

Thermal calculation of a BalticHaus dome house

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Inputs

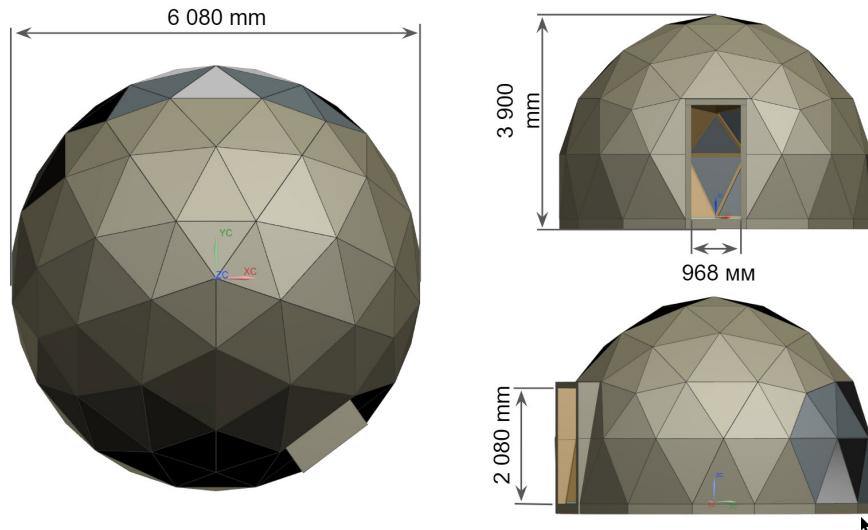
Operating conditions

| Metrics | Value |
|---|----------|
| The temperature of the coldest days | -4 °C |
| Heating period duration | 112 days |
| Average outside air temperature of the heating period | 5.1 °C |
| Room temperature | 20 °C |
| Humidity in the room | 55 % |

Monthly average temperature values for the specified region, °C

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|------|------|------|------|------|------|------|------|-----|
| 3.9 | 4.1 | 6.3 | 11.2 | 17.7 | 22.6 | 25.7 | 25.7 | 21.8 | 16.6 | 11.1 | 6.8 |

House Characteristics



| Element | Area, m ² |
|---------|----------------------|
| Floor | 28 |
| Walls | 55 |
| Windows | 9 |

