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BRNO UNIVERSITY OF TECHNOLOGY



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FACULTY OF CIVIL ENGINEERING
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D 1.1 A TECHNICAL REPORT

DIPLOMOVÁ PRÁCE

MASTER'S THESIS

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Purpose of use of the building

Energy passive block of flats for 28 inhabitants - 8 apartments.

Overall urban and architectural solution

The building is designed as four story building with flat roof for residential utilization. The building has three floors above ground and one under ground floor which serves as a collection garages.

Load-bearing construction is designed as a reinforced concrete monolithic system (locally supported slab).

Connection between floors (northern façade) and balcony (southern facade) is provided by outstanding steel construction with galvanized coating. Flooring of the construction is from wood and hand rail lathing is from wood.

There are 4 duplex apartments in 1st and 2nd floor each for 5 inhabitants. Floor connection inside apartment is provided by reinforced concrete monolithic staircase. Others 4 apartments in 3rd floor are each for 2 inhabitants.

The windows are situated mostly in southern facade. The windows are triple glazing mostly fixed.

Colour of the facade is grey.

Barrier-free use of the building

Parking spot for disabled is placed in parking area in front of the building. Access to the building for disabled peoples will be provided by electric platform mounted to the staircase. The width of doors in the building is not designed for wheelchair but can be easily modified if need so. Also one staircase can be replaced by lift.

Safety during the construction realization and use of buildings

Construction works must be complied all the regulations regarding concerning the protection of life and health of persons, in particular Act No. 309/2006 Coll., stipulating further

requirements of health and safety at work in labour relations and ensure the safety and health activities or services provided outside labour relations (Act about security and other health conditions), as amended by the Act. No. 362/2007 Coll.; further Act No. 183/2006 Coll. as amended regulations (Building Act), including implementing regulations, as well as all applicable IEC and EN. The building contractor has to create conditions to ensure safety. Part of the supply documentation has to be technological procedure and the documentation must be available on site. The procedure must establish requirements for the implementation of works in compliance with the principles of safety. Every worker must be informed and trained in safety regulations.

There is not safety risks connected with using of the building.

Operation of heating and ventilation system is fully automatic.

Service and maintenance of technical equipment will be provided by authorized workers only.

Basic characteristics of objects

Foundations

Foundations of the building are designed as a monolithic reinforced concrete pads under columns with foundation slab on it.

Foundations of the steel outstanding construction are designed as monolithic reinforced concrete walls to depth.

Dimension of the foundation and static calculation are in project documentation.

For foundation will be used concrete C25/30

Load – bearing structure

Load bearing structure is designed as monolithic reinforced concrete locally supported slab. Thickness of slab is 300mm. Dimension of columns are 300x350 (inner) and 300x250 (edge).

Vertical structures

External walls in underground floor and on south side of building are made from reinforced concrete C25/30.

Others external walls are made from ceramic masonry Heluz Aku, th. 250mm.

Partitions

Partitions between flats are from ceramic masonry Heluz Aku, th. 250mm

Others partitions are made from plasterboard system Knauf W11, th. 100-200mm.

Roof construction

Roof is designed as flat warm roof with stabilization layer.

Heat losses elimination

External walls are insulated with expanded polystyrene ESP Isover grey th. 300mm system ETICS.

External walls to the height 850mm above ground level is insulated with expanded polystyrene EPS Isover perimeter . 200mm system ETICS

Insulation of garage ceiling is from expanded polystyrene EPS 70F Isover th. 300mm system ETICS

Insulation of the roof is from expanded polystyrene EPS 200S, 70S Isover, total thickness of insulation is min. 400mm

For elimination of thermal bridges are also used another insulation materials: compactfoam and foamglass.

External facade

ETICS system is finished with silicone-silicate plaster, th. 3mm. Colour of facade is grey.

Internal finishes

The internal concrete walls in garage will be without finish.

Other walls will be covered with layer of plaster CEMIS th. 10-15mm.

Plasterboards will be treated according technical prescription of producer.

Colour of the plasters and plasterboards will be various according investor specification.

Openings

the windows are triple glazing with wooden frame, Slavona Progress, front-mounted installation in special L profiles according to detail in project documentation.

The external doors are wooden doors Slavona Progression, front-mounted installation in special L profiles according to detail in project documentation.

The interior doors are wooden in steel jambs of standard dimension specified in project documentation.

Insulation against ground water and radon

Waterproofing of below construction is provided by waterproof reinforced concrete C25/30, XC3, XD2, XF3, XA1

Basic characteristic of technical and technological equipments

Heating system

Heating will be ensured by condensation gas boiler. In the building will be used floor heating. Design of heating system was not solved.

Hot water supply

Hot water will be heated by condensation gas boiler and storage two tanks with total capacity 1200l.

HVAC system

In the building is designed forced ventilation system for demanded exchange of air with recuperation. . Unit is placed in service room. Detail information about system is in special project documentation D.1.4.1 HVAC system

Fire safety solution

An assessment has been made concerning the fire safety. The structure is designed in such way, that the building will be stable for the time required for the evacuation. The requirement for the fire resistance of the load-bearing construction is 30 minutes.

The building is divided into 10 fire sectors:

- N 1.01, N 1.02, N 1.03, N 1.04 (134.5m²)
- N 3.01, N 3.02, N 3.03, N 3.04 (70.59m²)
- N 0.01(15.6m²)
- The garage should be solved acc. to annex 1 of ČSN 73 0804 (non solved)

Acc to ČSN 730833 the structure meets description of buildings from the group OB2.

The evacuation of persons is provided with two non-protected escape route.

Detail information about fire safety solution in D1.3.A Fire safety solution