

# GREENFLEX

*INNOVATIVE, RELIABLE, PATENTED*

**FLEXCOMP**



**GREENFLEX IS AN INNOVATIVE AND INTERNATIONALLY PATENT CONNECTION SYSTEM THAT ENHANCE THE GLOBAL PERFORMANCE OF PRECAST INSULATED SANDWICH PANELS.**

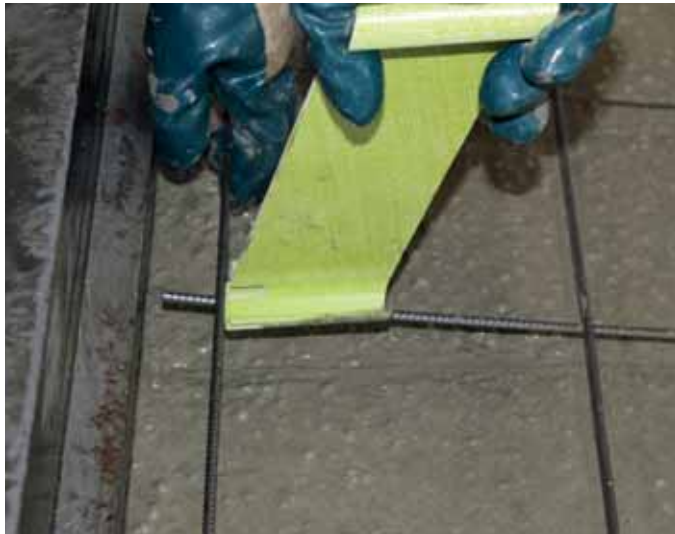
This new system enables:

- to achieve demanding precast wall panel U-Values or R-Values (\*) thanks to the composition of the insert and to the construction technology.
- to target specific U-Values that means save significant money thanks to an optimized design of the panel allowed by our specific Flexware software.

(\*) U-values or R-values are the coefficients of heat transmission or thermal transmittance.

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## A COMPLETE “THERMAL PERFORMANCE” SOLUTION COMPOSED BY:

### ➤ Innovative **GREENFLEX** inserts

- *Easy-to-place*
- *Ensuring even distribution of charges*
- *Ensuring thermal expansion*
- *Preventing thermal energy loss (thermal bridges)*
- *Available in a full range of sizes*



### ➤ Innovative software **FLEXWARE**

designed to achieve the expected thermal properties according to the quality of the insulating material used.

It enables to reach the best cost/thermal performance compromise and assists engineers in panel reinforcement designs along with insert positioning.



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### MAIN FEATURES AND BENEFITS:

- A cost-effective solution that improves productivity for precast manufacturers and reduced cost production.
- During the production **GREENFLEX** allows to organize the different time steps without any problem of concrete hardening.
- Elimination of any reduction of the performances of the insulation material typical of metal connectors.
- Optimized thermal performance eliminating all the thermal bridges thanks to new generation of synthetic inserts.
- **GREENFLEX** must be fixed to the steel mesh. This assure the maximal connection inside the external facing panel and avoid any kind of connection pulling out. The standard installation makes the panels COMPOSITE in the transversal direction and NON composite in the longitudinal ones. Other solution are available for a COMPOSITE application in every direction.