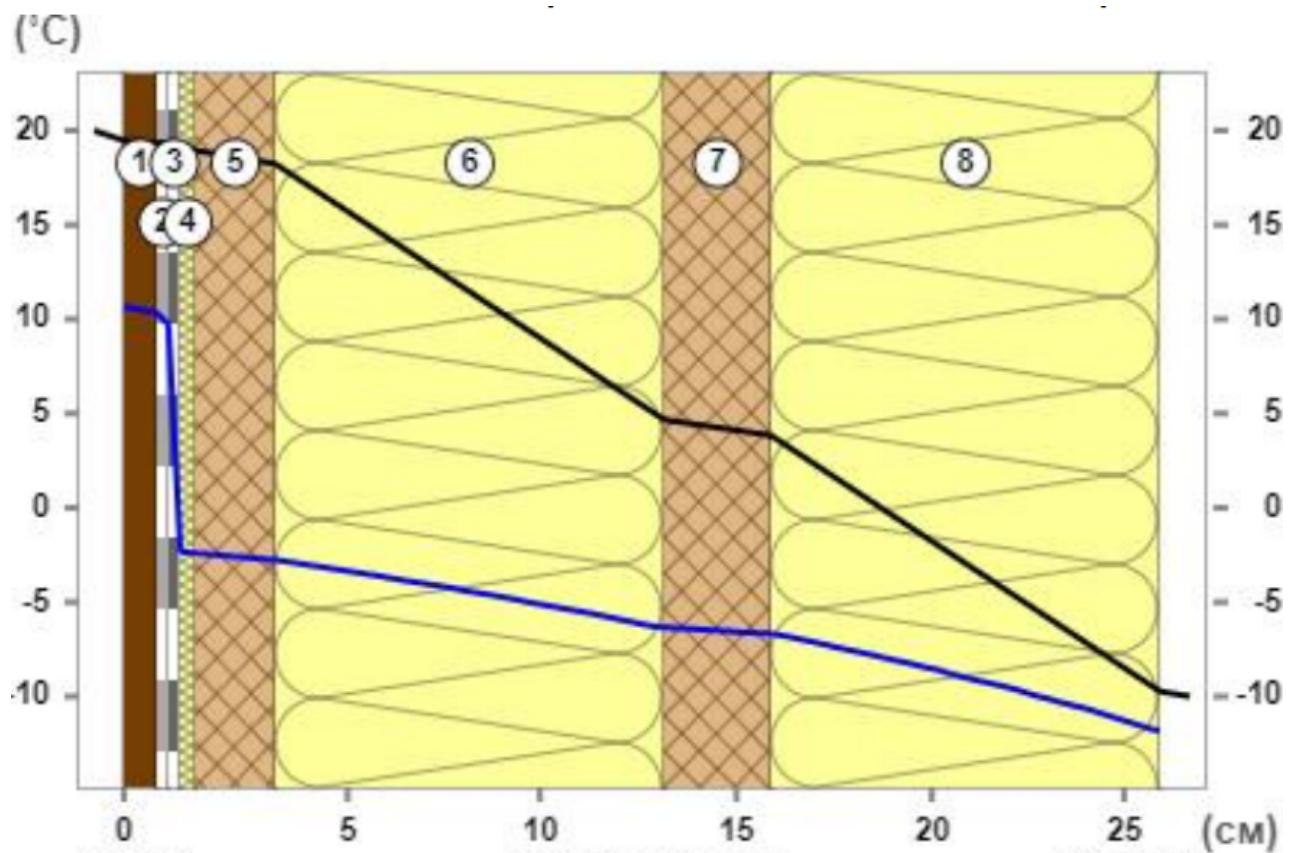
Heat loss of the whole house

| | Meas. unit | Floor | Walls | Wind. | Dome |
|---|-----------------------|-------|-------|-------|------|
| [S] Area | m ² | 28 | 55 | 9 | 93 |
| [R] Heat transfer resistance | (m ² °C)/W | 6.5 | 4.41 | 0.7 | - |
| [Q _{T1}] Heat loss of the structure under the condition: 1. Area 1 m ² 2. Temperature difference between inside and outside 1 °C ($\Delta = 1$ °C) 3. Duration of 1 hour | Wh | 0.154 | 0.227 | 1.43 | - |
| [Q _{T15}] The heat loss of the structure under the condition: 1. 5 °C outside and 20 °C inside ($\Delta = 15$ °C) 2. Duration of 1 hour | W/h | 65 | 187 | 193 | 445 |
| [Q _{T25}] The heat loss of the structure under the condition: 1. -5 °C outside and 20 °C inside ($\Delta = 25$ °C) 2. Duration of 1 hour | W/h | 108 | 312 | 322 | 742 |
| * The coldest day in the specified region | | | | | |
| [Q _{HS}] Heat loss during the heating period. * The calculation takes into account the average temperature distribution during the month relative to a specified region. | kW | - | - | - | 1172 |

* A detailed calculation of each structure individually is below in this report.

Thermal calculation of the floor

Floor layers and their heat transfer resistance



| Layer | Layer description | Thickness mm | λ W/(m °C) | R (m² °C)/W |
|-----------------------|-------------------------------|--------------|--------------------|-------------|
| _____ | Temperature | - | - | - |
| _____ | Dew point temperature | - | - | - |
| (1) | Laminate | 8 | 0.33 | 0.02 |
| (2) | Plastic foil | 0.16 | - | - |
| (3) | Aluminum foil | 0.1 | - | - |
| (4) | Extruded polystyrene foam XPS | 3 | 0.034 | 0.09 |
| (5) | OSB plate | 20 | 0.13 | 0.15 |
| (6) | Extruded polystyrene foam XPS | 100 | 0.034 | 2.94 |
| (7) | Ply | 27 | 0.15 | 0.18 |
| (8) | Extruded polystyrene foam XPS | 100 | 0.034 | 2.94 |
| Summary values | | 258.2 | - | 6.5 |

