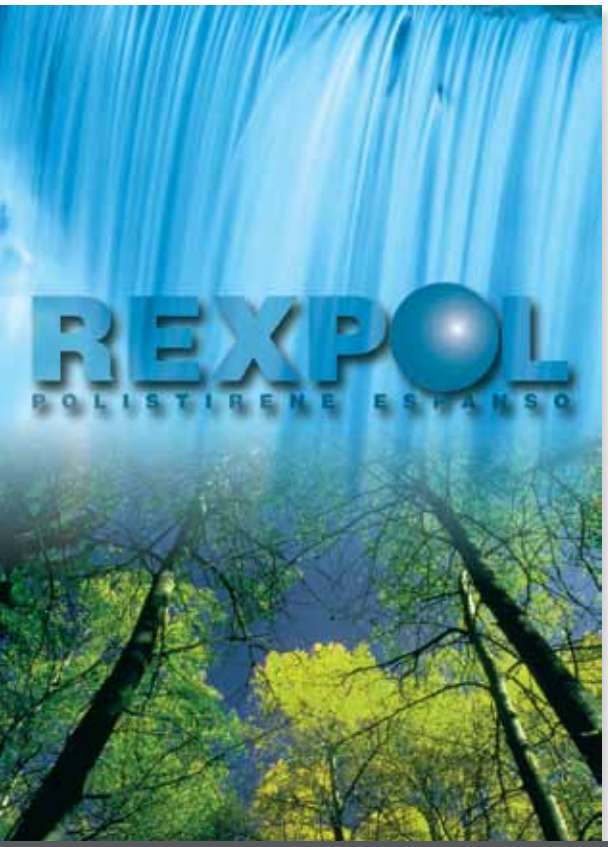


CASSERI PER MURATURE IN CALCESTRUZZO

ICF
REXwall

ICF REXwall Formworks for earthquake-resistant mason

In the building technologies scene we are witnessing **the technological development of increasingly sophisticated systems** that allow to achieve ambitious results in terms of structure, performance and costs.

These new systems have made advantageous innovations to building technologies, even to those of older origin.

This is the case of **structures of partition walls** that are ever more appreciated in the building industry especially in relation to the high resistance to different stresses, in particular those of seismic origin, given by the monolithic reinforced concrete walls.

The key of this renewed interest can be identified in the development of "permanent formworks" made of insulating material for the construction of structural elements combining the mechanical performances of the concrete partition wall with the lightness and high insulating properties of the material used to make the permanent formwork.

The technique of using structures of partition walls comes from the rationalization of the concept of "formwork" that becomes multifunctional element. **In this way you can create structures characterized by thermal insulation, thermal inertia, acoustic insulation, fire protection and mechanical resistance, and therefore able to ensure living comfort, energy saving, building and site management costs saving.**

The ease of assembly, the lightness of materials and the abatement of downtime during the phases of concrete curing in the formworks lead to the optimization of labour and therefore the cut in costs compared to traditional solutions.

The primary advantages resulting from the system are:
- **To create safe, reliable and well-performing buildings.**
- **To complete the works in short time.**
- **To cut the costs.**
- **To increase the quality of buildings and living comfort.**

The system is based on modular elements connected by easy and fast dry-procedure.

