

| Region:   |  | Lombardy   |  |  |                        |           |           | Archetype code:  |           |  |  |
|---|--|--|--|--|------------------------|-----------|-----------|--|-----------|--|--|
| Building category:  |  | Residential buildings – Apartments (in multifamily blocks) |  |  |                        |           |           | RES APPBLOCK 1921-   |           |  |  |
| Period of construction:   |  | 1921-1945  |  |  |                        |           |           |  | E_LOM     |  |  |
| Climatic zone: E  |  | E  | Number of records: 37  |  |                        | 37        |           |  |           |  |  |
| <b>Description</b> (the codes associated with wa<br><u>External walls</u> : double layer of hollow b<br><u>Roof slabs</u> : reinforced brick-concrete sla |  | ociated with wall<br>er of hollow br<br>ck-concrete slab   | s and slabs refer to the structures described in UNI/TR 11552:2014):<br>icks (8 cm + 12 cm) with uninsulated air gap (cod. MCV02).<br>(22 cm) plus uninsulated concrete screed (4 cm) (cod. SOL04) |  |                        |           |           | Data sources:<br>Municipal database (32%)<br>CURIT database (27%)<br>Visual inspection (19%)<br>Others (22%) # |           |  |  |
|   | Data   |  | Symbol   | Unit of  | Mean                   | Standard  | Q1 (first | Median   | Q3 (third |  |  |
| OMETRY  | Number of floors   |  |  | measure  | value                  | deviation | quartile) | value  | quartile) |  |  |
|   | Gross height   |  | n <sub>f</sub>   | -  | 4.73                   | 0.84      | 4.00      | 4.00   | 5.50      |  |  |
|   |  |  | Hg   | m  | -                      | -         |           |  |           |  |  |
|   | Hosted gross floor cross   |  | Afootprint   | <sup>2</sup>   | -                      | -         |           |  |           |  |  |
|   | Heated gross floor area  |  | A <sub>H;g</sub>   | <br>2  | -                      | -         | -         | -  | -         |  |  |
|   | Heated net floor area  |  | A <sub>H;n</sub>   |  | -                      | -         | -         | -  | -         |  |  |
|   | Heated gross volume  |  | V <sub>H;g</sub>   | <br>   | -                      | -         | -         | -  | -         |  |  |
| 0   | Heated net volume  |  | V <sub>H;n</sub>   | m <sup>-1</sup>  | 0.50                   | 0.10      | 0.20      | 0.50   | 0.05      |  |  |
| NIC   | Compactness ratio  |  | A <sub>env</sub> / V <sub>H;g</sub>  |  | - 0.50                 | - 0.19    | - 0.36    | - 0.50   | 0.65      |  |  |
|   | WWR – North orientation  |  |  | -  | -                      |           |           |  | -         |  |  |
| B   | WWWR - South orientation   |  |  | -  | -                      | -         | -         | -  | -         |  |  |
|   | WWR – East orientation   |  |  |  | -                      | -         | -         | -  | -         |  |  |
|   | Window to useful floor area  |  | UUUUNW   |  | _                      | -         |           |  |           |  |  |
|   | ratio  |  | A <sub>wi</sub> /A <sub>use</sub>  | -  |                        |           |           |  |           |  |  |
|   | Roof type  | Roof type  |  | Reinforced brick-concrete slab: 33%; Wood structure and planking with tiles: 25%; Reinforced brick-concrete slab low insulation: 25%; Reinforced brick-concrete slab. high insulation: 17% |                        |           |           |  |           |  |  |
|   | U-value of the r   | U-value of the roof  |  | W/(m <sup>2</sup> ·K)  | -                      | -         | -         | -  | -         |  |  |
| ш   | External walls type  |  | Hollow brick masonry, medium insulation: 84%; Solid Brick masonry: 16%   |  |                        |           |           |  |           |  |  |
| OPI   | U-value of the wall  |  | U <sub>wl</sub>  | W/(m <sup>2</sup> ·K)  | 1.07                   | 0.46      | 0.69      | 1.15   | 1.42      |  |  |
| VEL   | Slab on ground floor type  |  | Reinforced brick-concrete slab with concrete screed: 100%  |  |                        |           |           |  |           |  |  |
| EN  | U-value of the floor   |  | U <sub>fl;lw</sub>   | W/(m²⋅K)   | -                      | -         | -         | -  | -         |  |  |
|   | Windows type   |  |  |  |                        | -         |           |  |           |  |  |
|   | U-value of the windows   |  | Uw   | W/(m²⋅K)   | 2.54                   | 0.90      | 1.86      | 2.40   | 3.00      |  |  |
|   | Shading system type  |  |  |  |                        |           |           |  |           |  |  |
| z   | Occupancy dens   | Occupancy density *  |  | person/m <sup>2</sup>  |                        |           |           |  |           |  |  |
| and<br>TIO  | Lighting power density *   |  | WL   | W/m <sup>2</sup>   | UNI EN 16798-1 - A.8.3 |           |           |  |           |  |  |
| NS<br>ILA   | Equipment pow  | Equipment power density *                                  |  | WA         W/m²         UNI EN 16798-1 - A.8.3   |                        |           |           |  |           |  |  |
| <b>GAI</b>  | Type of ventilation  |  | Natural: 100%  |  |                        |           |           |  |           |  |  |
| >   | Air exchange rat   | te *   | n  | h⁻¹  | 0.30                   | 0.00      | 0.30      | 0.30   | 0.30      |  |  |
|   | Heating system type  |  | Centralized: 100%  |  |                        |           |           |  |           |  |  |
| THERMAL SYSTEMS   | Heating generat  | tor  | Traditional boiler: 80%; Condensing boiler: 20%  |  |                        |           |           |  |           |  |  |
|   | Daily operating<br>heating system  | time of the<br>*   | t <sub>H</sub>   | h  | 14.00                  | 0.00      | 14.00     | 14.00  | 14.00     |  |  |
|   | Energy carrier   |  | Natural gas: 94%; Electricity: 6%  |  |                        |           |           |  |           |  |  |
|   | Heating emission sub-system  |  | Radiators: 100%  |  |                        |           |           |  |           |  |  |
|   | Cooling system type  |  | Heat pump: 100%  |  |                        |           |           |  |           |  |  |
|   | Daily operating time of the cooling system *   |  | tc   | h  | -                      | -         | -         | -  | -         |  |  |
|   | Cooling emissio  | n sub-system   |  |  |                        | -         |           |  |           |  |  |
|   | DHW system type  |  | Autonomous - detached from heating: 100%   |  |                        |           |           |  |           |  |  |
|   | DHW generator  |  | Natural gas boiler: 74%; Electric boiler: 26%  |  |                        |           |           |  |           |  |  |
|   | # CENED database (ACE) (14%), Local database (6%), Standards (4%), Expert Assumption (4%)<br>* These values were not available in the considered sources, and are thus derived from UNI EN Standards |  |  |  |                        |           |           |  |           |  |  |







