Denia solutions

NEW

NAUTILUS

Advanced forming system for voided biaxial slabs

casseforme
formwork

NEW NAUTILUS®

NEW NAUTILUS® is a modular lost form in recycled polypropylene (PP*) developed for llightweight voided reinforced concrete slabs.
Concieved and developed by **Geoplast S.p.A.,** the system is manufactured using the most modern injection molding technology in the company's plants and following rigorous quality standards.

The **NEW NAUTILUS®** caissons are incorporated into the concrete, creating voids within a regular grid of orthogonal beams between two slabs, obtained with a single concrete pour. This technique allows a flat-soffit slab over large spans capable of bearing high loads.
Structural elements such as drops and beams can be included within the slab thickness, creating a vast flat surface with the greatest flexibilty of use. Thanks to the high inertia of the structure, this technology makes it possible to design large buildings cost-effectively.

The **NEW NAUTILUS®**, system, made of recycled material, is simple to lay and fast to move in the jobsite and contributes to the overall sustainibility of the building.

(*) Coefficient of thermal expansion 0.15 mm/m/°C - Flexural modulus 1100 N/mm² - Tensile strength 35 N/mm²

AXONOMETRIC VIEW OF NEW NAUTILUS® SINGLE

AXONOMETRIC VIEW OF NEW NAUTILUS® DOUBLE

NEW NAUTILUS® ADVANTAGES

BIAXIAL STRUCTURE
Transforms a full concrete slab in a mesh of orthogonal beams

LOW WEIGHT
Weight reduction up to 40%
Reduction of deformations
Foundation load reduction
Reduction of column width

FLEXIBILITY
Spans up to 20 m
No beams between columns
Fewer columns

EARTHQUAKE RESISTANT
Lower seismic mass
High rigidity thanks to the double concrete slab

GREAT SPANS
Open surfaces
No beams or drops interrupt the soffit
Ideal for new buildings as well as renovations
Gives the architects high flexibility in design

COST EFFECTIVENESS
Open surfaces
No beams or drops interrupt the soffit
Ideal new buildings as well as refurbishments
Gives the architect high flexibility in design

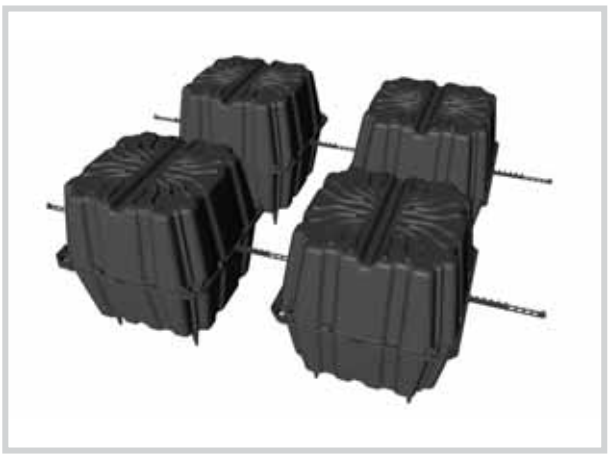
FIELDS OF APPLICATION

NEW NAUTILUS® can be used in various applications:

- RESIDENTIAL BUILDINGS
- COMMERCIAL AND INDUSTRIAL BUILDINGS
- MULTI-STOREY CAR PARKS
- PUBLIC BUILDINGS (schools, universities, hospitals, large halls)

NEW NAUTILUS® CHARACTERISTICS

- **NEW NAUTILUS® does not have a laying direction:** the caissons are simply placed on the forming surface, the correct distance between them given by the integrated tear-off spacer strips.
- **NEW NAUTILUS® is fully treadable:** once in place, jobsite workers can safely walk on its surface.
- **Solid part coupling:** the male-female coupling of the **NEW NAUTILUS® DOUBLE** caissons ensures a reliable behaviour during the concrete pour.
- **NEW NAUTILUS®** is manufactured with advanced injection technologies that solve the issue of gas inclusions in the material, ensuring reliable mechanical properties of the elements and of the spacer feet.
- **The integrated spacers are uniformly distributed** over the top surface of the caissons, ensuring the proper steel-concrete bond.



TECHNICAL SPECIFICATIONS and CUSTOMER SERVICE

The Engineering Dept. of Geoplast is available for technical information from the preliminary design stage up to the installation of the product.
For assistance please contact us at: phone +39 049 9490289 - fax +39 049 9494028 - email: ufficiotecnico@geoplast.it

NEW NAUTILUS® INSTALLATION

Once the deck formwork is erected and the lower armature placed, the site is ready for the installation of **NEW NAUTILUS®**. The universal geometry of the forms, which don't require any laying direction, makes installation simple and fast.
Correct form allignment and concrete cover are guaranteed by the conical feet integrated in the caissons, while the correct spacing bewteen the forms is ensured by the tear-off spacer strips. The fast coupling features on the lower edge of the forms make assembly of caissons taller than 24 cm (h32, h36, h40, h44, h48) very easy and reliable.

