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“ENERGY EFFICIENT BUILDING” – BY SOLAR PROTECTION

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Abstract: One of the concepts world wide most promoted in the last decade about how to design a buildings is: “Energy Efficient Building”. A crucial element to achieve low power consumption, so an energy efficient building, is the strong solar contributions limitation during summer. This can be reached by an external vertical solar shading on the south, east and west facades.

Key words: solar protection, energy efficient building.

1. INTRODUCTION

In Romania, during the summer, the solar contribution through a glass window with three layers is approx. $6.5 \text{ [MJ / m}^2 \cdot \text{day]}$, on the south facade and about $5, 5 \text{ [MJ / m}^2 \cdot \text{day]}$ on the eastern and western facades. An external adjustable shading system can reduce solar contribution with 90-95 %, respectively to a value less than $0.5 \text{ [MJ / m}^2 \cdot \text{day]}$.

Some practical aspects related to what described above will be presented forward.

2. EXTERNAL ELEMENTS FOR SOLAR PROTECTION

2.1 Classification of the external elements for solar protection

From a practical point of view and in terms of mounting external elements of solar protection, the external elements for protection can be classified into four structural types, namely:

External elements of solar protection with “C shaped” disks

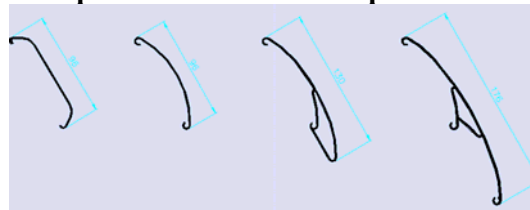


Fig. 1 Aluminum disks.

This system is composed of aluminum disks that can be assembled continuous or into a frame. Disks may be mounted in different ways, namely:

1) *Fixed disks continuously fitted using clips*: thus formed panels can be placed horizontally, vertically or at an angle.

2) *Disks fitted in a box*: the slides are mounted between two support profiles that are specially to respect this procedure. Boxes thus formed can be placed horizontally, vertically, angled or curved.



Fig. 2 Disks horizontally (left) and vertically (right) fitted.



Fig. 3 Disks angled (left) and curved (right) fitted.

External elements of solar protection with oval section disks

This system consists of plane or three-dimensional disks made of extruded aluminum.

Disks can be:

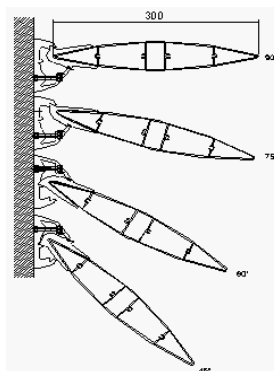


Fig. 4 Oval section disks.



Fig. 5 Fixed oval section disks fitted.

- Fixed, fitted on angles: 45 °, 60 °, 75 ° or 90 ° from the vertical (as figured above);
 - Mobile, their inclination can be adjusted in a continuous range of angles from 0 ° to 90 °.
- Disks angle adjustment can be done manually, mechanically or automatically.

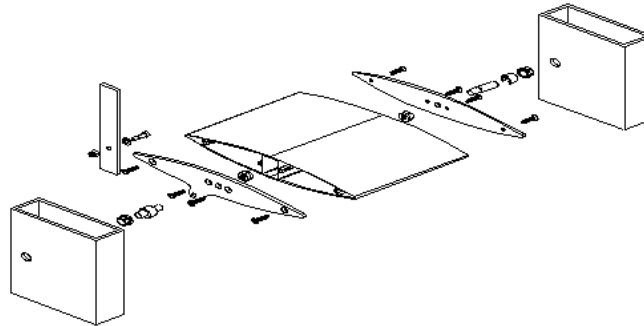


Fig. 6 Mobile oval section disks.