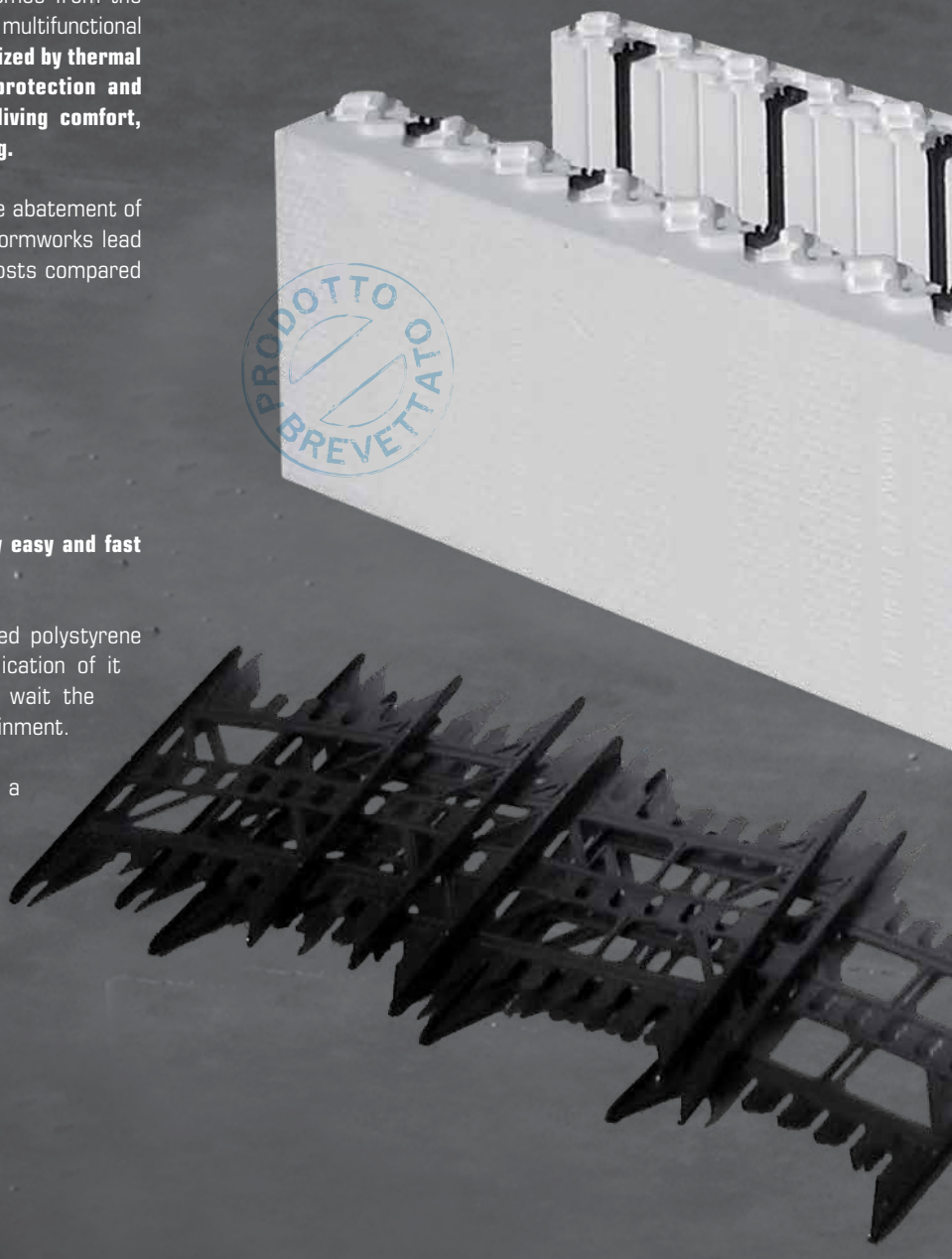
We thus achieve self-supporting structures in expanded polystyrene designed to receive the concrete casting or the application of it projected. Therefore t is not necessary anymore to wait the concrete curing to remove the temporary works of containment.

In addition the formwork remaining in place ensures a high and continuous thermal and acoustic insulation of the piece while the supportive concrete casting offers high efficient mechanical resistance. **The modularity of the elements, optimization of materials, connections, installation and assembly bring significant benefits in the design, creation and management of the site.**

These advantages continue in the long terms over the life of the building and further, until its closing down. The choice of material and construction technology, in fact, is a fundamental aspect of executive design: on this choice depend the evaluations of structure, efficiency and costs, both immediate and about management that on the whole determine the quality of the building.

There are important issues that in recent years have increasingly seen a growing interest by the building industry: **the structural aspect and the relationship between architecture and environment are strongly connected** and no doubt they are characteristic areas for the development of this innovative building system that in an ever more clear way emerges as a "new paradigm of building.

One of the most interesting topics in earthquake engineering is to develop technologies able to offer a guarantee of structural reliability even in extreme condition of resistance to unexpected and unpredictable stresses such as seismic.



REXPOL group
ICF Global System

In this sense the distributed reinforcement systems allow the creation of high performing monolithic structures thanks to the synergy between compression strength of concrete and tensile strength of steel.

The innovation brought by the systems to create permanent formworks in EPS is the possibility to make concrete partition wall where the horizontal and vertical reinforcing bars can be properly positioned to satisfy the structural requirements within a structure supportive to the plates in EPS, which allow to reach high thermal and acoustic inertia without resorting to the increase in thickness of the partition wall.

In our society the energy consumption has become the object of study and attention. **The matter of containing first building costs and then management costs is linked as much to the economic and managerial aspect as to the environmental one** and today it is certainly attractive in every way, both for clients and for designers and builders, in respect of latest thermo acoustic and anti-seismic regulations.

The use of an eco-friendly material as EPS allows to construct buildings that provide a reduction of energy consumption in both summer and winter that is considerably higher than with traditional systems.

A new element to appreciate even more the use of EPS materials is the limited environmental-impact that they allow to obtain: to replace the traditional lightening with expanded polystyrene means first of all to diminish the excavation of the area by limiting the use of non-renewable resources such as clay.

In terms of noxious emissions **expanded polystyrene does not contain any pollutant gas for the ozone layer, it does not give rise to alpha, beta or gamma radiations nor radon fumes.** The reduction of noxious emissions is accentuated by the significant abatement of energy consumption for heating/air conditioning that can be obtained with the distributed reinforcement systems.

Thanks to ICF REXwall to construct earthquake-resistant buildings with low energy consumption, sustainable and with high living comfort is no longer a mirage…

INDEX

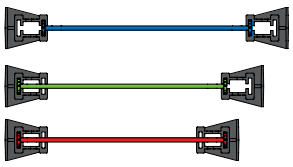
ICF REXwall Formworks for earthquake-resistant mason

The products range by **REXPOLgroup** is characterized by numerous European patents and the constant quality control of raw materials, machinery and finished products. Competence, professionalism and customer service have led the commercial policy of the group for almost **40 years.** These are the main strong points of the REXPOlgroup companies which consolidate the leadership of **Rexpol** and **Rexcop** brands in the European market for expanded sintered Polystyrene (EPS) products allowing the development of the **ICF GLOBAL SYSTEM**, the building system designed for the construction of earthquake-resistant buildings with low energy consumption and high acoustic insulation.

