

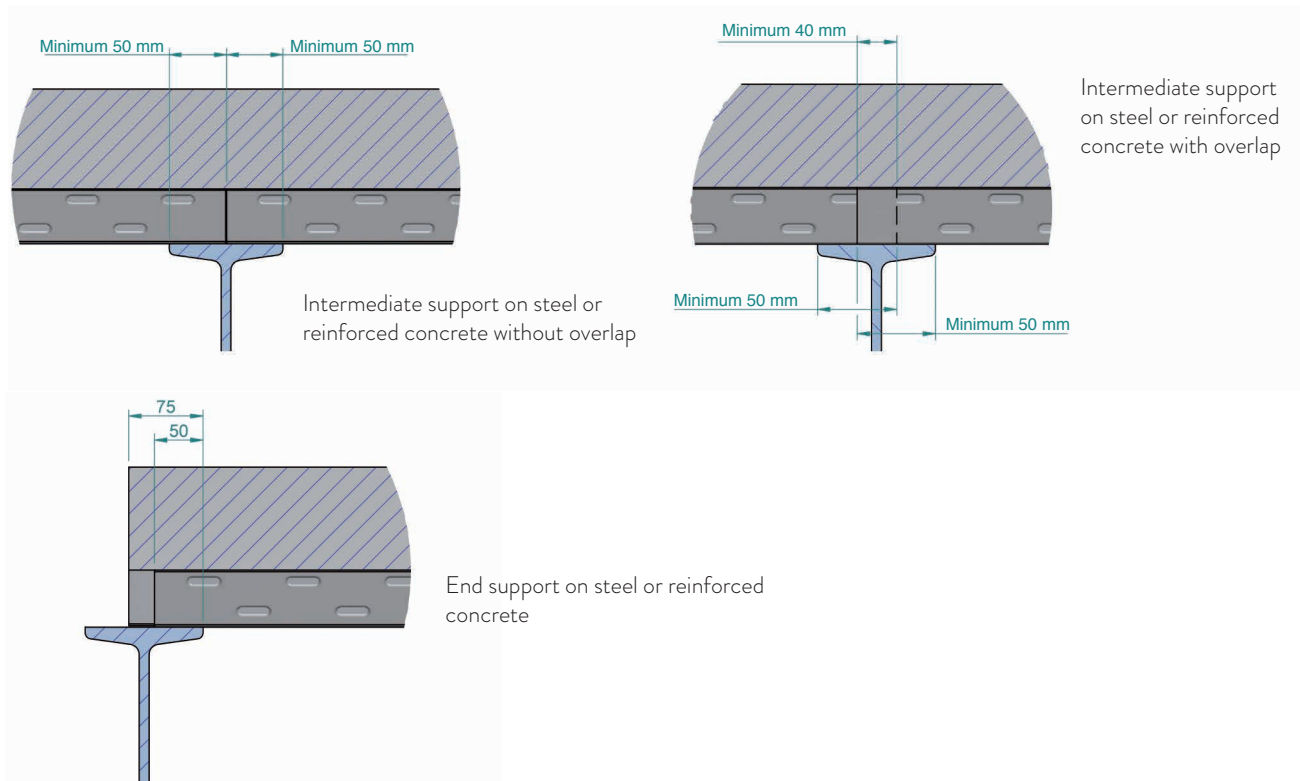


RECOMMENDATIONS FOR USE

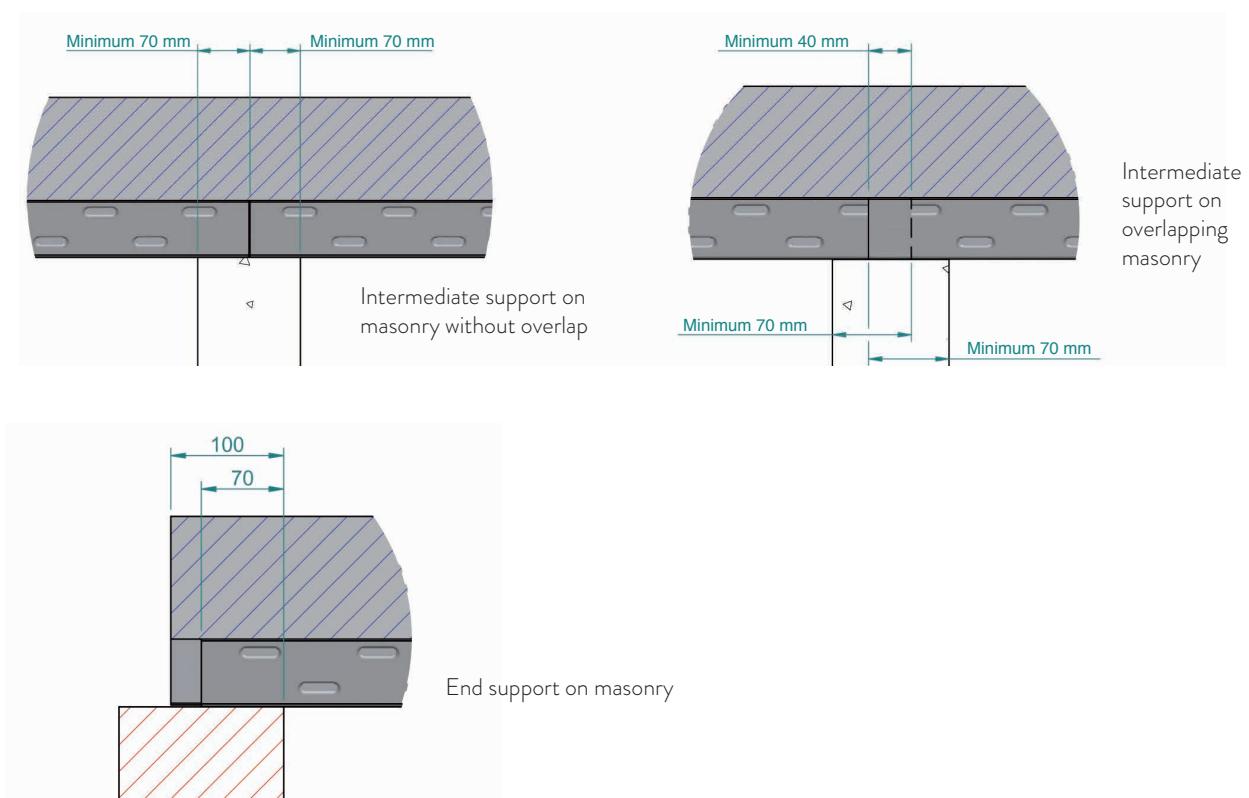
RECOMMENDATIONS FOR USE:

The nature of the supporting structure can be metallic, concrete or masonry. The supports on it must comply with the premises established by the EUROCODE.

