	0.4050	2.49E-0008	0.0687

Max. množství zkondenzované vodní páry za rok Mc,a: **0.1775 kg/m2**
Množství vyparitelné vodní páry za rok Mev,a: **0.1087 kg/m2**

Na konci modelového roku je zóna stále vlhká (tj. Mc,a > Mev,a).

Kondenzacní zóna c. 2

Mesíc	Hranice kondenzacní zóny levá [m]	pravá	Akt.kond./vypar. Mc [kg/m2s]	Akumul.vlhkost Ma [kg/m2]
2	---	---	---	---
3	---	---	---	---
4	---	---	---	---
5	---	---	---	---
6	0.4107	0.4698	3.45E-0010	0.0009
7	0.4107	0.4698	2.40E-0009	0.0073
8	0.4130	0.4698	3.55E-0009	0.0168
9	0.4130	0.4698	3.10E-0009	0.0249
10	0.4130	0.4698	6.93E-0010	0.0267
11	0.4130	0.4130	-2.02E-0009	0.0215
12	0.4130	0.4130	-4.44E-0009	0.0096
1	---	---	-5.81E-0009	0.0000

Max. množství zkondenzované vodní páry za rok Mc,a: **0.0267 kg/m2**
Množství vyparitelné vodní páry za rok Mev,a je minimálne: **0.0267 kg/m2**

Na konci modelového roku je zóna suchá (tj. Mc,a < Mev,a).

Poznámka: Hodnocení difúze vodní páry bylo provedeno pro predpoklad 1D šírení vodní páry prevažující skladbou konstrukce. Pro konstrukce s výraznými systematickými tepelnými mosty je výsledek výpoctu jen orientacní. Presnejší výsledky lze získat s pomocí 2D analýzy.

STOP, Teplo 2014 EDU

VYHODNOCENÍ VÝSLEDKU PODLE KRITÉRIÍ CSN 730540-2 (2011)

Název konstrukce: basement 123

Rekapitulace vstupních dat

Návrhová vnitrní teplota Ti:	9.0 C
Prevažující návrhová vnitrní teplota TiM:	20.0 C
Návrhová venkovní teplota Tae:	-15.0 C
Teplota na vnejší strane Te:	7.9 C
Návrhová teplota vnitrního vzduchu Tai:	10.0 C
Relativní vlhkost v interiéru RHi:	70.0 % (+5.0%)

Skladba konstrukce

Císlo	Název vrstvy	d [m]	Lambda [W/mK]	Mi [-]
1	Baumit jádrová omítka	0.005	0.830	25.0
2	Železobeton 3	0.400	1.740	32.0
3	Elastodek 40 Medium Mineral	0.008	0.210	30000.0
4	Austrotherm 50 XPS-G/030	0.060	0.030	200.0

I. Požadavek na teplotní faktor (cl. 5.1 v CSN 730540-2)

Požadavek: f,Rsi,N = f,Rsi,cr =	-0.439
Vypoctená prumerná hodnota: f,Rsi,m =	0.901

Kritický teplotní faktor f,Rsi,cr byl stanoven pro maximální prípustnou vlhkost na vnitrním povrchu 80% (kritérium vyloucení vzniku plísní).

Prumerná hodnota fRsi,m (resp. maximální hodnota pri hodnocení skladby mimo tepelné mosty a vazby) není nikdy minimální hodnotou ve všech místech konstrukce. Nelze s ní proto prokazovat plnení požadavku na minimální povrchové teploty zabudované konstrukce vcetne tepelných mostu a vazeb. Její prevýšení nad požadavkem naznacuje pouze možnosti plnení požadavku v míste tepelného mostu ci tepelné vazby.

II. Požadavek na soucinitel prostupu tepla (cl. 5.2 v CSN 730540-2)

Požadavek: U,N =	0.45 W/m2K
Vypoctená hodnota: U =	0.42 W/m2K

U < U,N ... POŽADAVEK JE SPLNEN.

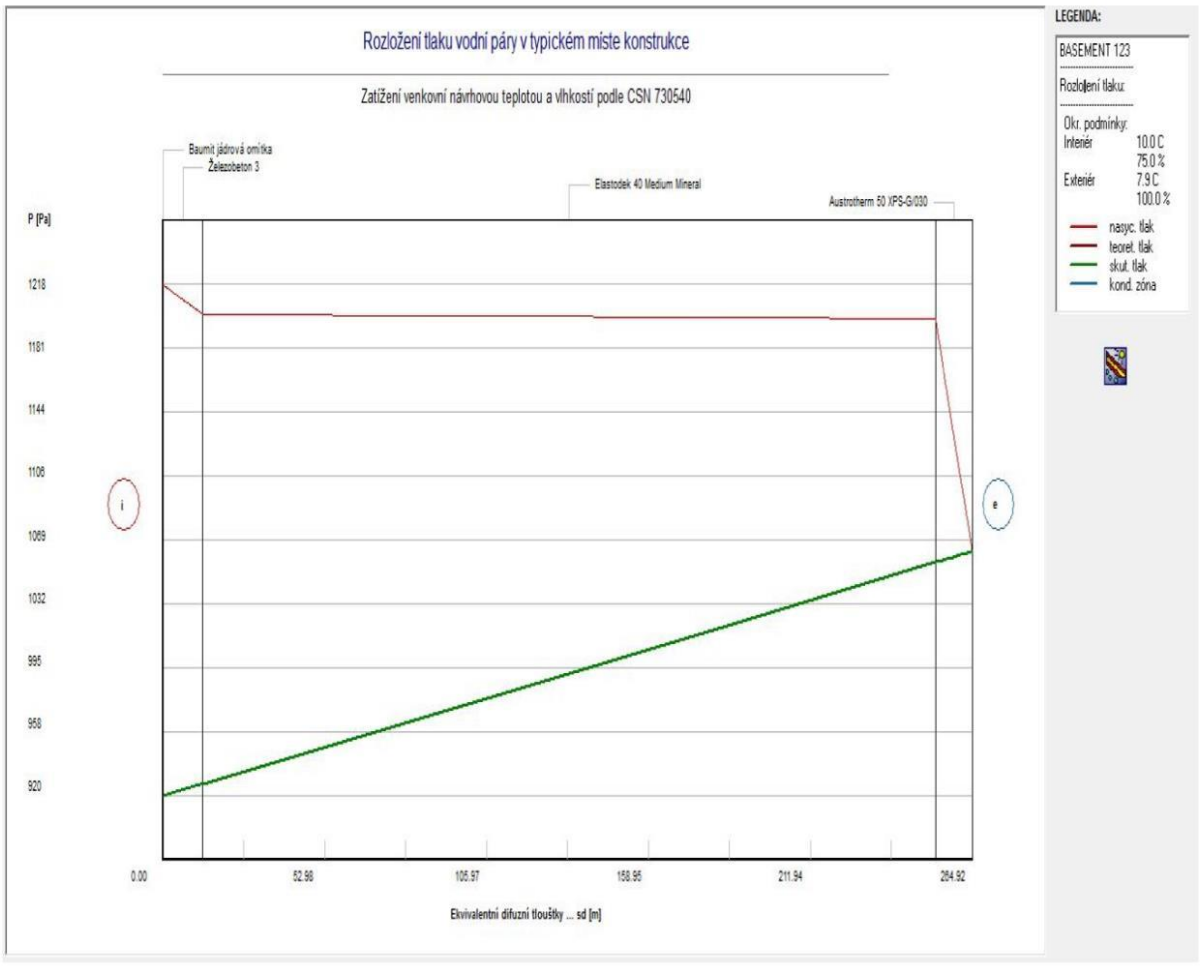
Vypoctený soucinitel prostupu tepla musí zahrnovat vliv systematických tepelných mostu (napr. krokví v zateplené šikmé streše).

III. Požadavky na šírení vlhkosti konstrukcí (cl. 6.1 a 6.2 v CSN 730540-2)

Požadavky:
1. Kondenzace vodní páry nesmí ohrozit funkci konstrukce.
2. Rocní množství kondenzátu musí být nižší než rocní kapacita odparu.
3. Rocní množství kondenzátu Mc,a musí být nižší než 0,1 kg/m2.rok, nebo 3-6% plošné hmotnosti materiálu (nižší z hodnot).

Vypoctené hodnoty: V kci nedochází pri venkovní návrhové teplote ke kondenzaci.

POŽADAVKY JSOU SPLNENY.



KOMPLEXNÍ POSOUZENÍ SKLADBY STAVEBNÍ KONSTRUKCE Z HLEDISKA ŠÍRENÍ TEPLA A VODNÍ PÁRY

podle EN ISO 13788, EN ISO 6946, CSN 730540 a STN 730540

Teplo 2014 EDU

Název úlohy : **cieling.**
Zpracovatel : PC
Zakázka :
Datum : 12/24/2016

ZADANÁ SKLADBA A OKRAJOVÉ PODMÍNKY :

Typ hodnocené konstrukce : Podlaha nad nevytápeným ci méne vytáp. vnitrním prostorem
Korekce soucinitele prostupu dU : 0.000 W/m2K

Skladba konstrukce (od interiéru) :

Císlo	Název	D [m]	Lambda [W/(m.K)]	c [J/(kg.K)]	Ro [kg/m3]	Mi [-]	Ma [kg/m2]
1	Železobeton 3	0.2100	1.7400	1020.0	2500.0	32.0	0.0000
2	Rigips Rigiflo	0.0700	0.0450	1270.0	10.0	30.0	0.0000
3	PE folie	0.0001	0.3500	1470.0	900.0	144000.0	0.0000
4	weber.bat 20 M	0.0500	1.3800	830.0	2030.0	40.0	0.0000
5	Baumit disperz	0.0010	0.6000	1010.0	1800.0	150.0	0.0000
6	Tapeta PVC	0.0025	0.1400	1010.0	1200.0	1050.0	0.0000

Poznámka: D je tlouštka vrstvy, Lambda je návrhová hodnota tepelné vodivosti vrstvy, C je merná tepelná kapacita vrstvy, Ro je objemová hmotnost vrstvy, Mi je faktor difúzního odporu vrstvy a Ma je pocátecní zabudovaná vlhkost ve vrstve.

Císlo	Kompletní název vrstvy	Interní výpocet tep. vodivosti
1	Železobeton 3	---
2	Rigips Rigifloor 4000	---
3	PE folie	---
4	weber.bat 20 MPa cementový potěr	---
5	Baumit disperzní lepidlo (DispersionKleber)	---
6	Tapeta PVC	---

Okrajové podmínky výpoctu :

Tepelný odpor pri prestupu tepla v interiéru Rsi : 0.17 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rsi : 0.25 m2K/W
Tepelný odpor pri prestupu tepla v exteriéru Rse : 0.17 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rse : 0.17 m2K/W

Návrhová venkovní teplota Te : 10.0 C
Návrhová teplota vnitrního vzduchu Tai : 21.0 C
Návrhová relativní vlhkost venkovního vzduchu RHe : 70.0 %
Návrhová relativní vlhkost vnitrního vzduchu RHi : 55.0 %

VÝSLEDKY VÝPOCTU HODNOCENÉ KONSTRUKCE :

Tepelný odpor a soucinitel prostupu tepla podle EN ISO 6946:

Tepelný odpor konstrukce R : 1.732 m2K/W
Soucinitel prostupu tepla konstrukce U : **0.483 W/m2K**

Soucinitel prostupu zabudované kce U,kc : 0.50 / 0.53 / 0.58 / 0.68 W/m2K
Uvedené orientacní hodnoty platí pro ruznou kvalitu rešení tep. mostu vyjádrenou približnou prirážkou podle poznámek k cl. B.9.2 v CSN 730540-4.

Difúzní odpor a tepelne akumulacní vlastnosti:

Difuzní odpor konstrukce ZpT : 1.5E+0011 m/s

Teplotní útlum konstrukce Ny* podle EN ISO 13786 : 148.6
Fázový posun teplotního kmitu Psi* podle EN ISO 13786 : 11.6 h

Teplota vnitrního povrchu a teplotní faktor podle CSN 730540 a EN ISO 13788:

Vnitrní povrchová teplota v návrhových podmínkách Tsi,p : 19.72 C
Teplotní faktor v návrhových podmínkách f,Rsi,p : **0.884**

Difúze vodní páry v návrh. podmínkách a bilance vodní páry podle CSN 730540:

(bez vlivu zabudované vlhkosti a slunecní radiace)

Prubeh teplot a cástecných tlaku vodní páry v návrhových okrajových podmínkách:

rozhraní:	i	1-2	2-3	3-4	4-5	5-6	e
theta [C]:	20.1	19.5	11.2	11.2	11.0	11.0	10.9
p [Pa]:	1367	1245	1207	946	909	907	859
p,sat [Pa]:	2351	2260	1330	1329	1313	1312	1304

Poznámka: theta je teplota na rozhraní vrstev, p je predpokládaný cástecný tlak vodní páry na rozhraní vrstev a p,sat je cástecný tlak nasycené vodní páry na rozhraní vrstev.

Pri venkovní návrhové teplote nedochází v konstrukci ke kondenzaci vodní páry.

Množství difundující vodní páry Gd : 3.629E-0009 kg/(m2.s)

Poznámka: Hodnocení difúze vodní páry bylo provedeno pro predpoklad 1D šírení vodní páry prevažující skladbou konstrukce. Pro konstrukce s výraznými systematickými tepelnými mosty je výsledek výpoctu jen orientacní. Presnejší výsledky lze získat s pomocí 2D analýzy.

STOP, Teplo 2014 EDU

VYHODNOCENÍ VÝSLEDKU PODLE KRITÉRIÍ CSN 730540-2 (2011)

Název konstrukce: cieling.

Rekapitulace vstupních dat

Návrhová vnitrní teplota Ti:	20.0 C
Prevažující návrhová vnitrní teplota TiM:	20.0 C
Návrhová venkovní teplota Tae:	-15.0 C
Teplota na vnejší strane Te:	10.0 C
Návrhová teplota vnitrního vzduchu Tai:	21.0 C
Relativní vlhkost v interiéru RHi:	50.0 % (+5.0%)

Skladba konstrukce

Císlo	Název vrstvy	d [m]	Lambda [W/mK]	Mi [-]
1	Železobeton 3	0.210	1.740	32.0
2	Rigips Rigifloor 4000	0.070	0.045	30.0
3	PE folie	0.0001	0.350	144000.0
4	weber.bat 20 MPa cementový pot	0.050	1.380	40.0
5	Baumit disperzní lepidlo (Disp	0.001	0.600	150.0
6	Tapeta PVC	0.0025	0.140	1050.0

I. Požadavek na teplotní faktor (cl. 5.1 v CSN 730540-2)

Požadavek: f,Rsi,N = f,Rsi,cr = 0.178
Vypoctená prumerná hodnota: f,Rsi,m = 0.884

Kritický teplotní faktor f,Rsi,cr byl stanoven pro maximální prípustnou vlhkost na vnitrním povrchu 80% (kritérium vyloucení vzniku plísní).

Prumerná hodnota fRsi,m (resp. maximální hodnota pri hodnocení skladby mimo tepelné mosty a vazby) není nikdy minimální hodnotou ve všech místech konstrukce. Nelze s ní proto prokazovat plnení požadavku na minimální povrchové teploty zabudované konstrukce vcetne tepelných mostu a vazeb. Její prevýšení nad požadavkem naznacuje pouze možnosti plnení požadavku v míste tepelného mostu ci tepelné vazby.

II. Požadavek na soucinitel prostupu tepla (cl. 5.2 v CSN 730540-2)

Požadavek: U,N = 0.60 W/m2K
Vypoctená hodnota: U = 0.483 W/m2K
U < U,N ... POŽADAVEK JE SPLNEN.

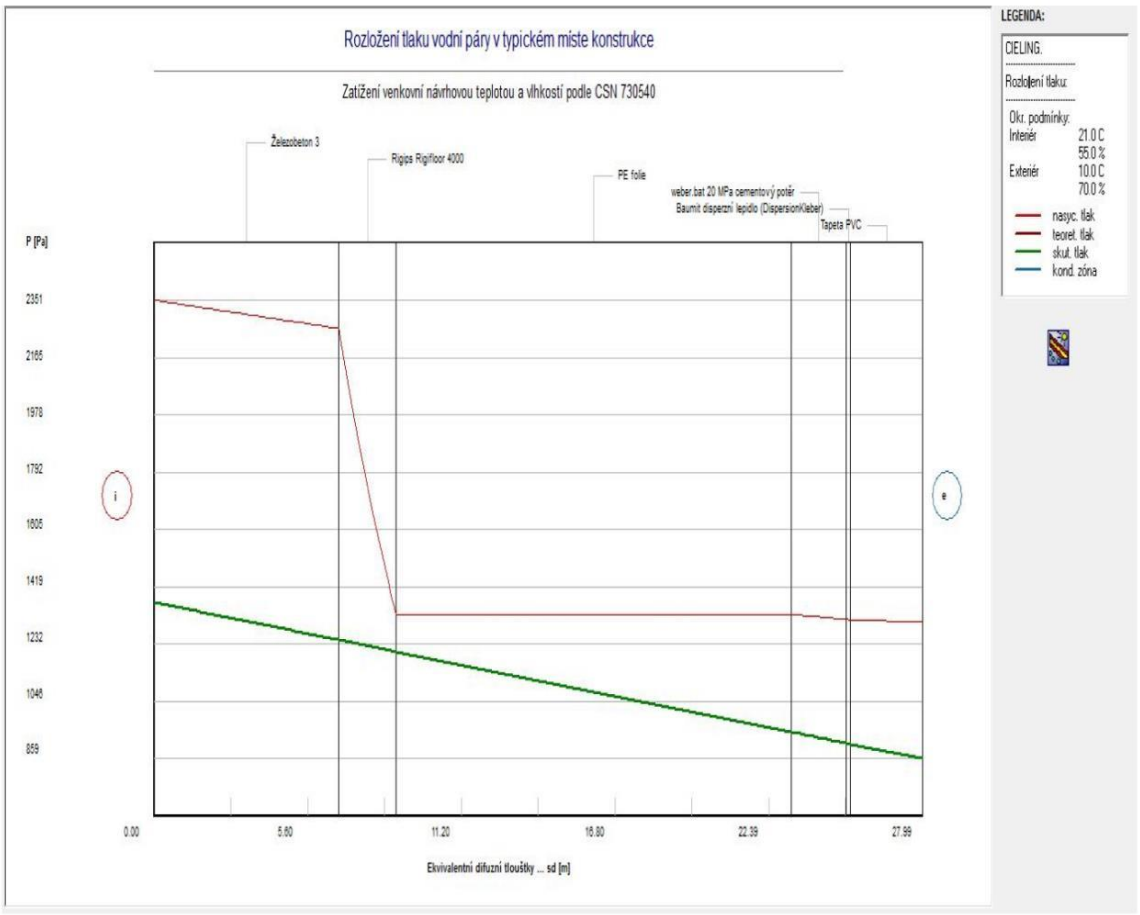
Vypoctený soucinitel prostupu tepla musí zahrnovat vliv systematických tepelných mostu (napr. krokví v zateplené šikmé streše).

III. Požadavky na šírení vlhkosti konstrukcí (cl. 6.1 a 6.2 v CSN 730540-2)

Požadavky:
1. Kondenzace vodní páry nesmí ohrozit funkci konstrukce.
2. Rocní množství kondenzátu musí být nižší než rocní kapacita odparu.
3. Rocní množství kondenzátu Mc,a musí být nižší než 0,1 kg/m2.rok, nebo 3-6% plošné hmotnosti materiálu (nižší z hodnot).

Vypoctené hodnoty: V kci nedochází pri venkovní návrhové teplote ke kondenzaci.

POŽADAVKY JSOU SPLNENY.



KOMPLEXNÍ POSOUZENÍ SKLADBY STAVEBNÍ KONSTRUKCE Z HLEDISKA ŠÍRENÍ TEPLA A VODNÍ PÁRY

podle EN ISO 13788, EN ISO 6946, CSN 730540 a STN 730540

Teplo 2014 EDU

Název úlohy : **slab**
Zpracovatel : PC
Zakázka :
Datum : 12/24/2016

ZADANÁ SKLADBA A OKRAJOVÉ PODMÍNKY :

Typ hodnocené konstrukce : Stena vnejší jednoplášťová
Korekce soucinitele prostupu dU : 0.000 W/m2K

Skladba konstrukce (od interiéru) :

Císlo	Název	D [m]	Lambda [W/(m.K)]	c [J/(kg.K)]	Ro [kg/m3]	Mi [-]	Ma [kg/m2]
1	Alsecco Reibep	0.0050	0.8700	1000.0	1800.0	110.0	0.0000
2	Železobeton 3	0.3500	1.7400	1020.0	2500.0	32.0	0.0000
3	BASF EPS 100 N	0.1500	0.0310	1250.0	18.0	45.0	0.0000
4	Alsecco Reibep	0.0050	0.8700	1000.0	1800.0	110.0	0.0000

Poznámka: D je tloušťka vrstvy, Lambda je návrhová hodnota tepelné vodivosti vrstvy, C je merná tepelná kapacita vrstvy, Ro je objemová hmotnost vrstvy, Mi je faktor difúzního odporu vrstvy a Ma je pocátecní zabudovaná vlhkost ve vrstve.

Císlo	Kompletní název vrstvy	Interní výpocet tep. vodivosti
1	Alsecco Reibeputz	---
2	Železobeton 3	---
3	BASF EPS 100 NEO	---
4	Alsecco Reibeputz	---

Okrajové podmínky výpoctu :

Tepelný odpor pri prestupu tepla v interiéru Rsi : 0.13 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rsi : 0.25 m2K/W
Tepelný odpor pri prestupu tepla v exteriéru Rse : 0.04 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rse : 0.04 m2K/W

Návrhová venkovní teplota Te : -13.0 C
Návrhová teplota vnitrního vzduchu Tai : 21.0 C
Návrhová relativní vlhkost venkovního vzduchu RHe : 84.0 %
Návrhová relativní vlhkost vnitrního vzduchu RHi : 55.0 %

Mesíc	Délka [dny]	Tai [C]	RHi [%]	Pi [Pa]	Te [C]	RHe [%]	Pe [Pa]
1	31	21.0	53.9	1339.7	-2.4	81.2	406.1
2	28	21.0	56.0	1391.9	-0.9	80.8	457.9
3	31	21.0	57.5	1429.2	3.0	79.5	602.1
4	30	21.0	59.3	1473.9	7.7	77.5	814.1
5	31	21.0	63.4	1575.9	12.7	74.5	1093.5
6	30	21.0	67.2	1670.3	15.9	72.0	1300.1
7	31	21.0	69.2	1720.0	17.5	70.4	1407.2
8	31	21.0	68.5	1702.6	17.0	70.9	1373.1
9	30	21.0	64.1	1593.3	13.3	74.1	1131.2
10	31	21.0	59.7	1483.9	8.3	77.1	843.7
11	30	21.0	57.5	1429.2	2.9	79.5	597.9
12	31	21.0	56.5	1404.4	-0.6	80.7	468.9

Poznámka: Tai, RHi a Pi jsou prum. mesícní parametry vnitrního vzduchu (teplota, relativní vlhkost

a částecný tlak vodní páry) a Te, RHe a Pe jsou prum. mesícní parametry v prostredí na vnejší strane konstrukce (teplota, relativní vlhkost a částecný tlak vodní páry).

Pro vnitrní prostredí byla uplatnena prirážka k vnitrní relativní vlhkosti : 5.0 %

Výchozí mesíc výpoctu bilance se stanovuje výpoctem podle EN ISO 13788.
Pocet hodnocených let : 1

VÝSLEDKY VÝPOCTU HODNOCENÉ KONSTRUKCE :

Tepelný odpor a soucinitel prostupu tepla podle EN ISO 6946:

Tepelný odpor konstrukce R : 5.051 m2K/W
Soucinitel prostupu tepla konstrukce U : **0.192 W/m2K**

Soucinitel prostupu zabudované kce U,kc : 0.21 / 0.24 / 0.29 / 0.39 W/m2K
Uvedené orientacní hodnoty platí pro ruznou kvalitu rešení tep. mostu vyjádrenou približnou prirážkou podle poznámek k cl. B.9.2 v CSN 730540-4.

Difúzní odpor a tepelne akumulacní vlastnosti:

Difuzní odpor konstrukce ZpT : 1.0E+0011 m/s

Teplotní útlum konstrukce Ny* podle EN ISO 13786 : 808.0
Fázový posun teplotního kmitu Psi* podle EN ISO 13786 : 12.9 h

Teplota vnitrního povrchu a teplotní faktor podle CSN 730540 a EN ISO 13788:

Vnitrní povrchová teplota v návrhových podmínkách Tsi,p : 19.41 C
Teplotní faktor v návrhových podmínkách f,Rsi,p : **0.953**

Císlo mesíce	Minimální požadované hodnoty pri max. rel. vlhkosti na vnitrním povrchu: --------- 80% ---------		-------- 100% ---------		Vypoctené hodnoty		
	Tsi,m[C]	**f,Rsi,m**	**Tsi,m[C]**	**f,Rsi,m**	**Tsi[C]**	**f,Rsi**	**RHsi[%]**
1	14.7	0.732	11.3	0.586	19.9	0.953	57.7
2	15.3	0.741	11.9	0.584	20.0	0.953	59.7
3	15.7	0.707	12.3	0.516	20.2	0.953	60.6
4	16.2	0.640	12.8	0.381	20.4	0.953	61.6
5	17.3	0.550	13.8	0.131	20.6	0.953	64.9
6	18.2	0.449	14.7	------	20.8	0.953	68.2
7	18.7	0.331	15.1	------	20.8	0.953	69.9
8	18.5	0.374	15.0	------	20.8	0.953	69.3
9	17.4	0.538	14.0	0.085	20.6	0.953	65.5
10	16.3	0.632	12.9	0.360	20.4	0.953	61.9
11	15.7	0.709	12.3	0.519	20.2	0.953	60.6
12	15.5	0.743	12.0	0.585	20.0	0.953	60.1

Poznámka: RHsi je relativní vlhkost na vnitrním povrchu, Tsi je vnitrní povrchová teplota a f,Rsi je teplotní faktor.