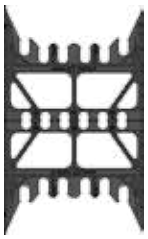
ICF REXwall System

ICF REXwall is the innovative building system that ensures the construction of earthquake-resistant buildings with low energy consumption and high acoustic insulation.
The main elements of the **ICF REXwall** system are: The multi-section track, the spacer and the Jolly panel.
The multi-section track is embed in the insulating material and allows the housing of each spacer in three different positions to ensure the construction of concrete load bearing walls of 15/17,5/20 or 25/27,5/30 cm. To reduce the impact of the transport cost and to facilitate some site works you can choose from three different modes such as: **"assembled formwork", "assembled wall" or "system to be assembled in site".** These modes consolidate the leadership of Rexpol and Rexcop brands in the European market for expanded sintered Polystyrene (EPS) products and allowed the development of ICF GLOBAL SYSTEM, the building system designed for the construction of earthquake-resistant buildings with low energy consumption and high acoustic insulation. The geometry of **the spacer** allows the correct placing of the horizontal reinforcement bars and any thickenings irrespective of the anti-seismic concrete wall section and the thermal insulation performances guaranteed by the Jolly panel. To achieve buildings with low energy consumption the **Jolly panel** is made of high density expanded sintered polystyrene with variable thermal insulation thicknesses (**7/10/14/18 cm**). The innovative shape of the surface joints prevents the leakage of concrete during casting and improves its stability. The external surface has a "ruler effect" and a series of vertical and horizontal grooves that facilitate the laying operations.

Earthquake-resistant buildings with low energy consumption and high acoustic insulation

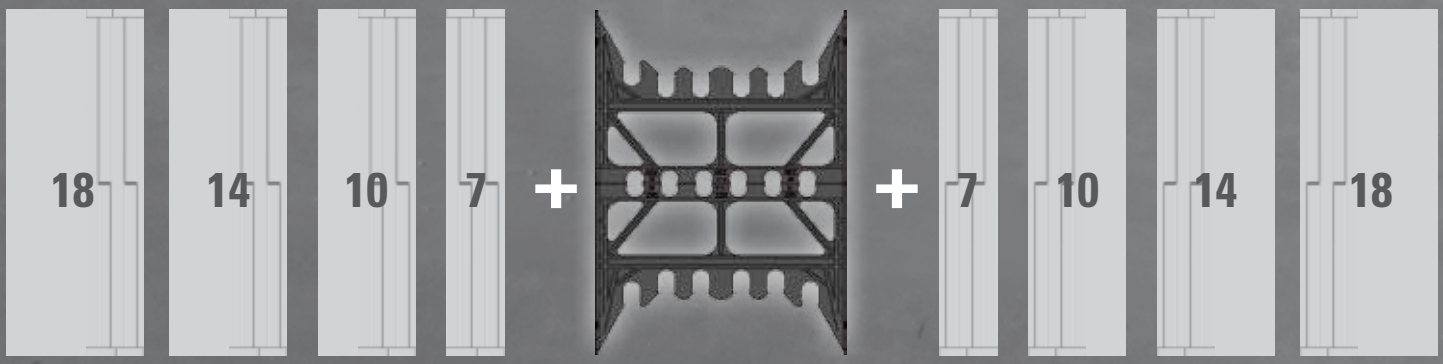


MULTI-SECTION TRACK



SPACER

JOLLY PANNEL



REXPOL group
ICF Global System

THE BENEFITS OF BUILDING WITH ICF REXWALL SYSTEM

01. The absence of thermal bridges in the buildings designed and built with ICF REXwall system allows a significant improvement of comfortable living with a **consequent reduction in energy consumption.**

02. Using the ICF REXwall system elements in the correct way there is a **significant reduction of time and cost** of buildings construction as the optimization of the assembly sequence determines the involvement of a small numbers of workers on site.

03. The checks carried out on buildings built with ICF REXwall system proved that they are **qualified** to the more **restrictive acoustic regulations**.

04. The monolithic reinforced concrete structures that were designed and made through the use of the ICF REXwall formworks proved to be **resistant to the maximum anti-seismic stresses** provided by law.

05. The physical and mechanical characteristics of reinforced concrete remain unchanged during its **entire life cycle** thanks to the protection of ICF REXwall system expanded sintered polystyrene panels.

06. ICF REXwall system is defined **eco-friendly** by the most important global regulations (e.g. LEED) because it maximizes the amount of products in the site, enables the recovery and recycling of waste materials, improves the quality of construction, gives significant energy savings and extends the life cycle of the building.

07. The **fire reaction** of the structures made with ICF REXwall formworks is guaranteed by the self-extinguishing additive contained in the expanded sintered polystyrene that is in each elements of the system, instead the **fire resistance** is provided by the continuous concrete structure and the opportunity to increase the concrete cover in the most adverse conditions.