Before the pour the steel armature will be placed completely, including the welded mesh in the top slab.
The pour should be performed in two stages: a first layer of concrete must cover the conical feet and the outer edge of the forms, and rest until it starts to set; the second stage will complete the pour of the slab.

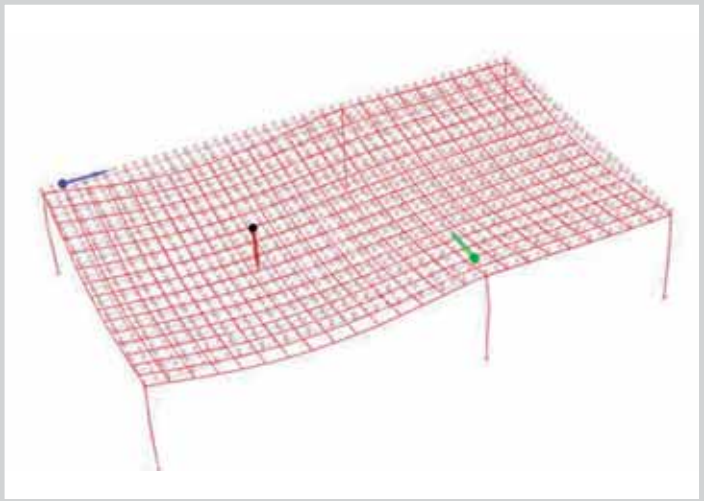
NEW NAUTILUS® is compatible with all slab formwork systems, from the traditional methods to the most recent advanced dismantling tecnology.

BUILDING SPECIFICATION

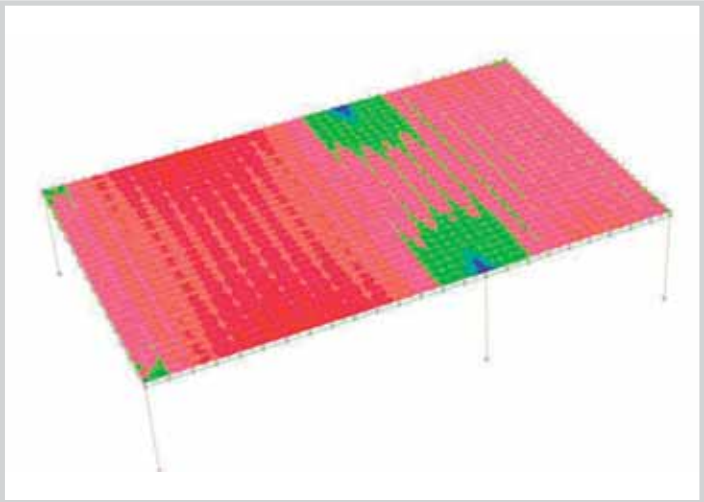
Furnishing of lost elements in recycled plastic type **NEW NAUTILUS®**, in the shape of a truncated pyramid, plane size 52 x 52 cm, with integrated conical feet, spacer strips, wire mesh spacers and side connectors for the coupling of elements; the product creates cavities within a monolithic reinforced concrete slab. The elements are laid on a prepared decking formwork surface and connected to each other with the integrated spacer strips; the element heights are 16, 20, 24, 32, 36, 40, 44, 48 cm with feet of height 0, 5, 6, 7, 8, 9, 10 cm.

NEW NAUTILUS® FEM CALCULATION SCHEME OF A SLAB

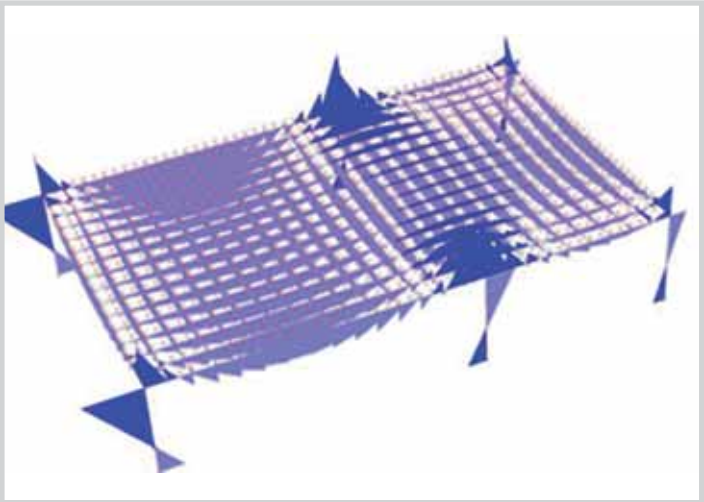
Scheme 1) - Undeformed structure



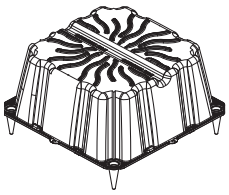
Scheme 2) - Deformation of the ribs



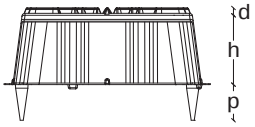
Scheme 3) - Flexural moment Mx of the upper slab