Difúze vodní páry v návrh. podmínkách a bilance vodní páry podle CSN 730540:
(bez vlivu zabudované vlhkosti a slunecní radiace)

Prubeh teplot a částecných tlaku vodní páry v návrhových okrajových podmínkách:

rozhraní:	**i**	**1-2**	**2-3**	**3-4**	**e**
theta [C]:	20.2	20.1	18.8	-12.7	-12.7
p [Pa]:	1367	1332	626	201	166
p,sat [Pa]:	2359	2354	2170	203	203

Poznámka: theta je teplota na rozhraní vrstev, p je predpokládaný částecný tlak vodní páry na rozhraní vrstev a p,sat je částecný tlak nasycené vodní páry na rozhraní vrstev.

Pri venkovní návrhové teplote nedochází v konstrukci ke kondenzaci vodní páry.

Množství difundující vodní páry Gd : 1.260E-0008 kg/(m2.s)

Bilance zkondenzované a vyparené vodní páry podle EN ISO 13788:

Rocní cyklus c. 1

V konstrukci nedochází behem modelového roku ke kondenzaci vodní páry.

Poznámka: Hodnocení difúze vodní páry bylo provedeno pro predpoklad 1D šírení vodní páry prevažující skladbou konstrukce. Pro konstrukce s výraznými systematickými tepelnými mosty je výsledek výpoctu jen orientacní. Presnejší výsledky lze získat s pomocí 2D analýzy.

STOP, Teplo 2014 EDU

VYHODNOCENÍ VÝSLEDKU PODLE KRITÉRIÍ CSN 730540-2 (2011)

Název konstrukce: slab

Rekapitulace vstupních dat

Návrhová vnitrní teplota Ti:	20.0 C
Prevažující návrhová vnitrní teplota TiM:	20.0 C
Návrhová venkovní teplota Tae:	-13.0 C
Teplota na vnejší strane Te:	-13.0 C
Návrhová teplota vnitrního vzduchu Tai:	21.0 C
Relativní vlhkost v interiéru RHi:	50.0 % (+5.0%)

Skladba konstrukce

Císlo	Název vrstvy	d [m]	Lambda [W/mK]	Mi [-]
1	Alsecco Reibeputz	0.005	0.870	110.0
2	Železobeton 3	0.350	1.740	32.0
3	BASF EPS 100 NEO	0.150	0.031	45.0
4	Alsecco Reibeputz	0.005	0.870	110.0

I. Požadavek na teplotní faktor (cl. 5.1 v CSN 730540-2)

Požadavek: f,Rsi,N = f,Rsi,cr = 0.753
Vypoctená prumerná hodnota: f,Rsi,m = 0.953

Kritický teplotní faktor f,Rsi,cr byl stanoven pro maximální prípustnou vlhkost na vnitrním povrchu 80% (kritérium vyloucení vzniku plísní).

Prumerná hodnota fRsi,m (resp. maximální hodnota pri hodnocení skladby mimo tepelné mosty a vazby) není nikdy minimální hodnotou ve všech místech konstrukce. Nelze s ní proto prokazovat plnení požadavku na minimální povrchové teploty zabudované konstrukce vcetne tepelných mostu a vazeb. Její prevýšení nad požadavkem naznacuje pouze možnosti plnení požadavku v míste tepelného mostu ci tepelné vazby.

II. Požadavek na soucinitel prostupu tepla (cl. 5.2 v CSN 730540-2)

Požadavek: U,N = 0.30 W/m2K
Vypoctená hodnota: U = 0.192 W/m2K
U < U,N ... POŽADAVEK JE SPLNEN.

Vypoctený soucinitel prostupu tepla musí zahrnovat vliv systematických tepelných mostu (napr. krokví v zateplené šikmé streše).

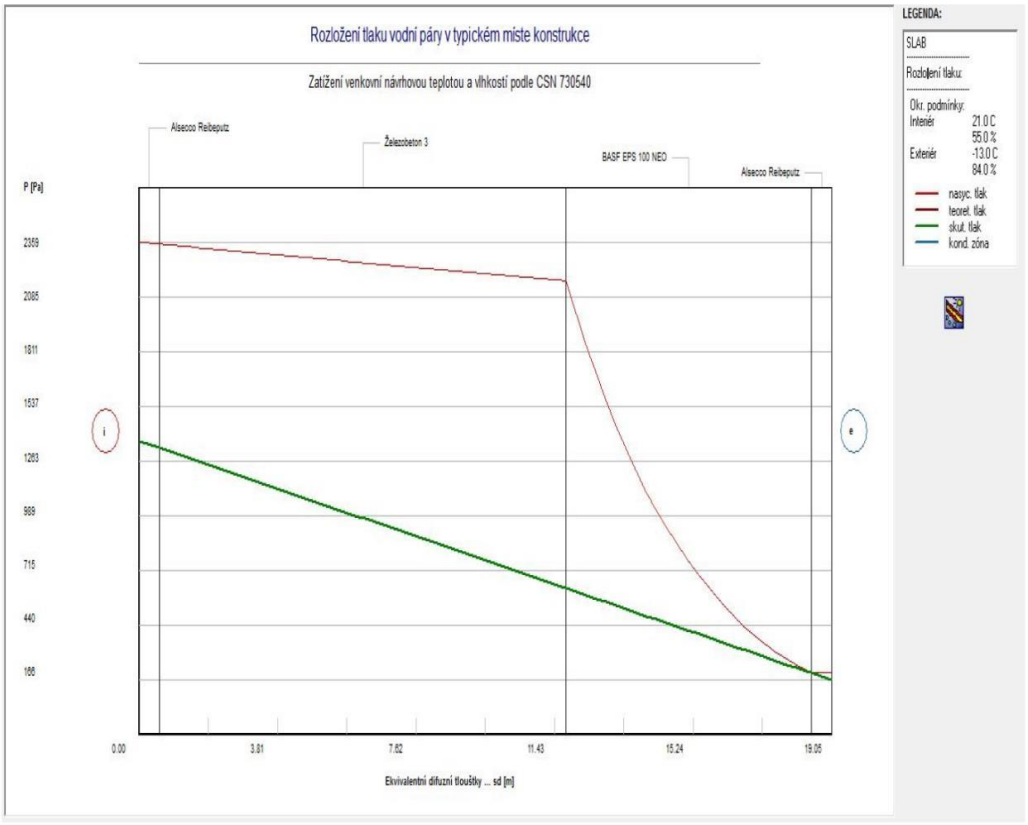
III. Požadavky na šírení vlhkosti konstrukcí (cl. 6.1 a 6.2 v CSN 730540-2)

Požadavky:
1. Kondenzace vodní páry nesmí ohrozit funkci konstrukce.
2. Rocní množství kondenzátu musí být nižší než rocní kapacita odparu.
3. Rocní množství kondenzátu Mc,a musí být nižší než 0,1 kg/m2.rok, nebo 3-6% plošné hmotnosti materiálu (nižší z hodnot).

Vypoctené hodnoty: V kci nedochází pri venkovní návrhové teplote ke kondenzaci.

POŽADAVKY JSOU SPLNENY.

Teplo 2014 EDU, (c) 2014 Svoboda Software



KOMPLEXNÍ POSOUZENÍ SKLADBY STAVEBNÍ KONSTRUKCE Z HLEDISKA ŠÍRENÍ TEPLA A VODNÍ PÁRY

podle EN ISO 13788, EN ISO 6946, CSN 730540 a STN 730540

Teplo 2014 EDU

Název úlohy : **external wall**
Zpracovatel : PC
Zakázka :
Datum : 12/21/2016

ZADANÁ SKLADBA A OKRAJOVÉ PODMÍNKY :

Typ hodnocené konstrukce : Stena vnejší jednoplášťová
Korekce soucinitele prostupu dU : 0.000 W/m2K

Skladba konstrukce (od interiéru) :

Císlo	Název	D [m]	Lambda [W/(m.K)]	c [J/(kg.K)]	Ro [kg/m3]	Mi [-]	Ma [kg/m2]
1	weber.dur 130	0.0050	0.3900	850.0	1300.0	20.0	0.0000
2	Porotherm 40 n	0.4000	0.1600	960.0	800.0	7.0	0.0000
3	BASF EPS 70	0.1000	0.0400	1250.0	16.0	40.0	0.0000
4	weber.dur 130	0.0050	0.3900	850.0	1300.0	20.0	0.0000

Poznámka: D je tlouštka vrstvy, Lambda je návrhová hodnota tepelné vodivosti vrstvy, C je merná tepelná kapacita vrstvy, Ro je objemová hmotnost vrstvy, Mi je faktor difúzního odporu vrstvy a Ma je pocátecní zabudovaná vlhkost ve vrstve.

Císlo	Kompletní název vrstvy	Interní výpocet tep. vodivosti
1	weber.dur 130 lehká podkladní omítka	---
2	Porotherm 40 na maltu lehkou	---
3	BASF EPS 70	---
4	weber.dur 130 lehká podkladní omítka	---

Okrajové podmínky výpoctu :

Tepelný odpor pri prestupu tepla v interiéru Rsi : 0.13 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rsi : 0.25 m2K/W
Tepelný odpor pri prestupu tepla v exteriéru Rse : 0.04 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rse : 0.04 m2K/W

Návrhová venkovní teplota Te : -13.0 C
Návrhová teplota vnitrního vzduchu Tai : 21.0 C
Návrhová relativní vlhkost venkovního vzduchu RHe : 84.0 %
Návrhová relativní vlhkost vnitrního vzduchu RHi : 55.0 %

Mesíc	Délka [dny]	Tai [C]	RHi [%]	Pi [Pa]	Te [C]	RHe [%]	Pe [Pa]
1	31	21.0	53.9	1339.7	-2.4	81.2	406.1
2	28	21.0	56.0	1391.9	-0.9	80.8	457.9
3	31	21.0	57.5	1429.2	3.0	79.5	602.1
4	30	21.0	59.3	1473.9	7.7	77.5	814.1
5	31	21.0	63.4	1575.9	12.7	74.5	1093.5
6	30	21.0	67.2	1670.3	15.9	72.0	1300.1
7	31	21.0	69.2	1720.0	17.5	70.4	1407.2
8	31	21.0	68.5	1702.6	17.0	70.9	1373.1
9	30	21.0	64.1	1593.3	13.3	74.1	1131.2
10	31	21.0	59.7	1483.9	8.3	77.1	843.7
11	30	21.0	57.5	1429.2	2.9	79.5	597.9

12	31	21.0	56.5	1404.4	-0.6	80.7	468.9

Poznámka: Tai, RHi a Pi jsou prum. mesícní parametry vnitrního vzduchu (teplota, relativní vlhkost a cástecný tlak vodní páry) a Te, RHe a Pe jsou prum. mesícní parametry v prostredí na vnejší strane konstrukce (teplota, relativní vlhkost a cástecný tlak vodní páry).

Pro vnitrní prostredí byla uplatnena prirážka k vnitrní relativní vlhkosti : 5.0 %

Výchozí mesíc výpoctu bilance se stanovuje výpoctem podle EN ISO 13788.
Pocet hodnocených let : 1

VÝSLEDKY VÝPOCTU HODNOCENÉ KONSTRUKCE :

Tepelný odpor a soucinitel prostupu tepla podle EN ISO 6946:

Tepelný odpor konstrukce R : 5.026 m2K/W
Soucinitel prostupu tepla konstrukce U : **0.192 W/m2K**

Soucinitel prostupu zabudované kce U,kc : 0.21 / 0.24 / 0.29 / 0.39 W/m2K
Uvedené orientacní hodnoty platí pro ruznou kvalitu rešení tep. mostu vyjádrenou približnou prirážkou podle poznámek k cl. B.9.2 v CSN 730540-4.

Difúzní odpor a tepelne akumulacní vlastnosti:

Difuzní odpor konstrukce ZpT : 3.7E+0010 m/s

Teplotní útlum konstrukce Ny* podle EN ISO 13786 : 2901.6
Fázový posun teplotního kmitu Psi* podle EN ISO 13786 : 21.2 h

Teplota vnitrního povrchu a teplotní faktor podle CSN 730540 a EN ISO 13788:

Vnitrní povrchová teplota v návrhových podmínkách Tsi,p : 19.40 C
Teplotní faktor v návrhových podmínkách f,Rsi,p : **0.953**

Císlo mesíce	Minimální požadované hodnoty pri max. rel. vlhkosti na vnitrním povrchu:				Vypoctené hodnoty		
	--------- 80% ---------		-------- 100% ---------				
	Tsi,m[C]	f,Rsi,m	Tsi,m[C]	f,Rsi,m	Tsi[C]	f,Rsi	RHsi[%]
1	14.7	0.732	11.3	0.586	19.9	0.953	57.7
2	15.3	0.741	11.9	0.584	20.0	0.953	59.7
3	15.7	0.707	12.3	0.516	20.2	0.953	60.6
4	16.2	0.640	12.8	0.381	20.4	0.953	61.6
5	17.3	0.550	13.8	0.131	20.6	0.953	64.9
6	18.2	0.449	14.7	------	20.8	0.953	68.2
7	18.7	0.331	15.1	------	20.8	0.953	69.9
8	18.5	0.374	15.0	------	20.8	0.953	69.3
9	17.4	0.538	14.0	0.085	20.6	0.953	65.5
10	16.3	0.632	12.9	0.360	20.4	0.953	61.9
11	15.7	0.709	12.3	0.519	20.1	0.953	60.6
12	15.5	0.743	12.0	0.585	20.0	0.953	60.2

Poznámka: RHsi je relativní vlhkost na vnitrním povrchu, Tsi je vnitrní povrchová teplota a f,Rsi je teplotní faktor.

Difúze vodní páry v návrh. podmínkách a bilance vodní páry podle CSN 730540:
(bez vlivu zabudované vlhkosti a slunecní radiace)

Prubeh teplot a cástecných tlaku vodní páry v návrhových okrajových podmínkách:

rozhraní:	i	1-2	2-3	3-4	e
theta [C]:	20.1	20.1	3.7	-12.7	-12.7
p [Pa]:	1367	1350	870	183	166
p,sat [Pa]:	2359	2346	796	204	203

Poznámka: theta je teplota na rozhraní vrstev, p je predpokládaný cástecný tlak vodní páry na rozhraní vrstev a p,sat je cástecný tlak nasycené vodní páry na rozhraní vrstev.

Pri venkovní návrhové teplote dochází v konstrukci ke kondenzaci vodní páry.

Kond.zóna císlo	Hranice kondenzacní zóny levá [m]	pravá	Kondenzující množství vodní páry [kg/(m2s)]
1	0.4172	0.4723	1.684E-0008

Rocní bilance zkondenzované a vyparené vodní páry:

Množství zkondenzované vodní páry za rok Mc,a: **0.0170 kg/(m2.rok)**
Množství vyparitelné vodní páry za rok Mev,a: **1.5291 kg/(m2.rok)**
Ke kondenzaci dochází pri venkovní teplote nižší než -5.0 C.

Bilance zkondenzované a vyparené vodní páry podle EN ISO 13788:

Rocní cyklus c. 1

V konstrukci nedochází behem modelového roku ke kondenzaci vodní páry.

Poznámka: Hodnocení difúze vodní páry bylo provedeno pro predpoklad 1D šírení vodní páry prevažující skladbou konstrukce. Pro konstrukce s výraznými systematickými tepelnými mosty je výsledek výpoctu jen orientacní. Presnejší výsledky lze získat s pomocí 2D analýzy.

STOP, Teplo 2014 EDU

VYHODNOCENÍ VÝSLEDKU PODLE KRITÉRIÍ CSN 730540-2 (2011)

Název konstrukce: external wall

Rekapitulace vstupních dat

Návrhová vnitrní teplota Ti:	20.0 C
Prevažující návrhová vnitrní teplota TiM:	20.0 C
Návrhová venkovní teplota Tae:	-13.0 C
Teplota na vnejší strane Te:	-13.0 C
Návrhová teplota vnitrního vzduchu Tai:	21.0 C
Relativní vlhkost v interiéru RHi:	50.0 % (+5.0%)

Skladba konstrukce

Císlo	Název vrstvy	d [m]	Lambda [W/mK]	Mi [-]
1	weber.dur 130 lehká podkladní	0.005	0.390	20.0
2	Porotherm 40 na maltu lehkou	0.400	0.160	7.0
3	BASF EPS 70	0.100	0.040	40.0
4	weber.dur 130 lehká podkladní	0.005	0.390	20.0

I. Požadavek na teplotní faktor (cl. 5.1 v CSN 730540-2)

Požadavek: f,Rsi,N = f,Rsi,cr = 0.753
Vypoctená prumerná hodnota: f,Rsi,m = 0.953

Kritický teplotní faktor f,Rsi,cr byl stanoven pro maximální prípustnou vlhkost na vnitrním povrchu 80% (kritérium vyloucení vzniku plísní).

Prumerná hodnota fRsi,m (resp. maximální hodnota pri hodnocení skladby mimo tepelné mosty a vazby) není nikdy minimální hodnotou ve všech místech konstrukce. Nelze s ní proto prokazovat plnení požadavku na minimální povrchové teploty zabudované konstrukce vcetne tepelných mostu a vazeb. Její prevýšení nad požadavkem naznacuje pouze možnosti plnení požadavku v míste tepelného mostu ci tepelné vazby.

II. Požadavek na soucinitel prostupu tepla (cl. 5.2 v CSN 730540-2)

Požadavek: U,N = 0.30 W/m2K
Vypoctená hodnota: U = 0.192 W/m2K
U < U,N ... POŽADAVEK JE SPLNEN.

Vypoctený soucinitel prostupu tepla musí zahrnovat vliv systematických tepelných mostu (napr. krokví v zateplené šikmé streše).

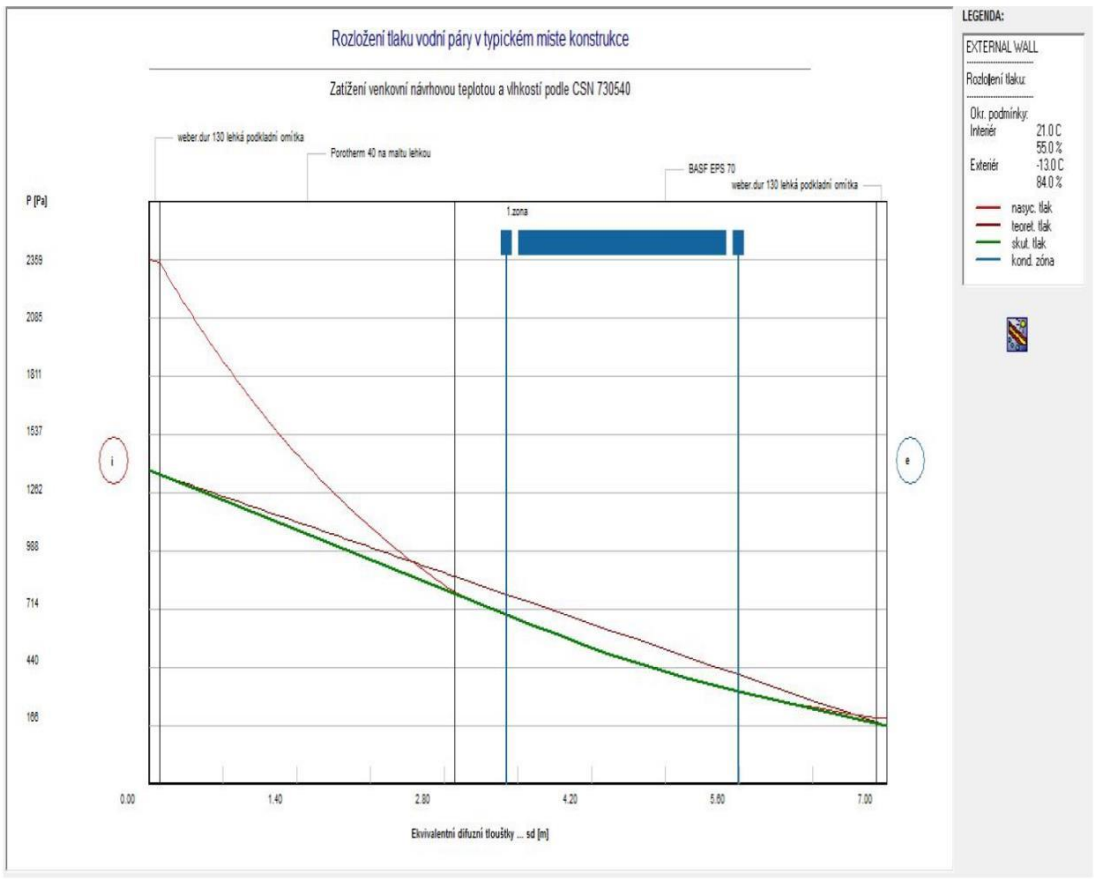
III. Požadavky na šírení vlhkosti konstrukcí (cl. 6.1 a 6.2 v CSN 730540-2)

Požadavky:
1. Kondenzace vodní páry nesmí ohrozit funkci konstrukce.
2. Rocní množství kondenzátu musí být nižší než rocní kapacita odparu.
3. Rocní množství kondenzátu Mc,a musí být nižší než 0,1 kg/m2.rok, nebo 3-6% plošné hmotnosti materiálu (nižší z hodnot).

Limit pro max. množství kondenzátu odvozený z min. plošné hmotnosti materiálu v kondenzacní zóne cini: 0.096 kg/m2,rok
(materiál: BASF EPS 70).
Dále bude použit limit pro max. množství kondenzátu: 0.096 kg/m2,rok

Vypoctené hodnoty: V kci dochází pri venkovní návrhové teplote ke kondenzaci.
Rocní množství zkondenzované vodní páry Mc,a = 0.0170 kg/m2,rok
Rocní množství odparitelné vodní páry Mev,a = 1.5291 kg/m2,rok

Vyhodnocení 1. požadavku musí provést projektant.
Mc,a < Mev,a ... 2. POŽADAVEK JE SPLNEN.
Mc,a < Mc,N ... 3. POŽADAVEK JE SPLNEN.



KOMPLEXNÍ POSOUZENÍ SKLADBY STAVEBNÍ KONSTRUKCE Z HLEDISKA ŠÍŘENÍ TEPLA A VODNÍ PÁRY

podle EN ISO 13788, EN ISO 6946, CSN 730540 a STN 730540

Teplo 2014 EDU

Název úlohy : **flat roof**
Zpracovatel : PC
Zakázka :
Datum : 12/21/2016

ZADANÁ SKLADBA A OKRAJOVÉ PODMÍNKY :

Typ hodnocené konstrukce : Stena vnejší jednoplášťová
Korekce soucinitele prostupu dU : 0.000 W/m2K

Skladba konstrukce (od interiéru) :

Cislo	Název	D [m]	Lambda [W/(m.K)]	c [J/(kg.K)]	Ro [kg/m3]	Mi [-]	Ma [kg/m2]
1	Železobeton 3	0.2100	1.7400	1020.0	2500.0	32.0	0.0000
2	Elastodek 40 S	0.0040	0.2100	1470.0	1200.0	30000.0	0.0000
3	Elastodek 40 S	0.0040	0.2100	1470.0	1200.0	30000.0	0.0000
4	BASF Styrodur	0.1500	0.0300	2060.0	30.0	100.0	0.0000
5	Štěrk	0.0500	0.6500	800.0	1650.0	15.0	0.0000

Poznámka: D je tloušťka vrstvy, Lambda je návrhová hodnota tepelné vodivosti vrstvy, C je merná tepelná kapacita vrstvy, Ro je objemová hmotnost vrstvy, Mi je faktor difúzního odporu vrstvy a Ma je pocátecní zabudovaná vlhkost ve vrstve.

Cislo	Kompletní název vrstvy	Interní výpocet tep. vodivosti
1	Železobeton 3	---
2	Elastodek 40 Special Mineral	---
3	Elastodek 40 Standard Mineral	---
4	BASF Styrodur 3000 S	---
5	Štěrk	---

Okrajové podmínky výpoctu :

Tepelný odpor pri prestupu tepla v interiéru Rsi : 0.13 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rsi : 0.25 m2K/W
Tepelný odpor pri prestupu tepla v exteriéru Rse : 0.04 m2K/W
dtto pro výpocet vnitrní povrchové teploty Rse : 0.04 m2K/W

Návrhová venkovní teplota Te : -13.0 C
Návrhová teplota vnitrního vzduchu Tai : 21.0 C
Návrhová relativní vlhkost venkovního vzduchu RHe : 84.0 %
Návrhová relativní vlhkost vnitrního vzduchu RHi : 55.0 %

Mesíc	Délka [dny]	Tai [C]	RHi [%]	Pi [Pa]	Te [C]	RHe [%]	Pe [Pa]
1	31	21.0	53.9	1339.7	-2.4	81.2	406.1
2	28	21.0	56.0	1391.9	-0.9	80.8	457.9
3	31	21.0	57.5	1429.2	3.0	79.5	602.1
4	30	21.0	59.3	1473.9	7.7	77.5	814.1
5	31	21.0	63.4	1575.9	12.7	74.5	1093.5
6	30	21.0	67.2	1670.3	15.9	72.0	1300.1
7	31	21.0	69.2	1720.0	17.5	70.4	1407.2
8	31	21.0	68.5	1702.6	17.0	70.9	1373.1
9	30	21.0	64.1	1593.3	13.3	74.1	1131.2
10	31	21.0	59.7	1483.9	8.3	77.1	843.7
11	30	21.0	57.5	1429.2	2.9	79.5	597.9

12	31	21.0	56.5	1404.4	-0.6	80.7	468.9

Poznámka: Tai, RHi a Pi jsou prum. mesícní parametry vnitrního vzduchu (teplota, relativní vlhkost a cástecný tlak vodní páry) a Te, RHe a Pe jsou prum. mesícní parametry v prostredí na vnejší strane konstrukce (teplota, relativní vlhkost a cástecný tlak vodní páry).

Pro vnitrní prostredí byla uplatnena prirážka k vnitrní relativní vlhkosti : 5.0 %

Výchozí mesíc výpoctu bilance se stanovuje výpoctem podle EN ISO 13788.
Pocet hodnocených let : 1

VÝSLEDKY VÝPOCTU HODNOCENÉ KONSTRUKCE :

Tepelný odpor a soucinitel prostupu tepla podle EN ISO 6946:

Tepelný odpor konstrukce R : 5.236 m2K/W
Soucinitel prostupu tepla konstrukce U : **0.185 W/m2K**

Soucinitel prostupu zabudované kce U,kc : 0.20 / 0.23 / 0.28 / 0.38 W/m2K
Uvedené orientacní hodnoty platí pro ruznou kvalitu rešení tep. mostu vyjádrenou približnou prirážkou podle poznámek k cl. B.9.2 v CSN 730540-4.

