

# GRISPE



Guidelines and Recommendations for Integrating Specific Profiled steel sheets in the Eurocodes  
(GRISPE)

**WP3 Doc 2 Final Version 04**

## **WP3 Test program definition**

**Working Package 3**

**Guidelines and Recommendations for Integrating Specific Profiled Steels sheets in the Eurocodes (GRISPE)**

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**Dissemination Level**

|           |  |          |
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**Verification and Approval**

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**Deliverable**

|   |  |
|---|--|
| <b><i>D 3.2 WP3 Test program definition</i></b> | <b><i>Due date : 31.12.2013</i></b><br><b><i>Completion date: 28.12.13</i></b> |
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## **1. INTRODUCTION**

### **1.1. Aim of the tests**

The aim of the tests is:

- to acquire data for analyzing the effects of:
  - . perforation arranged in square
  - . hole in the upper flange

### **1.2. General**

In order to acquire the data for analyzing the effect of perforation and holes, the same profiles will be tested:

- . without perforation
- . with perforation arranged in squares:
  - in the upper flange
  - in the webs
  - in the upper flange and in the webs
- . without hole
- . with circular or square hole in the upper flange

with two different thickness.

The global behaviour of profiles will be tested according to EN 1993-1-3, Annex A:

- single span tests,
- internal support tests,
- end support tests.

The local behaviour of sheets with perforation will be tested on coupon tests.

### **1.3 Preliminary measurements**

The following geometrical dimensions of the test samples have to be controlled:

- Core thickness (without zinc) and yield strength measured in relation with core thickness. The core thickness may be measured after chemical removal of the zinc or by mean of any device guarantying an equivalent precision of measure, as for example electro-magnetic device,
- Overall dimensions of sheeting cross section: width and height, measured with 1 mm precision.

### **1.4 General remarks concerning single span tests, internal support tests and end support tests procedure**

- The test procedure is based on the EN 1993-1-3 Annex A principles, however taking into account the amendments prepared by the Evolution Group EN 1993-1-3
- Test data to acquire are numerical values of corresponding loads and deflections, as well as corresponding diagrams
- The load will be applied with control of displacements

- Zeroing displacement sensors will be made after installation of the test sample, before installation of the loading system
- At each step of loading the displacements will be noted after stabilization of loading
- The graduation of the loading steps will be set and adjusted during each new type of test. Usually, in the initial stage the steps should be short, afterwards, in linear stage, they can be increased and it is recommended to shorten the steps at the beginning of non-linear stage and shortly after reaching maximal value, and afterwards it may be increased again
- In "single span tests" the loading will be applied up to collapse
- In "internal support tests" the loading will be applied up to deflection at least  $\approx s/10$
- During "end support tests" the loading will be slightly extended beyond ultimate maximum load

## 2. PERFORATION DIMENSIONS

An example of perforation arranged in equilateral triangles, currently used in practice, is shown in the Fig. 2.1

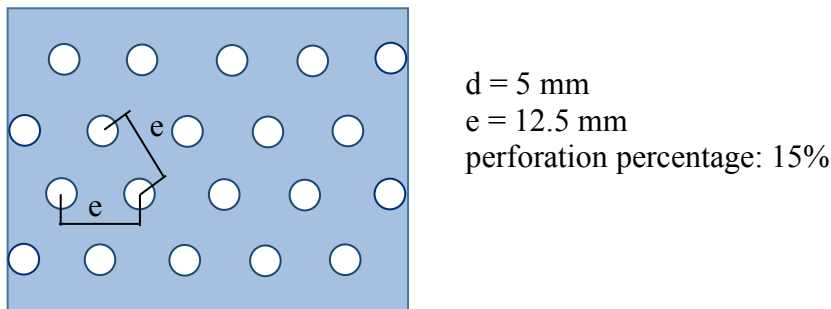


Fig. 2.1 Dimensions of existing perforation arranged in equilateral triangles

The perforation arranged in squares adopted for testing program is shown in the Fig. 2.2.

