

TECHNICAL INFORMATION
INSULATED CONCRETE ROOF & FLOOR
BEST SYSTEM FOR AN ICF HOME

ICF MEXICO

TECNOLOGÍA ICF DE MEXICO

WEBSITE

WWW.ICFMEXICO.COM | @ICF.MEXICO

SOCIAL MIDIA

Chihuahua, Chih. Mex. 31214
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KNOWING THE SYSTEM

INSULATED CONCRETE ROOFS & FLOORS

ICR&F SYSTEM

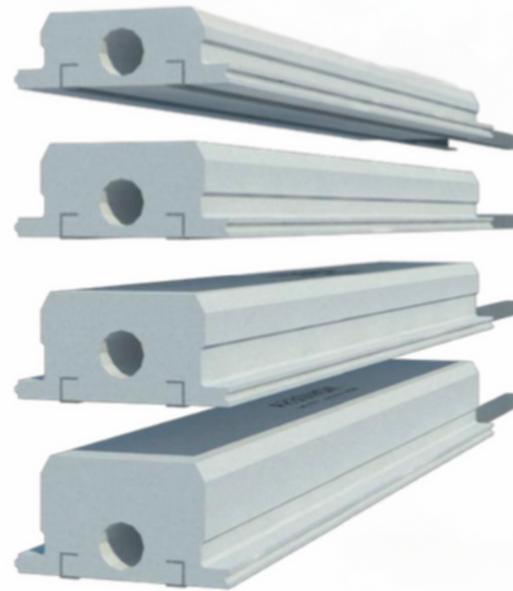
Durable & Resilient

Fast Installation

Lighter Structure

High R-Values

Low Air Infiltration



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GENERAL INFORMATION

Our panels are made of rigid expanded polystyrene foam (EPS) with a nominal density of 1.24 lb/ft³. It contains a flame retardant that helps prevent the flame from spreading. It consists of two G60 type “C” sections, 22 gauge, galvanized steel gutters with nominal punch holes spaced 12" apart. They serve as support for the system so it can bear the weight of the concrete as it is poured. The finish is applied to the lower part of the panel with plaster or you can screw sheetrock directly to it. Due to its modular configuration the panels are joined to form a cavity to place prefabricated $f'y = 85338$ lb/in² steel trusses or enabled $f'y = 59736.6$ lb/in² steel to form type “T” girders integrated into the layer compression system.



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ADVANTAGES OF THE SYSTEM

- 1. Fast, simple and clean installation.**
- 2. Thermal Insulation and Energy Efficiency translate to savings.**
- 3. Acoustic insulation.**
- 4. Savings in labor performance.**
- 5. Easy application of finishes such as plaster, stone, ceramic, drywall, fiber cement board, among others.**
- 6. Compatibility with all structural systems (rigid, flexible and hybrid).**
- 7. Given its light weight, it helps reduce the dead loads of the building.**
- 8. It offers great structural strength.**
- 9. Able to house utility services.**
- 10. It does not require special equipment for transportation, laying and cutting.**

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TECNICAL SPECIFICATIONS

Specifications

Thermal conductivity	0.034 W/m.K
Water vapor permeability	0.045 ng/Pa.s.n
Moisture adsorption (volume)	0%
*Bulk density	1.194831138
Acoustic (STC)	47 dB
Width	23.622"
**Length	Up to 39.36 ft
Application of permanent formwork in	Floor slabs Roof slabs Cantilevers Low grade concrete

* Density certified under Mexico's NOM-018-ENER-2011 standard.