08. To construct with the ICF REXwall system **avoids surface and/ or interstitial condensation** with the ability to modulate the insulation thicknesses and structural section (concrete).

09. The flexibility of the ICF REXwall system allows **the widest choice of internal finishes** (fibrous plastered boards, traditional plaster, wood panelling, etc…) **and external** (plaster, exposed stone cladding, marble cladding, etc…).

10. The shells made with the ICF REXwall system are part of the new age of **passive buildings** thanks to their excellent air tightness.

11. In the ICF REXwall **buildings the creation of all plants** (electrical, plumbing, forced ventilation, suction, etc…) is **simplified** compared to traditional constructions (beams, pillars and infillings) as it is made in the expanded polystyrene insulating thickness with no need of partial demolition of the part already built.

12. The values of **thermal phase shift** and **reduction obtained** by designing and building with the ICF REXwall system allow a significant improvement of living comfort both in winter and in summer.

JOLLY PANNEL WIND

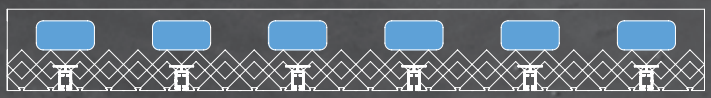
ALFA PANNEL

STOP PANNEL

www.REXPOL group.it

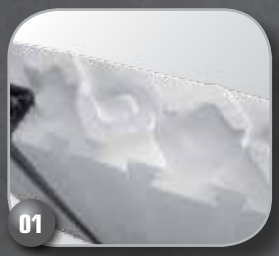
ICF REXwall Formworks for earthquake-resistant mason

The system is characterized by a complete program of modular elements and among them the **Jolly panel** and the **spacer** are fundamental.
The Jolly panel is an element in self-extinguishing Class E expanded sintered polystyrene, high density, made by mould, with 6 multi-section guides embedded in the insulation thickness.
The usable sizes of the Jolly panel are: 120x35x7/10/14/18cm.
Depending on the specific design requirements it is possible to combine the various insulating thicknesses in ten modes to obtain building characterized by high energy efficiency and with no thermal bridges.
To further improve the summer behaviour of the ICF REXwall system a new element was introduced, and patented: the **Jolly panel wind**.
The Jolly panel wind represents the evolution of the Jolly panel as cavities have been obtained in the thickness of the external insulation that allow the creation of the first v**entilated wall integrated** into a formwork system.

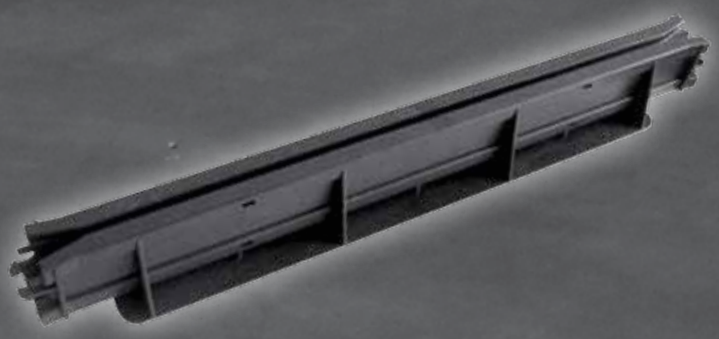


The main features of the Jolly panel and the Jolly panel wind are:

01. The surface joints have levels on different heights (1) to contain the leakage of concrete during casting, to facilitate the panels connection and allow the reversibility and bi-directionality of panels by reducing the timing of installation.
02. The side joints have a special alternate geometry (2) that is appropriate to ensure the alignment of panels and containment of concrete during casting.
03. The internal surface has many dovetailed vertical sections to ensure a perfect and lasting adherence between concrete and insulating material.
04. The external surface has a honeycomb shape (4) to improve the adhesion of the plaster, one "ruler effect" (5) to facilitate the cut to size of the panels and six centre to centre distance of 20 cm bas-reliefs to highlight the reinforcement bar embedded in the panel.
05. The multi-section guide cast into the panel allows the placing of the spacer in two different positions (7) and determines three structural sections with the same spacer (15/17, 5/20 cm or 25/27, 5/30 cm). it vertically interconnects the panels between them thanks to hooks on either end of each plastic element (8).
06. The cavities in the external insulating thickness (9) have the aim of creating an integrated ventilated wall to improve summer behaviour of the entire building shell.



REXPOL group
ICF Global System



The **multi-section guide** is an element in plastic material with a unique and unmistakable geometry, fused into the expanded sintered polystyrene elements of the ICF REXwall system.
The importance of the multi-section guide is fundamental because it prevents the swelling and collapse of system elements during concrete casting, it allows the blocking of the spacers preventing them to slip down, allows the creation of the desired structural section, it vertically hooks together up all the elements of the system and allows, if required, the anchorage of internal finish into plastered panels.

Structural sections created by using the basic spacer

Structural sections created by using the maxi spacer

Structural sections created by using the metal spacer

The main features of the multi-section guide are:

01. The stiffening rib that are designed to ensure the correct placement of the spacers and to stabilize the geometry of the element.