Floor heat loss

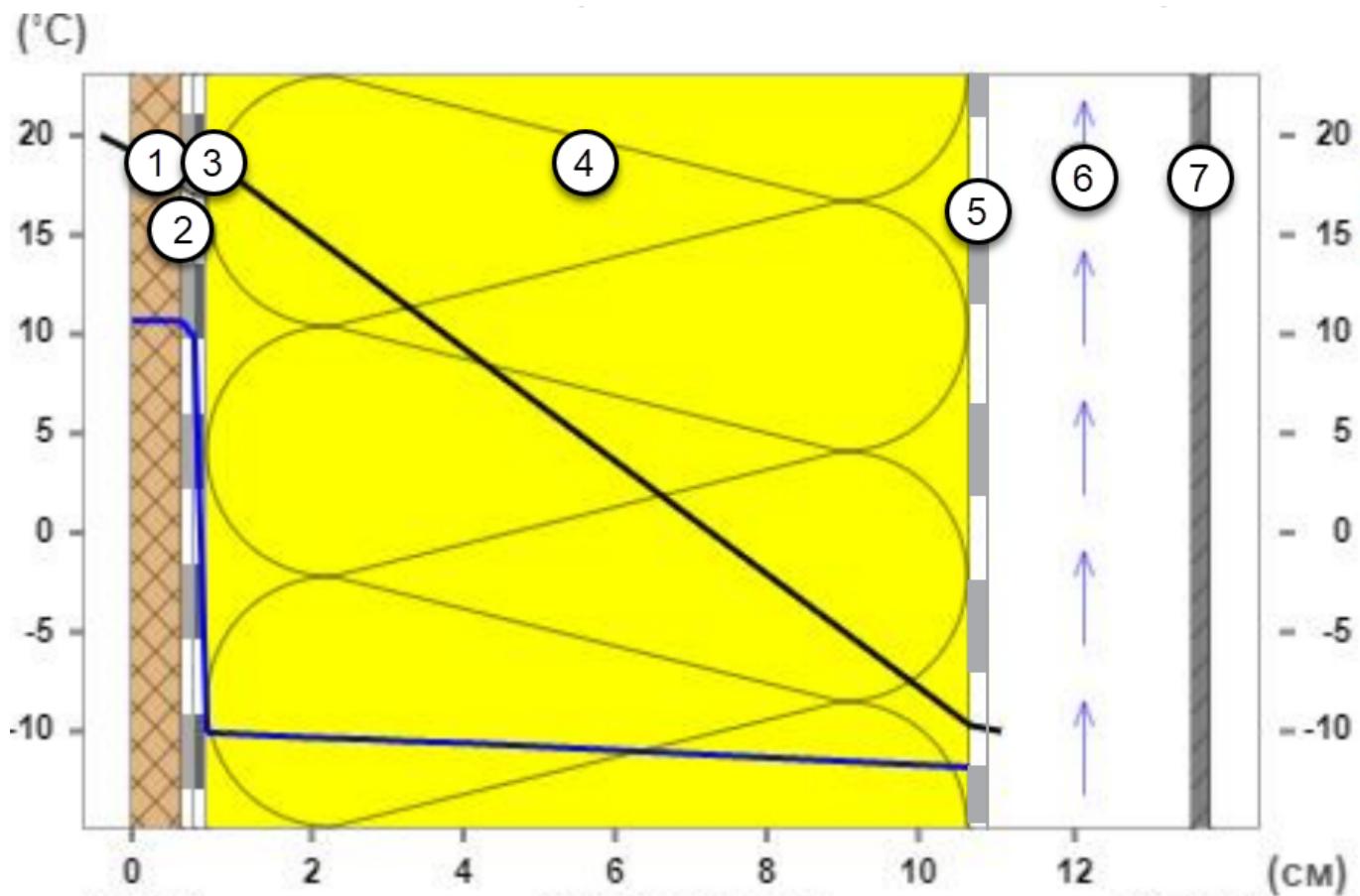
| Parameter description | Symbol | Value |
|--|-----------------|-----------------------------------|
| Heat transfer resistance | R | 6.5 ($\text{m}^2 \text{ °C}$)/W |
| Heat loss per 1 m ² at a temperature difference of 1 °C | Q _{T1} | 0.154 W/h |

Moisture retention

| | |
|--------------------------------|-----|
| Protection against overwetting | YES |
| Condensation protection | YES |

Thermal calculation of walls

Layers of walls and their heat transfer resistance



| Layer | Layer description | Thickness mm | λ W/(m °C) | R (m² °C)/W |
|----------------|--------------------------|--------------|--------------------|-------------|
| — | Temperature | - | - | - |
| — | Dew point temperature | - | - | - |
| (1) | Ply | 6 | 0.15 | 0.04 |
| (2) | Vapor barrier foil | 0.16 | - | - |
| (3) | Aluminum foil | 0.1 | - | - |
| (4) | PIR | 100 | 0.024 | 4.17 |
| (5) | Aluminum foil | 0.1 | - | - |
| (6) | Ventilated gap | 29 | - | - |
| (7) | Aluminum composite panel | 4 | - | - |
| Summary values | | - | - | 4.41 |

Heat loss of the wall

| Parameter description | Symbol | Value |
|--|-----------------|------------------------------------|
| Heat transfer resistance | R | 4.41 ($\text{m}^2 \text{ °C}$)/W |
| Heat loss per 1 m ² at a temperature difference of 1 °C | Q _{T1} | 0.227 W/h |

Moisture retention

| | |
|--------------------------------|-----|
| Protection against overwetting | YES |
| Condensation protection | YES |

Thermal calculation of windows

Window layers and their heat transfer resistance

| Layer | Layer description | Thickness mm | λ W/(m °C) | R (m² °C)/W |
|----------------|-------------------|--------------|--------------------|-------------|
| (1) | Glass M | 4 | - | - |
| (2) | Argon gas | 16 | - | - |
| (3) | Glass i | 4 | - | - |
| Summary values | | - | - | 0.698 |

Window heat loss

| Parameter description | Symbol | Value |
|--|-----------------|-----------------|
| Heat transfer resistance | R | 0.698 (m² °C)/W |
| Heat loss per 1 m ² at a temperature difference of 1 °C | Q _{T1} | 1.43 Вт/ч |