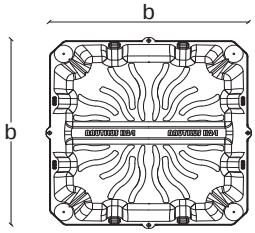
Scheme 4) - Flexural moment Mz of the structural ribs



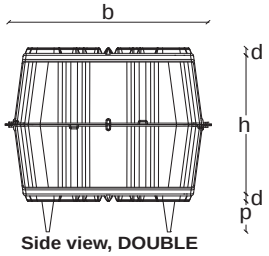
Axonometry



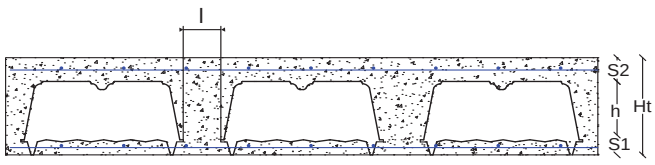
Side view, SINGLE



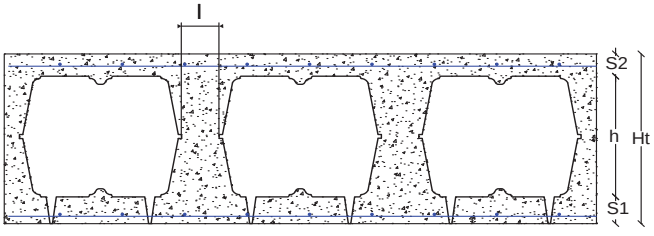
Plane view New Nautilus®



Side view, DOUBLE



Cross-section, SINGLE



Cross-section, DOUBLE

NEW NAUTILUS® GEOMETRY

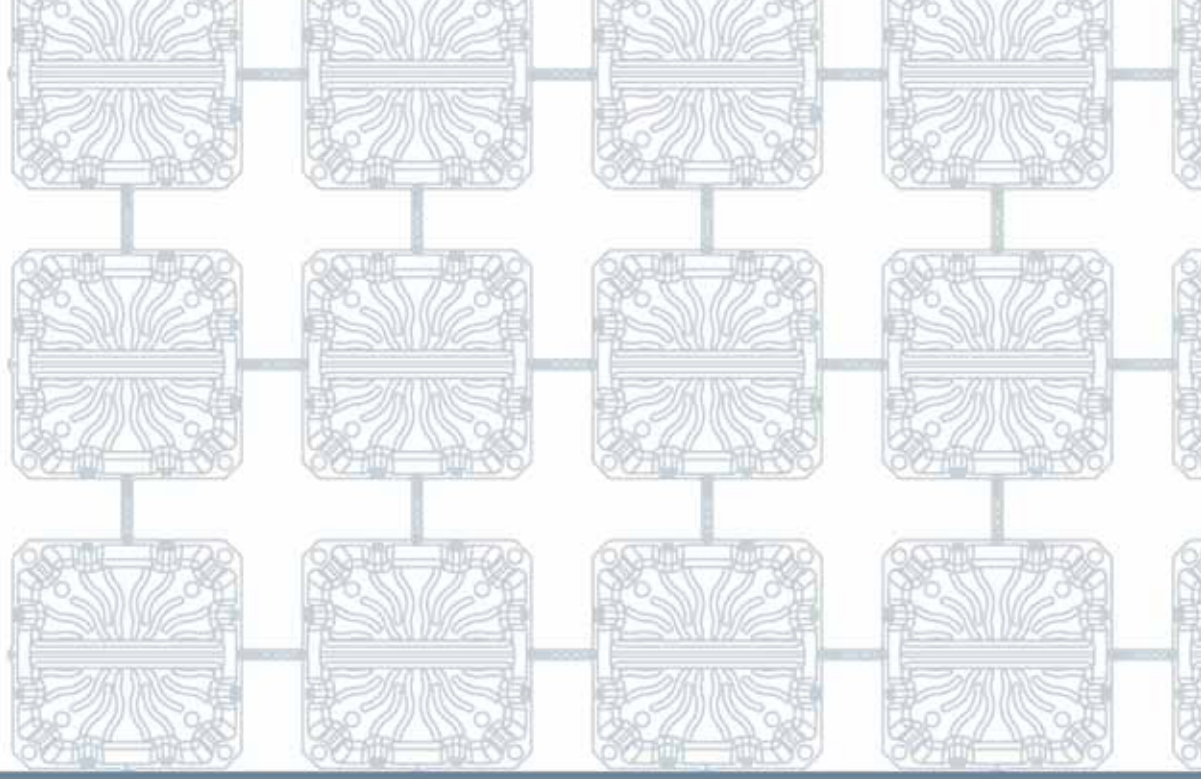
Form	Base b (cm)	Height h (cm)	Feet p (cm)	Spacers d (cm)	Rib width l (cm)	Ribs on-centres (cm)	No. pc./m²	Consumption (ribbing) m³/m²	Concrete saved	
									m³/pc.	m³/m²
H16 single	52 x 52	16	0-5-6-7-8-9-10	0.8	12	64	2.44	0.079	0.033	0.081
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.084	0.033	0.076
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.089	0.033	0.071
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.093	0.033	0.067
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.096	0.033	0.064
H20 single	52 x 52	20	0-5-6-7-8-9-10	0.8	12	64	2.44	0.102	0.040	0.098
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.108	0.040	0.092
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.114	0.040	0.087
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.118	0.040	0.082
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.123	0.040	0.077
H24 single	52 x 52	24	0-5-6-7-8-9-10	0.8	12	64	2.44	0.125	0.047	0.115
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.132	0.047	0.108
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.138	0.047	0.102
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.144	0.047	0.095
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.149	0.047	0.091
H32 double	52 x 52	32	0-5-6-7-8-9-10	0.8	12	64	2.44	0.159	0.066	0.161
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.168	0.066	0.152
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.177	0.066	0.143
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.185	0.066	0.135
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.193	0.066	0.127
H36 double	52 x 52	36	0-5-6-7-8-9-10	0.8	12	64	2.44	0.182	0.073	0.178
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.192	0.073	0.168
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.202	0.073	0.158
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.211	0.073	0.149