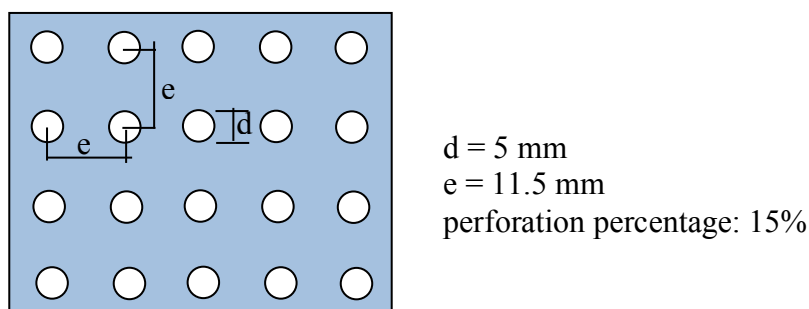


Fig. 2.2 Dimensions of perforation arranged in squares

### 3 TESTING PRINCIPLES

#### 3.1 Testing on sheeting

##### 3.1.1 Single span tests

###### Tests set-up:

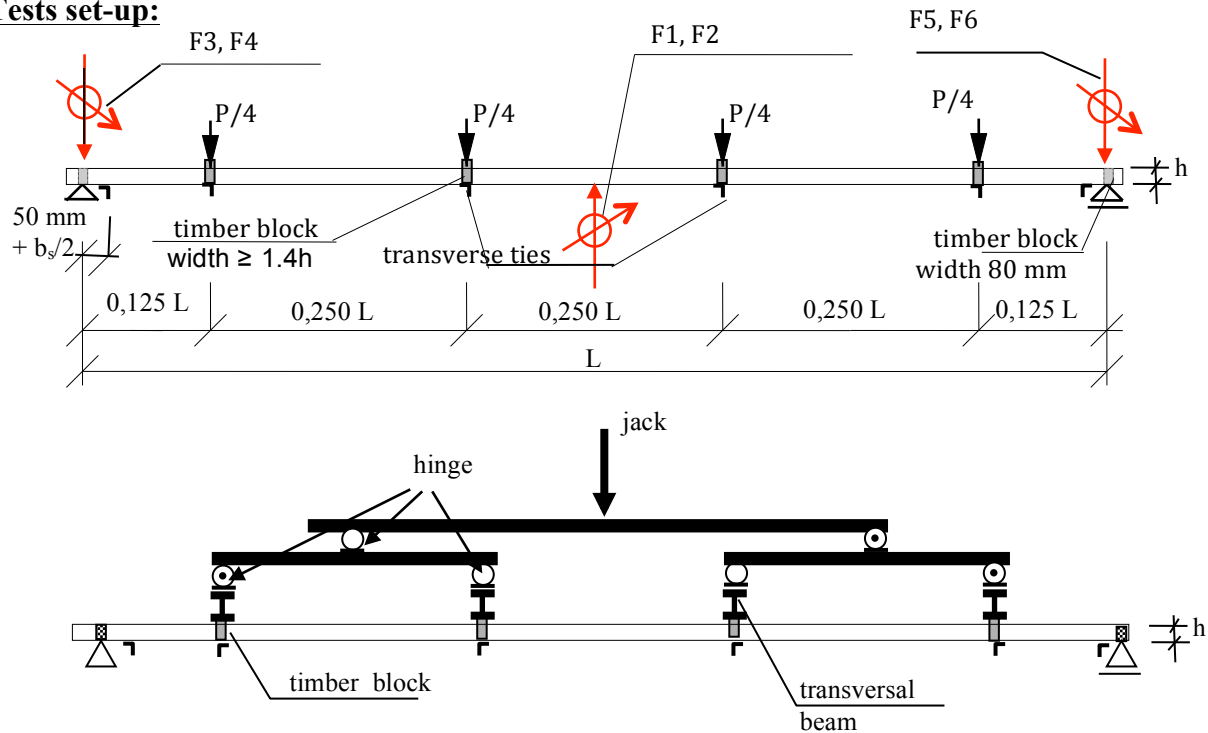


Fig. 3.1.1.1 – Test set-up for single span tests

###### Key:

- fixe hinge
- ⊙ mobile hinge (free horizontal displacement)
- $b_s$  support width