** The length is adjusted to each project's needs

Makros Panel cambers and weights

Cambers MAKROS (in)	18 (7.09")	20 (7.87")	25 (9.84")	29 (11.42")	32 (12.60")
EPS weight lb/ft	1.08	1.25	1.58	1.84	1.92
EPS + gutter weight lb/ft	2.29	2.46	2.79	3.05	3.13
EPS + gutter weight lb/ft ²	1.16	1.25	1.41	1.55	1.58

Panel thermal insulation

R (Ft ² .Fh/BTU)	25.36	27.98	34.50	38.41	39.72
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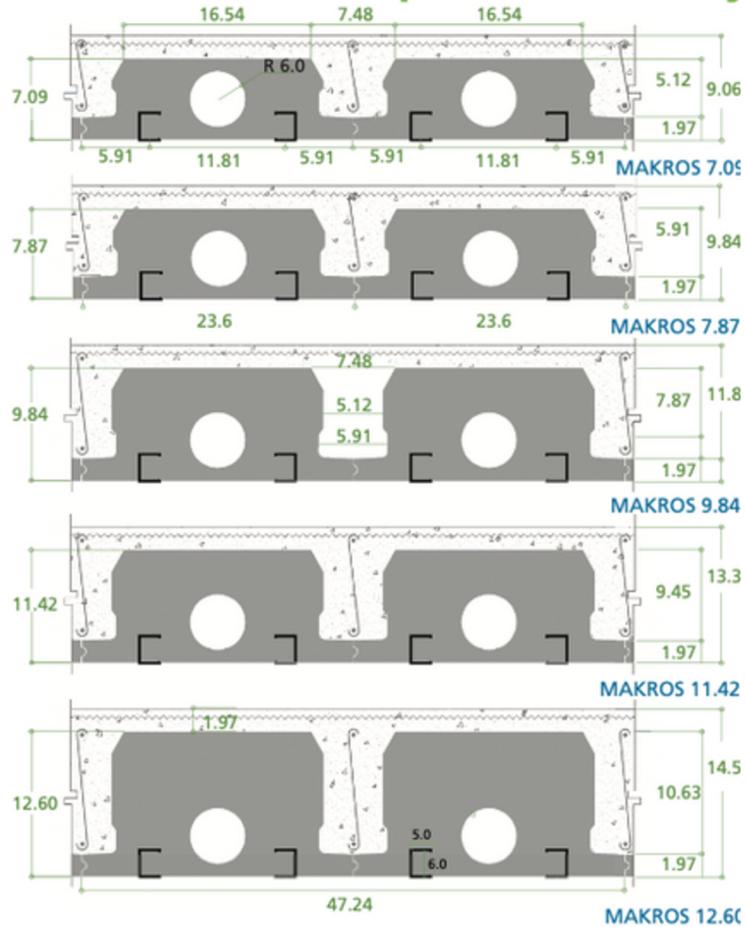
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TECNICAL SPECIFICATIONS

Makros panel availability



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TECHNICAL SPECIFICATIONS

System properties

Camber MAKROS in	Overall camber of the slab in	Amount of concrete ft ³ /ft ²	System's own weight lb/ft ²	Max underpinning ft	lb of steel per ft ²	
					F'y 59736.6 lb/in ²	F'y 85338 lb/in ²
7.09"	9.05	30.7	41.98	4.92	276	191
7.87"	9.84	35.33	45.87	4.92	313	216
9.84"	11.81	40.27	52.22	4.59	405	280
11.42"	13.38	44.07	57.34	4.26	479	331
12.6"	14.56	47.11	61.23	4.26	534	370

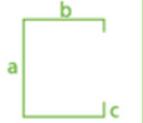
*To calculate the maximum spacing of shoring i a 100% load of fresh concrete is considered, accumulations from itself equivalent to 44lb according to the NTC, also a live load of 198lb per the weight of the operator for a total of 58.98kg/m², it was verified in this way that the beams shall not exceed a maximum allowable deflection of L/240 +5 according to the concrete formwork design criteria of ACI.