Difúzní odpor a tepelne akumulacní vlastnosti:

Difuzní odpor konstrukce ZpT : 1.4E+0012 m/s

Teplotní útlum konstrukce Ny* podle EN ISO 13786 : 350.0
Fázový posun teplotního kmitu Psi* podle EN ISO 13786 : 11.8 h

Teplota vnitrního povrchu a teplotní faktor podle CSN 730540 a EN ISO 13788:

Vnitrní povrchová teplota v návrhových podmínkách Tsi,p : 19.46 C
Teplotní faktor v návrhových podmínkách f,Rsi,p : **0.955**

Císlo mesíce	Minimální požadované hodnoty pri max. rel. vlhkosti na vnitrním povrchu:				Vypoctené hodnoty		
	--------- 80% ---------		-------- 100% ---------				
	Tsi,m[C]	f,Rsi,m	Tsi,m[C]	f,Rsi,m	Tsi[C]	f,Rsi	RHsi[%]
1	14.7	0.732	11.3	0.586	19.9	0.955	57.5
2	15.3	0.741	11.9	0.584	20.0	0.955	59.5
3	15.7	0.707	12.3	0.516	20.2	0.955	60.5
4	16.2	0.640	12.8	0.381	20.4	0.955	61.5
5	17.3	0.550	13.8	0.131	20.6	0.955	64.9
6	18.2	0.449	14.7	------	20.8	0.955	68.2
7	18.7	0.331	15.1	------	20.8	0.955	69.9
8	18.5	0.374	15.0	------	20.8	0.955	69.3
9	17.4	0.538	14.0	0.085	20.7	0.955	65.5
10	16.3	0.632	12.9	0.360	20.4	0.955	61.8
11	15.7	0.709	12.3	0.519	20.2	0.955	60.5
12	15.5	0.743	12.0	0.585	20.0	0.955	60.0

Poznámka: RHsi je relativní vlhkost na vnitrním povrchu, Tsi je vnitrní povrchová teplota a f,Rsi je teplotní faktor.

Difúze vodní páry v návrh. podmínkách a bilance vodní páry podle CSN 730540:
(bez vlivu zabudované vlhkosti a slunecní radiace)

Prubeh teplot a cástecných tlaku vodní páry v návrhových okrajových podmínkách:

rozhraní:	i	1-2	2-3	3-4	4-5	e
theta [C]:	20.2	19.4	19.3	19.2	-12.3	-12.7
p [Pa]:	1367	1336	787	238	170	166
p,sat [Pa]:	2363	2255	2238	2221	212	203

Poznámka: theta je teplota na rozhraní vrstev, p je predpokládaný cástecný tlak vodní páry na rozhraní vrstev a p,sat je cástecný tlak nasycené vodní páry na rozhraní vrstev.

Pri venkovní návrhové teplote nedochází v konstrukci ke kondenzaci vodní páry.

Množství difundující vodní páry Gd : 9.150E-0010 kg/(m2.s)

Bilance zkondenzované a vyparené vodní páry podle EN ISO 13788:

Rocní cyklus c. 1

V konstrukci nedochází behem modelového roku ke kondenzaci vodní páry.

Poznámka: Hodnocení difúze vodní páry bylo provedeno pro predpoklad 1D šírení vodní páry prevažující skladbou konstrukce. Pro konstrukce s výraznými systematickými tepelnými mosty je výsledek výpoctu jen orientacní. Presnejší výsledky lze získat s pomocí 2D analýzy.

STOP, Teplo 2014 EDU

VYHODNOCENÍ VÝSLEDKU PODLE KRITÉRIÍ CSN 730540-2 (2011)

Název konstrukce: flat roof

Rekapitulace vstupních dat

Návrhová vnitrní teplota Ti:	20.0 C
Prevažující návrhová vnitrní teplota TiM:	20.0 C
Návrhová venkovní teplota Tae:	-13.0 C
Teplota na vnejší strane Te:	-13.0 C
Návrhová teplota vnitrního vzduchu Tai:	21.0 C
Relativní vlhkost v interiéru RHi:	50.0 % (+5.0%)

Skladba konstrukce

Císlo	Název vrstvy	d [m]	Lambda [W/mK]	Mi [-]
1	Železobeton 3	0.210	1.740	32.0
2	Elastodek 40 Special Mineral	0.004	0.210	30000.0
3	Elastodek 40 Standard Mineral	0.004	0.210	30000.0
4	BASF Styrodur 3000 S	0.150	0.030	100.0
5	Štěrk	0.050	0.650	15.0

I. Požadavek na teplotní faktor (cl. 5.1 v CSN 730540-2)

Požadavek: f,Rsi,N = f,Rsi,cr = 0.753
Vypoctená prumerná hodnota: f,Rsi,m = 0.955

Kritický teplotní faktor f,Rsi,cr byl stanoven pro maximální prípustnou vlhkost na vnitrním povrchu 80% (kritérium vyloucení vzniku plísní).

Prumerná hodnota fRsi,m (resp. maximální hodnota pri hodnocení skladby mimo tepelné mosty a vazby) není nikdy minimální hodnotou ve všech místech konstrukce. Nelze s ní proto prokazovat plnení požadavku na minimální povrchové teploty zabudované konstrukce vcetne tepelných mostu a vazeb. Její prevýšení nad požadavkem naznacuje pouze možnosti plnení požadavku v míste tepelného mostu ci tepelné vazby.

II. Požadavek na soucinitel prostupu tepla (cl. 5.2 v CSN 730540-2)

Požadavek: U,N = 0.24 W/m2K
Vypoctená hodnota: U = 0.185 W/m2K
U < U,N ... POŽADAVEK JE SPLNEN.

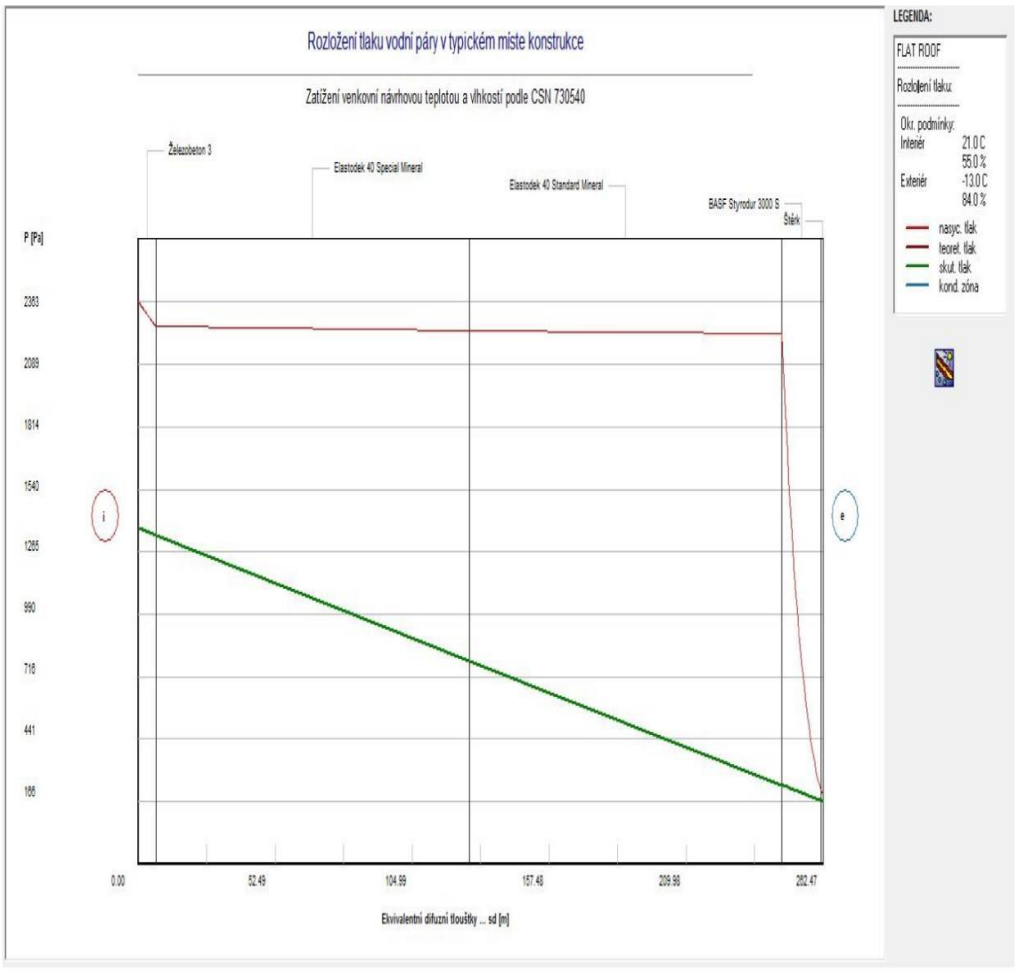
Vypoctený soucinitel prostupu tepla musí zahrnovat vliv systematických tepelných mostu (napr. krokví v zateplené šikmé streše).

III. Požadavky na šírení vlhkosti konstrukcí (cl. 6.1 a 6.2 v CSN 730540-2)

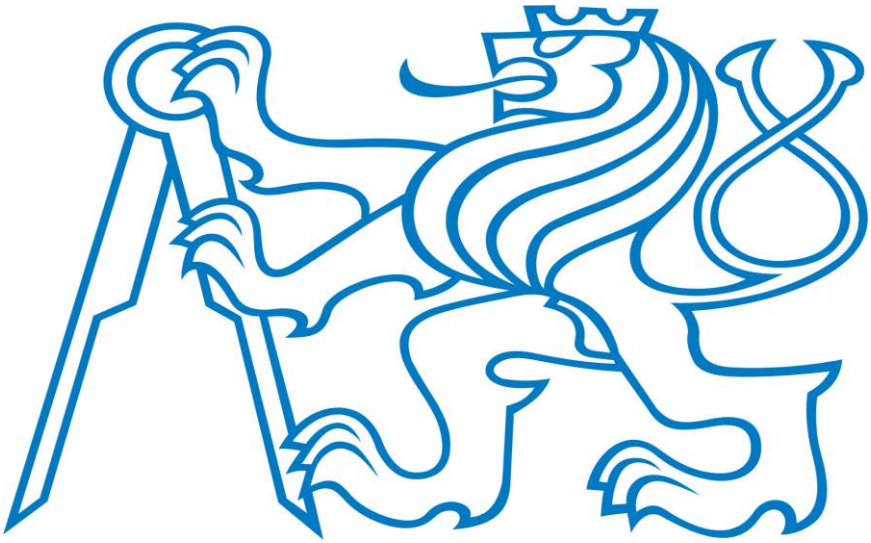
Požadavky:
1. Kondenzace vodní páry nesmí ohrozit funkci konstrukce.
2. Rocní množství kondenzátu musí být nižší než rocní kapacita odparu.
3. Rocní množství kondenzátu Mc,a musí být nižší než 0,1 kg/m2.rok, nebo 3-6% plošné hmotnosti materiálu (nižší z hodnot).

Vypoctené hodnoty: V kci nedochází pri venkovní návrhové teplote ke kondenzaci.

POŽADAVKY JSOU SPLNENY.



Czech Technical University in Prague
FACULTY OF CIVIL ENGINEERING



TECHNICAL REPORT
PART BUILDING SERVICE

According to the standards CSN 01 3107; ISO 128-23; CSN 01 3450

Thesis

RESIDENTIAL APARTMENT BUILDING

Name:Yosufi Mohammad Fayez
Supervisor: doc Ing Hana Gattermayrova CSc
Consultant: Ing . Miroslav Urban
Accademic year:2016/17

Signature:

Contents:

- Identification data of the building.
- General description of the building.
- Basic material.
- Description sewerage systems.
- Description pipeline.
- Evaluations of water supply.
- Evaluation of gas supply.
- Description central heating.
- Finally - implementing regulations.

Apartment Building Multifunction

Identification data:

- **Project name:** Residential aprtment building
- **Location:** prague west (jenec)
- **Function of the building:** apartment building and cafeteria + buffet
- **Stage :** Building permits.
- **Investor** : Private.
- **supplier:** will be selected by tender.

General description of the building:

- This Apartment building is located in an urban area jenec west of the Prague Czech Republic the total area of the building is 245 m^2 this building is consists of four floors including of the basement. Basically the basement is provided for storages and car parking for the whole residence of the building and on the ground floor there is cafeteria + buffet and also there is one apartment the 2nd and 3th floors are appartment.Roof is not accessible to public except repair and maintain reason.
- Apartments type:
- Basement:boiler room, ventilation roo , 4x storages , 5 x Car parking , 1x staircase ,2x corridors.
- Ground floor:1x staircase, 2x corridors,3x toilets,caffeteria and buffet, technical room and also there is one appartment include of kitchen room,hall, 2x bed rooms,corridor,bathroom,toilet.
- 2nd and 3th floors: in each floors there are 2 appartments which each one consists of bathroom,living room,kitchen room, toilet, 2x bed rooms, kitchen room and balcony in one sides of the building.
- On the 3th floor there is opeing in order to have accessibility to the roof for service or emergency case.
- Generally Surrounding the building with dimension of 1,5m there is stone pavements and the other are of the building will be after the rough landscaping grassed and planted with low and medium greenery there is also a gardin for the restaurant.

Drawing documentation:

- Typical, ground floors and basement drainage systems.
- Rain drainage and internal drainage supply.
- Typical, ground floors and basement Water supply systems.
- Typical, ground floors and basement Gas supply systems.
- Typical, ground floors Ventilations and Heat systems.
- Situation of the Building.
    - Note: All of the drawing can be seen in my attachments which is in folders.

Drainage systems of the building:

Building drain connection:

- Basically more details and solution of the sewr system is plotted in attachment which is consists of sewerage and rainwater indeed both of them are separated.
- The connection of the Sewerage pipe is PVC DN 150 and and rainwater is PVC DN 125 and shall connected to the an existing sewerage network administrator.

- Generally The slope of building drain connection is considered as 5% (for DN 110, DN 75 DN 125,DN 150).
- The man hole will be in frost-free depth and will be concreted and fitted walk-on cover. The shaft dimensions 1000 x 800 mm.
- The drain connection will be made from plastic pipes.

Building drain

- Obviously the slope of building drain is 5% in this case It will be used plastic pipes. The diameters vary from 50mm up to 150mm with the knee pipe with angle of 45◦. Connection with plumbing fixtures is provided by connecting pipes, which are connected with the main vertical stacks with DN 11O. There are 5 vertical stacks for drainage and 3 vertical stacks for rainwater drainage. The vertical stacks are placed in vertical shafts and in external walls, the connection pipes are placed in internal walls and in the floor. *(The dimensions are shown in the technical drawings).*

Waste water internal distribution:

- All of the waste water pipes are made up of PVC pipes, with diameters DN 50-110 basically the pipes are conducted in grooves in the wall, and floor. 5% is assumed for inclination of the piping.
- The pipes with diameters DN 100 and 125 , it is conducted in pre-prepared pits.
- Also as a result We need to have anchored all of the pipes for a better safety at a distance of mounting brackets for a good functionality which mainly indicates the pipe manufacturer. Due to the fatc all of the drain pipes on the roof shall be provided with the ventilation and equipped with ventilation head.
- Also each of the the ventilation pipes has same properties as drain pipes and join the waste pipes also conducted tot he installation shaft.
- The drainage pipes is directed to the basement with the diameter of (DN125-150) after that the drain pipes is directed through to the basement wall and also in the basement wall there are several opening which are provided for passages of the swerage pipes.
- There re 3 rainwater pipes with the DN110 for interior and 125 for exterior with properties of copper and the slope iis assumed 5%.

fixtures and fittings:

- Obviousely in the basement plane there ccurs 1x outlet fittings.
- Functionality in the ground floors.6x sink, 6x corner valve (toilet), 2x kitchen sink, 1x shower, 2x dishwasher, 1x washing machine.
- In the typical floor(2nd and 3th).8x sink, 8x kitchen sink, 4x dishwasher, 4x toilet, 4x shower, 4x washing machine.

Basic Material:

- Each of this PVC pipes which we used in our building we use DN from 50 to 150mm.
- From the risk of the freezing for external pipes which effected by infeluenced of environment we provide thermal insulation while the ground pipes does not need because of thier deep position and protection by subsoil layers.

Drains cleaning:

- Basically in case if do we need a drains cleaning the process will be implemented by vertical drains from the roof top through to the ventilation ducts.

pumping:

- So in this case the we see that the public sewer is positioned in deep elevation therefore the justification says that we do not need.

Wastewater stacks:

- Plastic pipes will be used, with DN 110. The wastewater stacks are placed in vertical shaft in this building.

Horizontal fixture branch:

- Deu to the fact Slope of 5% is applied. Used material would be plastic pipes with DN 110 and DN 150. The pipes are located in the ground-floor, in the foundations.

Plumbing fixtures

- KOHLER PLUMBING company is responsible for the designed instalations. Material used is ceramics. Installations : washbasin , bath, sink and washing-machine.

Rainwater

- There are 3 vertical rain pipes and this Rainwater drainage is made by cooper pipes. The diameter of vertical rainwater pipes is DN 110 and the horizontal is DN125 (slope of 3.5%).

Conclusion:

- After the investigations of the all process we rech to the point that this project is generally designed within the scope of the project for the building permit accordance with applicapble regulations (CSN 73 6660, CSN 73 6005). obligatory Performing the work will be done by an authorized company, which at the handover submit their authorization certificate to implementation of the building. The company is obliged to follow the regulations of material manufacturers.
- The total sanitation is needed to test for leaks according to CSN 73 6760th.

Water supply systems:

Source of drinking water:

- Basically the Source of drinking water is central connection fresh water from the street underground waternetwork.

Building water supply connection:

- Slope of the drain connection of the building is about 0.5% . connection will be conducted in frost-free depth of abut 1 to 1.5m.
- Water supply connection will be made from copper pipes, diameter 25mm.
- fresh water supply connection is plotted in situation.
- Water connection will be DN25 polypropylene and will be connected to the existing water system network under pressure.

Water meter assembly:

- The main water meter assembly is placed in the ground-floor in the west. It‘s composed of filter, water meter, 2x reducer, 2x drain valve, shut off valve, check valve.

Horizontal piping:

- The decline a of horizontal piping is 0.5%. All horizontal pipes are made from copper. The pipes are placed mainly in the walls, in the ground floor in the flooring.

Vertical piping:

- All vertical pipes are made from copper. It is placed in the vertical shafts. The hydrant water supply pipe is placed in the bearing wall.

Connection piping:

- The connection pipes have decline 5% and it is made from copper pipes. All connection pipes are placed in the wall.

Outlet valves: Outlet valves are angle valves which are made from chrome and MP valves.

Distribution of water in internal:

- Slope of the drain connection of the building is about 0.5% . connection will be conducted in frost-free depth of abut 1 to 1.5m.
- Cold water is conducted in polypropylene piping conducted in the wall grooves , at the entrance to the builiding and before ascending pipe is provided with a ball vale and outlet valve of possible reasongs for the crash.
- Hot water is also conducted in polypropylene pipes conducted in the wall grooves before each rising hot water piope is provided with a ball valve and outlet valve of possible reasons for the crash.
- circulation pipe is also poypropylene is conducted freely supspended below the ceiling befor each rising pipe is with a ball valve and outlet valve of possible reason for the crash.
- All three of these lines shall be kept longer For checks provided dilatation spacer and each pipe must be carefully fitted due to insulation reasons and unwanted heat.
- Fire pipeline is made of steel, is guided by its own pipe from the meter assembly is brought into the stairwell of the building, where it joins the rising fire lines and is equipped with fire hydrants.

Functionality and installations:

- boiler room is located in the basement of the building.
- 2 x heater type VITOCELL 100-V - VIESMANN 200 l.
- More information, refer to the manufacturer.
- Generally The size and power is directly proportional to the number of inhabitants in object.
- The Cold water is brought to the heater and is led out of hot water and circulation pipe with is fitted with circulation pump.

fixtures and fittings:

- Obviousely in the basement plane there ccurs 0 outlet fittings.
- Functionality in the ground floors.6x sink, 6x corner valve (toilet), 2x kitchen sink, 1x shower, 2x dishwasher, 1x washing machine.
- In the typical floor(2nd and 3th).8x sink, 8x kitchen sink, 4x dishwasher, 4x toilet, 4x shower, 4x washing machine.

pipe insulation:

- In order to premit from sorounding of the tenvironmental infeluence the piping shal be insulated and indeed the fire pipes will be insulated from fireproof material the invastigation and judgment will focuse more on the manufatures.
- Kind of the thermal insulation materials and thier functionality,durability will be based on the manufactures.

water consumption measurements:

- The key function of the Water consumption is basically measured in meter shaft, by using of hydrometric reports which is supplied by the network administrator, who will intervals to read the status of the meter. Longer secondary water meters will be installed in each residential units.

Final conclusion:

- Usually internal water supply connection and execution of work is according to the current standards of the czech republic and the EU.
- CSN 73 66 60 - INDOOR WATER.
- CSN 73 66 55 - CALCULATION OF INTERNAL WATER.
- EN 806-3 - INTERNAL DISTRIBUTION OF WATER FOR HUMAN CONSUMPTION.
- H 132 98 - HEATER WATER.

Gas supply system:

connection:

- Include the coffeteria and all of the residence of this appartments basically connected to the local existing piplines with a medium pressure from the road mainly in the position where there is provided by the administration networks.

Connections and main properties:

- Dimension between gas piplenes and other connection is 1,3m.
  slope of the gas connection piping is min. 0,4 %.
- The connector is mounted on the boundary brick which is equipped with a main gas closure and gas meter.
- Protective zones are at least 0.8 m depth and min. 4 m on each side from the pipe.
- The pipes will be placed into an excavation 800x1000mm.
- The excavation will be filled by sand to protect the piping. All required tests must be done before using.
- The low pressure gas connection will lead till the main shut off valve of the building, which is placed in the niche The niche is placed in the externall wall.
- The pipes will be made from steel, connected by welding. All visible parts will be painted by yellow colour and all parts will be protected against corrosion.
- The gas pipes are placed in the load-bearing walls (vertical piping) or under ceiling (horizontal piping). The slope is always orientated from a gas meter to the appliances. All tests must be done before using slope of the gas connection piping is min. 0,4 %.

Gas consumption:

- Each independent part of the building has its own gas meter Gallus 2000 G 1,6 and own shut off valve. All devices are placed inside the wall openings. All wall openings are placed in accessible points.

Gas appliances

- In each kitchen, there is placed a gas cooker MORA 1411E12 (consumption 1.15 m^3/h). Gas exhaustions are spread in the room and the air supply is natural, the volume of the room is bigger than 20 m^3.
- The building was designed with local heating system. Each flat has own gas boiler TIGER 12KTZ (consumption 1.34 m^3/h). Air supply is provided by double-surface chimney Schiedel Absolut ABS 20L. Exhaust gas goes to the chimney.

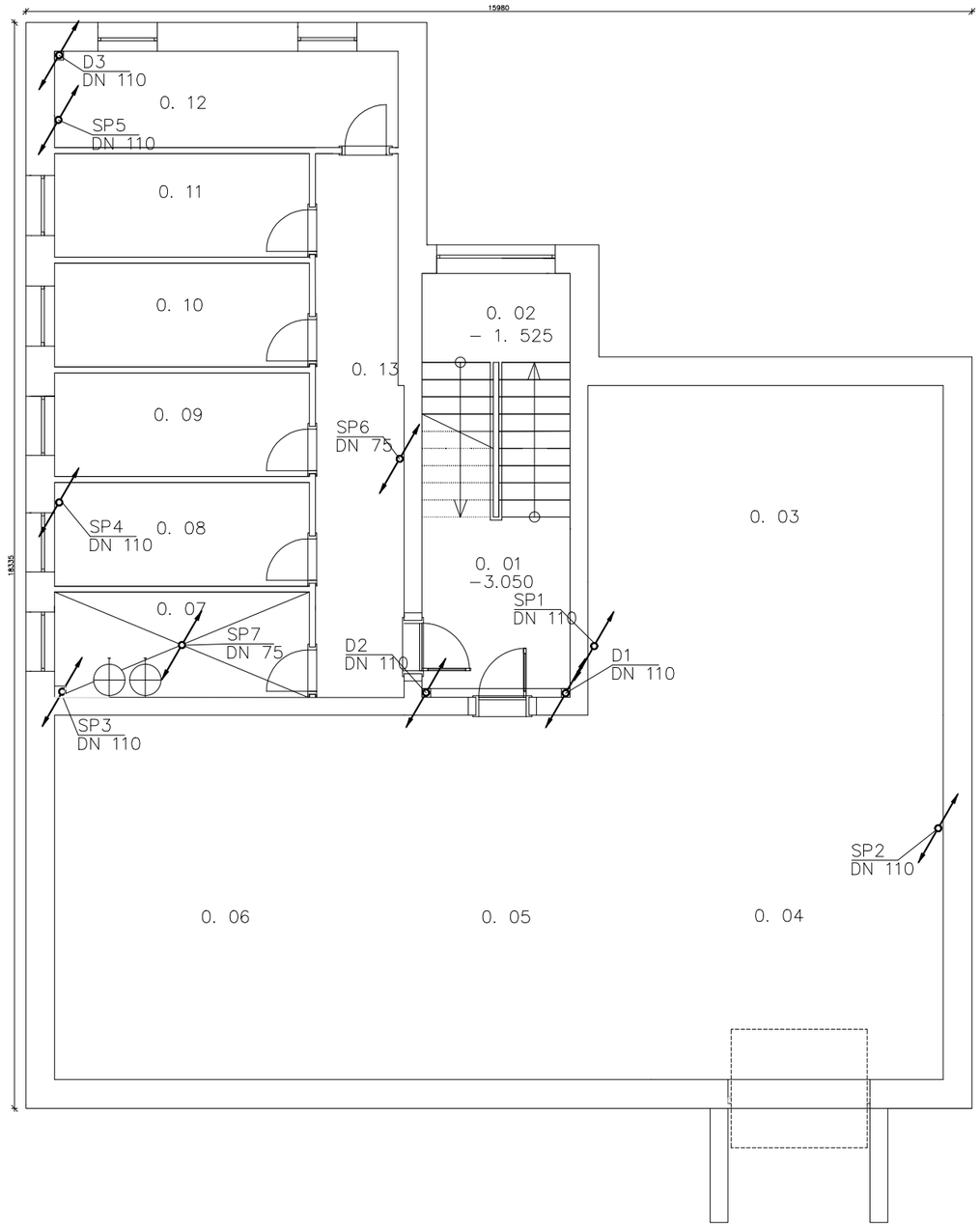
Heating:

- Include of the caffeteria and each individual apartments is heated by the radiators and all of the radiators are placed in the front of the opening (windows,doors,balconey) and basically with respect to heat lose in the building we determine the size and number of radiators.
- The pipes is initiated from the boilers and vertically rise up through to the opening and connected to the radiators the pipes which is provided for suply water and return water it is made up of copper.
- **NOTE:** Please for More justification of the heating Visit evaluation of the u value calculationin part of the building structures.