02. The particular undercut housings (2) that ensure the perfect locking of the spacers even if used in the "divided" version.

03. The two longitudinal tracks (3) that keep the various ICF REXwall system spacers in the correct position to withstand the stresses during reinforced concrete casting phases.

04. The countersink of the insertion of spacers (4) that facilitates all the assembly operations, regardless of the chosen configuration (formwork to be assembled in site, assembled formwork, assembled wall).

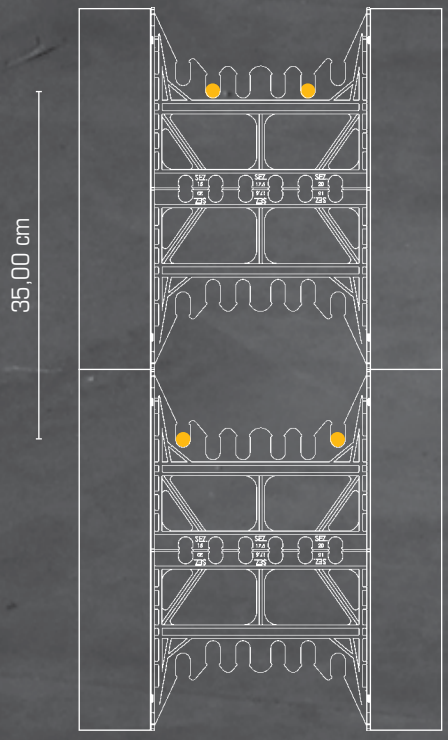
05. The shape of the multi-section guide that allows the anchorage of the walls alignment systems and the application of internal finishes simply by the use of self-tapping screws.

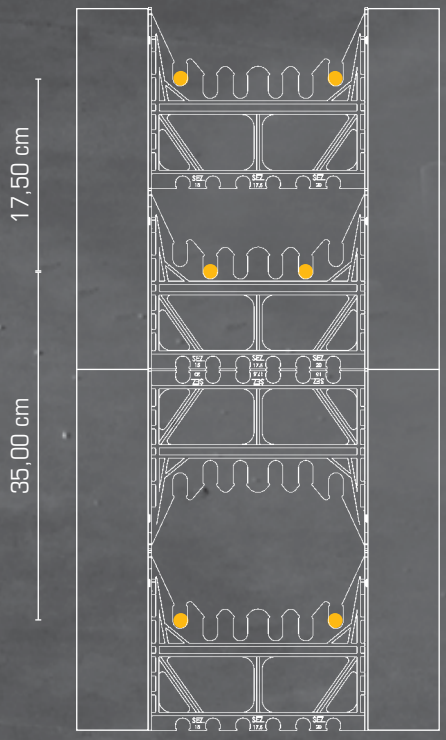
www.REXPOLgroup.it

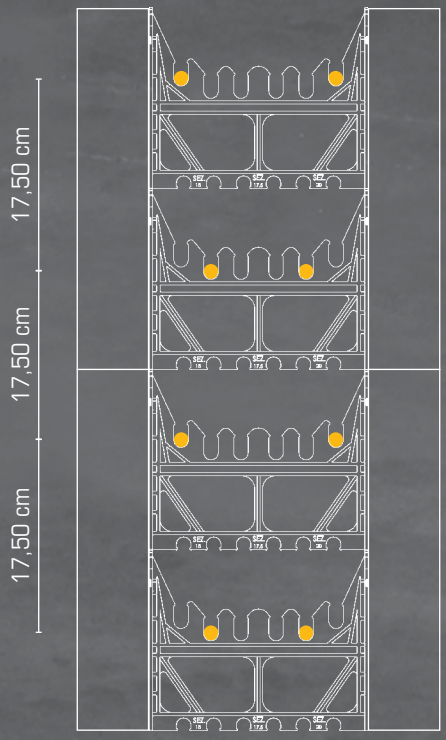
ICF REXwall Formworks for earthquake-resistant mason

The **spacer** is an element in plastic material properly structured and strengthened in order to ensure maximum grip of the ICF REXwall system during concrete casting.
To meet the different methods of structural analysis the spacer has been conceived as a single element but able to be divided into two perfectly identical parts to receive any rebar (ø) and to forecast the correct overlay in accordance with the regulations.

Although the ICF REXwall system has been designed to create horizontal rebars with centre to centre distance of 35 cm, the feature described above (divisibility) allows the creation of reinforced structures in different ways.In fact by alternating whole spacers and half spacers the average centre to centre distance is of 26,25 cm while by assembling the ICF REXwall system elements with only the half spacers you get a centre to centre distance of 17,50 cm.