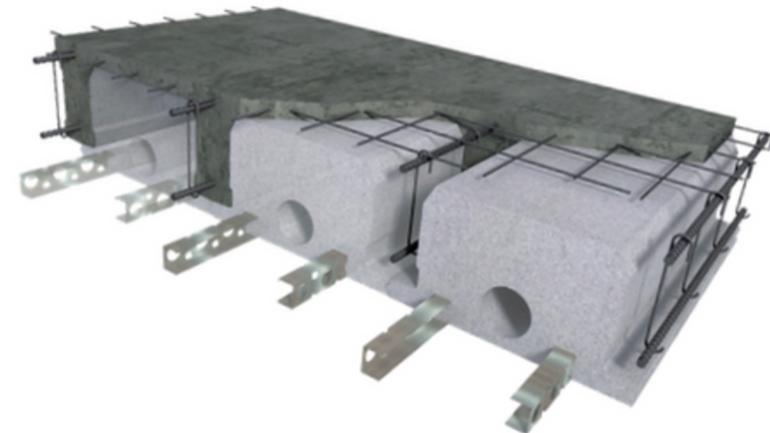
Loads on roof and floor slab

Subfloor		Roof top	
Weight and dead load lb/ft ²	Factorized design load, dead load and live load lb/ft ²	Weight and dead load lb/ft ²	Factorized design load, dead load and live load lb/ft ²
61.44	100.35	78.84	88.26
65.33	102.19	82.73	90.11
71.68	107.52	89.08	95.43
76.8	111.82	94.20	99.73
80.69	115.09	98.09	103.01

These charges are considered for distances presented in the specification tables of distances and armings. Dead loads in mezzanines concept considered by finishings of 19 lb/ft² and dead loads in rooftop considered by a finishings concept of 37 lb/ft²

Properties of the inner channel

	Camber in"	2.362204724
	Width in"	1.968503937
	Patin in"	0.291338583
	Gauge	22
Moment of inertia in ⁴	0.207 I _x	0.1042 I _y
Turning radius R in"	1.0118 R _x	0.72047 R _y
Module Section s in ³	0.1751 S _x	0.1055 S _y



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TECHNICAL SPECIFICATIONS

Maximum distance, sistem simply supported

Camber MAKROS in	Subfloor					Rooftop				
	Max distance ft	Distance ft	lb of steel per ft ²	Assembly		Max distance ft	Distance ft	lb of steel per ft ²	Assembly	
				Lower belt	Upper belt				Lower belt	Upper belt
7.09"	19.02	18.04	0.55	1Ø of #. 4 + 1 bar of #.3	2Ø of #. 3	18.37	17.06	0.48	2Ø of #. 3	1Ø of #. 3
7.87"	20.99	19.68	0.63	1Ø of #. 4 + 1 bar of #.3	2Ø of #. 3	20.01	18.70	0.56	1Ø of #. 4 + 1 bar of #.3	1Ø of #. 4
9.84"	25.91	24.60	0.75	2Ø of #. 4	1Ø of #. 4	24.60	22.96	0.83	2Ø of #. 4	2Ø of #. 3
11.42"	29.52	27.88	1.04	2Ø of #. 4 + 1 bar of #.3	1Ø of #. 4 + 1 bar of #.3	27.88	26.24	1.00	2Ø of #. 4 + 1 bar of #.3	1Ø of #. 4 + 1 bar of #.3
12.6"	32.15	30.18	1.09	2Ø of #. 4 + 2 bar of #.3	1Ø of #. 4 + 1 bar of #.3	30.18	29.52	1.22	2Ø of #. 4 + 2 bar of #.3	1Ø of #. 4 + 1 bar of #.3