Air and ventilation of the building:

- As i mentioned in the previous that this building is in an new urban area which far away from infeluence of the environment(traffic noise,pollutions,etc) therefore the biulding is nutrally ventilated through to the windows and internal doors are equipped ventilation grill in the underground cellar block.
- The mechanical ventilation is provided for each apartment (toilet , bathroom, kitchenroom and grages) the exhaust air is lead out to the roof top by vertical pipes which is positioned in the installation shaft.

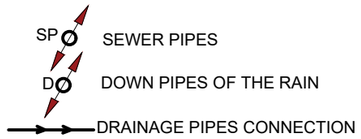
BASEMENT PLAN DRAINAGE SYSTEMS : −3,050 M

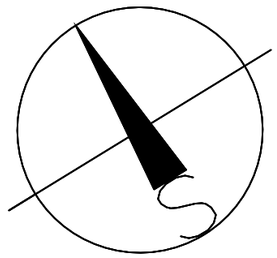


Area table

Room#	Function	M 2	Flooring	Notes
0. 01	STAIRCASE	10.28	COLOR	
0. 02	CORRIDOR	7.6	concrete cladding	10mm
0. 03	PARKING	33.36	Bautch car praking finishes	
0. 04	PARKING	36.9	Bautch car praking finishes	
0. 05	PARKING	19.07	Bautch car praking finishes	
0. 06	PARKING	36.29	Bautch car praking finishes	
0. 07	BOILER ROOM	7.64	concrete cladding	
0. 08	STORAGE ROOM	7.64	concrete cladding	
0. 09	STORAGE ROOM	7.64	concrete cladding	
0. 10	STORAGE ROOM	7.64	concrete cladding	
0. 11	STORAGE ROOM	7.64	concrete cladding	10mm
0. 12	VENTILATION ROOM	9.43	concrete cladding	
0. 13	CORRIDOR	13.371	concrete cladding	

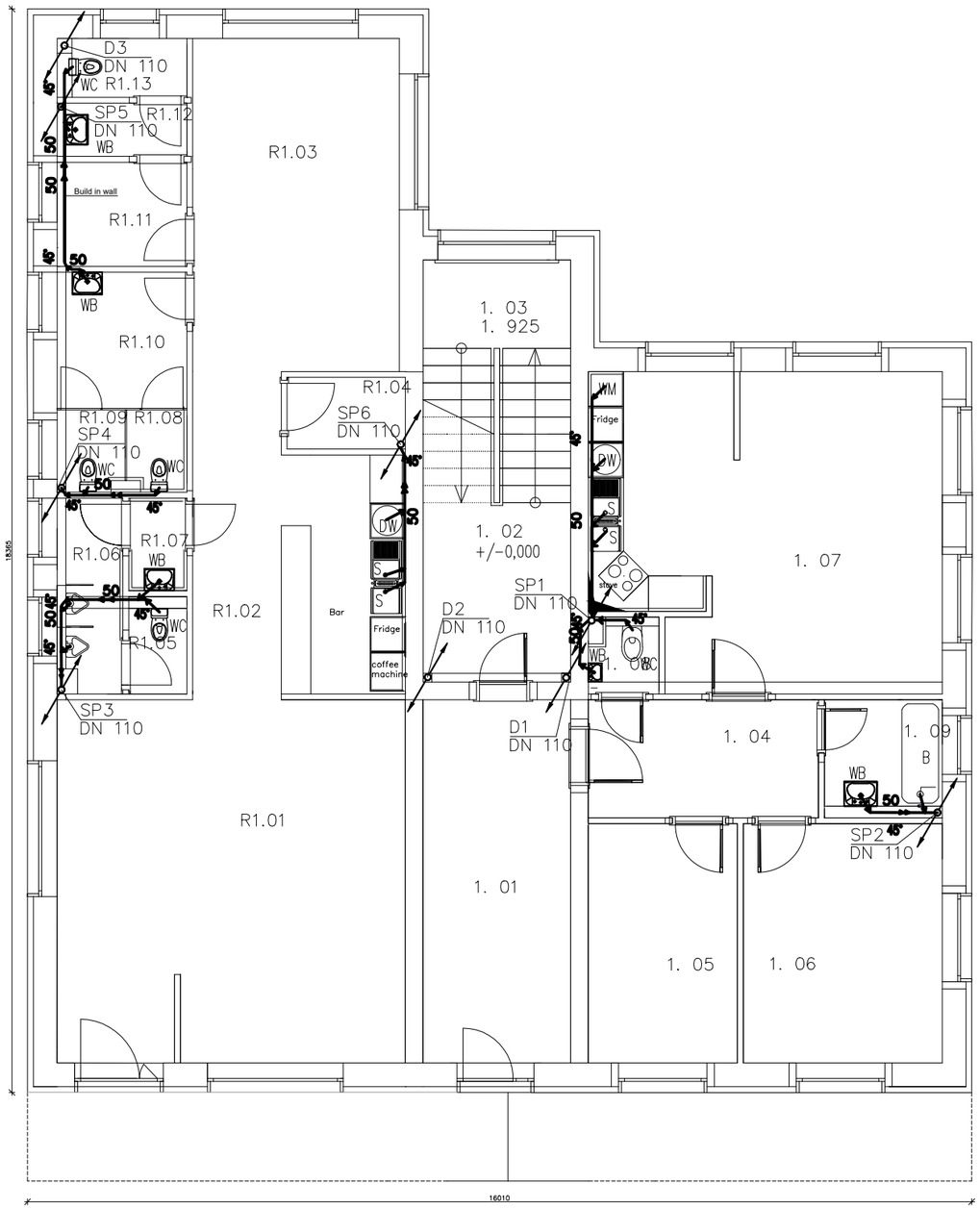
LEGEND:





DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Basement Drainage connection			Scale. 1:100 / Drawing No. 01

GROUND FLOOR PLAN DRAINAGE SYSTEM : +/-
0,000- 3.760 M



Area table

Room#	Function	M 2	Flooring	Notes
1. 01	CORRIDOR	15.39	CERAMIC TILES	30X60
1. 02	CORRIDOR	6.625	CERAMIC TILES	30X60
1. 03	STAIRCASE	11.25	EPOXY LAYER	3mm
1. 04	CORRIDOR	7.76	pure gray color	-
1. 05	BED ROOM 1	11.52	PVC plank wooden color	4mm, 2.2kg/m2
1. 06	BED ROOM 2	13.69	PVC plank wooden color	4mm, 2.2kg/m2
1. 07	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
1. 08	TOILET	1.32	CERAMIC TILES	22.5X45
1. 09	BATHROOM	3.7	CERAMIC TILES	22.5X45
R1.01	COFFEE ROOM	36.17	CERAMIC TILES	45X45
R1.02	BAR	14.58	CERAMIC TILES	45X45
R1.03	TEA ROOM	19.76	CERAMIC TILES	45X45
R1.04	TECHNICAL ROOM	2.43	CERAMIC TILES	45X45
R1.05	MEN TOILET	1.5	CERAMIC TILES	22.5X45
R1.06	MEN TOILET	3.67	CERAMIC TILES	22.5X45
R1.07	CORRIDOR	1.565	CERAMIC TILES	22.5X45
R1.08	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.09	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.10	CORRIDOR	4.65	CERAMIC TILES	22.5X45
R1.11	CORRIDOR	3.883	CERAMIC TILES	22.5X45
R1.12	WASHROOM	1.98	CERAMIC TILES	22.5X45
R1.13	TOILET	2.189	CERAMIC TILES	22.5X45

LEGEND:

SP Ø SEWER PIPES

D Ø DOWN PIPES OF THE RAIN

DRAINAGE PIPES CONNECTION

SYMBOLS:

WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

COMMENTARY:

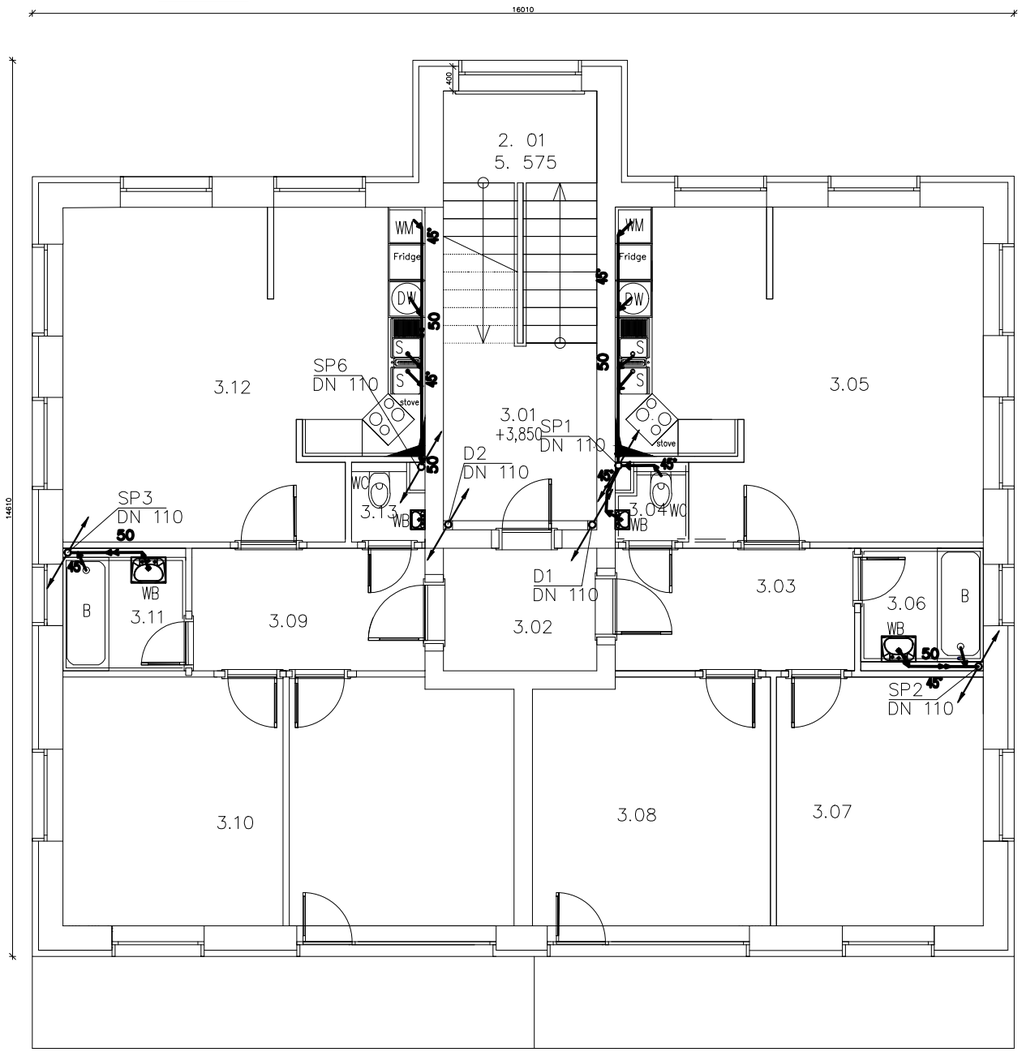
DRAINAGE PIPES OF 2nd FLOORS IS BUILT IN WALL THEN
THROUGH TO THE CEILING OF GROUND FLOOR CONNECTED TO THE
SP6 PIPES.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		
Attachment name: Ground Floor Drainage Connection		

Fakulta stavební ČVUT

Format:	2XA4
Date:	13/10.2016
Purpose:	Building Permit
Archive Issues	-----
Scale. 1:100	Drawing No. 02

2nd & 3th FLOOR PLAN DRAINAGE SYSTEMS : 7,210 – 10.660M



Area table

Room#	Function	M 2	Flooring	Notes
3. 01	CORRIDOR	7	CERAMIC TILES	30X60
3. 02	CORRIDOR	5	CERAMIC TILES	30X60
3. 03	CORRIDOR	7.8	PVC plank wooden color	4mm, 2.2kg/m2
3. 04	TOILET	1.32	CERAMIC TILES	22.5X45
3. 05	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
3. 06	BATHROOM	3.70	CERAMIC TILES	22.5X45
3. 07	BED ROOM 1	13.67	PVC plank wooden color	4mm, 2.2kg/m2
3. 08	BED ROOM 2	15.74	PVC plank wooden color	4mm, 2.2kg/m2
3. 09	CORRIDOR	7.6	PVC plank wooden color	4mm, 2.2kg/m2
3. 10	BED ROOM	14.56	PVC plank wooden color	4mm, 2.2kg/m2
3. 11	BATHROOM	4	CERAMIC TILES	22.5X45
3. 12	KITCHEN ROOM	28.09	PVC plank wooden color	4mm, 2.2kg/m2
3. 13	TOILET	1.32	CERAMIC TILES	22.5X45

LEGEND:

SP Ø SEWER PIPES

D Ø DOWN PIPES OF THE RAIN

DRAINAGE PIPES CONNECTION

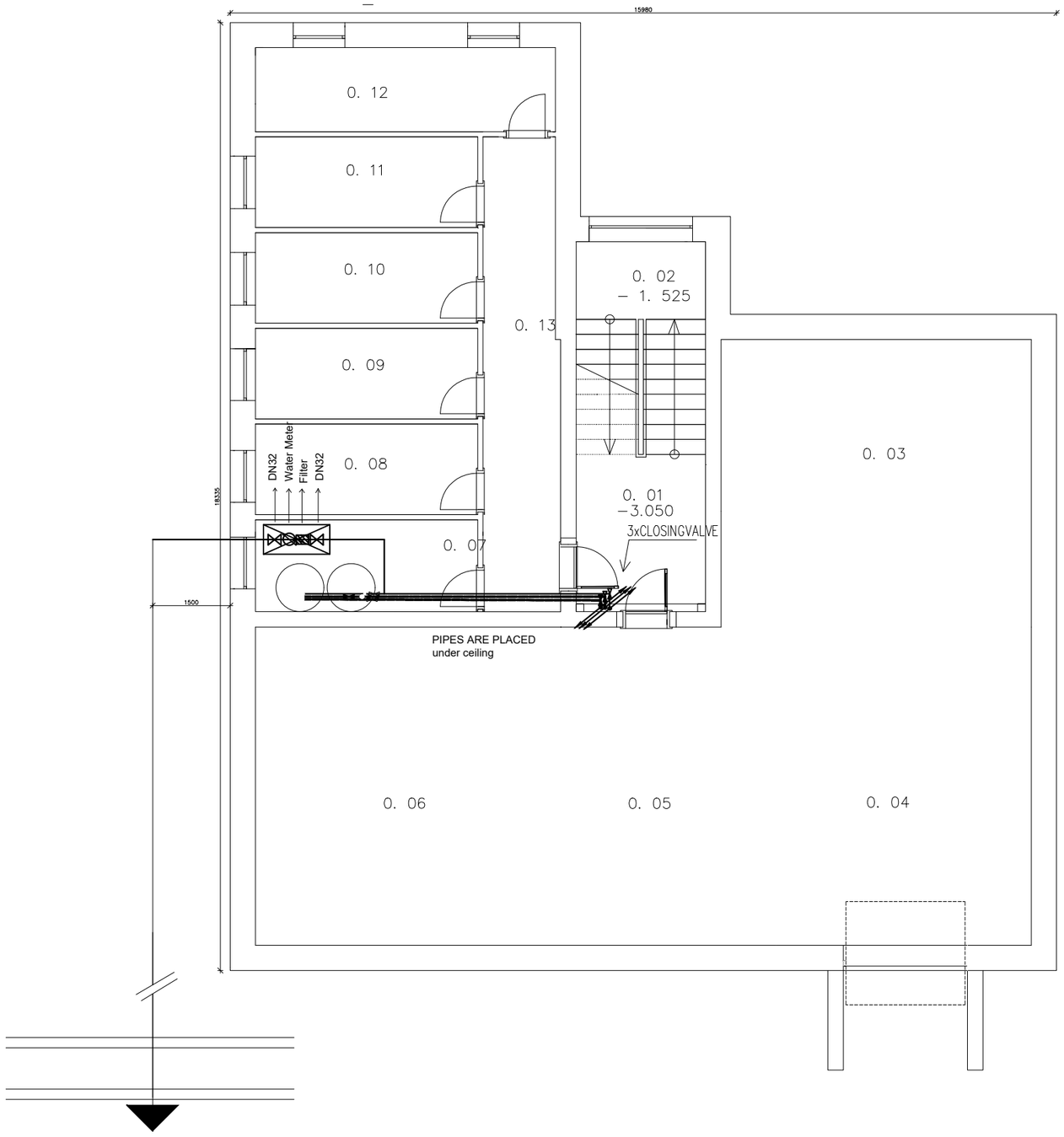
SYMBOLS:

WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

COMMENTARY:

-2nd FLOOR & 3th FLOORS HAS SAME STRUCTURAL ELEMENTS
-THEREFORE THE DRAINAGE IS SAME AS 2nd FLOOR.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: doc.Ing Hana Gattermyerova CSc	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Typical Floor Drainage Connection			Scale. 1:100 Drawing No. 03



Area table

Room#	Function	M 2	Flooring	Notes
0. 01	STAIRCASE	10.28	COLOR	
0. 02	CORRIDOR	7.6	concrete cladding	10mm
0. 03	PARKING	33.36	Bautch car praking finishes	
0. 04	PARKING	36.9	Bautch car praking finishes	
0. 05	PARKING	19.07	Bautch car praking finishes	
0. 06	PARKING	36.29	Bautch car praking finishes	
0. 07	BOILER ROOM	7.64	concrete cladding	
0. 08	STORAGE ROOM	7.64	concrete cladding	
0. 09	STORAGE ROOM	7.64	concrete cladding	
0. 10	STORAGE ROOM	7.64	concrete cladding	
0. 11	STORAGE ROOM	7.64	concrete cladding	10mm
0. 12	VENTILATION ROOM	9.43	concrete cladding	
0. 13	CORRIDOR	13.371	concrete cladding	

LEGEND:

- COLD WATER
- CIRCULATION
- HOT WATER
- CLOSINGVALVE
- Watermeter
- Filter
- CIRCULATION PUMP

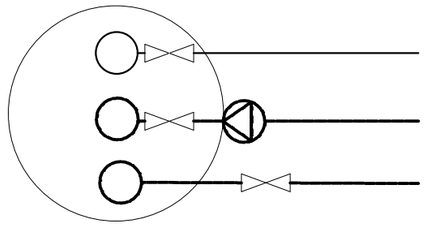
SYMBOLS:

WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

SYMBOLS:

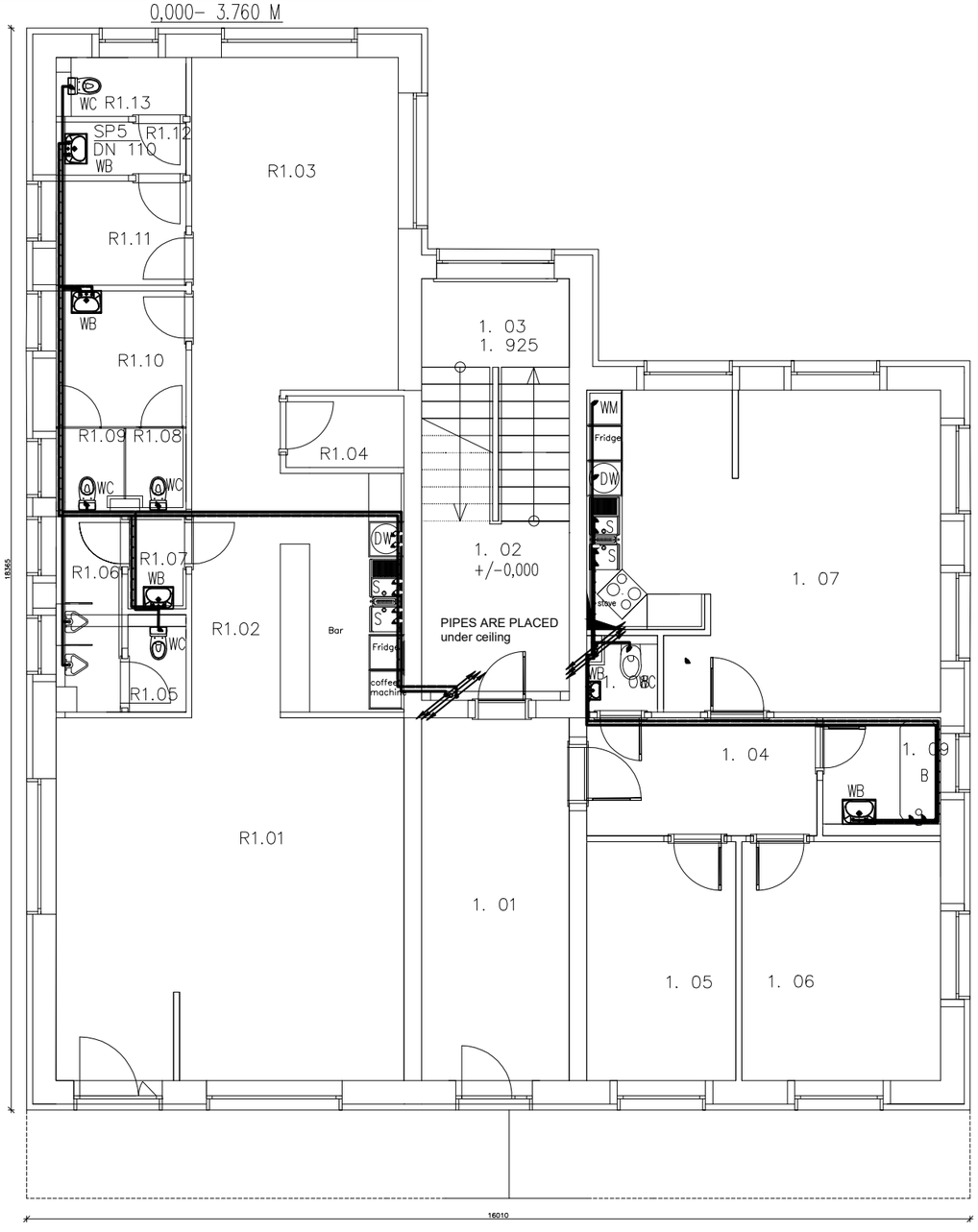
WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

SPECIFICATION OF BOILER



DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Basement water supply			Scale. 1:100 Drawing No. 04

GROUND FLOOR PLAN WATER SUPPLY SYSTEM : +/-
0,000- 3.760 M



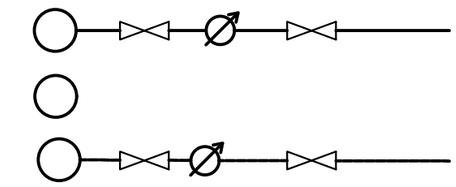
Area table

Room#	Function	M 2	Flooring	Notes
1. 01	CORRIDOR	15.39	CERAMIC TILES	30X60
1. 02	CORRIDOR	6.625	CERAMIC TILES	30X60
1. 03	STAIRCASE	11.25	EPOXY LAYER	3mm
1. 04	CORRIDOR	7.76	pure gray color	-
1. 05	BED ROOM 1	11.52	PVC plank wooden color	4mm, 2.2kg/m2
1. 06	BED ROOM 2	13.69	PVC plank wooden color	4mm, 2.2kg/m2
1. 07	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
1. 08	TOILET	1.32	CERAMIC TILES	22.5X45
1. 09	BATHROOM	3.7	CERAMIC TILES	22.5X45
R1.01	COFFEE ROOM	36.17	CERAMIC TILES	45X45
R1.02	BAR	14.58	CERAMIC TILES	45X45
R1.03	TEA ROOM	19.76	CERAMIC TILES	45X45
R1.04	TECHNICAL ROOM	2.43	CERAMIC TILES	45X45
R1.05	MEN TOILET	1.5	CERAMIC TILES	22.5X45
R1.06	MEN TOILET	3.67	CERAMIC TILES	22.5X45
R1.07	CORRIDOR	1.565	CERAMIC TILES	22.5X45
R1.08	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.09	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.10	CORRIDOR	4.65	CERAMIC TILES	22.5X45
R1.11	CORRIDOR	3.883	CERAMIC TILES	22.5X45
R1.12	WASHROOM	1.98	CERAMIC TILES	22.5X45
R1.13	TOILET	2.189	CERAMIC TILES	22.5X45

LEGEND:

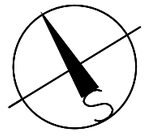
- COLD WATER
- CIRCULATION
- HOT WATER
- CLOSINGVALVE
- Watermeter
- Filter
- CIRCULATION PUMP
- DUMP VALVE