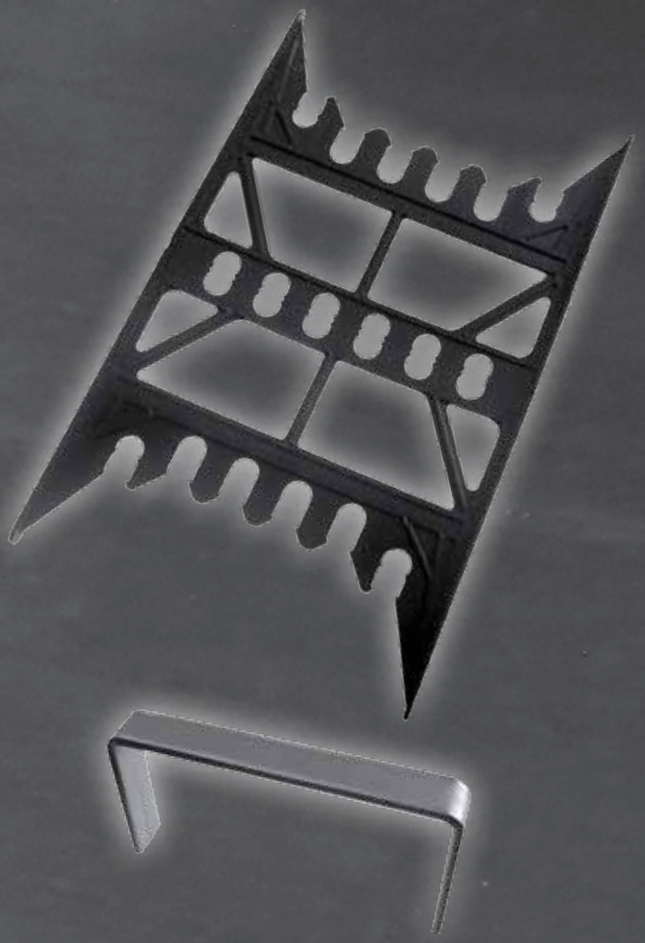


ry with low energy consumption

REXPOL group
ICF Global System

The main features of the plastic spacer are:

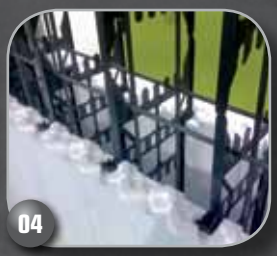
01. The width that has been designed to allow different structural sections (15/17,5/20cm or 25/27,5/30cm) using the same plastic spacer but setting it in its multi-section guide housings (1).
02. The height that is the same of the other system elements (Jolly panel, Jolly panel wind, Alfa panel, Stop panel) to get a better distribution of vertical loads (2).
03. The side pins that are designed to lock the plastic spacer inside the multi-section guide allowing the creation of the versions: "assembled formwork" and "assembled wall".
04. The particular shaping of horizontal bars housings (4) that forecasts both the side overlay and the lock of them.
05. The breaking line of the plastic spacer (5) that ensures the thickening of the horizontal rebars and their correct distribution near perimeter curbs.
06. The plastic material that makes up the elements of the system that come from the recycling of processed raw materials (6).
07. The resistance to the stresses of the reinforced concrete casting that is ensured by systematic laboratory tests (7).
08. The packaging of the system elements (8) that are moved by just one operator with ease.
09. The metal spacer (9) that contributes to the construction of infilling walls with small internal sections (7,5/10cm) to be used in traditional buildings (beams and pillars) or metal structures.
10. Where required the use of horizontal rebar with distance centre to centre no reproducible with the plastic spacer it is advisable to use the metal spacer (10) with variable sections depending on the design requirements.




01


02


03


04


05


06


07


08


09


10

www.REXPOLgroup.it

ICF REXwall Formworks for earthquake-resistant mason

In the world scene of ICF (insulation Concrete Form) systems ICF REXwall presents itself as a **flexible building system**, designed for different needs of those working in the field of civil and industrial construction.

To define the technical and performance characteristics of the ICF REXwall system was commissioned a market survey to a known pool of professionals with the involvement of a large numbers of the industry opinion leaders. From the elaboration of the information obtained experts showed the need a single system but in different configurations depending of specific needs.

On the basis of these considerations the ICF REXwall system was reshaped to ensure the same thermal, acoustic and static performances while varying the ways to provide the system.

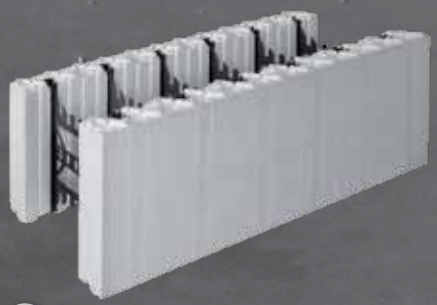
The possible configurations of the ICF REXwall system are:

01. formwork to be assembled in site
    An ideal solution for those building sites with limited space for storage of materials or where the incidence of transport costs is very high or when there is a very irregular plan.