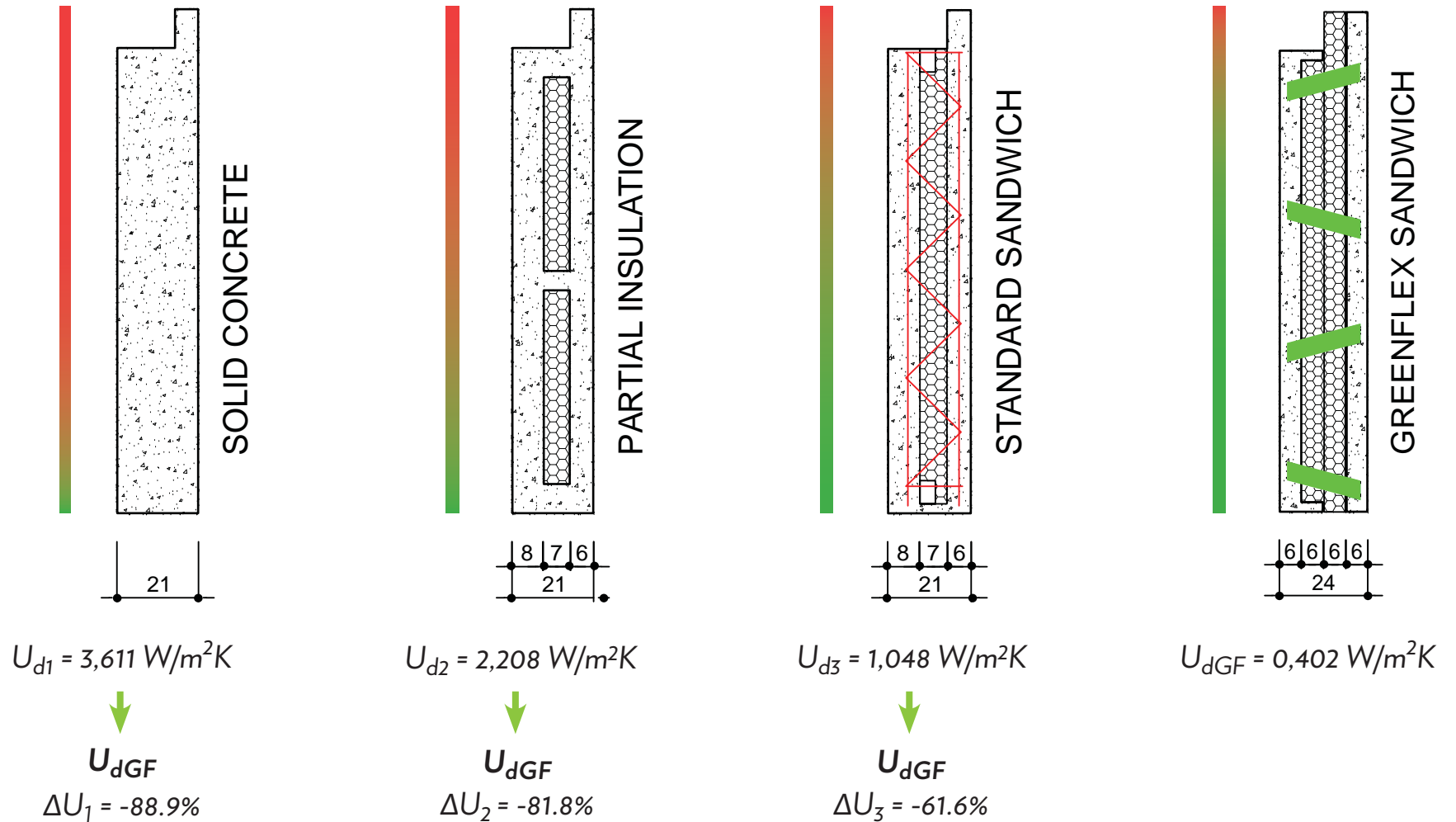
## AND SOME ADDITIONAL FEATURES:

- A flexible system that allows to manufacture a panel that reaches the thermal performance required thanks to **FLEXWARE** software.
- A very easy-to-use system that requires a little more of one insert of **GREENFLEX** each square meter of panel, placed according to the **FLEXWARE** software prescriptions to optimize the inserts' position.
- **GREENFLEX** is strong enough to endure the handling and erection stresses that exist during the manufacture and installation of the panels.
- During the life time of the panel, **GREENFLEX** supports tension and various stresses, and flexes along the direction of the maximal thermal stresses for an infinite number of cycles.