SPECIFICATION OF BOILER



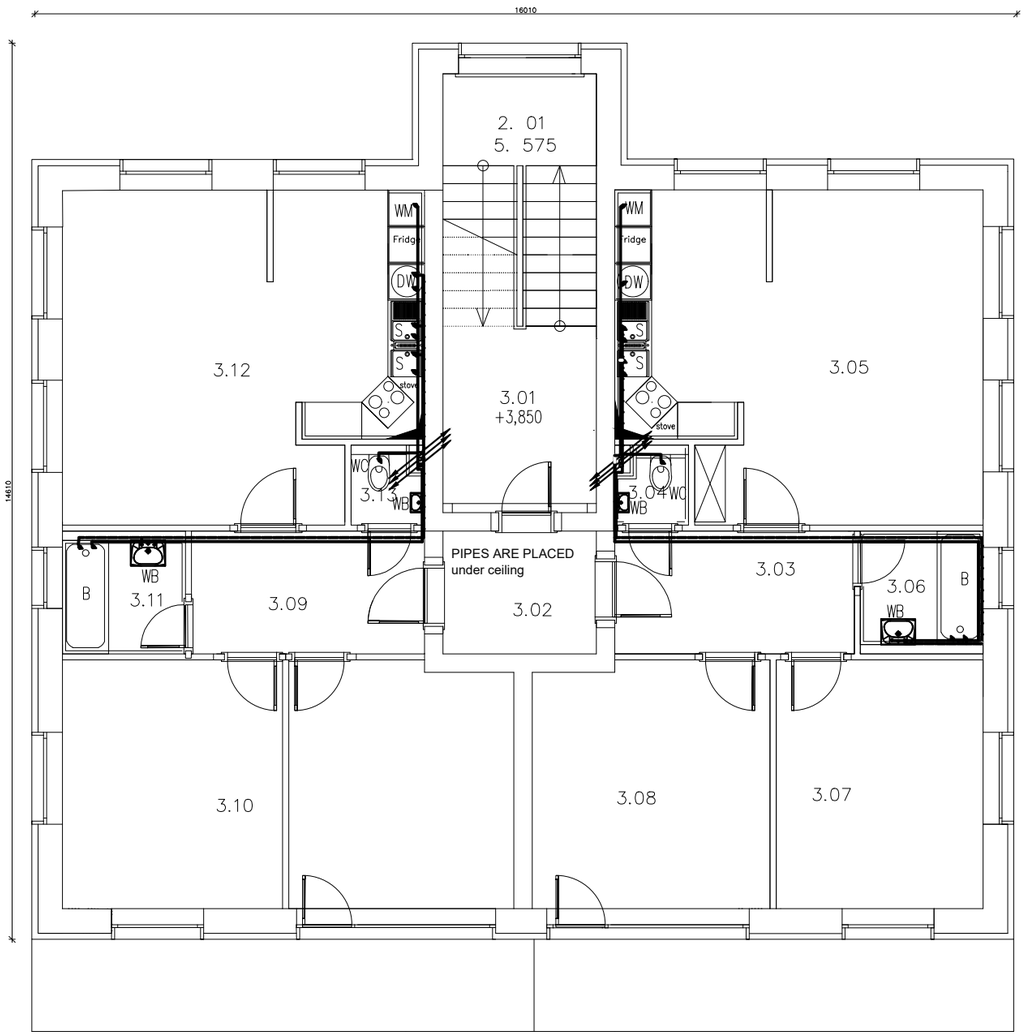
SYMBOLS:

WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm



DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Ground Floor water suply			Scale. 1:100 Drawing No. 05

2nd & 3th FLOOR PLAN WATER SUPPLY SYSTEMS :
7,210 – 10.660M



Area table

Room#	Function	M 2	Flooring	Notes
3. 01	CORRIDOR	7	CERAMIC TILES	30X60
3. 02	CORRIDOR	5	CERAMIC TILES	30X60
3. 03	CORRIDOR	7.8	PVC plank wooden color	4mm, 2.2kg/m2
3. 04	TOILET	1.32	CERAMIC TILES	22.5X45
3. 05	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
3. 06	BATHROOM	3.70	CERAMIC TILES	22.5X45
3. 07	BED ROOM 1	13.67	PVC plank wooden color	4mm, 2.2kg/m2
3. 08	BED ROOM 2	15.74	PVC plank wooden color	4mm, 2.2kg/m2
3. 09	CORRIDOR	7.6	PVC plank wooden color	4mm, 2.2kg/m2
3. 10	BED ROOM	14.56	PVC plank wooden color	4mm, 2.2kg/m2
3. 11	BATHROOM	4	CERAMIC TILES	22.5X45
3. 12	KITCHEN ROOM	28.09	PVC plank wooden color	4mm, 2.2kg/m2
3. 13	TOILET	1.32	CERAMIC TILES	22.5X45

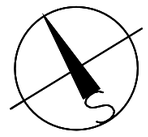
LEGEND:

COLD WATER
CIRCULATION
HOT WATER
CLOSINGVALVE
Watermeter
Filter
CIRCULATION PUMP
DUMP VALVE

SPECIFICATION OF BOILER

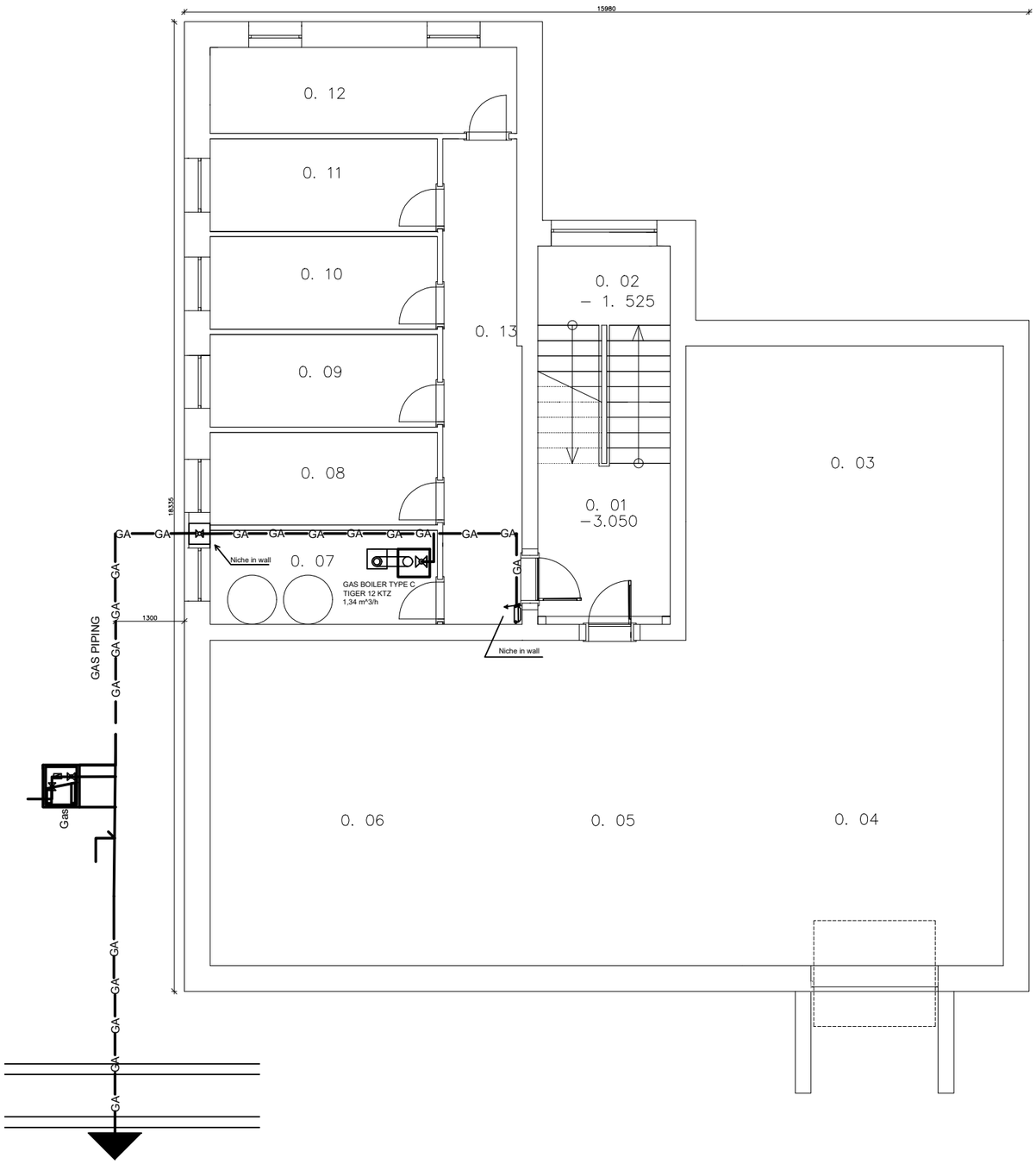
SYMBOLS:

WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm



DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Typical Floor water supply			Scale. 1:100 Drawing No. 06

BASEMENT PLAN GAS SUPPLY SYSTEMS : −3,050 M



Area table

Room#	Function	M 2	Flooring	Notes
0. 01	STAIRCASE	10.28	COLOR	
0. 02	CORRIDOR	7.6	concrete cladding	10mm
0. 03	PARKING	33.36	Bautch car praking finishes	
0. 04	PARKING	36.9	Bautch car praking finishes	
0. 05	PARKING	19.07	Bautch car praking finishes	
0. 06	PARKING	36.29	Bautch car praking finishes	
0. 07	BOILER ROOM	7.64	concrete cladding	
0. 08	STORAGE ROOM	7.64	concrete cladding	
0. 09	STORAGE ROOM	7.64	concrete cladding	
0. 10	STORAGE ROOM	7.64	concrete cladding	
0. 11	STORAGE ROOM	7.64	concrete cladding	10mm
0. 12	VENTILATION ROOM	9.43	concrete cladding	
0. 13	CORRIDOR	13.371	concrete cladding	

LEGEND:

CLOSINGVALVE

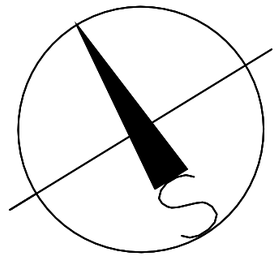
CLOSINGVALVE

GAS METER

FILTER

GA GAS PIPING

PUBLIC GAS STATION.

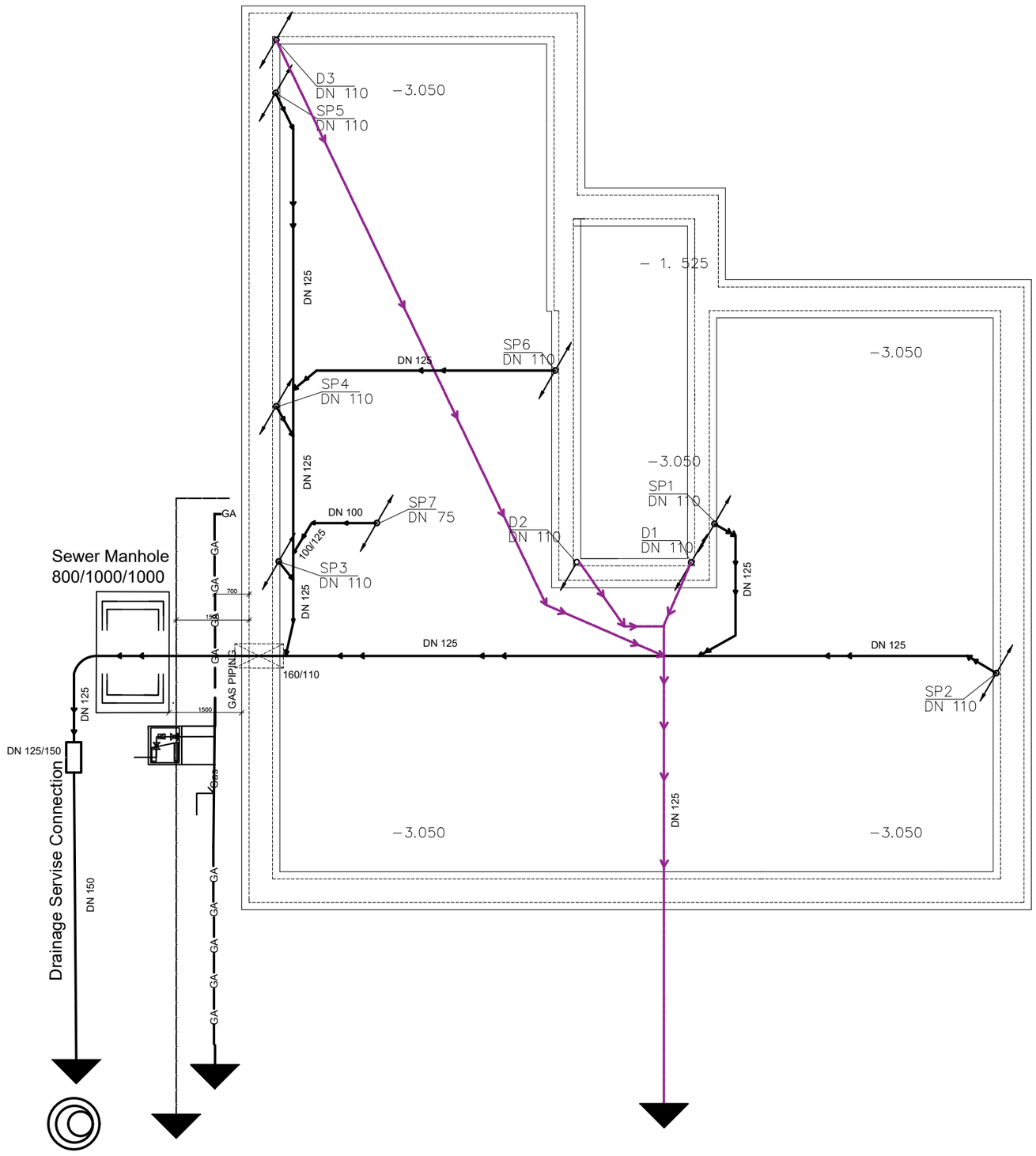


COMMENTARY:

THE MAIN JUNCTION OF THE GAS IS NICHE IN WALL
THEN DISTRIBUTED TO THE ALL FLATS.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Gas supply			Scale. 1:100 / Drawing No. 07

BASEMENT PLAN GAS SUPPLY SYSTEMS : −3,050 M

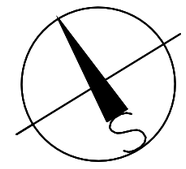


LEGEND:

- SP — SEWER PIPES
- D — DOWN PIPES OF THE RAIN
- DRAINAGE PIPES CONNECTION
- COLD WATER
- CLOSINGVALVE
- CLOSINGVALVE
- GAS METER
- FILTER
- GA — GAS PIPING
- PUBLIC GAS STATION.

BUILDING DRAIN CONNECTION:

-THE SLOPE OF BUILDING DRAIN IS ESTIMATED 5% THE DRAIN IS LINKED WITH A SINGLE SEWER SYSTEM
-SLOPE ON THE KNEW PIPES ARE 45 DEGREE FOR ALL PIPES.
-MAXIMUM LENGTH OF THE PIPES IS 8M.
-THE PIPES ARE MADE OF PVC WITH DIMENSION OF DN 110 AND DN 75 DN 125 AND DN 150.



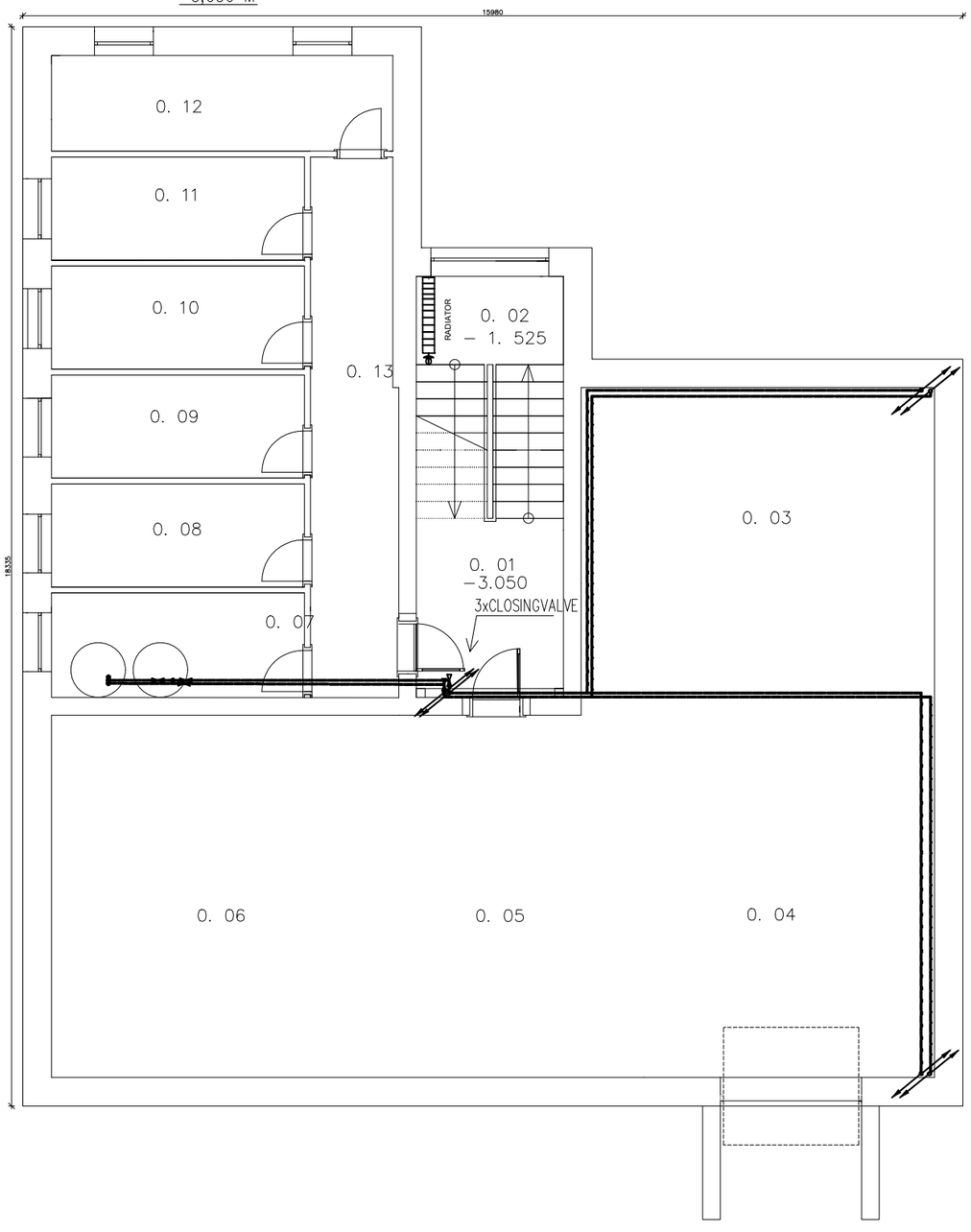
DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		
Attachment name: Situation		

Fakulta stavební
ČVUT

Format:	2XA4
Date:	13/10.2016
Purpose:	Building Permit
Archive Issues	-----
Scale. 1:100	Drawing No. 08

BASEMENT PLAN VENTILATION AND HEAT SYSTEMS :

−3,050 M



Area table

Room#	Function	M 2	Flooring	Notes
0. 01	STAIRCASE	10.28	COLOR	
0. 02	CORRIDOR	7.6	concrete cladding	10mm
0. 03	PARKING	33.36	Bautch car praking finishes	
0. 04	PARKING	36.9	Bautch car praking finishes	
0. 05	PARKING	19.07	Bautch car praking finishes	
0. 06	PARKING	36.29	Bautch car praking finishes	
0. 07	BOILER ROOM	7.64	concrete cladding	
0. 08	STORAGE ROOM	7.64	concrete cladding	
0. 09	STORAGE ROOM	7.64	concrete cladding	
0. 10	STORAGE ROOM	7.64	concrete cladding	
0. 11	STORAGE ROOM	7.64	concrete cladding	10mm
0. 12	VENTILATION ROOM	9.43	concrete cladding	
0. 13	CORRIDOR	13.371	concrete cladding	

LEGEND:

COLD WATER

CIRCULATION

HOT WATER

CLOSINGVALVE

Watermeter

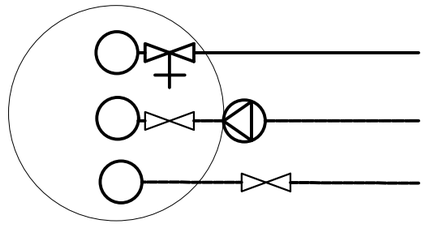
Filter

CIRCULATION PUMP

SYMBOLS:

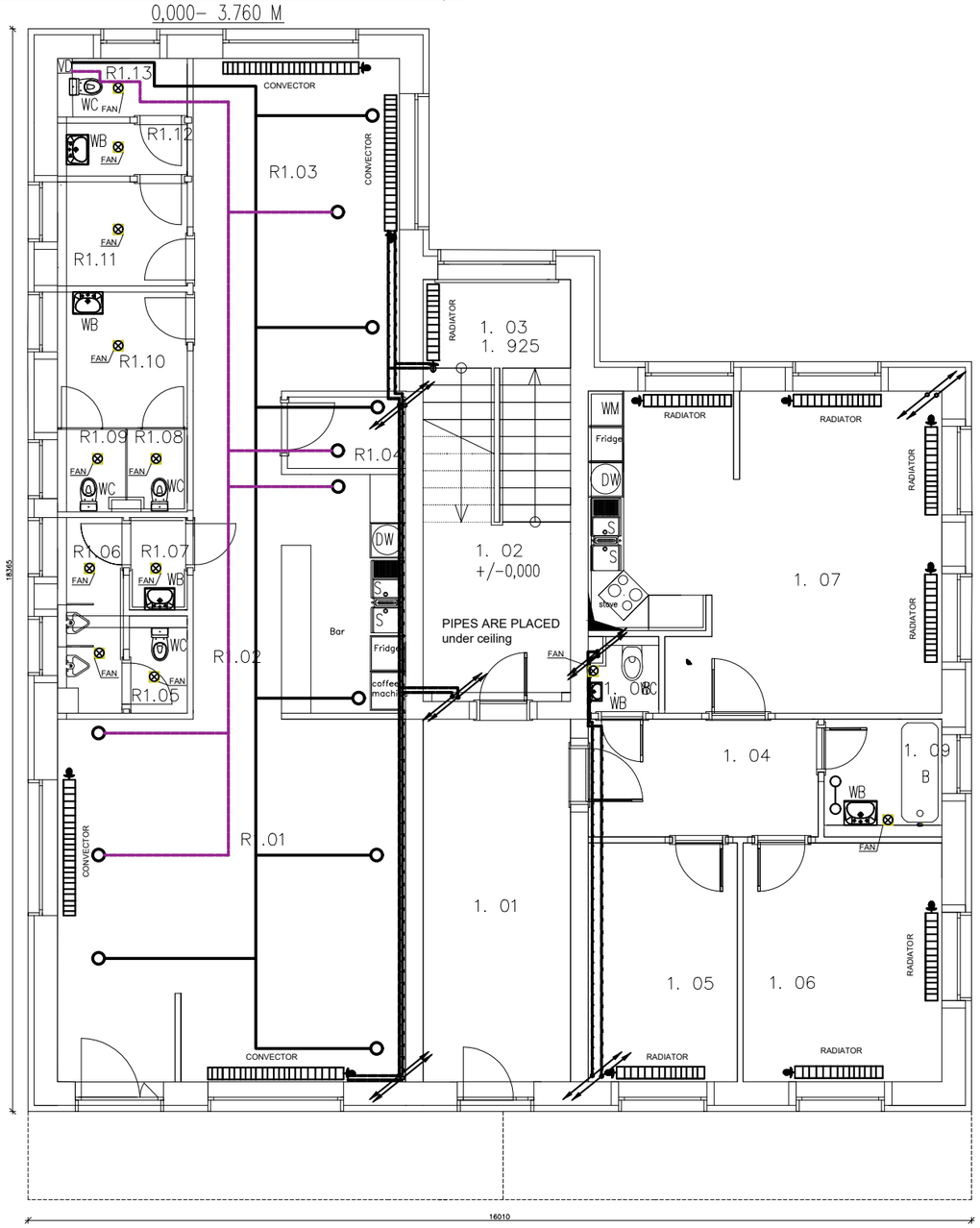
WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

SPECIFICATION OF BOILER



DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: Basement heat system			Scale. 1:100 Drawing No. 09

GROUND FLOOR PLAN VENTILATION AND HEAT SYSTEM : +/- 0,000- 3.760 M



Area table

Room#	Function	M 2	Flooring	Notes
1. 01	CORRIDOR	15.39	CERAMIC TILES	30X60
1. 02	CORRIDOR	6.625	CERAMIC TILES	30X60
1. 03	STAIRCASE	11.25	EPOXY LAYER	3mm
1. 04	CORRIDOR	7.76	pure gray color	-
1. 05	BED ROOM 1	11.52	PVC plank wooden color	4mm, 2.2kg/m2
1. 06	BED ROOM 2	13.69	PVC plank wooden color	4mm, 2.2kg/m2
1. 07	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
1. 08	TOILET	1.32	CERAMIC TILES	22.5X45
1. 09	BATHROOM	3.7	CERAMIC TILES	22.5X45
R1.01	COFFEE ROOM	36.17	CERAMIC TILES	45X45
R1.02	BAR	14.58	CERAMIC TILES	45X45
R1.03	TEA ROOM	19.76	CERAMIC TILES	45X45
R1.04	TECHNICAL ROOM	2.43	CERAMIC TILES	45X45
R1.05	MEN TOILET	1.5	CERAMIC TILES	22.5X45
R1.06	MEN TOILET	3.67	CERAMIC TILES	22.5X45
R1.07	CORRIDOR	1.565	CERAMIC TILES	22.5X45
R1.08	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.09	WOMEN TOILET	1.35	CERAMIC TILES	22.5X45
R1.10	CORRIDOR	4.65	CERAMIC TILES	22.5X45
R1.11	CORRIDOR	3.883	CERAMIC TILES	22.5X45
R1.12	WASHROOM	1.98	CERAMIC TILES	22.5X45
R1.13	TOILET	2.189	CERAMIC TILES	22.5X45

LEGEND:

- AIR INTAKES
- EXHAUST AIR
- CLOSING VALVE
- MECHANICAL VENTILATION
- SUPPLY WATER 75 C
- RETURN WATER 65 C COPPER
- RADIATOR