- Slabs that support steel or concrete beams must have a minimum support of 75 mm (50 mm per sidewhere the structure is continuous)

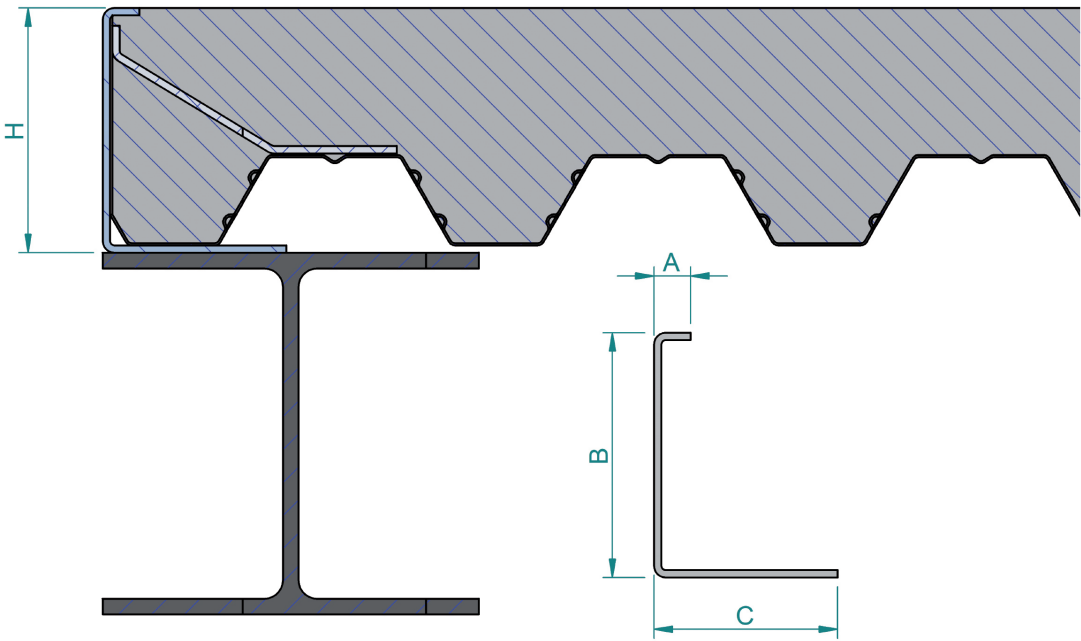


- Slabs which are supported on other materials must have a minimum support of 100 mm (70 mm per side where the structure is continuous)