Maximum distance system and support combined

Camber MAKROS in	Subfloor					Rooftop				
	Max distance ft	Distance ft	lb of steel per ft ²	Assembly		Max distance ft	Distance ft	lb of steel per ft ²	Assembly	
				Lower belt	Upper belt				Lower belt	Upper belt
7.09"	19.02	18.04	0.55	1Ø del No. 4 + 1 bar of #.3	2Ø of #. 3	20.34	19.35	0.49	1Ø del No. 4 + 1 bar of #.3	1Ø of #. 3
7.87"	20.99	19.68	0.63	1Ø del No. 4 + 1 bar of #.3	1Ø of #. 4	22.63	21.32	0.55	1Ø del No. 4 + 1 bar of #.3	1Ø of #. 4
9.84"	25.52	24.60	0.75	2Ø of #. 4	1Ø of #. 4	27.23	25.59	0.78	2Ø of #. 4	1Ø of #. 4
11.42"	29.52	27.88	1.04	2Ø del No. 4 + 1 bar of #.3	1Ø del No. 4 + 1 bar of #.3	31.16	29.19	0.92	2Ø del No. 4 + 1 bar of #.3	1Ø del No. 4 + 1 bar of #.3
12.6"	32.15	30.18	1.09	2Ø del No. 4 + 2 bar of #.3	1Ø del No. 4 + 1 bar of #.3	33.82	31.82	1.11	2Ø del No. 4 + 1 bar of #.3	1Ø del No. 4 + 1 bar of #.3

The following notes apply to the tables above:

Subject to the approval of an expert on structures.

The specified assembly is not applicable to the maximum distance.

The rods are considered the center of the distance with a length of 1/4 of distance, and No.2 stirrups are considered in all cases.

Specified rib, steel 59738 lb/in² The above distances are ideal for the loads specified.

Definition of system simply leaning: One way slab reactions just passes reactions to its supports and loses continuity at the ends of the steel.

Combined support system definition: One way slab where there is continuity in the steel despite having intermediate distances, keeping reactions at points of support.



ASTM E94



ASTM A653 & C645



NOM-018-ENER-2011
NMX-C-405-1997-ONNCE
NMX-C-460-ONNCE



MEMBER



Nº 202-12/N1108

See the [MAKROS](#) manual for more distances and loads.

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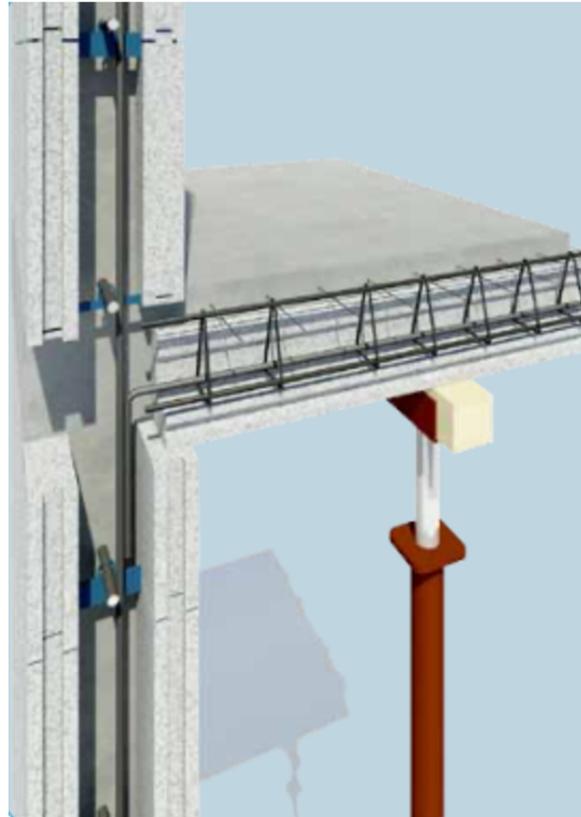
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STEP #8: SOLID WALL ICF AND ICF ROOF INSTALL

Once the concrete pouring of the ICF walls is finished, the bracing of the slab is performed, bringing the ICF ROOF PANEL piece to one of the faces of the ICF. Then the Panels are placed, rebar installed and the concrete pouring begins.



RECOMMENDED ICF ROOF SYSTEMS



The ICF Slab System is an autoclave expanded polystyrene panel with galvanized steel supports, providing strength to receive the steel rebar and concrete during the pour.