-TUBULAR HEAT ENTIRE (KORALUX RONDO COMFORT)
- KRC, l = 1500mm, h = 536mm

SYMBOLS:

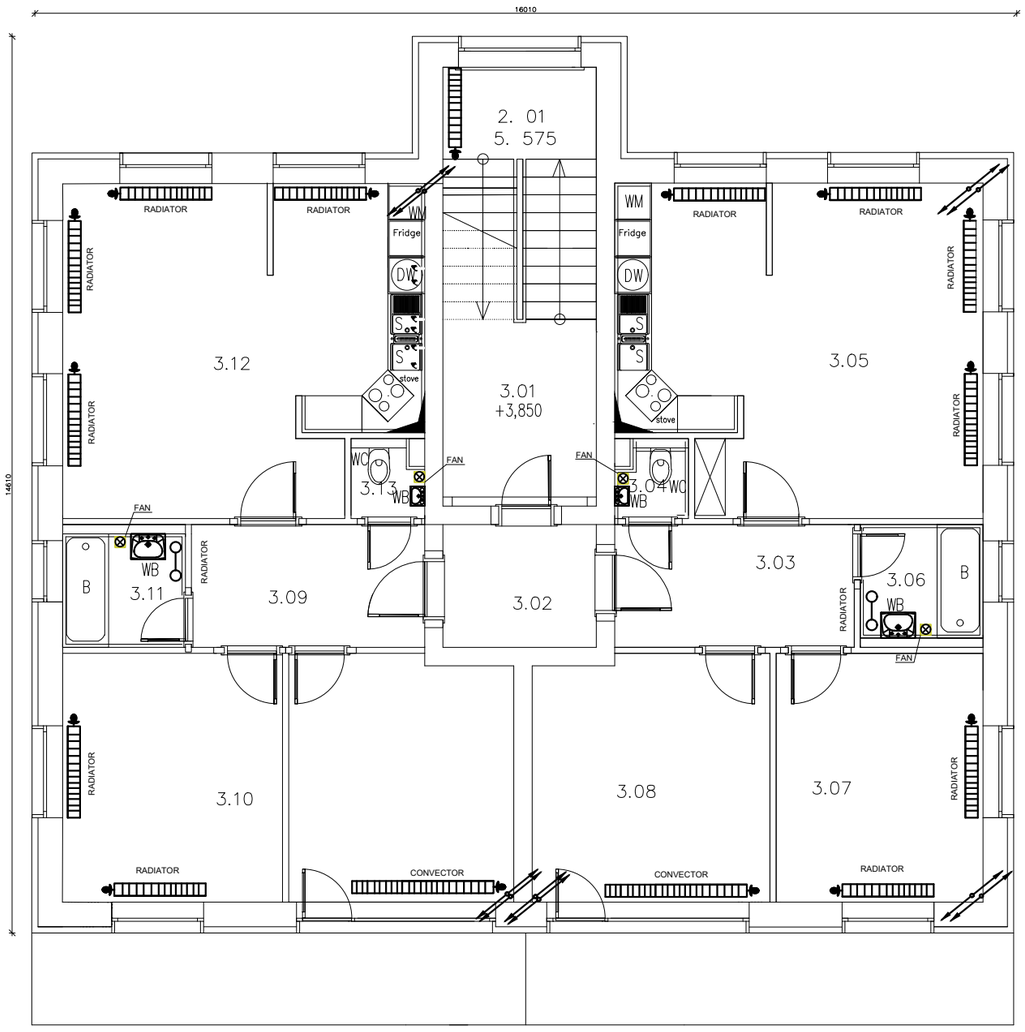
WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		
Attachment name: Ground Floor heat system		

Fakulta stavební ČVUT

Format:	2XA4
Date:	13/10.2016
Purpose:	Building Permit
Archive Issues	-----
Scale. 1:100	Drawing No. 10

2nd & 3th FLOOR PLAN VENTILATION AND HEAT SYSTEMS : 7,210 – 10.660M



Area table

Room#	Function	M 2	Flooring	Notes
3. 01	CORRIDOR	7	CERAMIC TILES	30X60
3. 02	CORRIDOR	5	CERAMIC TILES	30X60
3. 03	CORRIDOR	7.8	PVC plank wooden color	4mm, 2.2kg/m2
3. 04	TOILET	1.32	CERAMIC TILES	22.5X45
3. 05	KITCHEN ROOM	28.10	PVC plank wooden color	4mm, 2.2kg/m2
3. 06	BATHROOM	3.70	CERAMIC TILES	22.5X45
3. 07	BED ROOM 1	13.67	PVC plank wooden color	4mm, 2.2kg/m2
3. 08	BED ROOM 2	15.74	PVC plank wooden color	4mm, 2.2kg/m2
3. 09	CORRIDOR	7.6	PVC plank wooden color	4mm, 2.2kg/m2
3. 10	BED ROOM	14.56	PVC plank wooden color	4mm, 2.2kg/m2
3. 11	BATHROOM	4	CERAMIC TILES	22.5X45
3. 12	KITCHEN ROOM	28.09	PVC plank wooden color	4mm, 2.2kg/m2
3. 13	TOILET	1.32	CERAMIC TILES	22.5X45

LEGEND:

- AIR INTAKES
- EXHAUST AIR
- CLOSING VALVE
- MECHANICAL VENTILATION
- SUPPLY WATER 75 C
- RETURN WATER 65 C COPPER
- RADIATOR

-TUBULAR HEAT ENTIRE (KORALUX RONDO COMFORT)
- KRC, l = 1500mm, h = 536mm

SPECIFICATION OF HEAT:

-MORE DETAILS CAN BE SEE IN MY PREVIOUS CALCULATION OF THERMAL INSULATION IN ORDER OF TEMPERATURE REQUIREMENTS.

SYMBOLS:

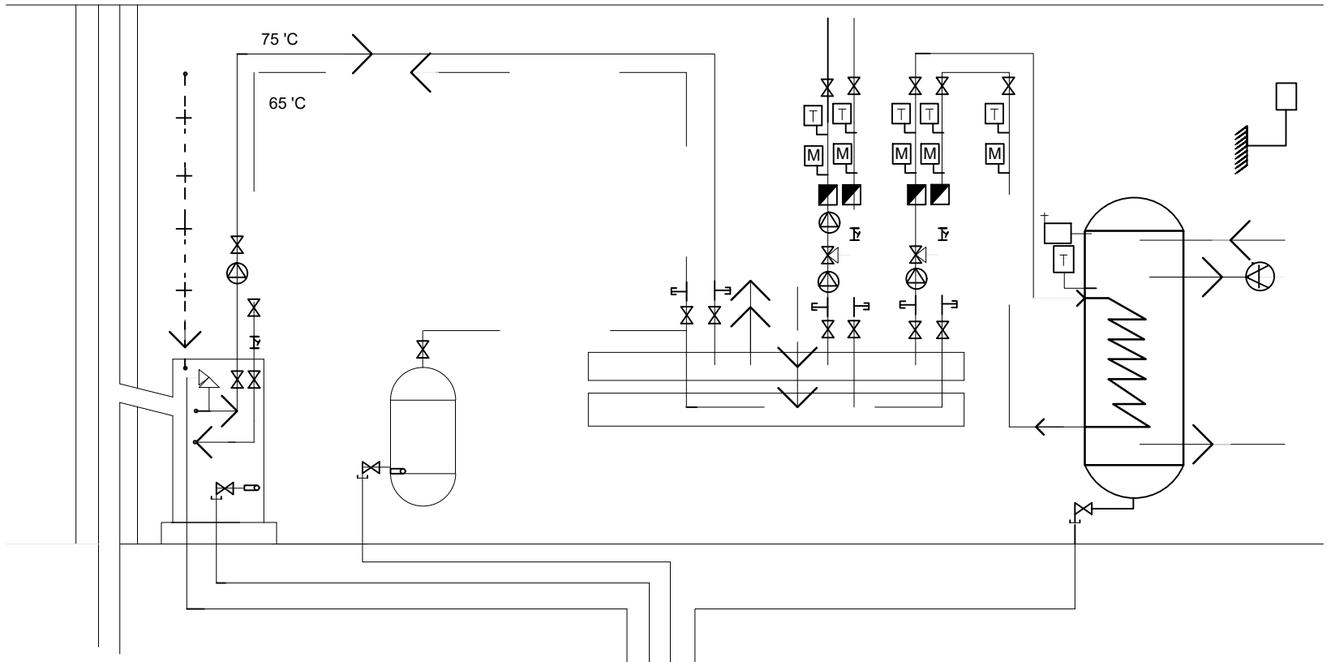
WC-TOILET WITH h=185mm
WB-WASH BASING WITH h=580mm
B-BATH WITH h=140mm
WM-WASHING MACHINE WITH h=550mm
S-SINK WITH h=580mm
DW- DISHWASHER WITH h=600mm

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT	
General Purpose: Apartment house (multifunction)		
Attachment name: Typical Floor heat system		

Fakulta stavební ČVUT

Format:	2XA4
Date:	13/10.2016
Purpose:	Building Permit
Archive Issues	-----
Scale. 1:100	Drawing No. 11

SPECIFICATION OF BOILER FUNCTIONALITY:



LEGEND:

- PUMP
- 3 WAY VALVE
- CLOSING COCK VALVE
- CLOSING COCK OR DRAIN
- DRAIN COCK
- SAFETY VALVE
- VENTING VALVE
- FILTER
- CHECK VALVE DUMPER
- PRESSURE GOUP
- TEMPERATURE GOUP
- EXTERIOR TEMPERATURE

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Miroslav Urban	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2XA4
			Date: 13/10.2016
			Purpose: Building Permit
			Archive Issues -----
Attachment name: boiler room			Scale. 1:100 / Drawing No. 12

Czech Technical University in Prague

Faculty of Civil Engineering Thákurova 7, 166 29 Praha 6

Preliminary Design (Design dimensions of all elements)

Apartment House Multifunction

Name:Yosufi Mohammad Fayez

Supervisor: doc Ing Hana Gattermayrova CSc

Consultant: Ing . petr billy Ph.D.

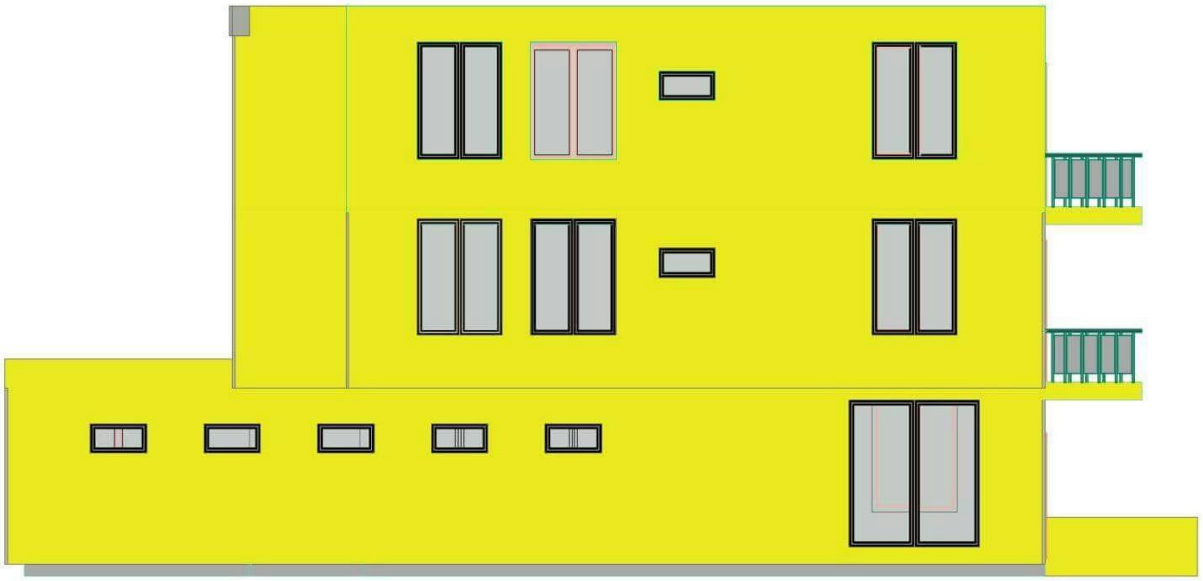
Accademic year:2016/17

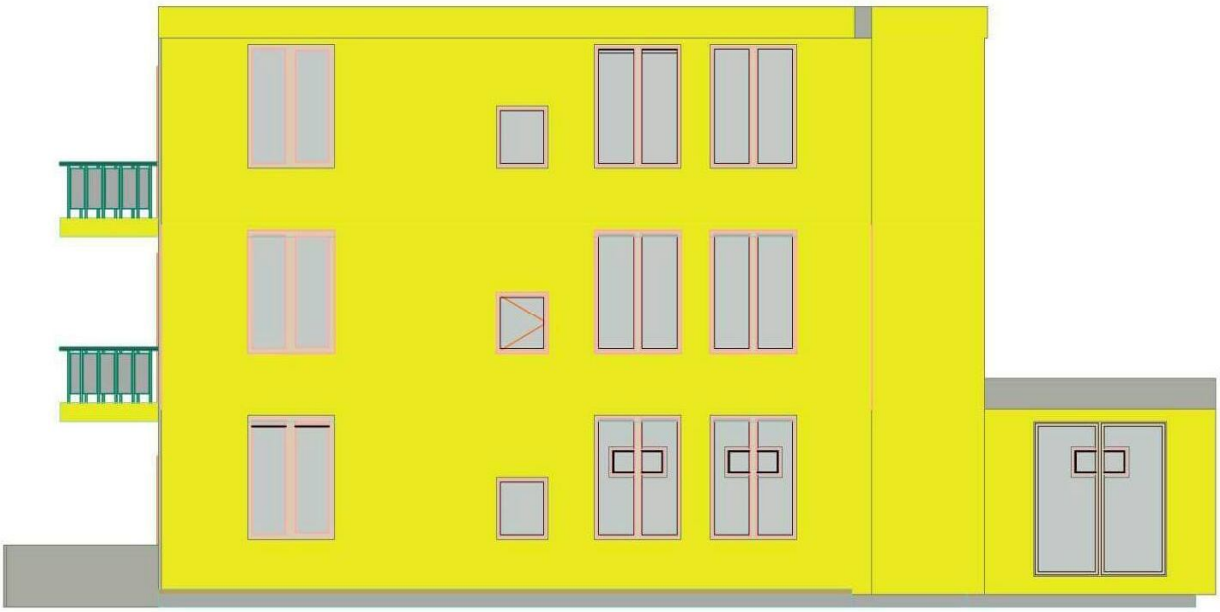
Signature:

Contents:

General description of the building:

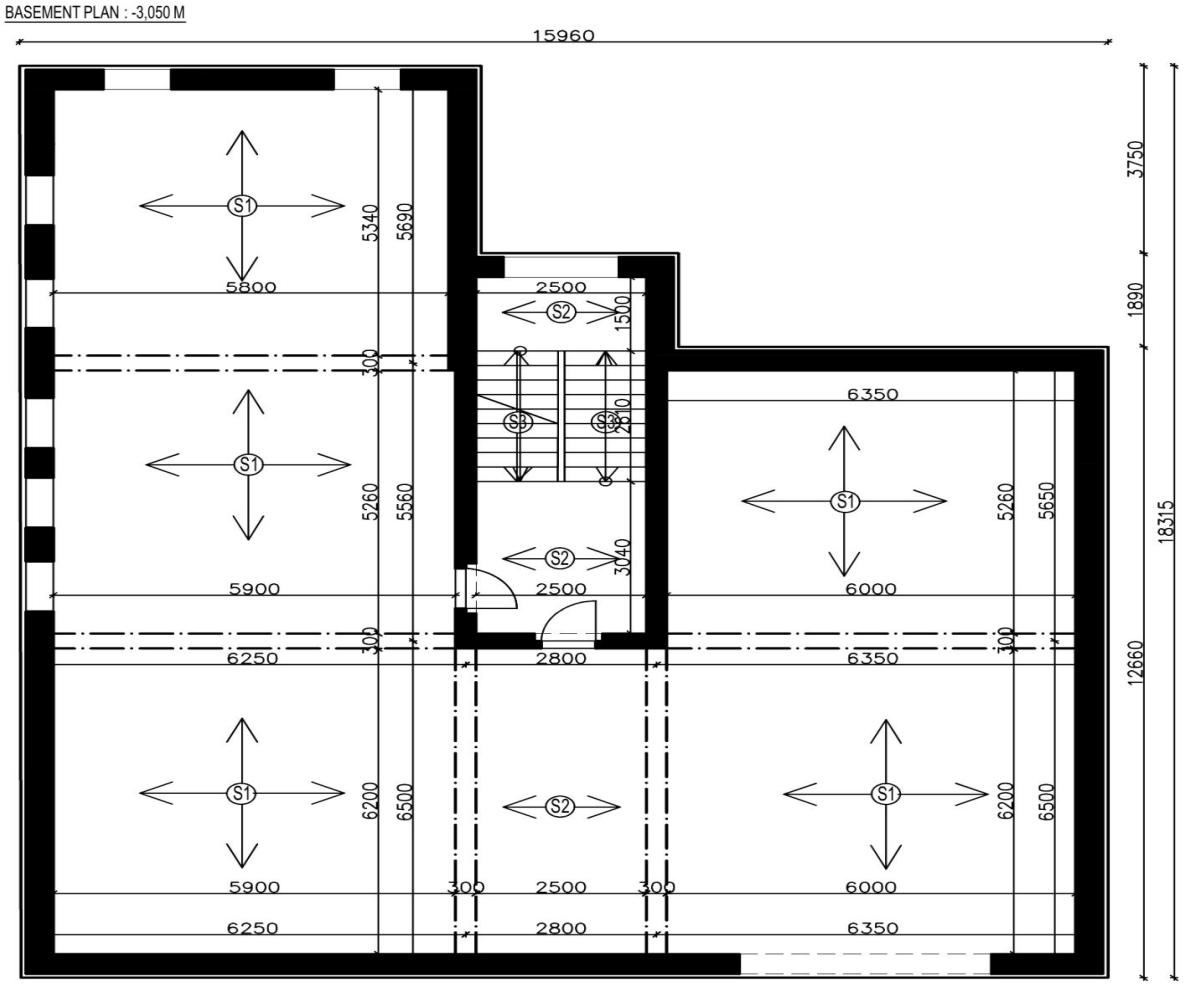
This is mentionable that Apartment building is located in an urban area jenec west of the Prague Czech Republic the total area of the building is 245 m^2 this building is consists of four floors including of the basement. Basically the basement is provided for storages and car parking for the whole residence of the building and on the ground floor there is cafeteria + buffet and also there is one apartment.





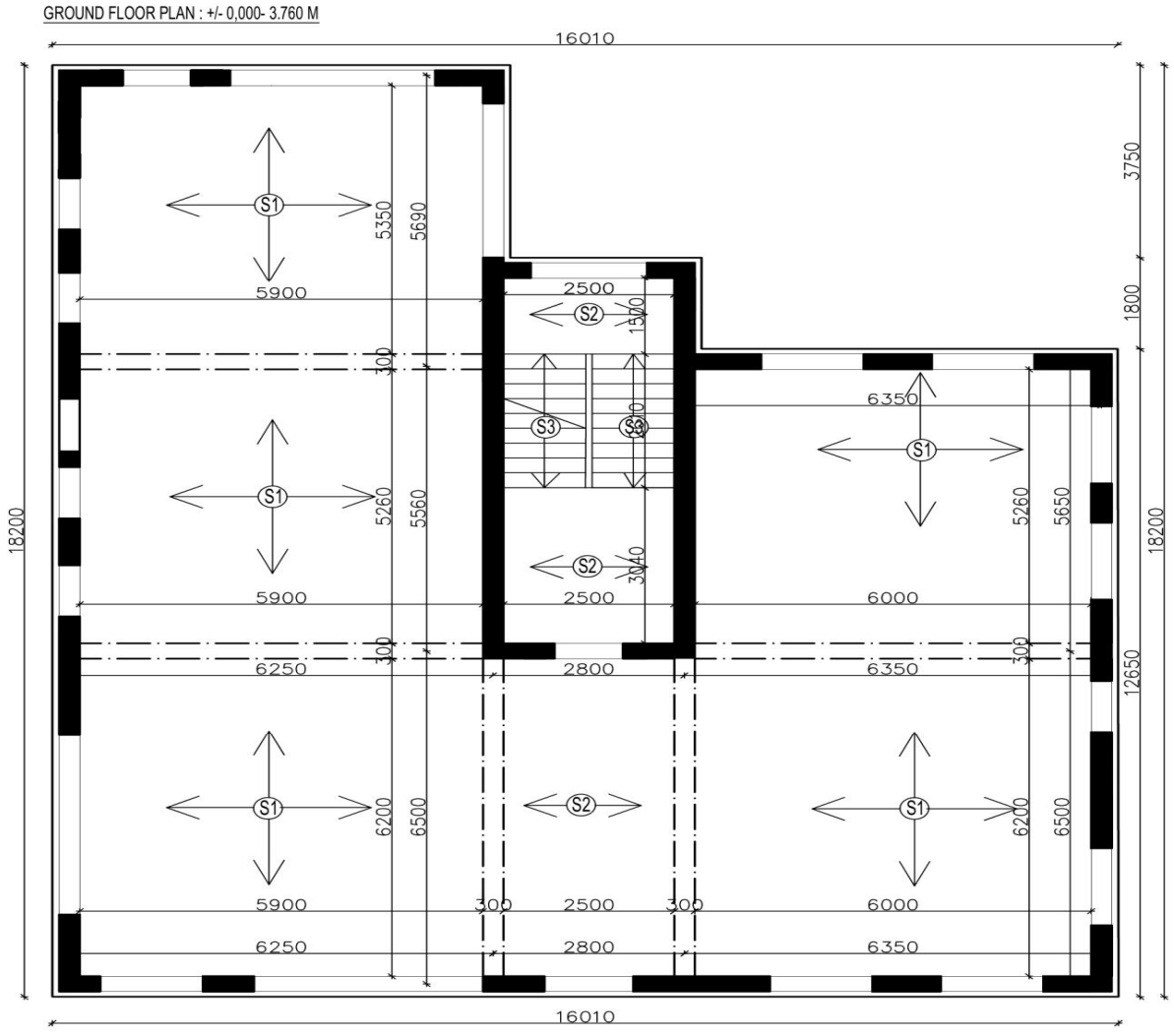
Evaluation of structural solution in basement:

In the basement one of the key function to solve the solution is that the tow-way concrete solid slab with depth h = 210 mm supported by (300 x 500) mm beams and 400mm reinforced concrete walls in all external parts of the building in the both directions. Also slab of the staircase is assumed as a one-way slab which is supported in concrete walls. the judgments of the geometry of structural elements is given later. This solution can reduce both depth and reinforcement of the slab, but has the inconvenience of beams, which may hinder matching the internal walls sequence, especially for dwellings. For a safe preliminary evaluation of the quantity of materials the slab "voids" due to stairs and lifts assumed as not present. The resulting extra volume of concrete takes into accounts deformations of formworks and any loss of concrete during casting (pump filling, etc.).



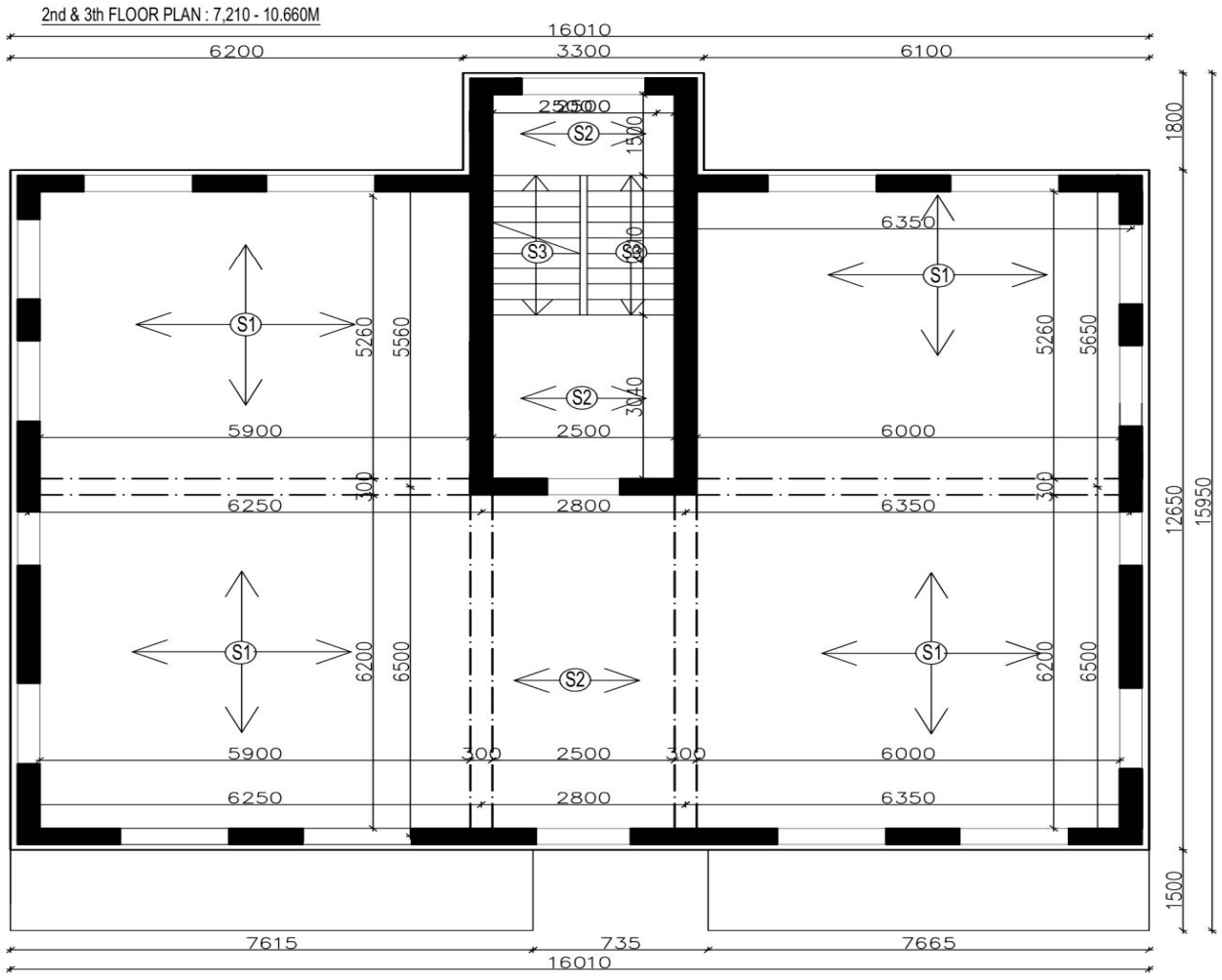
Evaluation of structural solution in ground floor:

In the ground floor one of the key function to solve the solution is that the tow-way concrete solid slab with depth h = 210 mm supported by (300 x 500) mm beams and 400mm porothem breaks in all external parts of the building in the both directions. Also slab of the staircase is assumed as a one-way slab which is supported in concrete walls. the judgments of the geometry of structural elements is given later. This solution can make ease the detailing connection of the thermal insulations.



