

## Precast system for housing

**DOMUS DRY®**





## DOMUS DRY® SYSTEM

- DOMUS DRY® is the most advanced precast system for housing patented by DLC consulting
- The elements are connected with dry-assembled mechanical devices that provide high speed of assemblage
- Exceptional realisation speed and turnkey delivery of the finished construction with elements provided in factory with finishes and MEP equipment
- High composition and distribution flexibility
- The load-bearing wall structure is engineered in order to attain great lightness
- Coupled wall-frame structures in combination with the Pandal® system
- Low m<sup>3</sup> of concrete per m<sup>2</sup> of construction ratio
- Long spans

DOMUS DRY® is the newest and most advanced precast system for residential use patented by DLC consulting after the experience gained in over 40 years with large panel (Briona) and three-dimensional element (ELLE) systems. The system has been developed and patented after 15 years of technological improvements and investigations, through the process optimisation with dry-assemblage of structural elements and functional blocks, completed in factory with finishes and facilities.

The DOMUS DRY® system allows the realisation of a wide range of fully prefabricated buildings from single-family houses up to tower buildings with high flexibility of composition, revolutionary architectural design and distribution due to the absence of structural walls and columns inside the apartments.

The system is made by pre-stressed R.C. single hollow-core slab elements (Domus® slab) which make a flat ceiling. Their top spacing is closed by ribbed R.C. plates. Lightened Master® bearing walls in R.C. sustain the gravity and horizontal loads. The façade is made with R.C. cladding panels, typically horizontal, or with other cladding typologies. The system is completed with complementary elements and functional blocks.

It can be used in combination with the Pandal® system to build combined wall/frame structures for residential or tertiary use. The system is characterised by a m<sup>3</sup> of concrete over m<sup>2</sup> of construction referred to the finished building of down to 0,26. The low number of elements ensures a high speed of assemblage. Its light weight allows appreciable savings in materials and the production in factory guarantees a high quality of the product.

The DOMUS DRY® system allows to attain structural spans up to 12 m long by using pre-stressed slab elements.



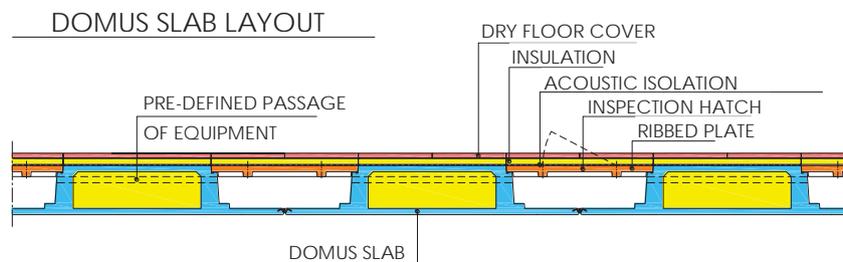
## DOMUS® SLAB

- High lightness
- Slab with flat soffit and floor
- Pre-definition of the MEP equipment passages inside the hollow cores of the slab
- Long spans
- High fire resistance

The Domus® slab is an element in pre-stressed R.C. with lower flange having standard width of 2,4 m. Its shape allows high stiffness and flexural-torsional resistance with reduced thickness and consequent great lightness. It is used to create decks having flat extrados and intrados.

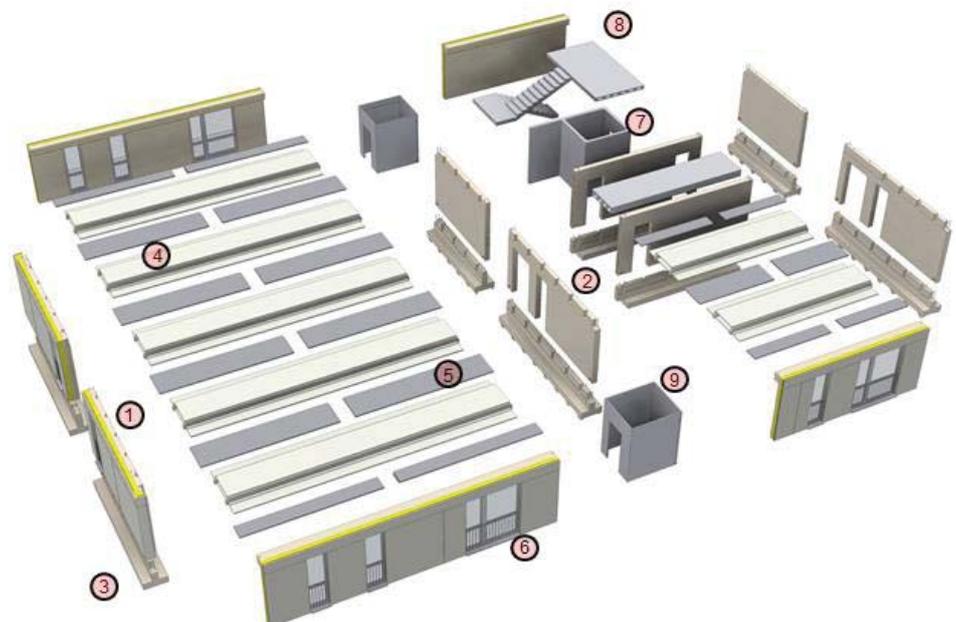
The Domus® slab elements are mounted side by side and connected together. Ribbed R.C. plates placed on special recesses left on the upper edge of the slab element close the floor. The Domus® slab is produced with a depth of up to 350 mm. The ribs are extended at the edges for the installation in proper recesses left in the Master® walls. The slab can cover spans of up to 12 m.