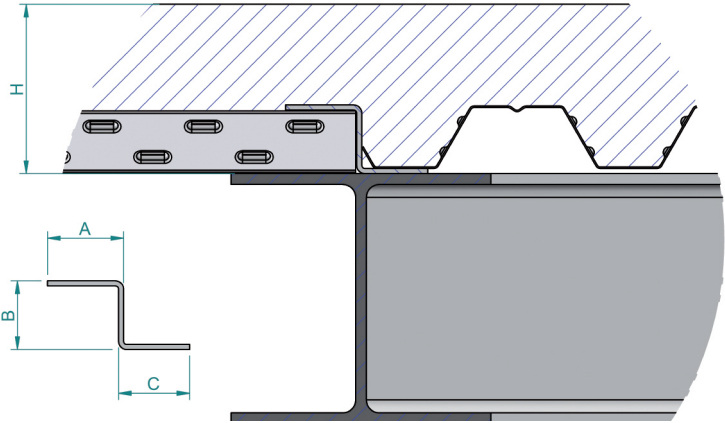
SIDE PERIMETER CLOSING

MG 60/220
COMPOSITE FLOOR DECK
MG 60/220
NON-COMPOSITE FLOOR DECK



| H (mm) | | | | | |
|--------|-----|-----|-----|-----|-----|
| | 120 | 140 | 160 | 180 | 200 |
| A (mm) | 25 | 25 | 25 | 25 | 25 |
| B (mm) | 120 | 140 | 160 | 180 | 200 |
| C (mm) | 125 | 105 | 148 | 128 | 108 |

DIRECTIONAL PERIMETER CHANGE



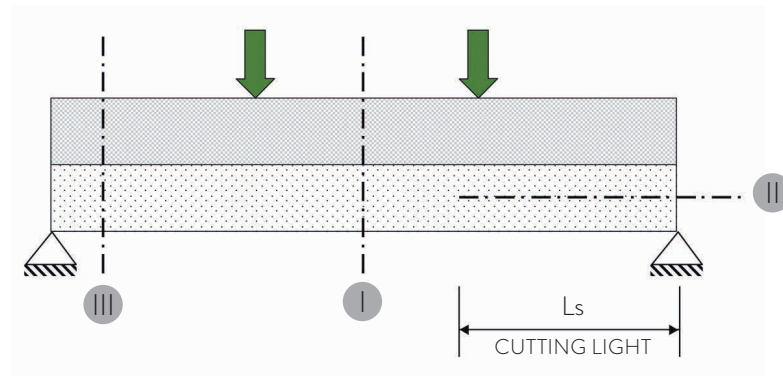
| DIRECTIONAL CHANGE | |
|--------------------|----|
| A (mm) | 70 |
| B (mm) | 60 |
| C (mm) | 70 |

1.- DEFINITIONS

1.1.- MIXED SLAB

It is an element used as a slab, consisting of a ribbed metal sheet that initially serves as a formwork supporting the weight of the concrete, the reinforcement and the installation loads. After hardening, the set can behave like a slab so that the sheet constitutes all or part of its tensile reinforcement. To confirm that the ribbed sheet works partially with concrete, tests have been carried out at the Eduardo Torroja Construction Institute corresponding to report nº 18664, in which the coefficients m and k are determined.

In this case, the way in which failure occurs determines the calculation criteria based on three types, as seen in the following figure:



Critical sections

- I - Bending
- II - Low-level stresses
- III - Shear and punching

This process can also be omitted by adding reinforcement that absorbs the sagging bending moment in the spans, in which case it will be used as non-composite floor deck.

1.2.- NON-COMPOSITE FLOOR DECK

When designing a concrete slab, it must be taken into account that, during the construction phase, for a certain time, the concrete is soft and requires an element to retain it until it hardens. Hence the idea of non-composite metal floor deck was born.