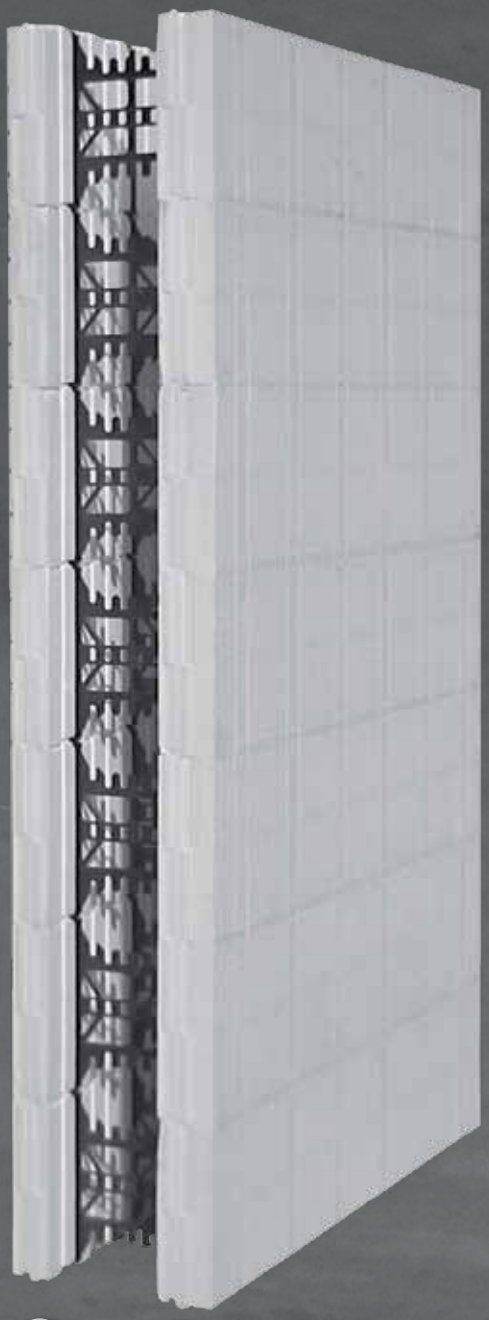
02. Assembled formwork
    An ideal solution for those sites with regular plan or in the absence of structural section changes or where energy performance is obtained with a single thickness of total insulation.

03. Assembled wall
    Ideal solution for those sites with a reduced number of openings (windows, doors, etc…) or when the plan is linear or in presence of a unique and constant structural section.

01



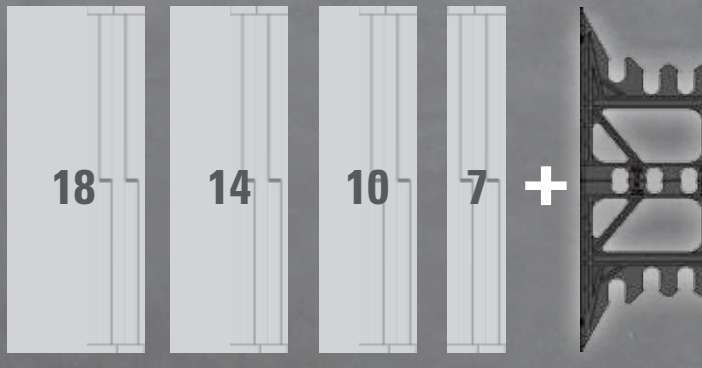
02



03

SPECIFICATION HEADING

Permanent modular formworks to build vertical load-bearing structures made of reinforced concrete of slightly reinforced concrete, consisting of two printed sheets of Expanded Sintered Polystyrene (EPS), high density, Euroclass E self-extinguishing, size 120x35x7/10/14/18 cm, interconnected by spacers made of plastic material that allow the creation of different sections of the concrete partition wall (15/17,5/20/25/27,5/30 cm) with a U thermal transmittance value lower than 0,234W/m²K, Rexpol ICF REXwall type.



