ISOVER Multi-Comfort House Students Contest Edition 2015
Residential function in cold climate – Astana, Kazakhstan

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CONCEPT
LOCATION OF PROJECT
CLARITY, HARMONY, SUSTAINABILITY
Noise isolation and solitude of the internal space of the residential complex
Creation of public and recreational spaces
Connection of the residential complex with the surrounding infrastructure
Protection from wind due to increasing the level of high-altitude platforms
Location of houses and green terraces in accordance with the insolation
SITE PLAN

- building plot
- traffic calmed street
- public and recreational spaces
- residential pedestrian/automobile routes
- pedestrian/bicycle trans-neighborhood routes
ARCHITECTURAL DECISION
PROJECT OVERVIEW
living area = 26 000 m²
offices = 515 m²
restaurant = 558 m²
shop = 1406 m²
beauty shop massage = 363 m²
bakery = 197 m²
parking entrance/exit
garbage room = 294 m²
market = 786 m²
pharmacy = 217 m²
fitness studio = 647 m²
kindergarten = 698 m²
repair shop = 272 m²
bicycle shop = 242 m²
GROUND FLOOR PLAN WITH LANDSCAPE DESIGN

PARKING PLACES CA. 300

PARKING PLACES CA. 50 AROUND RESIDENTIAL COMPLEX
TECHNICAL ASPECTS
1. Fresh Air Energy Piles
2. Heat Recovery with Automatically Controlled Summer Bypass
3. Fresh Air Inlets
4. Air Extract
5. External Sun Shadding
6. Roof Integrated Photovoltaics for Electricity Production

SUMMER VENTILATION/COOLING

WINTER PASSIVE HEAT GAINS
1 SAINT GOBAIN TRIPPLE GLAZING SGG CLIMATOP LUX, 35dB
2 SAINT-GOBAIN PAM GLOBAL RML VENTILATION PIPES
3 SOUND ABSORBING SUSPENDED CEILING AKUSTIC TP1, 23dB
4 ISOVER SOUND PROTECT, 58dB
5 ISOVER AKUSTIC EP3, 25dB
6 EXTERIER SOUND INSULATION, 65dB
RE-USE OF RAIN WATER

1 COLLECTING OF RAINWATER CA. 50.000 LITERS/YEAR
2 SAINT-GOBAIN PAM GLOBAL V SEWERPIPES
3 RAINWATER STORAGE
4 RAINWATER USED FOR TOILET FLUSHING
WAVE SURFACE USED AS PATTERNS FOR PERFORATION ON SHELF

PERFORATED METAL PLATE PROVIDES 60 TO 80% SHADING

SAINT GOBAIN TRIPPLE GLAZING SGG CLIMATOP LUX 42mm - 0.73W/m²K

VISIBLE TRANSMITTANCE OF 75%
GROSS FLOOR AREA
DENSITY OF HOUSING
TOTAL NUMBER OF APARTMENTS

31753 m²
8807 m²/ha
ca. 330

SECTION A-A WITHOUT SCALE
MULTI-COMFORT DESIGNER: CALCULATION FOR A TOWER WITH 8 FLOORS - OVERVIEW PALETTE

A. PROJECT DATA
Object: Residential Complex
Climate zone: Astana
Construction: New Building
Building Type: Residential
Usage: For living
Design Temperature: 22.00°C

B. AREA INPUT
Sum of living area: 3200.00 m²
Sum of Heated Space Volume: 9422.16 m³
V/A Ratio: 2.94
Sum of Thermal Envelope: 2392.00 m²

C. ENVELOPE - OPAQUE ELEMENTS
(Average U-Values)
Flat Roof: 0.11
Wall against air: 0.08
Wall against ground: 0.17
Slab against ground: 0.10

D. ENVELOPE - WINDOWS AND DOORS
(Average U-Values)
Windows: 0.73
Doors: 0.80

E. QUALITY
Airtightness rate: 0.60
Thermal Bridge Free: Yes

F. MEAN SHADING FACTORS
North 0°: 0.47
South 180°: 0.70
West 270°: 0.70
East 90°: 0.70

OVERHEATING PARAMETERS
Kind of Construction: Massive
Max. admitted interior temperature: 25

