

## Description

The MAKROS ICF Roof system panel is made of rigid expanded polystyrene foam (EPS) with a nominal density of 1.24 lb/ft<sup>3</sup>. It contains a flame retardant<sup>1</sup> that helps prevent the flame from spreading.

It consists of two G60, type "C" section, 22 gauge, galvanized steel<sup>2</sup> 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 placed, and the finish is applied to their lower part.

Due to its modular configuration both panels are joined so as to form a cavity to place prefabricated f'y = 85338 lb/in<sup>2</sup> steel trusses or enabled f'y = 59736.6 lb/in<sup>2</sup> steel to form type "T" girders integrated into the layer compression system.

## 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

## Labor performance

**Whole system performance** 1075 ft<sup>2</sup>/working day

**Product installation performance** 2153 ft<sup>2</sup>/working day

Considering a team of a construction foreman, two installers and a helper.

## Advantages

- Fast, simple and clean installation.
- Thermal insulation and savings in energy consumption maintain a comfortable atmosphere.
- Acoustic insulation.
- Pieces cut to size.
- Savings in labor performance.
- Easy application of finishes such as pastes, stone materials, ceramic, drywall, fiber cement board, and ceiling, among others.
- Compatibility with all structural systems (rigid, flexible and hybrid).
- Given its light weight, it helps reduce the dead loads of the building.
- It offers great structural strength.
- Able to house utility services.
- It does not require special equipment for transportation, laying and cutting.

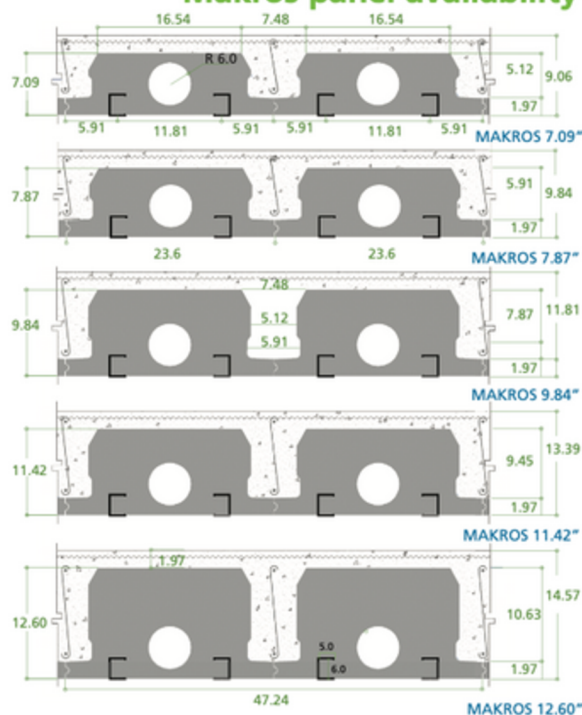
## Makros Panel cambers and weights

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 <sup>2</sup>	1.16	1.25	1.41	1.55	1.58

## Panel thermal insulation

R (Ft <sup>2</sup> .Fh/BTU)	25.36	27.98	34.50	38.41	39.72
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## Makros panel availability



<sup>1</sup> UL Underwriters Laboratories Inc. The standard in safety, file: E 305362, Vol.1

<sup>2</sup> Yield stress Fy = 33425 lb/in<sup>2</sup>

## System properties

Camber MAKROS in	Overall camber of the slab in	Amount of concrete ft <sup>3</sup> /ft <sup>2</sup>	System's own weight lb/ft <sup>2</sup>	Max underpinning ft	lb of steel per ft <sup>2</sup>	
					F'y 59736.6 lb/in <sup>2</sup>	F'y 85338 lb/in <sup>2</sup>
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/m<sup>2</sup>, 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		Rooftop	
Weight and dead load lb/ft <sup>2</sup>	Factorized design load, dead load and live load lb/ft <sup>2</sup>	Weight and dead load lb/ft <sup>2</sup>	Factorized design load, dead load and live load lb/ft <sup>2</sup>
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/ft<sup>2</sup> and dead loads in rooftop considered by a finishings concept of 37 lb/ft<sup>2</sup>

## Maximum distance, sistem simply supported

Subfloor					Rooftop				
Camber MAKROS in	Max distance ft	Distance ft	lb of steel per ft <sup>2</sup>	Assembly	Max distance ft	Distance ft	lb of steel per ft <sup>2</sup>	Assembly	
				Lower belt				Lower belt	Upper belt
7.09"	19.02	18.04	0.55	1Ø of #. 4 + 1 bar 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	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	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	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	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

Subfloor					Rooftop				
Camber MAKROS in	Max distance ft	Distance ft	lb of steel per ft <sup>2</sup>	Assembly	Max distance ft	Distance ft	lb of steel per ft <sup>2</sup>	Assembly	
				Lower belt				Lower belt	Upper belt
7.09"	19.02	18.04	0.55	1Ø del No. 4 + 1 bar 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	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	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	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	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.

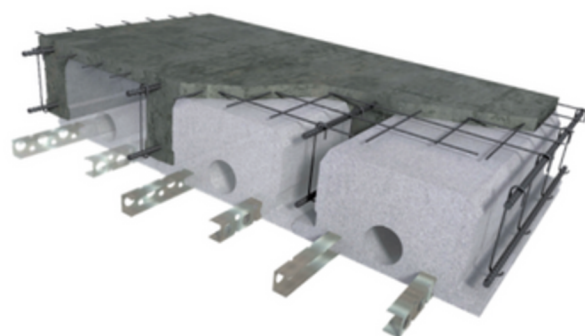
Specified rib, steel 59738 lb/in<sup>2</sup> The above distances are ideal for the loads specified.

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.

## Properties of the inner channel

Camber in"	2.362204724
Width in"	1.968503937
Patin in"	0.291338583
Gauge	22
Moment of inertia in <sup>4</sup>	0.207 Ix 0.1042 Iy
Turning radius R in"	1.0118 Rx 0.72047 Ry
Module Section s in <sup>3</sup>	0.1751 Sx 0.1055 Sy



## Certifications



ASTM E94



ASTM A653 & C645



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



MEMBER



N° 202-12/N1108

See the MAKROS manual for more distances and loads.

To view other presentations, running boards, additional reinforcements, deformation and / or countershafts consult the NOVIDESA technical department.