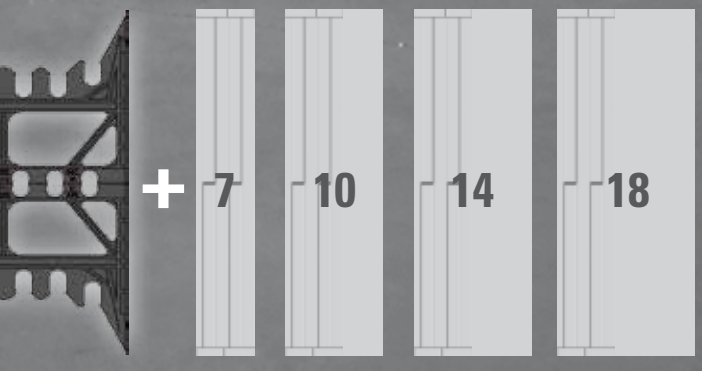
REXPOL group
ICF Global System

PERFORMANCE FEATURES

Internal insulation section (cm)		Concrete section (cm)		External insulation section (cm)	Concrete volume (m^3/m^2)	Thermal U (w/m^2k)	Acoustic abatement (db)	Thermal shifting (h)
7	+	15	+	7	0,150	0,234	51	9:40
7	+	15	+	10	0,150	0,195	51	10:50
7	+	15	+	14	0,150	0,160	51	12:45
7	+	15	+	18	0,150	0,136	51	14:45
7	+	17,5	+	7	0,175	0,231	53	10:10
7	+	17,5	+	10	0,175	0,194	53	11:20
7	+	17,5	+	14	0,175	0,160	53	13:15
7	+	17,5	+	18	0,175	0,136	53	15:15
7	+	20	+	7	0,200	0,230	55	10:45
7	+	20	+	10	0,200	0,193	55	11:55
7	+	20	+	14	0,200	0,159	55	13:50
7	+	20	+	18	0,200	0,135	55	15:50
7	+	25	+	7	0,250	0,228	59	11:55
7	+	25	+	10	0,250	0,192	59	13:10
7	+	25	+	14	0,250	0,158	59	15:00
7	+	25	+	18	0,250	0,134	59	17:05
7	+	27,5	+	7	0,275	0,227	60	12:40
7	+	27,5	+	10	0,275	0,191	60	13:50
7	+	27,5	+	14	0,275	0,157	60	15:40
7	+	27,5	+	18	0,275	0,134	60	17:45
7	+	30	+	7	0,300	0,226	62	13:20
7	+	30	+	10	0,300	0,190	62	14:30
7	+	30	+	14	0,300	0,157	62	16:20
7	+	30	+	18	0,300	0,134	62	18:25

The values shown in the table are extracts from the results of tests performed in our laboratories, certified laboratories and from the subsequent interpolations according to formulas proposed by UNI Technical Report.

www.REXPOLgroup.it



Earthquake-resistant buildings with low energy consumption and high acoustic insulation.

PHASES OF ASSEMBLY

REXPOLgroup offers to all the building companies involved in the use of ICF REXwall system the appropriate assistance to guarantee the correct installation.

Depending on your preferences and specific site requirements, may be activated three procedures of technical support:

Telephone technical support
For the entire duration of site operations specialized REXPOLgroup technicians are available to explain the methods to build with ICF REXwall system.

Basic training
At the beginning of the work the specialized REXPOlgroup technicians go on site to assess the level of knowledge of the ICF REXwall system and to explain the phases of assembly

Technical assistance on site
It is provided by REXPOLgroup operators or by companies that have already a significant experience in the construction of buildings with ICF REXwall system. It consists in the active presence of a "team leader" for a predetermined number of days with the aim of resolving the inevitable site problems and training the personnel.
The result of the training is the issue of a license testifying the knowledge of construction know-how.

TRACKING OF MASONRY

INSERTION AND CONTROL OF THE SPACERS

PLACEMENT OF THE FIRST LINE

PLACEMENT OF THE FIRST LINE OF REINFORCING BARS

PLACEMENT OF THE SECOND LINE OF FORMWORKS

PLACEMENT OF THE SECOND LINE OF REINFORCING BARS

REXPOL group
ICF Global System

OPENING DOORS AND WINDOWS

PLACEMENT OF THE FOLLOWING LINES

INSTALLATION OF THE ALIGNMENT SYSTEM

PLACEMENT OF THE FRAMINGS

PLACEMENT OF THE FOLLOWING REBARS

ALIGNMENT OF THE WALL

CONCRETE CASTING

FINAL RESULT

ICF REXwall Formworks for earthquake-resistant mason








REXPOL group
ICF Global System

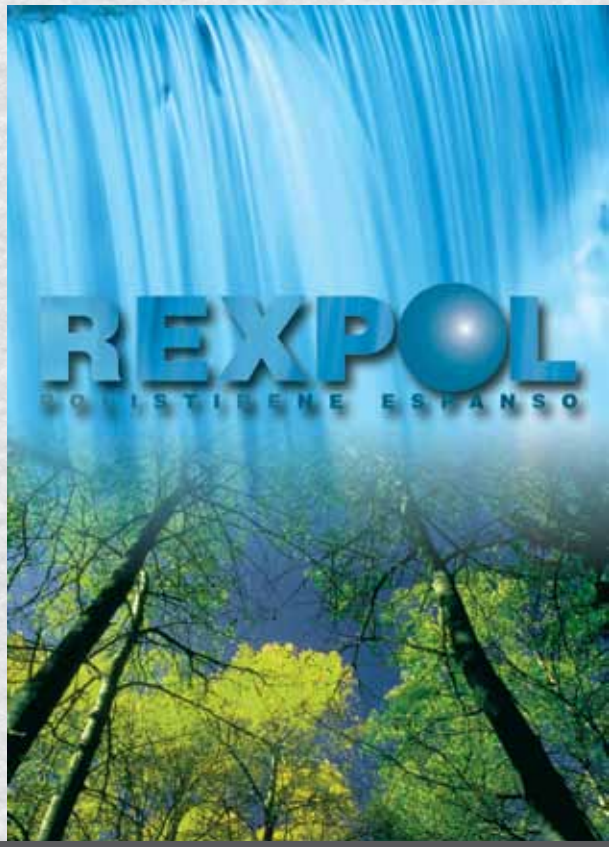






Images also extracted from previous versions.

C 28.03 - 0212



REXPOL
POLISTIRENE ESPANSO

CERTIFICAZIONE DI SISTEMA QUALITÀ ISO 9001 DNV

via E. Fermi, 1 - 30036 Santa Maria di Sala (VE) - Tel. +39 041 486822 - Fax +39 041 486907

www.rexpolgroup.it - vendite@rexpolgroup.it