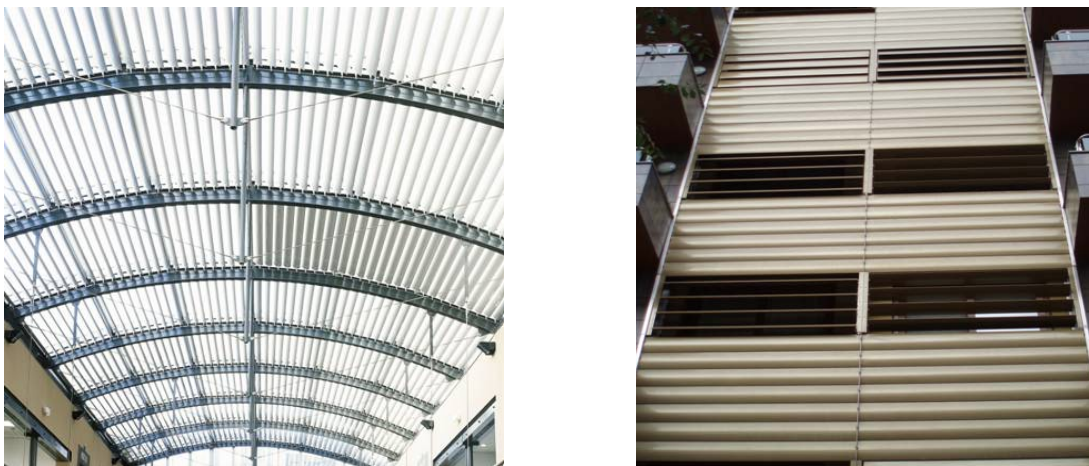


Fig. 7 Mobile oval section disks fitted.

External elements of solar protection made from mobile panels

The system consists of a rigid aluminum frame that is mounted disks for shading.

The frame is fixed with a system that allows dragging it horizontally, which makes it can be brought to the desired position more easily.

There are several options available for both frame and disks, so they can assure visual density and desired shade for each project.



Fig. 8 External elements of solar protection made from mobile panels.

Shield shaped external elements of solar protection

The screen is made of glass fiber texture and a PVC layer, resistant to fire. It has the ability to keep their shape and color and not be affected by moisture and heat.

The shield sides are reinforced with transparent tape of 9 mm width and 0.3 mm thick. At the bottom and top has a hot made stitch, through which fixing cables are mounted.

Manufacturing dimensions are:

- L = 2.500 m; H = 1.600 m
- L = 4.000 m; H = 2.700 m
- L = 6.000 m; H = 3.000 m or L = 3.000 m; H = 6.000 m.

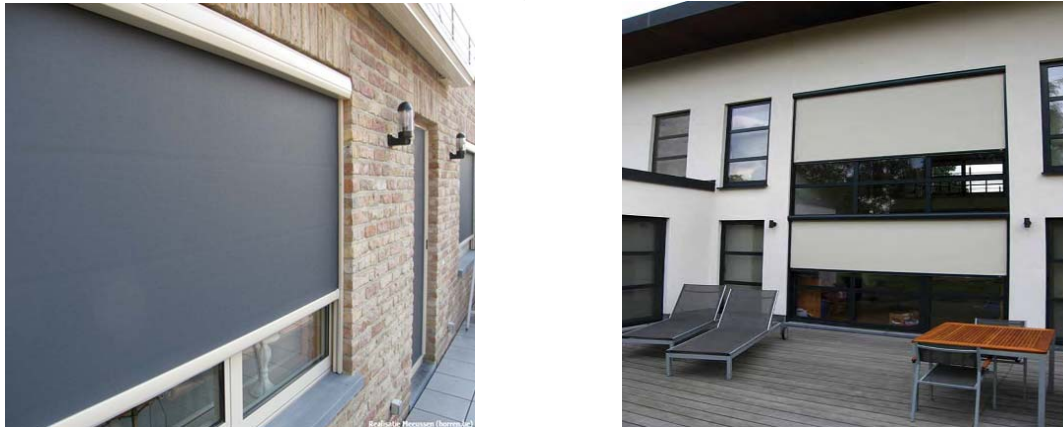


Fig. 9 Shield shaped external elements of solar protection.

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