| Region:                 | n: Lombardy               |                    |    |            |
|-------------------------|---------------------------|--------------------|----|------------|
| Building category:      | Residential buildings – A | RES_APPBLOCK_1921- |    |            |
| Period of construction: | 1921-1945                 |                    |    | 1945_E_LOM |
| Climatic zone:          | E                         | Number of records: | 37 |            |

| ADDITIONAL DATA         |   |   |                    |   |                       |                        |                 |                        |
|-------------------------|---|---|--------------------|---|-----------------------|------------------------|-----------------|------------------------|
|                         | Data                                      | Symbol  | Unit of<br>measure | Mean<br>value   | Standard<br>deviation | Q1 (first<br>quartile) | Median<br>value | Q3 (third<br>quartile) |
| GEOMETRY:<br>apartments | Inter-storey height                       | H <sub>n</sub>                                | m                  | -   | -                     | -                      | -               | -                      |
|                         | Heated gross floor area                   | A <sub>H;g</sub>                              | m²                 | -   | -                     | -                      | -               | -                      |
|                         | Heated net floor area                     | A <sub>H;n</sub>                              | m²                 | 172.10  | 135.58                | 76.43                  | 140.91          | 220.04                 |
|                         | Heated gross volume                       | V <sub>H;g</sub>                              | m <sup>3</sup>     | 747.93  | 615.52                | 311.00                 | 624.17          | 913.33                 |
|                         | Heated net volume                         | V <sub>H;n</sub>                              | m <sup>3</sup>     | -   | -                     | -                      | -               | -                      |
| THERMAL SYSTEMS         | Heating efficiency or COP                 | $\eta_{ m H;gen}$ or $COP_{ m H;gen}$         | -                  | This value has to be retrieved from suitable datasheets |                       |                        |                 |                        |
|                         | Total heating power *                     | P <sub>H;gen</sub>                            | kW                 | 118.71  | 168.51                | 24.00                  | 30.30           | 140.15                 |
|                         | Cooling efficiency or EER                 | η <sub>C;gen</sub> or<br>EER <sub>C;gen</sub> | -                  | This value has to be retrieved from suitable datasheets |                       |                        |                 |                        |
|                         | Total cooling power *                     | P <sub>C;gen</sub>                            | kW                 | 98.50   | 226.14                | 3.50                   | 5.20            | 10.82                  |
|                         | Temperature of DHW                        | $\vartheta_{W}$                               | °C                 | 40.00   | 0.00                  | 40.00                  | 40.00           | 40.00                  |
|                         | DHW system power *                        | P <sub>W;gen</sub>                            | kW                 | 81.98   | 134.68                | 24.00                  | 28.00           | 34.95                  |
|                         | * These values after to the second second |   |                    |   |                       |                        |                 |                        |



Residential buildings – Apartment blocks – 1921-1945 – Zone E – Lombardy