## SHORT COMPARISON WITH OTHER TECHNOLOGIES

MATERIALS OF DIFFERENT TECHNOLOGIES	GREENFLEX PERFORMANCES
<p><b>Old fashioned metallic solutions like:</b></p> <ul style="list-style-type: none"><li>• anchor</li><li>• wires</li><li>• ties</li><li>• pins</li><li>• metallic truss</li></ul>	<ul style="list-style-type: none"><li>✓ No thermal transmission</li><li>✓ Easy to design</li><li>✓ Less elements involved in the production</li><li>✓ Easiness of installation</li><li>✓ Time reduction</li><li>✓ Duration</li></ul>
<p><b>Non metallic solutions like:</b> Polyester, fiberglass and resins solutions</p>	<ul style="list-style-type: none"><li>✓ Less connectors to be needed</li><li>✓ Easiness of installation</li><li>✓ Assurance of right positioning</li><li>✓ Strength of anchorage</li><li>✓ Less use of concrete with lightened panels</li></ul>

## GREENFLEX COMPARED WITH OTHERS PANELS (SIZE IN CENTIMETRES)

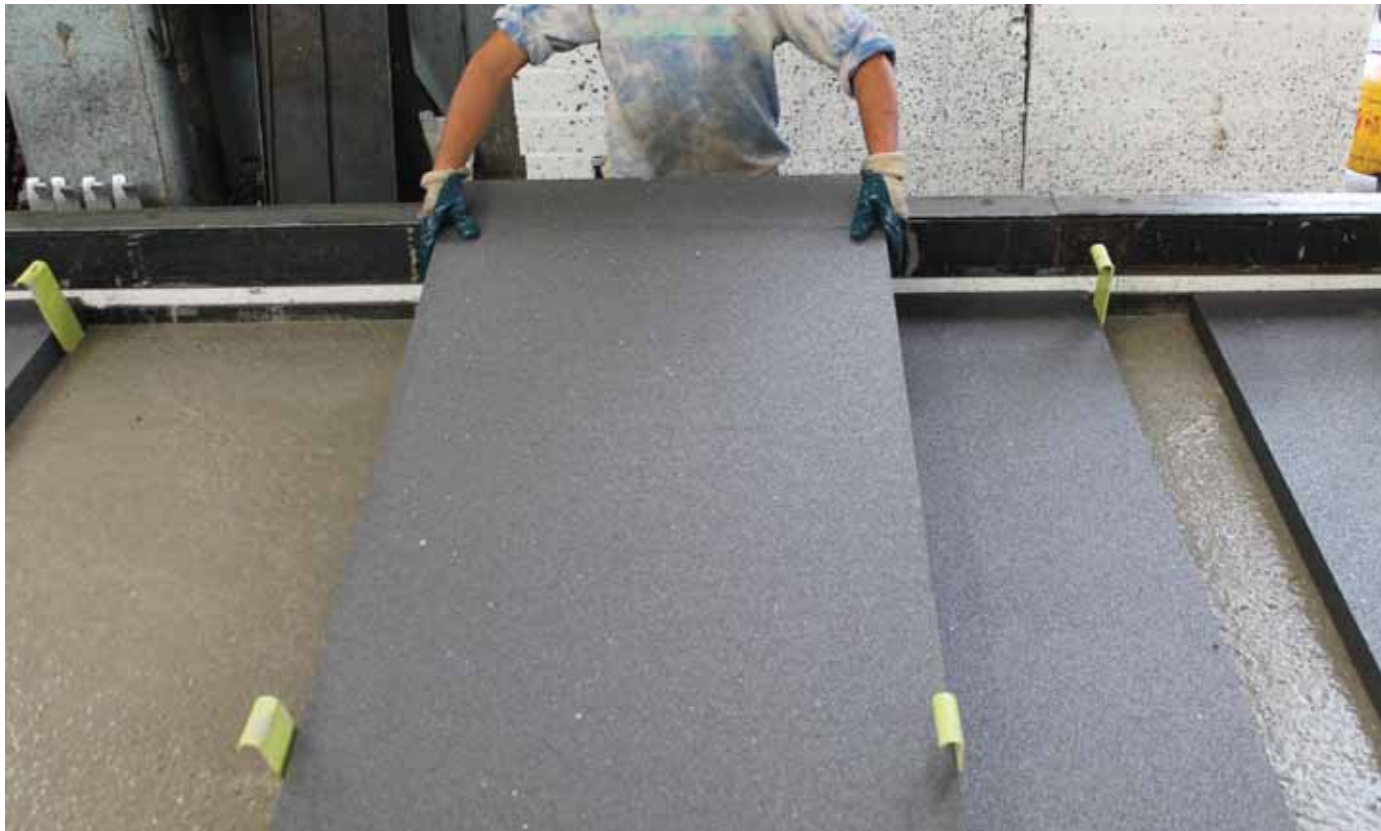