When used in this way, the trapezoidal sheet presents a series of considerable advantages thanks to its speed of assembly and its self-supporting capacity to bear the weight of fresh concrete and the loads of the slab installation.

The loads that must be considered when calculating a non-composite floor deck are:

- The sheet's own weight.
- The concrete's own weight (thickness and type: normal or light).
- Temporary loading in the concreting phase.

The criterion used in the tables for the allowable deflection is $L/200$.

The data necessary to calculate the most suitable profile is:

- Distance between supports and number of spans.
- Slab thickness.
- Type of concrete: Normal (2400 Kg/m^3), Light (1900 Kg/m^3). The resistance of the concrete used to make the boards is HA-25.
- Maximum deflection ratio by default ($L/200$).

2.- PRE-DIMENSIONAL CALCULATION HYPOTHESIS

2.1.- TABLES CALCULATION CRITERIA

- Deflection criterion in pouring (concreting): $F=L/200$.
- Elastic limit of complementary reinforcement steel: $\delta_e \geq 500 \text{ N / mm}^2$.
- Yield strength of formed sheet S250GD $\delta_e \geq 250 \text{ N / mm}^2$.
- Characteristic resistance of concrete: $F_{ck} = 25 \text{ N / mm}^2$.
- Material reduction coefficient:
 - Concrete: 1.8
 - Steel arm: 1.15
 - Structural steel: 1.1

2.2.- LOADS TO CONSIDER WHEN CONSULTING THE CHARTS

In the calculation of a metal slab, three types of vertical loads come into consideration, which we will now define:

- Own weight: This refers, as its name indicates, to the weight of the resistant element itself, whether it is the ribbed profile, the case of a self-supporting metal slab, or the complete slab, in the case of a composite slab.
- Permanent loads (dead loads): Include all those loads that act permanently on the slab, not varying over time. Clear examples are flooring, false ceilings, suspended installations, partitions, etc.
- Use, in service or working loads: Usable required load, which will vary depending on the type of building and the purpose for which the premises are to be used and corresponds to the weight of anything that may weigh on the slab due to its use.

3.- SIZING CRITERIA OF A MIXED SLAB FLOOR

In a project with a composite slab floor, all relevant limit situations and states are considered to guarantee a satisfactory level of safety and service, in particular:

3.1.- ASSEMBLY SITUATION

In this phase, the only resistant element is the ribbed sheets that act as concrete formwork and must withstand the following:

- Weight of concrete and sheet.
- Construction loads, including concrete stacking during pouring.
- Stockpiles of materials, if any.
- "Pooling" effect, a greater thickness of concrete due to deflection in the sheet metal.

3.2.- SERVICE SITUATION

When checking the floor as a composite part once the props have been removed, any unfavorable loads must be distributed by applying one of the following procedures:

- Linear analysis, with or without redistribution.
- Overall rigid-plastic analysis provided that the sections where plastic hinges are formed have sufficient rotation capacity.
- Elastoplastic analysis, considering the non-linear properties of the material.

3.3.- ULTIMATE LIMITS STATES

In a mixed floor with sheet metal as permanent formwork, the rupture modes and the critical sections where a rupture can occur are:

- Critical section type I: these sections occur in the centre of spans and in supports; breakage occurs in the form of bending when the final positive or negative moment is reached.
- Critical section type II: these sections occur in the supports, and are only critical in special cases, such as large depth slabs with small spans and significant loads; failure occurs by vertical shearing and / or punched holes when the ultimate value is reached.

3.4.- IN SERVICE LIMIT STATES

- Concrete cracks: The crack width in continuous negative moment areas is evaluated under the criteria indicated in section 4.4.2. of EUROCODE 2.
- Deflections: the limitations relative to the admissible deflections that these floors must satisfy are similar to those specified for beams and must meet acceptable values for the structural elements they support (partitions, walls, etc.) and for the appearance of the building. In general, the criteria given in section 4.2.2 of the EUROCODE 3 may be adopted.

The reference standard used to prepare these tables is:

• EHE-08 RD 1247/2008

• EUROCODE 4. Part 1-1





C/ Persiles y Segismunda, s/n • 45221 Esquivias / Toledo / Spain
Phone: +34 925 520 035
www.magon.es
magonaceros@magon.es

This document is not a safety manual.

The content and recommendations in the catalogue are informative and non-binding.

MAGON METALES PERFILADOS S.A. reserves the right to modify the contents of this document without prior notice.

General Sales Conditions available on our website www.magon.es