The positioning of the pre-stressing tendons allows to obtain a high fire resistance.



### LEGEND

- 1) Internal Master wall
- 2) External Master wall
- 3) Foundation beam
- 4) DOMUS slab
- 5) Ribbed plates
- 6) Cladding panel
- 7) Elevator block
- 8) Ramp
- 9) Bath block







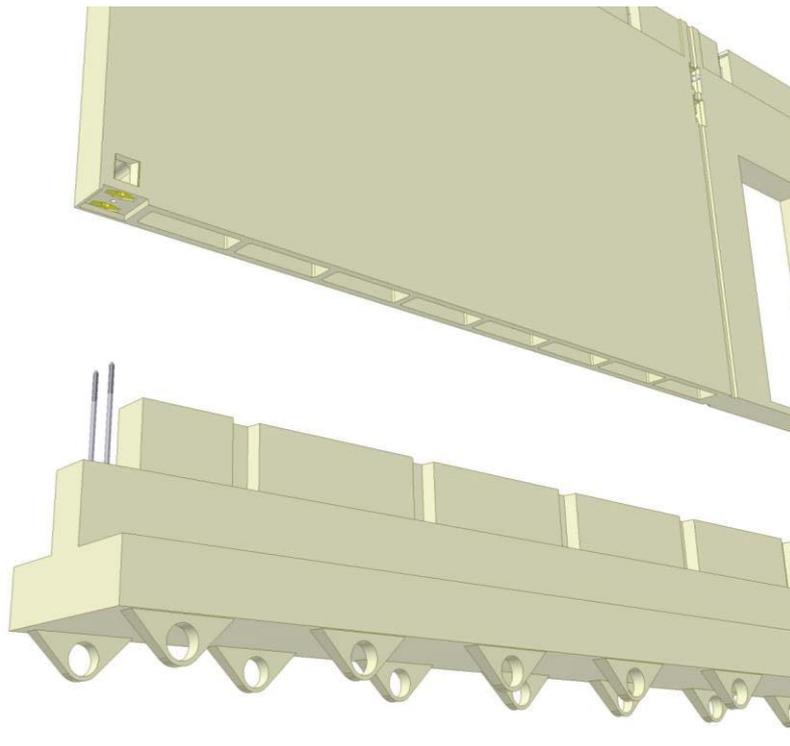
## MASTER® load-bearing walls

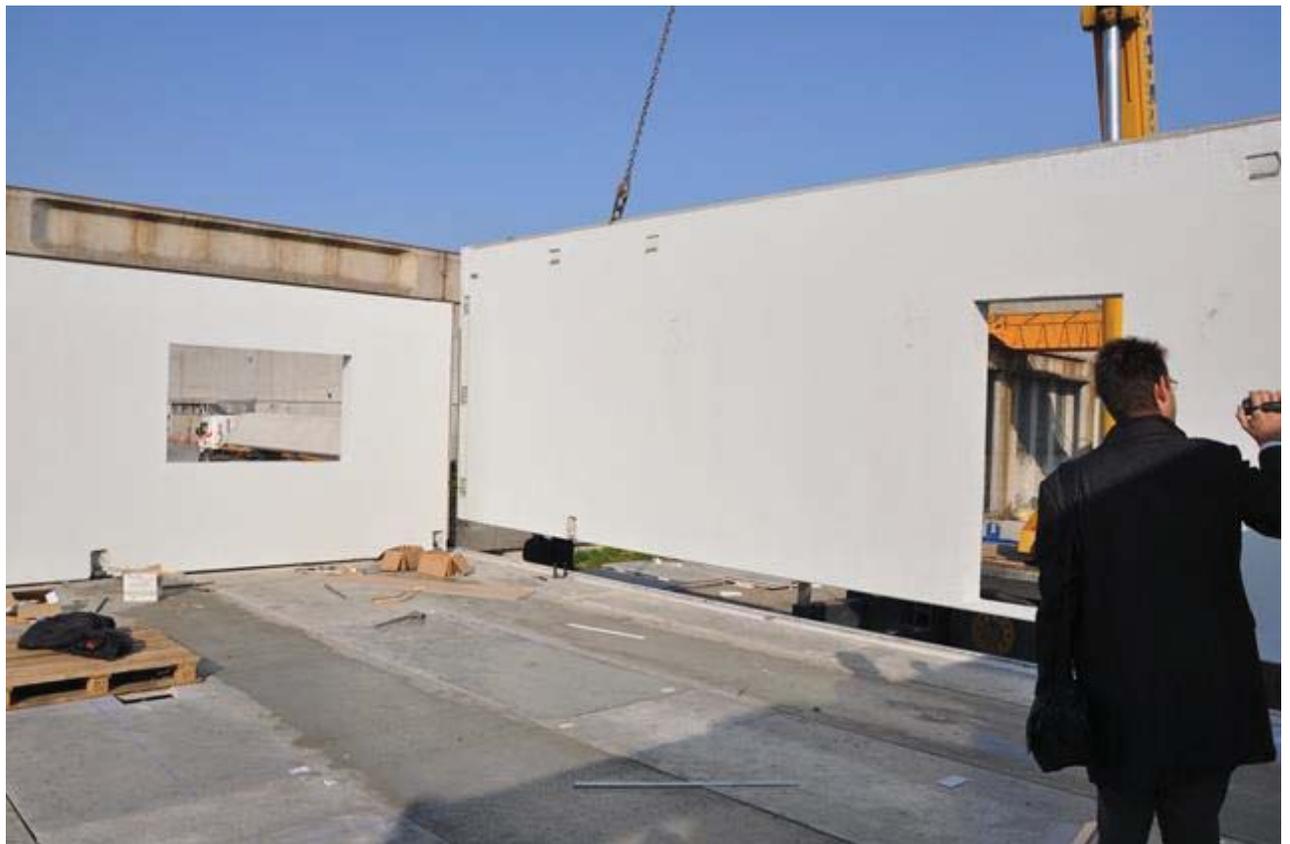
- The Master® walls support the slabs and can be combined to make bracing cores
- The walls are connected with mechanical connections
- The walls can be placed on the perimeter of the building
- The foundations are partially precast with cast-in-situ completion pouring of the lower portion

The bearing walls are made by entirely precast R.C. Master® elements with vertical lightning cavities. Each wall modulus has the height of one storey and length up to 12,60 m.

The Master® walls of the Domus Dry® series are produced in special high precision moulds with removable cores. The moduli are vertically juxtaposed and connected with the Kaptor® mechanical device and can be horizontally connected with rigid or dissipative connections to make bracing cores. The walls can also be arranged on the perimeter of the building, and in this case they are provided with an external suspended layer having the same insulation properties of that of the cladding panels.

Their foundations are made with inverted-T beams to be completed with cast-in-situ concrete pouring of the lower portion of the foundation. Precast piles may be included for deep foundations.







## Cladding panel

- Double screed panels with continuous thermal insulation
- A natural ventilation chamber can be left
- High energetic performances with low transmittance
- Multiple dry finishes techniques for different aesthetic solutions

The R.C. horizontal cladding panels are made with continuous thermal insulation placed in between the inner grid screed and the outer suspended screed.

In between the two concrete layers a natural ventilation chamber can be left.

The panels and their connections are energetically optimised so to get a total envelope transmittance  $U$  down to  $0,18 \text{ W/m}^2\text{K}$ .

Several finishes techniques can be mechanically applied to the outer surface of the panels, also in combination, among which:

- bush-hammering
- polishing
- washing
- matrix patterns







## COMPLEMENTARY ELEMENTS

Several precast elements for the completion of the construction are produced in the factory.

Also the structural and technical connections of these elements are engineered with dry technology in order to allow a quick assemblage.