## MANUFACTURING (STEP 1/5): PLACING GREENFLEX AND PARTLY COVERING PIECES WITH CONCRETE

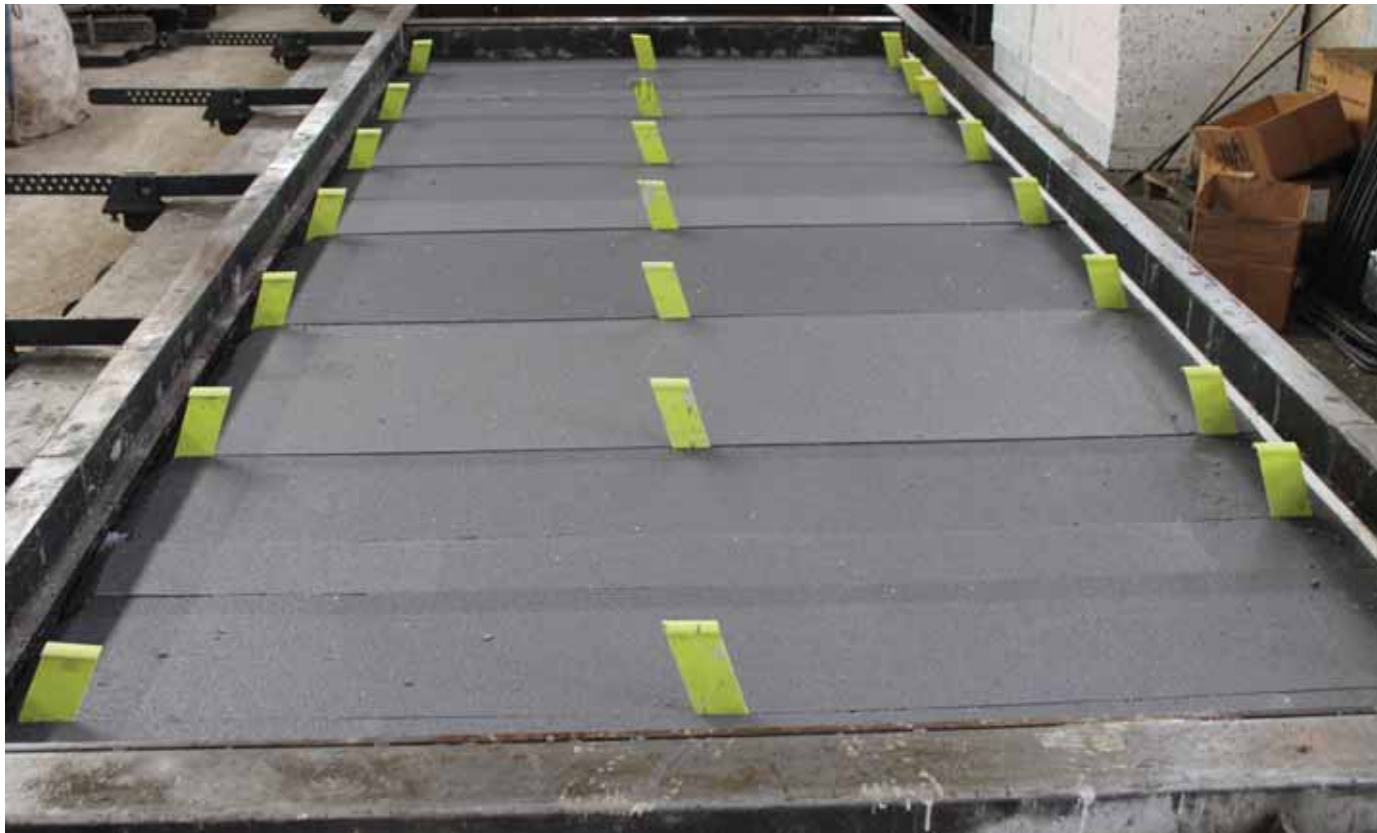




## MANUFACTURING (STEP 2/5): PLACING INSULATION



## MANUFACTURING (STEP 3/5): REFINING INSULATION



**MANUFACTURING (STEP 4/5):  
ADDING LIGHTENING, STEEL STRUCTURE AND FINAL STEEL MESH.**



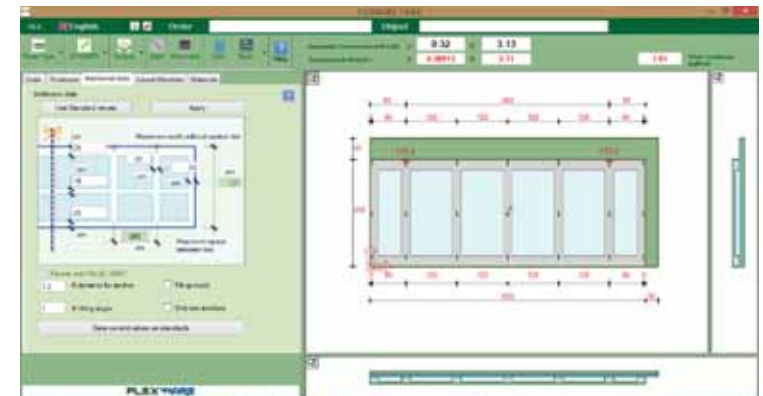
## MANUFACTURING (STEP 5/5): POURING THE CONCRETE OF BEARING LAYER





## FOCUS ON FLEXWARE WHAT MAKES IT AN INNOVATIVE SOFTWARE?

- The software takes into account different parameters such as:
  - *Size and spacing of the steel mesh;*
  - *Thermal efficiency of the insulation;*
  - *Thickness of the insulation;*
  - *Thickness of the concrete;*
  - *Openings of the panels.*
- Consequently, it allows a perfect optimization for:
  - *Panel properties;*
  - *Structural/mechanical performance;*
  - *Thermal insulation performance;*
  - *Cost reduction.*



## PRODUCTION TESTING AND CERTIFICATES

**GREENFLEX** is “pull through” in a production line that produce long bars of Glass Fiber Reinforce Polymer (GFRP) using multi axial reinforced made in glass fibers. To complete the production process the bars are sized according technical specifications.



## TECHNICAL DATA

CHARACTERISTICS	TEST METHOD	AXIS	MAX LOAD [ MPa ]	MODULUS [ GPa ]
Tensile strength and modulus at 23°C	EN ISO 527-4	1	127	6.2
		2	380	11.6
Tensile strength and modulus at 80°C	EN ISO 527-4	1	116	5.6
		2	297	8.5
Compression strenght at 23°C	EN ISO 14126	1	97	-
		2	175	-
Compression strenght at 80°C	EN ISO 14126	1	64	-
		2	75	-

CHARACTERISTICS	TEST METHOD	INSULATION THICKNESS	MAX LOAD [ kN ]	DISPLACEMENT MAX [ mm ]
Shear test on Greenflex 200/70	Shear with Metallic Clamps	50 mm	10.6	7
		65 mm	9.3	6
		80 mm	7.6	7



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For any kind of additional information about Greenflex, please refer to:

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