H. CALCULATIONS
Transmission Heat Losses: 122782.89 kWh/a
Ventilation Heat Losses: 36370.72 kWh/a
Total Heat Losses: 159153.60 kWh/a
Internal Heat Gains: 35965.44 kWh/a
Available Solar Heat Gains: 103632.60 kWh/a
Total Heat Gains: 123246.58 kWh/a
Annual Heat Demand: 35907.02 kWh/a

Specific Annual Heat Demand: **11.22 kWh/(m²a)**
MULTI-COMFORT DESIGNER:
ORIGIN RESIDENTIAL COMPLEX SIMULATION – OVERVIEW PALETTE

A. PROJECT DATA
Object: Residential Complex
Climate zone: Astana
Construction: New Building
Building Type: Residential
Usage: For living
Design Temperature: 22.00°C

B. AREA INPUT
Sum of living area: 31753 m²
Sum of Heated Space Volume: 73126.88 m³
V/A Ratio: 2.07
Sum of Thermal Envelope: 44598.30 m²

C. ENVELOPE- OPAQUE ELEMENTS
(Average U-Values)
Flat Roof: 0.11
Wall against air: 0.08
Wall against ground: 0.17
Slab against ground: 0.10

D. ENVELOPE- WINDOWS AND DOORS
(Average U-Values)
Windows: 0.73
Doors: 0.80

E. QUALITY
Airtightness rate: 0.60
Thermal Bridge Free: Yes

F. MEAN SHADING FACTORS
North 0°: 0.47
South 180°: 0.70
West 270°: 0.70
East 90°: 0.70

OVERHEATING PARAMETERS
Kind of Construction: Massive
Max. admitted interior temperature: 25

SUMMER VENTILATION STRATEGY
Summer Air Exchange Rate
Natural Ventilation Losses 0.2
Mechanical Ventilation Losses 0.4

G. HVAC
Heat Recovery System: 90.00 %
Subsoil Heat Exchanger
Efficiency: 33.00 %
Length: 80 m

H. CALCULATIONS
Transmission Heat Losses: 1430980.88 kWh/a
Ventilation Heat Losses: 401265.12 kWh/a
Total Heat Losses: 1832246.01 kWh/a
Internal Heat Gains: 396793.83 kWh/a
Available Solar Heat Gains: 918164.04 kWh/a
Total Heat Gains: 1233091.15 kWh/a
Annual Heat Demand: 599154.85 kWh/a

Specific Annual Heat Demand: 16.97 kWh/(m²a)
CONSTRUCTION DETAILS
DETAIL 1

EXTENSIVE GREENING
80 mm SUBSTRAT FOR EXTENSIVE GREENING
FILTER LAYER (GEOTEXTILE FIBROUS WEB)
25 mm DRAINAGE LAYER
FILTER LAYER (GEOTEXTILE FIBROUS WEB)
180 mm XPS-EXTRUDED POLYSTYRENE FOAM BOARD
5 mm ROOF CONFINEMENT LAYER
8 mm DOUBLE-LAYER ROOF SKIN
200 mm ISOVER ROOF WITH MECHANICAL STRENGTH
200 mm REINFORCED CONCRETE CEILING
10 mm INTERIOR PLASTER
80 mm INSTALLATION LEVEL WITH ISOVER Akustic TP
25 mm GYPROS DOUBLE LAYER
DETAIL 2

- DRIP EDGE
- Airtight layer

Layer Details:

- 50 mm CEMENT SCREED
- 15 mm SEPARATING LAYER
- 200 mm THERMAL INSULATION
- 140 mm REINFORCED CONCRETE CEILING
- 80 mm ISOVER SILLATHERM WVP
- 80 mm FIBRE CEMENT PANELS
DETAIL 3/4

FLOOR COVERING
8 mm DOUBLE-LAYER ROOF SKIN
200 mm ISOVER ROOF
WITH MECHANICAL STRENGTH
200 mm REINFORCED CONCRETE CEILING
10 mm INTERIOR PLASTER
80 mm INSTALLATION LEVEL
WITH ISOVER Akustic TP1
25 mm GYPROS DOUBLE LAYER

SAINT GOBAIN
TRIPPLE GLAZING
SGG CLIMATOP LUX

10 mm INTERIOR PLASTER
300 mm REINFORCED CONCRETE WALL
320 mm ISOVER SILLATHERM WVP (2x160)
80 mm FIBRE CEMENT PANELS
SIMPPLICITY IS EFFICIENCY