Evaluation of structural solution 2nd and 3th floors:

In the 2nd and 3th floors which is provided with the balcony and one of the key function to solve the solution is that the tow-way concrete solid slab with depth h = 210 mm supported by (300 x 500) mm beams and 400mm prothem breaks in all external parts of the building in the both directions. Also slab of the staircase is assumed as a one-way slab which is supported in concrete walls. the judgments of the geometry of structural elements is given later. This solution can make ease the detailing connection of the thermal insulations and has high economic benefits in compare to other solutions.



Preliminary Design (Design dimensions of all elements)

Apartment House Multifunction

Fundamental Requirements:

Used documents, standards

ČSN EN 1990 Eurocode: Basis of structural design

ČSN EN 1991-1-1 Eurocode 1: Actions on structures: General actions - Densities, self-weight and imposed loads.

ČSN EN 1991-1-3 Eurocode 1: Actions on structures: General actions - Snow loads

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

ČSN EN 1992-1-1 Eurocode 2: Design of concrete structures: General rules and rules for buildings

ČSN EN 1993-1-1 Eurocode 3: Design of steel structures: General rules and rules for buildings

ČSN EN 1996-1-1 Eurocode 6: Design of masonry structures: General rules for reinforced and unreinforced masonry structures.

Source: http://eurocodes.jrc.ec.europa.eu/showpage.php?id=13

1: basic materials of concrete and steel.

Strength class of the concrete	C30/37[Mpa]
Characteristic cylinder strength.	F_{ck} = 30 [Mpa]
Cube Characteristic cube strength.	F_{ck} = 37 [Mpa]
Target mean cylinder strength.	F_{cm} = 38 [Mpa]
Mean axial tensile strength.	F_{ctm}= 2.9 [Mpa]
Mean secant modulus of elasticity.	E_{cm} = 30 [Gpa]
Concrete density.	ρ = 2500 [kg/m^3]
Partial safety factor for concrete.	1.5[-]

Steel:

Steel grade B500B

The Class is	B
Characteristic yield strength	$\mathbf{F_{yk}}$ = 500 [Mpa]
Characteristic strain at maximum force	$\boldsymbol{\varepsilon_{uk}}$ = 5 [%]
Density	**ρ** = 7850 [kg/m^3]

Modulus of elasticity **E** = 210 000 MPa [N/mm^2]

Partial safety factor for steel 1.15[-]

Things to remember is that all of this data which is marked above is achieved from sample test of the materials (concrete & steel) to be judged for the durability of the structure.

Design cover for main reinforcement:

we need to take into account in the design of the cover reinforcement secure transmission of forces in cohesion protection of steel against influence of the environment (thermal insulation, corrosion) . according to Eurocode EN 206-1 for my building I need to take into considerations the influence of the environment as follows.

XC1- for internal slabs and foundations C25/30

XC2 - for reinforced walls.

Xc1 – dry or permanently wet concrete inside the building with low air humidity .

XC2- wet rarely dry concrete suffer subject the long term water like many foundations.

$$C_{nom} = c_{min} + \Delta c_{dev}$$

$$C_{min} = \max(Cmin_{,b} \; ; \; C_{min,dur} \; ; 10\,mm)$$

Δc_{dev} = 10 mm (technology allowance)

$C_{min,b}$ = 10 mm (cover depth necessary for good mechanical bond between steel and concrete, equal to diameter of steel bars)

The value $C_{min,dur}$ depends on the “structural class”, which has to be determined first. So in my case the structure service life is designed for 50 years therefore the initiation of the structure class is nominated as s4.

The minimum cover with regard to the durability for reinforcement steel according EN 10080.

Table: 1.4.2 determination of $C_{min,dur}$ which is function of structure class and exposure class.

Environmental Requirement for $c_{min,dur}$ (mm)							
Structural Class	Exposure Class according to Table 4.1						
	X0	XC1	XC2 / XC3	XC4	XD1 / XS1	XD2 / XS2	XD3 / XS3
S1	10	10	10	15	20	25	30
S2	10	10	15	20	25	30	35
S3	10	10	20	25	30	35	40
S4	10	15	25	30	35	40	45
S5	15	20	30	35	40	45	50
S6	20	25	35	40	45	50	55

$$\boldsymbol{C_{nom}} = \mathbf{c_{min}} + \Delta\mathbf{c_{dev}}$$

$$C_{min} = \max(Cmin_{,b} \; ; \; C_{min,dur} \; ; 10\,mm)$$

$$C_{min} = \max(10 \; ; \; 15 \; ; 10\,mm)$$

$$C_{min} = 15 \; [mm]$$

$$C = c_{min} + \Delta c_{dev}$$

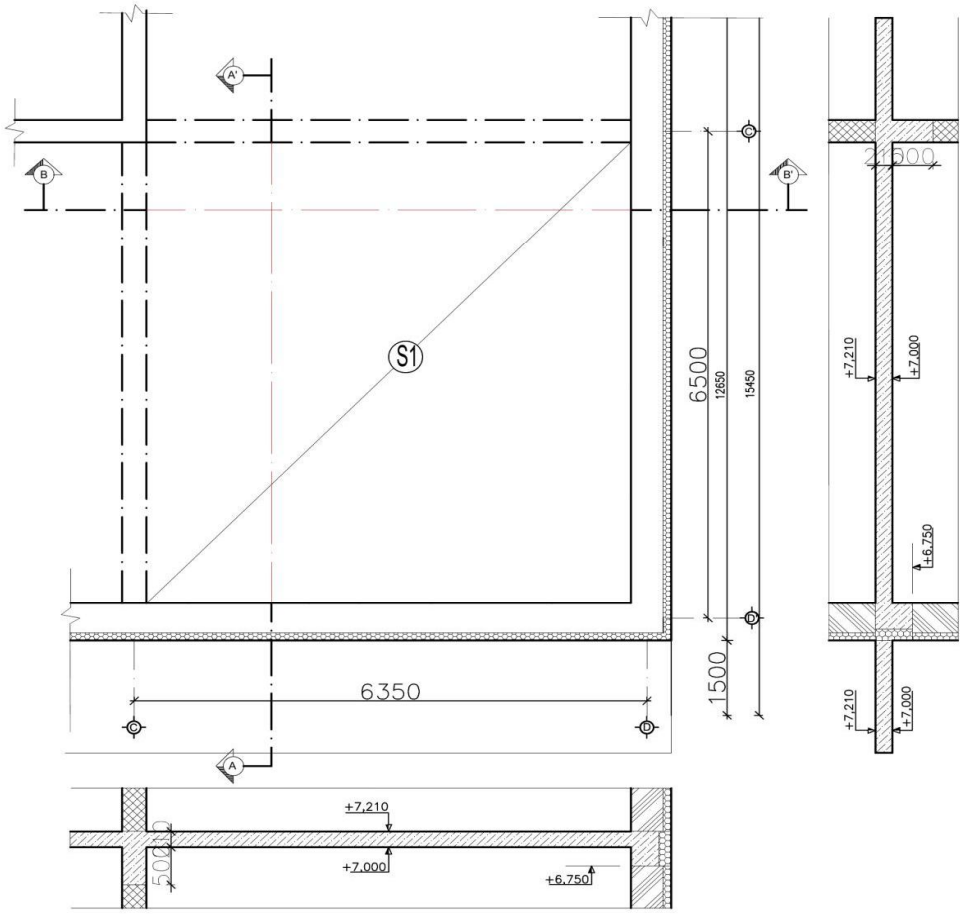
$$C_{slab} = 10 + 15 = 25 \text{ [mm]}$$

$$C_{wall} = 10 + 25 = 35 \text{ [mm]}$$

Slab depth design:

The slab depth is evaluated from the extreme area of the most loaded parts of the building which is nominated as a tributary area. The load is collecting by 2- way monolithic reinforced slab then transferred to the beam and then by the wall transferred to the foundation part of the building.

EXTREME PART DUE TO THE SPAN DIMENSION.



Empirical estimation:

2- way slab depth: $h_s = \frac{lx+ly}{75}\ ln_{max} = \frac{6350+6500}{75}\ [mm] = 171.34\ [mm] \approx 175\ [mm]$

Effective depth: $d = h_s - c - \frac{\emptyset}{2} = 175 - 25 - 8 = 142\ [mm]$

Ø= 16mm for slab

Deflection control: $\lambda = \frac{l}{d} \leq \lambda_{lim} = k_{c1} * k_{c2} * k_{c3} * \lambda_{d,tab}$

L – Length of span 6500 [mm] in Y-direction and L = 3650 [mm] in X-direction.

d – Effective width of cross section

Kc_1 – effect of shape 1.0

K_{c2} - effect of span 1.0 `

K_{c3}- effect of reinforcement 1.2

$\lambda_{d,tab}$ depend of the table we will consider 0.5% reinforcement ratio for the inner span.

$\lambda_{d,tab}$ for inner span of the continuous beam/slab

	Concrete class						
ρ	12/15	16/20	20/25	25/30	30/37	40/50	50/60
0,5 %	21,9	23,7	25,5	27,8	30,8	38,6	48
1,5 %	18,3	18,9	19,5	20,3	21	22,5	24

Ø= 12mm for

$$\lambda = \frac{l}{d} \leq \lambda_{lim} = k_{c1} * k_{c2} * k_{c3} * \lambda_{d,tab}$$

$$\lambda = \frac{6500}{142} = 45.78\ [mm] > \lambda_{lim} = 1 * 1 * 1.2 * 30.8 = 36.9$$

In this case the height of the slab should be increased as from 10 – 40 mm.

$h_s = 210\ mm$, d = 177mm

$\lambda = \frac{l}{d} = \frac{6500}{177} = 36.73 \leq \lambda_{lim} = 36.90$

We can see that after the evaluation the final depth of the concrete slab is 210[mm] so in this case I will use the design further calculation within take into consideration the slab thickness to be 210[mm].

Evaluation of the loads in the structure:

Generally, actions for use in design shall be obtained from parts of EN 1991 as following:

EN1991-1.1 Densities, self-weight and imposed loads.

EN1991-1.3 Snow loads

EN1991-1.4 Wind loads

This is mentionable that with respect limited dimensions of the building, thermal actions were not considered, nor were impact and explosion action.

the partial safety factors have to be taken into consideration as the suggested values in EC2.

In this case for all loads consider are design values for the self-weight of the structures (dead loads) we consider partial safety factor of γ = 1.35 [-] and also for variable loads γ = 1.5[-].

Evaluations of the load on (typical floor):

Permanent load in one tributary area of the typical floor.

	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	γ	Design value [Kn/m^2]
permanent load	1	PVC plank	4		0.022	1.35	0.0297
	2	plain concrete levelling	60	24	1.44	1.35	1.944
	3	PE layer			0		0
	4	acoustic insulation	126	0.3	0.0378	1.35	0.05103
	5	rienforce concrete slab	210	25	5.25	1.35	7.0875
	permanent load from typical slab gd				6.7498	1.35	9.11223

Usually in case of the areas in residential, commercial , administration and social building shall be divided into some specific categories according to their specific uses in table 6.1 categories of use.

Variable loads in one tributary area of the typical floor.

	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	γ	Design value [Kn/m^2]
variable loads	1	category A domestic areas			2	1.5	3
	2	movable partation <3kn/m			1.2	1.5	1.8
	tottal varialbe load on typical floor slab qd				3.2	1.5	**4.8**

The total value of design load: $f_d = (g_d + q_d = 9.11223 + 4.8 = 13.92\ kn/sqm.$

The total in one tributary area N.TA. f_d = 3 . 4.575. 13.92 = 191.10 [kn/m]

Load on the basement slab:

	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	ν	Design value [Kn/m^2]
permanent load	1	antisliding paint	0		0	1.35	0
	2	other permanaent load	10		0.01	1.35	0.0135
	3	RC slab	100	25	2.5	1.35	3.375
		plain concrete levelling	50	24	1.2	1.35	1.62
	permanent load from typical slab gd				3.715.0085	1.35	5.0085

Table 6.8 – Imposed loads on garages and vehicle traffic areas is determined by 2 categories category **F** traffic and parking areas for light vehicles ≤ 30kN gross vehicle weight and ≤ 8 seats but also not including of driver)

	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	ν	Design value [Kn/m^2]
variable loads	1	category F			2	1.5	3
	2	movable partation <3kn/m			1.2	1.5	1.8
	tottal varialbe load on typical floor slab qd				3.2	1.5	**4.8**

The total value of design load: $f_d = (g_d + q_d = 5.0085 + 4.8 = 9.8085 kn/sqm.$

Load on the roof:

	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	ν	Design value [Kn/m^2]
permanent load	1	ceramic finishesh	10	20	2	1.35	2.70
	2	cement mortar for ceramice	40	19	0.76	1.35	1.03
	3	Bitumen water proofing	8		0.0305	1.35	0.04
	4	EPS insulation	150	0.3	0.045	1.35	0.06
	5	vaper barrier foil	50				
		rienforced concrete slab	210	25	5.25	1.35	7.09
		plaster	5	0	0.005	1.35	0.01
	permanent load from typical slab on the roof gd				8.09	1.35	10.92

Categories of loaded area (of a roof) generally there are 3 categories according to table 6.9:
Category H – Accessible for normal maintenance and repair only
Category I – Accessible with occupancy according to categories A to G
Category K – Accessible for special services e.g. helicopter landing areas.

Imposed load on the roof:

variable loads	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	ν	Design value [Kn/m^2]
	1	category F			2	1.5	3
	2	snow load			0.75	1.5	1.125
	tottal varialbe load on typical floor slab qd				2.75	1.5	**4.125**

The total value of design load: $f_d = (g_d + q_d = 10.92 + 4.125 = 15.045 kn/sqm.$

The total in one tributary area N.TA. f_d = 1 . 4.575. 15.045= 68.86 [kn/m]

Beam depth design:

$$h_B = \left(\frac{L}{12} - \frac{L}{15}\right) = \left(\frac{6500}{12} - \frac{6500}{15}\right) = (541.67 - 433.34)[mm]$$

$$h_B = 500mm$$

$$b_B = \left(\frac{1}{2} - \frac{2}{3}\right) h_B = \left(\frac{500}{2} - \frac{2.500}{3}\right) = (166.67 - 333.34)[mm]$$

$$b_B = 300mm$$

Tributary area $AT = \left(\frac{1}{2} + \frac{1}{2}\right) L = \left(\frac{6350}{2} + \frac{2800}{2}\right) = 4575mm$

Load from slab acting on wall: N.TA.gd = 3 . 4.575. 13.92 = 191.10 [kn/m]kn/m
Load from roof acting on wall: N.TA.gd=1.4.575. 10.92= 68.86 kn/m
Load from beam acting on wall: $(h_B - h_s)\ b_B$.v = (0.5-0.21).0.3.25= 1.88 kn/m

$$\left(\frac{1}{2} + \frac{1}{2}\right) L = \left(\frac{6500}{2} + \frac{5550}{2}\right) . 1.88 = 11{,}32 kn$$

N.TA.gd1 = 3.11,32 = 33.89 kn

Dimension of the wall:

We need to estimate the geometry of the wall thickness is t = 300mm this is mentionable that this wall is for the staircase but the other load bearing walls has thickness t = 400 mm.

$$AT = \left(\frac{1}{2} + \frac{1}{2}\right) L = \left(\frac{6350}{2} + \frac{2800}{2}\right) = 4575mm$$

$$h_{wall} = \left(h_{floor} - \quad h_B\right) = 3.3 - 0.5 = 2.8\,[m]$$

sw = 1.0.3.2.8 .25 = 21 kn

Ned = slab + beam + roof + wall = 191.10 + 33.89 + 68.86 + 21 = 314.85 kn.

This mean that total load from the structure in extreme parts of the of the building) which transferred to the foundation is Ned = 314.85 kn.

Load bearing walls:

Preliminary design dimension and judgment of the resistance check of internal load bearing walls (tributary area) in structures, basically These load bearing wall shall transfer the total loads from slabs and beams of a tributary area vertically to the foundation of the structures.

The total tributary area of this load bearing wall is $AT = \left(\frac{1}{2} + \frac{1}{2}\right) L = \left(\frac{6350}{2} + \frac{2800}{2}\right) = 4575mm$

Basically the Load which carried by this wall to the foundation of the structure is Ned = 314.85 kn.

Also this load is assumed as uniformly distributed load so that mean that I can divide this load into the dimension of the wall which L = 2.825m.

314.85 kn / 2.825m = 111.450kn/m.

Ned = 111.450kn/m.

$N_{Ed} \leq N_{Rd} = 0.8A_c * F_{Cd} + A_s * F_{yd}$

$A_c = \frac{N_{Ed}}{(0.8*F_{Cd} + 0.02*F_{yd})} = \frac{111.450*1000}{0.8*20+0.02*435} = 4512.15\ mm^2 \rightarrow but\ we\ know\ that\ Ac = B * L \quad where\ l = 1000mm$

$B * L = 23589.8 \rightarrow B = \frac{4512.15\ mm^2}{1000\ mm} = 4.52\ mm$

$\rightarrow minimum\ thickness\ of\ load\ bearing\ wall\ have\ to\ be\ 300\ mm$

$A_c = 200 * 1000 = 300000mm^2$

$N_{Ed} \leq N_{Rd} = 0.8 * 300000 * 20 + 0.02 * 200000 * 435 = 7410000\ N = 7410\ KN$

$$N_{Ed} = 111.450\ KN \leq N_{Rd} = 7410\ KN$$

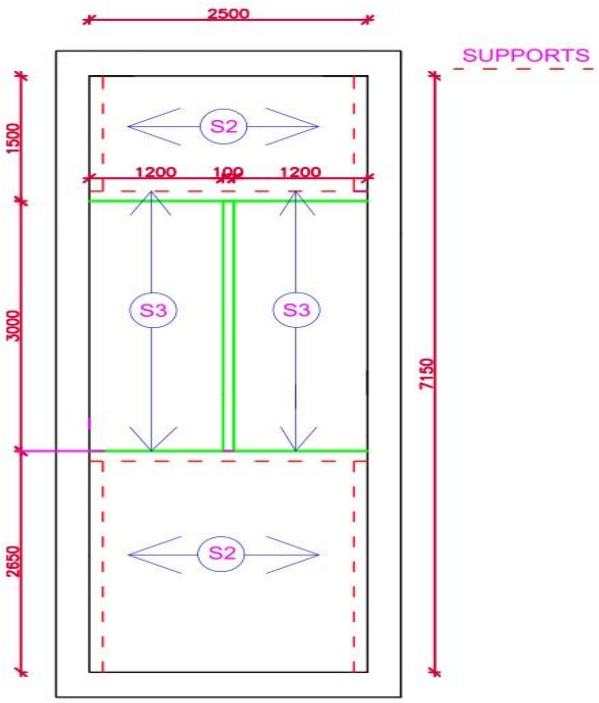
The judgment says that this estimation have implemented safely and rightly while the resistance is much higher than the applied load so means that we are in safe sides.

Design the geometry of the staircase: (in basement)

- Height of the floor h_{foolr} =3050 mm
- Depth of the main slab h_s = 210 mm
- Depth of floor structure h_f = 100 mm

Dimensions of the staircase:

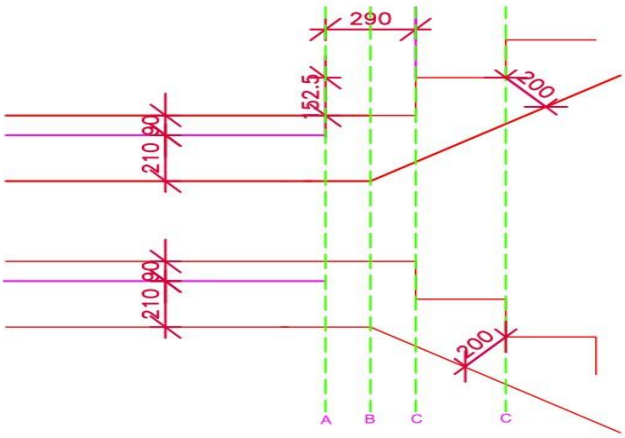
- Ideal height of one step is 160 mm
- 3050 / 160 = 19.063 => 20 steps (2 flights each of them with 10 steps)
- Height of one step h = 3010/ 20 = 152.5 mm
- Width of one step b = 630 – 2h => 630 – 2 x 152,5 = 290 mm
- **DESIGN: Staircase with 152.5/325 mm steps, 2 flights, 10 steps in each flight**
- Width of the flight – 1200 mm
- Width of the gap between the flights – 100 mm
- Width of the landing – 1500 mm
- Total Width of the staircase is 1200*2+100 = 2500 mm
- Slope of the staircase is α= arc tan (h/b) => arc tan (152.5/290) = 27.74°
  Scheme of the staircase.



Preliminary check of the depth of the slab.

- The staircase is considered as one-way slab with the span of 4110 mm. The slab will be simply supported => the depth should be at least 4110/25 = 164.4 mm.
- The depth of landings is the same as the depth of the main slab – 210 mm.
- The depth of flights can be obtained from the details of flight-landing connections In my case, the depth is 220 mm.

- 210 mm > 180 mm and 220 mm > 180 mm => **OK**



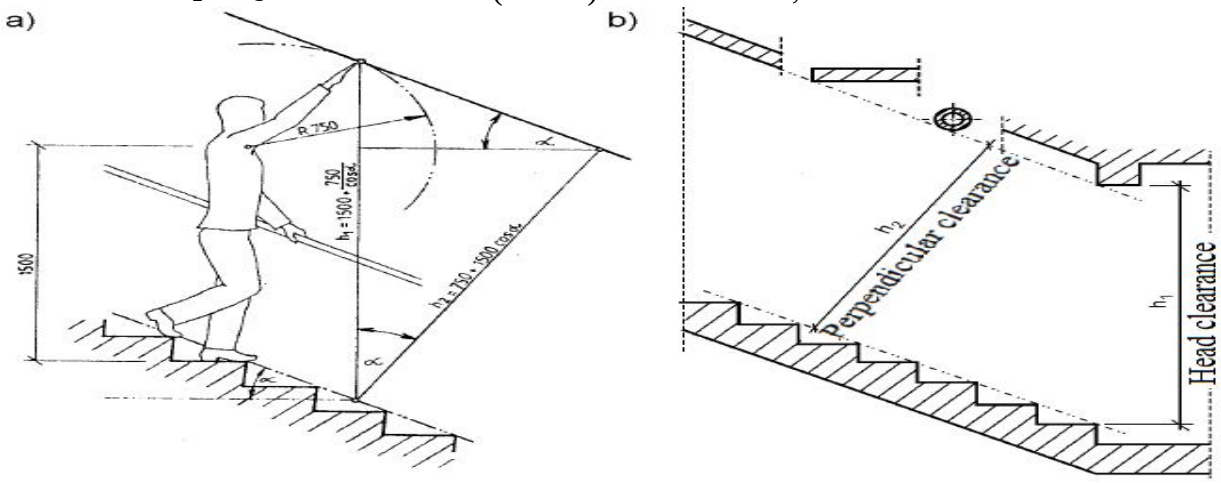
A: this is mentionable that both edges first and the last steps of the concrete should be in the same position because of the formworks.

B: also both flights have to be start in the same position not only because of the formworks but because of the esthetic as well.

C: concrete edges are not in the same position only it is better that the cladding in both flights should be in the same position and also the reason is because of the esthetic.

Perpendicular and head clearance of the staircase

- Head clearance of the staircase should be more than 1500+750/cosα = 1500+750/cos(25.14°) = 2036.86 mm and more than 2100 mm.
- Head clearance of our staircase is $h_1 = h_k - h_s - h_f - h$ = 3050 – 210 – 100 –152.5 = 2387.5 mm => **OK.**
- Perpendicular clearance of the staircase should be more than 750+1500*cosα = 750+1500*cos(25.14°) = 2036.86 mm and more than 1900 mm.Perpendicular clearance of our staircase is $h_2 = h_1 \cos\alpha$ = 2487.5cos(25.14°) = 2251.86 mm, => **OK.**

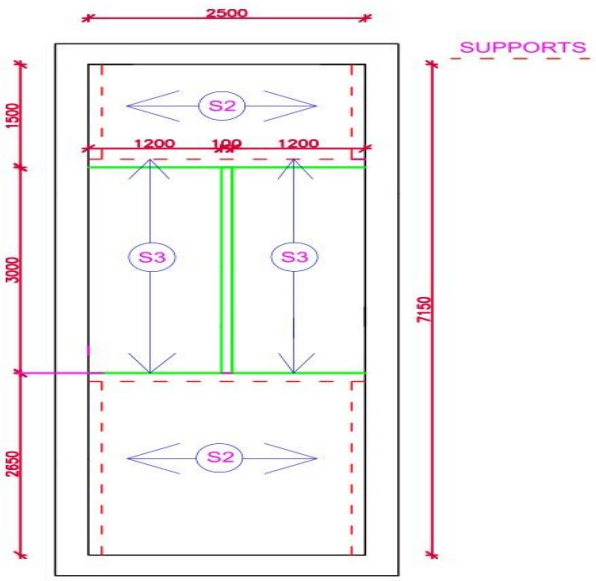


Design the geometry of the staircase: (in ground floor)

- Height of the floor h_{foolr} =3850 mm
- Depth of the main slab h_s = 210 mm
- Depth of floor structure h_f = 200 mm

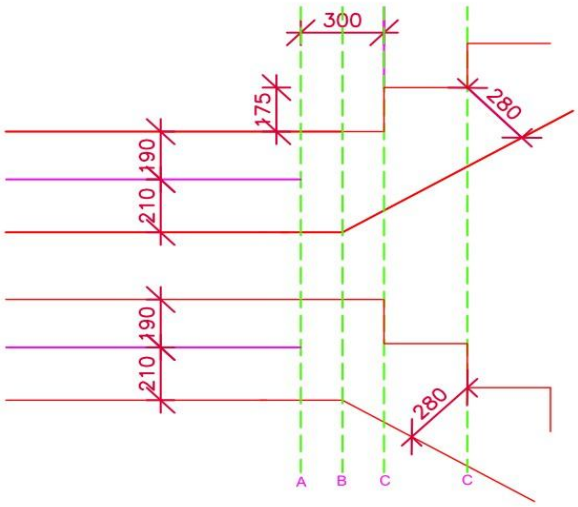
Dimensions of the staircase:

- Ideal height of one step is 180 mm
- 3850 / 180 = 21.39 => 22 steps (2 flights each of them with 11 steps)
- Height of one step h = 3850/ 22 = 175 mm
- Width of one step $b = 630 - 2h$ => 630 – 2 x 175 = 300 mm
- **DESIGN: Staircase with 175/280 mm steps, 2 flights, 11 steps in each flight**
- Width of the flight – 1200 mm
- Width of the gap between the flights – 100 mm
- Width of the landing – 1500 mm
- Total Width of the staircase is 1200*2+100 = 2500 mm
- Slope of the staircase is α= arc tan (h/b) => arc tan (175/300) = 30.25°
  Scheme of the staircase:



Preliminary check of the depth of the slab.