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.219	0.073	0.141
H40 double	52 x 52	40	0-5-6-7-8-9-10	0.8	12	64	2.44	0.205	0.080	0.195
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.216	0.080	0.184
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.227	0.080	0.173
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.237	0.080	0.163
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.246	0.080	0.154
H44 double	52 x 52	44	0-5-6-7-8-9-10	0.8	12	64	2.44	0.228	0.087	0.212
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.240	0.087	0.200
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.252	0.087	0.188
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.263	0.087	0.177
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.272	0.087	0.168
H48 double	52 x 52	48	0-5-6-7-8-9-10	0.8	12	64	2.44	0.251	0.094	0.229
			0-5-6-7-8-9-10	0.8	14	66	2.30	0.264	0.094	0.216
			0-5-6-7-8-9-10	0.8	16	68	2.16	0.277	0.094	0.203
			0-5-6-7-8-9-10	0.8	18	70	2.04	0.288	0.094	0.192
			0-5-6-7-8-9-10	0.8	20	72	1.93	0.299	0.094	0.181

Disclaimer: the values shown in this brochure are for guidance only. They are not meant to be used for design criteria.
Their use and reliance thereon for any purpose by anyone is entirely voluntary and at the sole risk of the user. GEOPLAST is not responsible for any loss, claim, or damage resulting from their use.

NEW NAUTILUS® slab chart - Ribbing width 12 cm

Column on-centres (m)	Slab thickness Ht (cm)	Slab thickness S1 (cm)	NEW NAUTILUS height h (cm)	Upper slab thickness S2 (cm)	Total concrete consumption m³/m²	Slab self weight kg/m²	Inertia of voided section J c⁴/m	Self weight of equivalent full slab J kg/m²	As (typical) cm²	As (supplementary reinf.) cm²
5	25	5	16	4	0.169	423	105330.3	583	1.41	2.54
7	31	10	16	5	0.229	573	214030.5	737	2.51	4.78
9	40	10	24	6	0.285	712.5	441142.4	937,5	4.05	7.13
11	45	7	32	6	0.289	722.5	467502.2	957	6.53	10.56
12	49	10	32	7	0.329	822.5	604042.1	1042.3	7.6	11.94
14	55	10	36	9	0.372	930	675130.3	1081.7	10.21	16.49
15	58	10	36	12	0.402	1005	777528.2	1133.9	11.53	19.63

The loads considered for the preliminary calculation are the self weight of the voided slab and at total overload of 300 kg /m²



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