NIDA CORE
STRUCTURAL HONEYCOMB MATERIALS

Product Data Sheet

NIDA FUSION STO

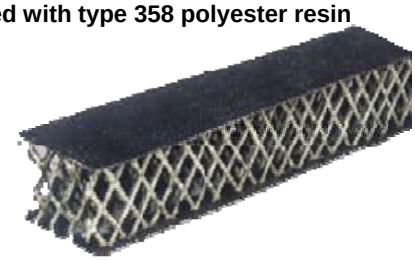
CLOSED MOLDING CORE

Composed of a layer of polyurethane (PU) or phenolic foam covered with a reinforcing fiber layer on each side, the core's three elements are "stitched" together by glass fiber bridging strands, which pass through them obliquely, and form triangulations in the mechanical sense. Typical reinforcing materials used are woven or non woven glass, carbon or aramid fiber fabrics, although additional reinforcements are available in the marketplace. NidaFusion STO cores allow for rapid infusion of resin without the use of resin transfer media at a very affordable cost. Designed for infusion, RTM and closed-matched die molding, this new product is set to revolutionize the closed molding process. Compared to unstitched sandwich panels, stitched panels exhibit significantly increased stiffness and ultimate stress under bending, as well as much greater resistance to core shear and flat-wise compression. The percentage of gain depends on the structural parameters (angle and step stitches) of the stitched sandwiches. Thus, for the high stitch density (step of 12.5 mm), performance improvements can reach 250 percent for bending rigidity and 1,000 percent for shear failure stress.

step	20mm	0,8 inches	40mm	1,6 inches
Flexural strength (ISO 14125)	35 Mpa	5076 psi	18 Mpa	2611 psi
Flexural modulus	5000 Mpa	725 189 psi	3500 Mpa	507 632 psi
Shear strength (ASTM 273)	1,4 Mpa	2030 psi	0,75 Mpa	109 psi
Shear modulus	20 Mpa	2900 psi	15 Mpa	2175
Compressive strength (ASTM 365-03)	2,5 Mpa	3626 psi	1,4 Mpa	203 psi
Compressive modulus	120 Mpa	17 405	70 Mpa	10 153 psi

20 mm thick complexes, 2400 Tex triangulations, skins Woven roving 440 gsm 2 layers, Impregnated with type 358 polyester resin

On the other hand, this increase leads to increased mass and, consequently, a loss of specific properties. A compromise must be found. A similar compromise also should be found in relation to the effect of the stitch angle on the mechanical properties. For example, 45° angles offer the best performance in terms of bending and shear behavior, but the 60° angle presents the best properties with respect to compression behavior. Concerning the impact and the compression after impact, it appears that step stitching is the principal factor providing the best overall performance. The choice of structural parameters will depend on the specification of the structure.



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