- The staircase is considered as one-way slab with the span of 4110 mm. The slab will be simply supported => the depth should be at least 4110/25 = 164.4 mm.
- The depth of landings is the same as the depth of the main slab – 210 mm.
- The depth of flights can be obtained from the details of flight-landing connections In my case, the depth is 220 mm.
- 210 mm > 180 mm and 220 mm > 180 mm => **OK**



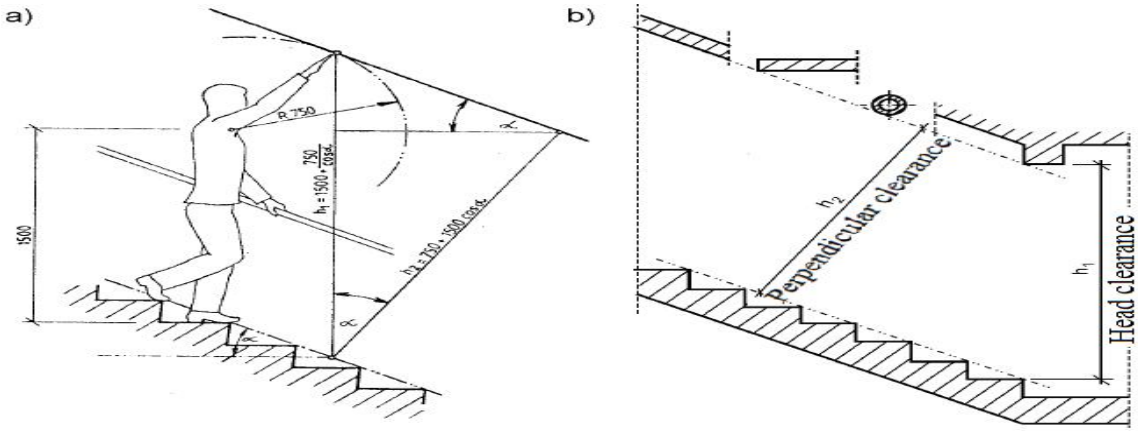
A: this is mentionable that both edges first and the last steps of the concrete should be in the same position because of the formworks.

B: also both flights have to be start in the same position not only because of the formworks but because of the esthetic as well.

C: concrete edges are not in the same position only it is better that the cladding in both flights should be in the same position and also the reason is because of the esthetic.

Perpendicular and head clearance of the staircase

- Head clearance of the staircase should be more than 1500+750/cosα = 1500+750/cos(32.005°) = 1908.004 mm and more than 2100 mm.
- Head clearance of our staircase is $h_1 = h_k - h_s - h_f - h$ = 3850 – 210 – 2100 –175 = 3265 mm => **OK.**
- Perpendicular clearance of the staircase should be more than 750+1500*cosα = 750+1500*cos(32.005°) = 1908.004 mm and more than 1900 mm.
- Perpendicular clearance of our staircase is $h_2 = h_1 \cos\alpha$ = 3265cos(32.005°) = 2768.73 mm, => **OK.**



Design the geometry of the staircase: (in typical floor)

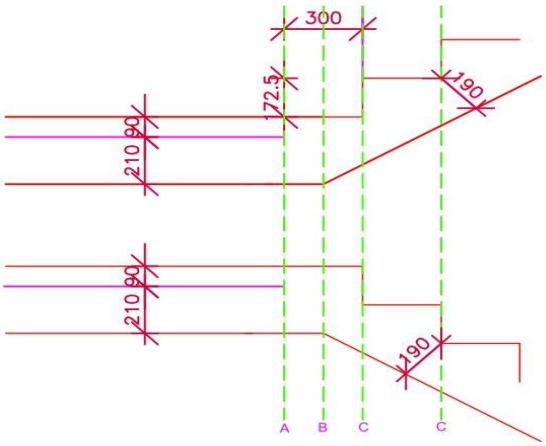
- Height of the floor h_{foolr} =3450 mm
- Depth of the main slab h_s = 210 mm
- Depth of floor structure h_f = 100 mm

Dimensions of the staircase:

- Ideal height of one step is 180 mm
- 3450 / 180 = 19.17 => 20 steps (2 flights each of them with 10 steps)
- Height of one step h = 3450/ 20 = 172.5 mm
- Width of one step $b = 630 - 2h$ => 630 – 2 x 172.5 = 300 mm
- **DESIGN: Staircase with 175/280 mm steps, 2 flights, 11 steps in each flight**
- Width of the flight – 1200 mm
- Width of the gap between the flights – 100 mm
- Width of the landing – 1500 mm
- Total Width of the staircase is 1200*2+100 = 2500 mm
- Slope of the staircase is α= arc tan (h/b) => arc tan (172.5/300) = 29.89°

Preliminary check of the depth of the slab.

- The staircase is considered as one-way slab with the span of 4110 mm. The slab will be simply supported => the depth should be at least 4110/25 = 164.4 mm.
- The depth of landings is the same as the depth of the main slab – 210 mm.
- The depth of flights can be obtained from the details of flight-landing connections In my case, the depth is 220 mm.
- 210 mm > 180 mm and 220 mm > 180 mm => **OK**



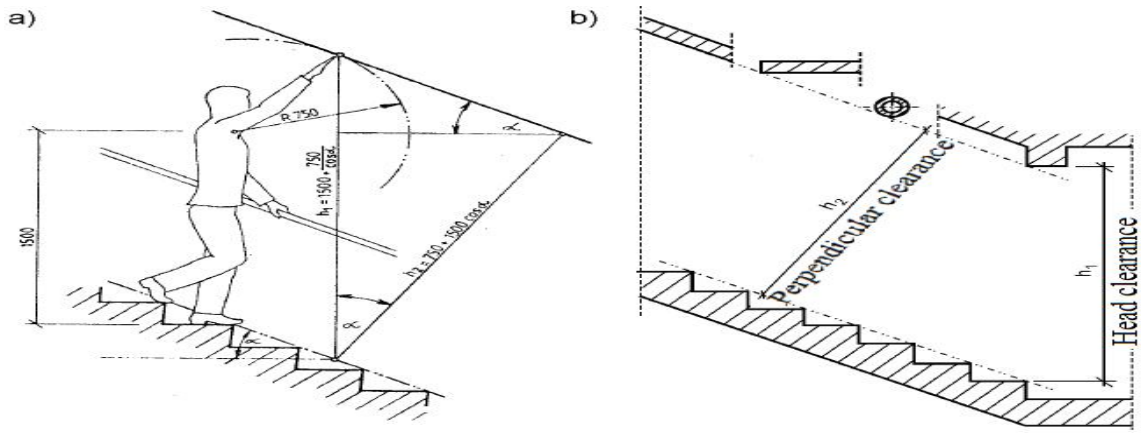
A: this is mentionable that both edges first and the last steps of the concrete should be in the same position because of the formworks.

B: also both flights have to be start in the same position not only because of the formworks but because of the esthetic as well.

C: concrete edges are not in the same position only it is better that the cladding in both flights should be in the same position and also the reason is because of the esthetic

Perpendicular and head clearance of the staircase

- Head clearance of the staircase should be more than $1500+750/\cos\alpha = 1500+750/\cos(32.005°)$ = 1908.004 mm and more than 2100 mm.
- Head clearance of our staircase is $h_1 = h_k - h_s - h_f - h$ = 3850 – 210 – 2100 –175 = 3265 mm => **OK.**
- Perpendicular clearance of the staircase should be more than $750+1500*\cos\alpha = 750+1500*\cos(32.005°)$ = 1908.004 mm and more than 1900 mm.
- Perpendicular clearance of our staircase is $h_2 = h_1\cos\alpha = 3265\cos(32.005°)$ = 2768.73 mm, => **OK.**



Load calculation of the staircase:

- Evaluations of the load which based on the landing of the staircase:

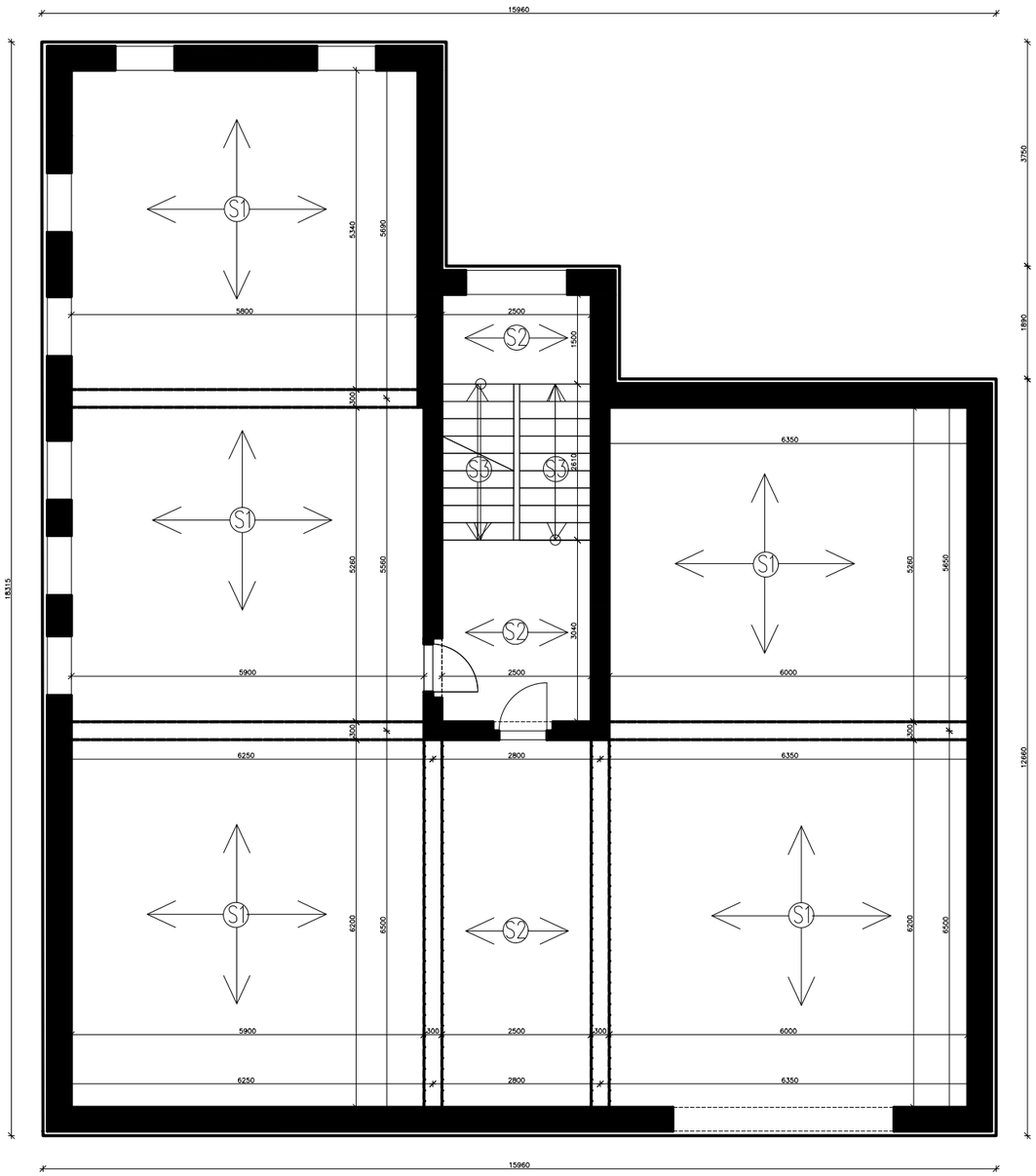
	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	γ	Design value [Kn/m^2]
landing load	1	PVC plank	4		0.022	1.35	0.0297
	2	plain concrete levelling	60	24	1.44	1.35	1.944
	3	PE layer			0		0
	4	acoustic insulation	126	0.3	0.0378	1.35	0.05103
	5	rienforce concrete slab	210	25	5.25	1.35	7.0875
	permanent load from typical slab gd				6.7498	1.35	9.11223

Load in landing: fd = 9.11223kn/sqm.

	No#	kind of layer	thickness [mm]	Density [Kn/m^3]	Characterstic value [Kn/m^2]	γ	Design value [Kn/m^2]
flight loads	1	RC slab	210/cos(30.25)	25	5.62	1.35	7.587
	2	epoxy layers	0	0	0	0	0
	3	steps	175+0/2	25	2	1.35	2.7
		live load			3	1.5	4.5
	tottal varialbe load on typical floor slab qd				10.62		**14.787**

Load in landing: fd = 14.787kn/sqm.

BASEMENT PLAN : −3,050 M

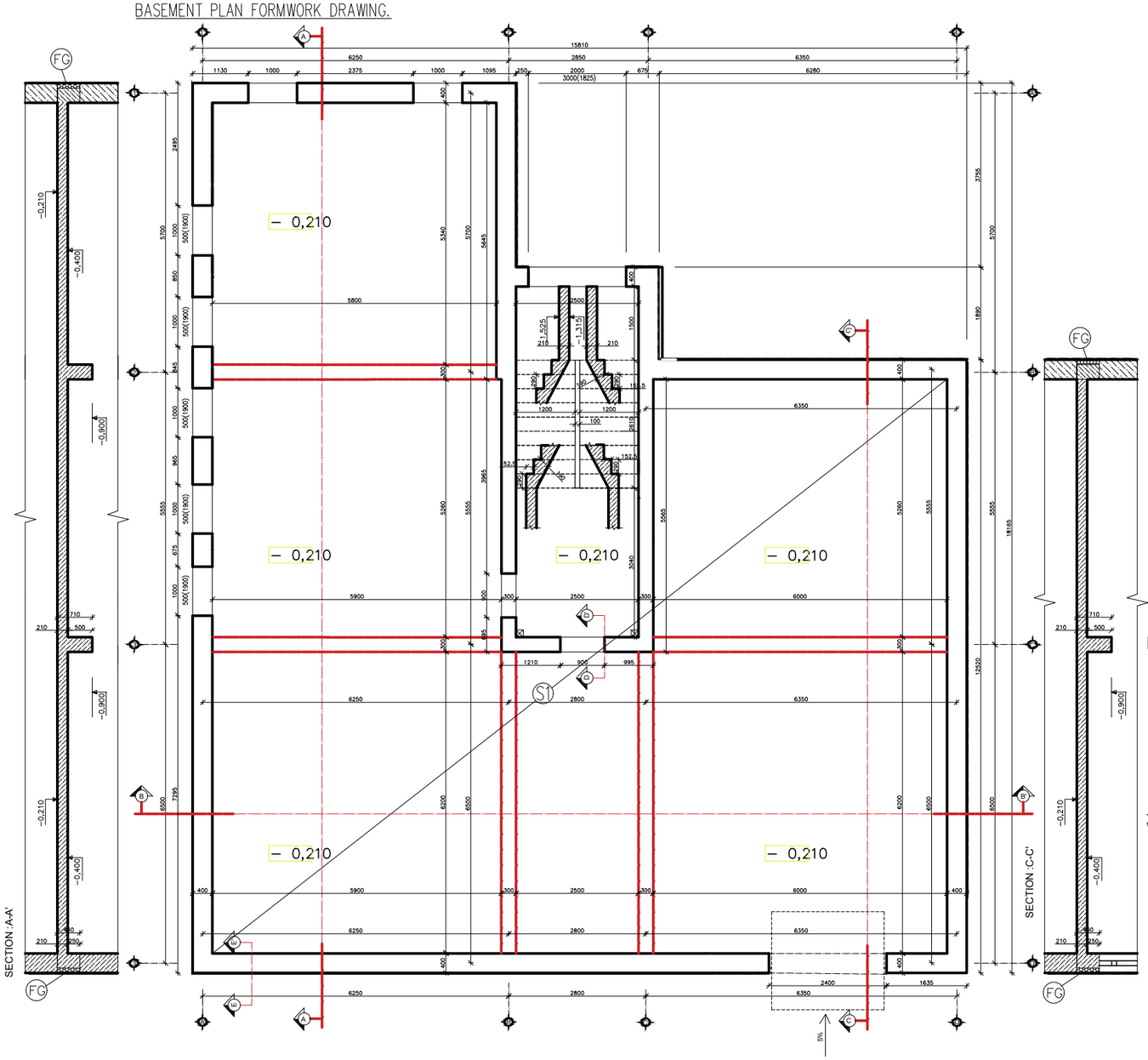


STRUCTURAL SOLUTION IN BASEMENT: A

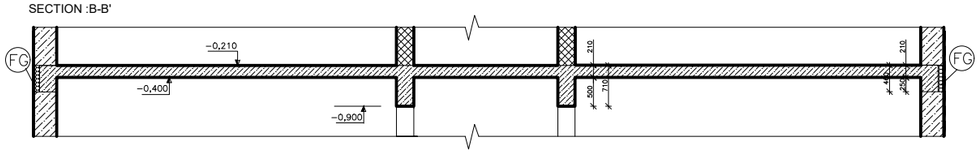
MAIN BEARING REINFORCES SLABS WALLS AND BEAMS
CONCRETE C30/37 STEEL GRADE B500B
SLAB h = 210 mm , BEAM h= 500mm, b = 300
CONCRETE WALL ROUND THE STAIRCASE t = 300mm
AND ROUND THE WHOLE BUILDING t= 400mm.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Petr Billy.PhD.	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2xA4
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: Structural solution variant A			Scale. 1:100 / Drawing No. 06

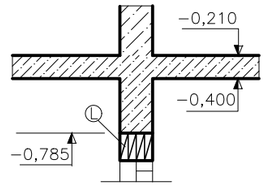
BASEMENT PLAN FORMWORK DRAWING.



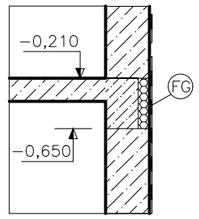
SECTION :B-B'



SECTION :D-D'



SECTION :E-E'



EXPLANATION OF THE SYMBOLS:

(L) LINTEL ABOVE THE DOORS

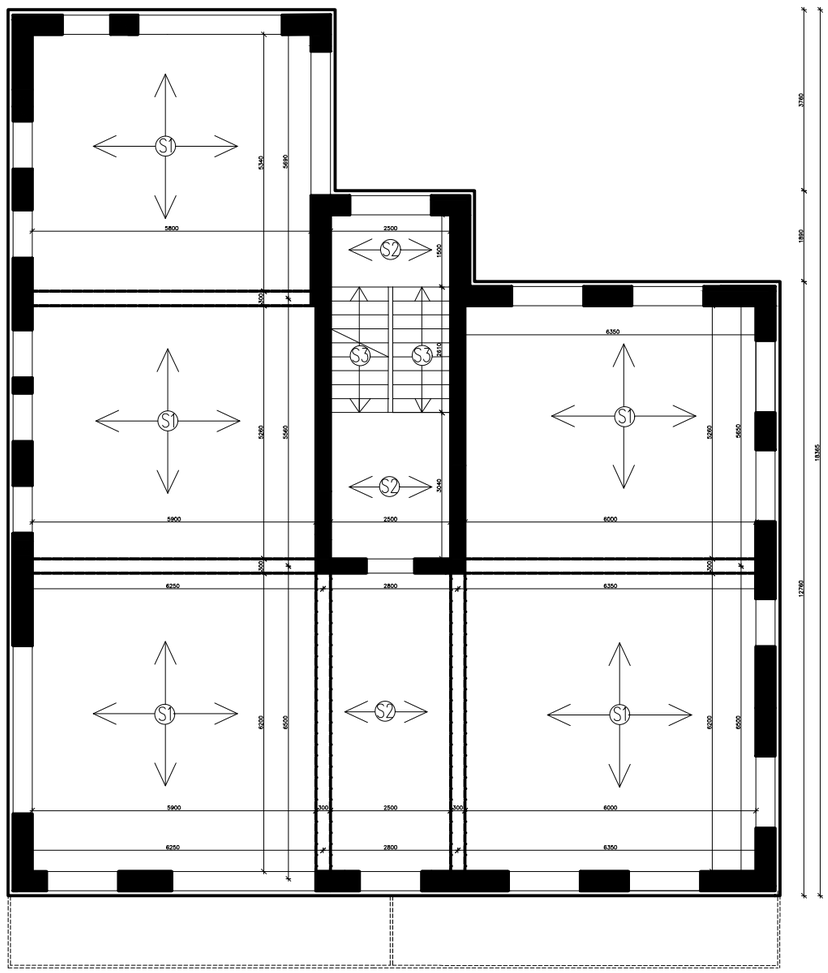
(FG) FOAM GLASS IN EACH CORNERS OF SLAB. TO SUPPORT CANTILEVER PART OF BEARING STRUCTURES AND PERMIT THERMAL BRIDGES.

MATERIALS:

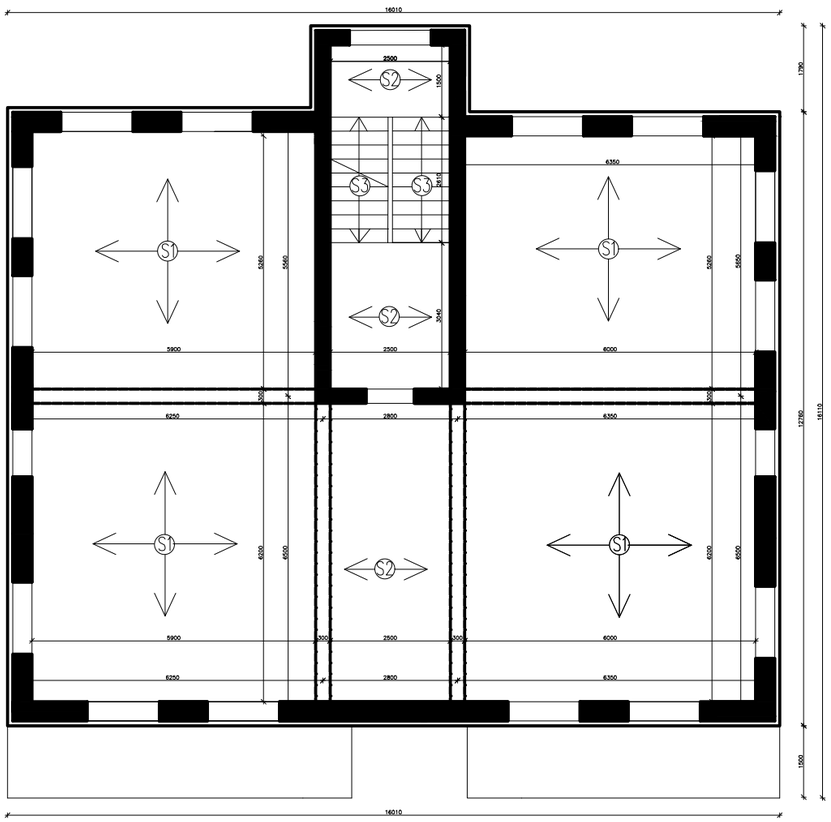
REINFORCED CONCRETE WALL t = 300mm 400mm , C 30/37 B500B
BEAMS b = 300mm SLABS hs = 210mm
- POROTHERM 40 P15 T = 400mm PROFI M 10 LOAD BEARING WALL WITH AN ADDITIONAL MORTAR.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Petr Billy.PhD.	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2xA4
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: Structural solution variant A			Scale. 1:100 / Drawing No. 06

GROUND FLOOR PLAN : +/- 0,000- 3.760 M



2nd & 3th FLOOR PLAN : 7,210 - 10.660M



STRUCTURAL SOLUTION IN GROUND FLOOR: A

- MAIN BEARING REINFORCES SLABS POROTHERM WALLS AND BEAMS
- CONCRETE CC30/37 STEEL GRADE B500B
- SLAB h = 210 mm , BEAM h= 500mm, b = 300
- CONCRETE WALL ROUND THE STAIRCASE t = 300mm
- POROTHERM 40 P+D t= 400mm PROFI M
10 LOAD BEARING WALL WITH AN ADDITIONAL
- EPS FOR THERMAL INSULATION. t = 100mm MORTAR.

DEVELOPED BY: Yosufi mohammad fayez	CONSULTANT: Ing . Petr Billy.PhD.	CONTROLLED: doc . Ing Hana Gattermyerova CSc	Fakulta stavební ČVUT
DREW BY: Yosufi mohammad fayez	CUSTOMER: Faculty of Civil Engineerinf ČVUT		
General Purpose: Apartment house (multifunction)			Format: 2xA4
			Date: 13/10.2016
			Purpose: building permit
			Archive Issues: -----
Attachment name: Structural solution variant A			Scale. 1:100 / Drawing No. 06