**SPECIFICATIONS FOR REINFORCED CONCRETE VOIDED SLAB LIGHTEN WITH U-BOOT BETON® FORMWORK OF THE COMPANY DALIFORM GROUP S.R.L.**

Supply of lightening formwork **U-Boot Beton®** and its accessories, for the execution of a reinforced concrete slab, with a bidirectional capacity, to be casted on suitable horizontal formwork (or on a prefabricated slab).

Total slab thickness is xx cm lightened in compliance with the design, with recycled plastic elements such as **U-Boot Beton**® of the Daliform Group Company, truncated-pyramid in shape with a crossed semi-cylindrical notch at the top to put reinforcement bars or installations to be integrated in the casting. **U-Boot Beton**® has got plan dimensions equal to 52 x 52 cm and height equal to H = xx cm, with the four semi-circular notched corners at the base of which the conic elevator foot is created, in integral way, facing down, with a height equal to H = xx cm, basing on the scaffolding to form the thickness of the intrados suitably reinforced with bidirectional mesh of reinforcing bars in steel type B450C, with diameter and spacing adapted to the design stresses.

The supply includes positioning of the **U-Boot Beton**® modules with rigid spacer joints to form a link and thus create the perpendicular ribs between the formworks according to the predefined thickness and ensure the perfect geometry and bearing capacity upon casting, to be placed at the top of them inside the notches.

The supply and casting of the concrete (minimum resistance class equivalent to C25/30, consistency class Slump S4 or S5 and diameter of the aggregates such to avoid “segregation” phenomena) is also included. The lower slab must be made, in a first phase, by casting the concrete and vibrating it until it covers the entire **U-Boot Beton**® feet (max 4 cm above them in case of *Double* type lightening). In a second phase, the completion casting will continue as soon as the first layer has lost fluidity (in this second phase a class of concrete consistency other than the previous one is allowed).

The **U-Boot Beton**® modules, produced in **ALAPLEN® CV30**, must be safe to walk on and certified with a resistance characteristic of 150 kg in the weakest point on an 8 x 8 cm footprint; they must not release any polluting substances and must have a *Certificate of Compliance with the environmental compatibility criteria (CCA)* and be produced by a company using an Integrated Management System (ISO 9001, ISO 14001, ISO 45001, SA 8000).

The final design of the voided slabs must have graphs and calculations provided by the Company supplying the **U-Boot Beton**®, which must exhibit the product certificate approved by an EOTA member Body (*European Organisation for Technical Approvals*).

The Manufacturer must provide: the Technical and Safety Data Sheet of the product and as well as that of the granule used **ALAPLEN® CV30**; a Certificate of acoustic behaviour that shows the raw minimum value of the sound insulation of the bare floor (*Rw*) equal to 56 dB, and a value of the noise level of footing of the bare floor (*Ln,w*) maximum of 82 dB verified on a lightened slab type of thickness equal to 26 cm (5 + 16 + 5), issued by certified Third Parties.

With reference to fire regulations, the Manufacturer must provide fire behaviour test, issued by an accredited Body, which demonstrates for a voided slab of 25 cm thickness (5 + 16 + 4) a fire resistance REI 180 with a design moment of at least 4880 daNm and minimum concrete cover of 3 cm, and which also demonstrates that the behaviour of the **U-Boot Beton**® feet is similar to that of overpressure relief valves, and therefore it is not necessary to provide suitable vents for overpressure (as, on the contrary, it is necessary for lightening in polystyrene or similar materials). Moreover the Manufacturer will have to provide a detailed study, conducted by an EOTA member accredited Body, of the fire behaviour of a lightened slab with elements in recycled plastic, executed on scaled samples from which the isothermal temperature propagation curves inside the slab can be deduced.

In addition, the manufacturer shall provide, on request, appropriate certifications relating experimental test that proving the bi-directional resistant mechanism of the system, namely its actual behaviour as a slab, and appropriate certifications relating to tests of slab-column node, in order to provide the system's ability to perform, in a seismic zone, its secondary system function supported to a primary system of ductile bracings.

The cost for the creation of holes with the dimensions and sections foreseen by the architectural drawings is also included, the price also includes and covers all costs for providing the finished work in a workmanlike manner; it does not include the supply and positioning of the horizontal formwork that supports the slab and accessories, the steel reinforcements, which will be entered separately.

Cost Euro/m2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SPECIFICATIONS FOR REINFORCED CONCRETE VOIDED SLAB LIGHTEN WITH U-BOOT BETON® CONE FORMWORK OF THE COMPANY DALIFORM GROUP S.R.L.**

Supply of lightening formwork **U-Boot Beton® Cone** and its accessories, for the execution of a reinforced concrete slab, with a bidirectional capacity, to be casted on suitable horizontal formwork (or on a prefabricated slab).

Total slab thickness is xx cm lightened in compliance with the design, with recycled plastic elements such as **U-Boot Beton**® **Cone** of the Daliform Group Company, truncated-pyramid in shape with a crossed semi-cylindrical notch at the top to put reinforcement bars or installations to be integrated in the casting. **U-Boot Beton**® **Cone** has got plan dimensions equal to 52 x 52 cm and height equal to H = xx cm, it is provided with a central cone to facilitate the execution operations. In fact, it allows: a visual check of the completion of the lower slab; a better yield of the exterior finishing of the intradox; the decrease of the lifting force during casting; a greater resistance to walkability; the air vent. **U-Boot Beton**® **Cone** is provided with the four semi-circular notched corners at the base of which the conic elevator foot is created, in integral way, facing down, with a height equal to H = xx cm, basing on the scaffolding to form the thickness of the intrados suitably reinforced with bidirectional mesh of reinforcing bars in steel type B450C, with diameter and spacing adapted to the design stresses.

The supply includes positioning of the **U-Boot Beton**® **Cone** modules with rigid spacer joints to form a link and thus create the perpendicular ribs between the formworks according to the predefined thickness and ensure the perfect geometry and bearing capacity upon casting, to be placed at the top of them inside the notches.

The supply and casting of the concrete (minimum resistance class equivalent to C25/30, consistency class Slump S4 or S5 and diameter of the aggregates such to avoid “segregation” phenomena) is also included. The lower slab must be made, in a first phase, by casting the concrete and vibrating it until it covers the entire **U-Boot Beton**® **Cone** feet (max 4 cm above them in case of *Double* type lightening). In a second phase, the completion casting will continue as soon as the first layer has lost fluidity (in this second phase a class of concrete consistency other than the previous one is allowed).

The **U-Boot Beton**® **Cone** modules, produced in **ALAPLEN® CV30**, must be safe to walk on and certified with a resistance characteristic of 150 kg in the weakest point on an 8 x 8 cm footprint; they must not release any polluting substances and must have a *Certificate of Compliance with the environmental compatibility criteria (CCA)* and be produced by a company using an Integrated Management System (ISO 9001, ISO 14001, ISO 45001, SA 8000).

The final design of the voided slabs must have graphs and calculations provided by the Company supplying the **U-Boot Beton**® **Cone**, which must exhibit the product certificate approved by an EOTA member Body (*European Organisation for Technical Approvals*).

The Manufacturer must provide: the Technical and Safety Data Sheet of the product and as well as that of the granule used **ALAPLEN® CV30**; a Certificate of acoustic behaviour that shows the raw minimum value of the sound insulation of the bare floor (*Rw*) equal to 56 dB, and a value of the noise level of footing of the bare floor (*Ln,w*) maximum of 82 dB verified on a lightened slab type of thickness equal to 26 cm (5 + 16 + 5), issued by certified Third Parties.

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