These elements are:

- Also the complementary elements are made in the factory
- The structural and technical connections allow a dry assemblage

- stairs
- lift block
- bath block
- kitchen block
- plasterboard internal partitions
- vertical block for MEP equipment









## DOMUS DRY® + PANDAL®

- DOMUS DRY® + PANDAL® for coupled wall-frame structures
- It can be used to build:
  - malls
  - multifunctional centres
  - office buildings
  - schools
  - stations
  - hospitals
  - multilevel parking
  - etc.
- The column corbels and the beams are in the slab thickness
- The distribution systems can be placed into the ceiling between two distanced slabs

For all buildings where columns are required, for example with garages and pilotis, or buildings with special façades or large extension, the DOMUS DRY® system may be used in combination with the PANDAL® system to obtain a coupled wall-frame structure.

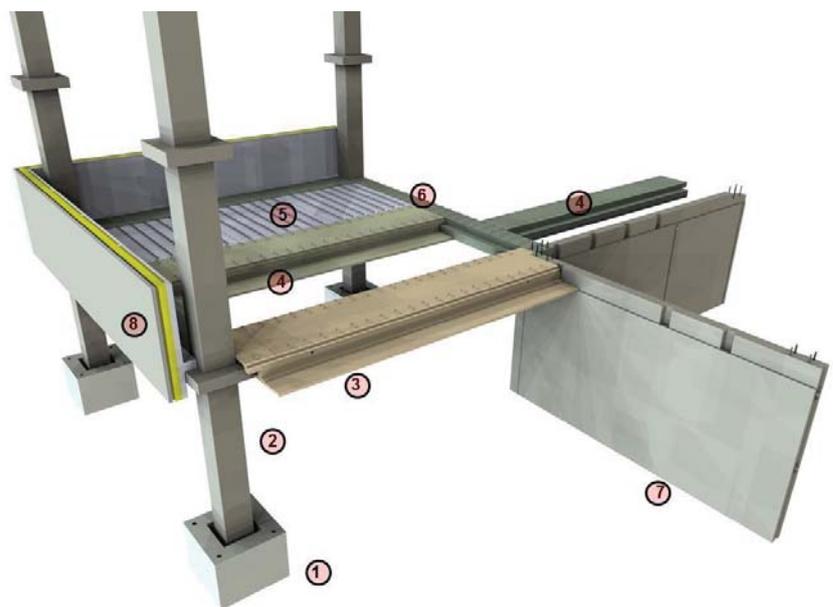
This system, in addition to allowing particular solutions in the residential field, may be used for the construction of commercial/multifunctional centres, office buildings, schools, stations, hospitals, car parks, etc.

The parts external from the wall cores are made with columns with corbels in the thickness of the slab at each storey and precast foundations.

The beams can be placed in both the main directions of the building to support the DOMUS® slabs which can also be spaced with interposed bottom ceiling for the MEP equipment distribution.

### LEGEND

- 1) Foundation footing
- 2) Column
- 3) Tragolo
- 4) Domus/Pandal slab
- 5) Ribbed or trussed plates
- 6) Hollow-core or inverted-T beam
- 7) Master wall
- 8) Horizontal cladding panel







## Experimentation

- The DOMUS DRY® + PANDAL® system has been chosen as innovative structure within the Safecast European research project

- The largest precast structure ever built for scientific purposes has been subjected to a seismic experimental campaign at the ELSA/JRC laboratory

- Interviews and more information on:

In addition to the testing of individual components, the mixed DOMUS DRY® + PANDAL® system was selected as an innovative structure in the frame of the Safecast research project funded by the European Commission.

A full-scale precast prototype of a multi-storey building assembled with this system and tested in the DOMUS DRY® + PANDAL®, standard PANDAL® and PANDAL® with adaptable restraint versions has been subjected to a seismic experimental campaign at the ELSA laboratory of the Joint Research Centre of Ispra (VA).

It is the largest precast structure ever built for scientific purposes.

Watch the video interviews and find out more about the Safecast research project and its results:

<http://elsa.jrc.ec.europa.eu/showproject.php?id=21>






**OUR REFERENCES**


DOMUS and DOMUS + PANDAL buildings

Residential complex for students	Civitanova Marche (MC)
Parma's trade fair	Parma (PR)
"La Martinella" mall	Langhirano (PR)
Residential complex	Langhirano (PR)
Multi-storey structure for seismic testing	Ispra (VA) - demolita
Prototype for study of finishes and MEP equipment	Fiorenzuola d'Arda (PC) - demolito
Prototype for the optimisation of assemblage timing	Treviso (TV)

**more details? design quotations?**

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