Transverse ties: folded angles 30x30x1. The ties are reusable for different tests.

$P$  = applied external load on the sample (jack force + accessories weight)

$F_i$  = displacement sensors:

- at the mid-span -  $F_1, F_2$

- at the end supports:

left side:  $F_3, F_4$

right side:  $F_5, F_6$

The displacement sensors  $F_1$  and  $F_2$  are situated under bottom flanges of edge ribs.

The displacement sensors  $F_3$  to  $F_6$  are situated above upper flanges of edge ribs.

Dimension of timber blocs:

- at the supports:  $h_{\text{timber}} = h_{\text{sheeting}}$ , thickness  $b_{\text{timber}} = 80$  mm

- under transversal beams  $h_{\text{timb}} = h_{\text{sheeting}} + 5$  mm, thickness  $b_{\text{timber}} = 1.4 h_{\text{sheeting}}$

The length of timber block is adjusted to the internal width of the sheeting being in contact with the timber block (taking into account the rounded corners)

The surface of the timber block being in contact with sheeting flange is adjusted to the stiffeners in the flange

The samples are placed freely at the supports without fixing.

Remarks:

In order to avoid web crippling at the supports and under the transversal beam, the timber blocks are used.

In order to avoid spreading of the sheets, the transverse ties (for example folded angles 35x35x1 fixed to the sheet edges with hex-head self-tapping screws  $d \geq 4.2$  mm) are used (see Fig. 3.1.1.2)

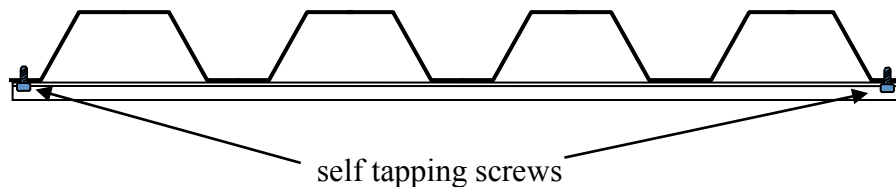


Fig. 3.1.1.2 – Fixation of the ties

### 3.1.2 Internal support tests

Test set-up:

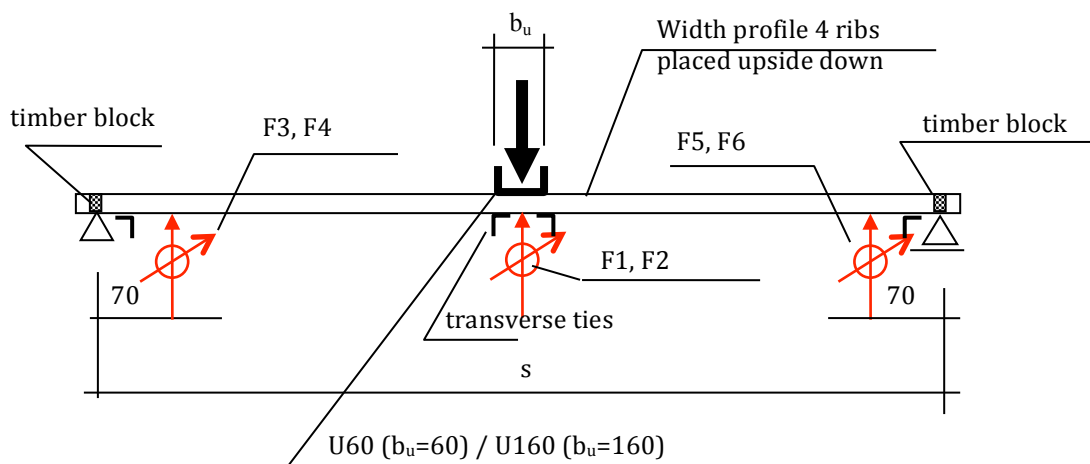


Fig. 3.1.2.1 – Test set-up for internal support tests

Transverse ties: folded angles 30x30x1. The ties are reusable for different tests.

$F_i$  = displacement sensors:

- at the mid-span - F1, F2

- at the end supports:

left side: F3, F4

right side: F5, F6

All displacement sensors are situated under bottom flanges of edge ribs.

Dimensions of timber blocs at the supports:

height  $h_{\text{timber}} = h_{\text{sheeting}}$

thickness of  $b_{\text{timber}} = 80 \text{ mm}$

The length of timber block is adjusted to the internal width of the sheeting being in contact with the timber block (taking into account the rounding corners).

The surface of the timber block being in contact with sheeting flange should be also adjusted to the stiffeners in the flange.

The samples are placed freely on the supports without fixing.

Remarks:

In order to avoid web crippling at the supports, the timber blocks are used.

In order to avoid spreading of the sheets, the transverse ties (for example folded angles 35x35x1 fixed to the sheet edges with hex-head self-tapping screws  $d \geq 4.2 \text{ mm}$ ) are used (see Fig. 3.1.1.2)

### 3.1.3 End support tests

Test set-up:

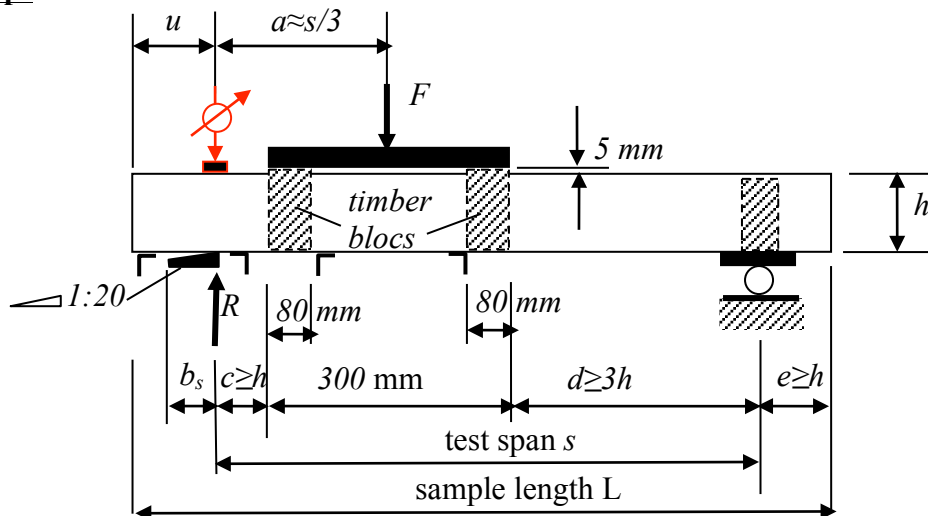


Fig. 3.1.3.1 – Test set-up for end support test

Dimension of timber blocs:

height of timber blocs situated at the supports:  $h_{\text{timber}} = h_{\text{sheeting}}$

height of timber blocs situated under transversal beams  $h_{\text{timb}} = h_{\text{sheeting}} + 5 \text{ mm}$

thickness  $b_{\text{timber}} = 80 \text{ mm}$

The length of timber block is adjusted to the internal width of the sheeting being in contact with the timber block (taking into account the rounding corners).

The surface of the timber block being in contact with sheeting flange is adjusted to the stiffeners in the flange .

Remarks:

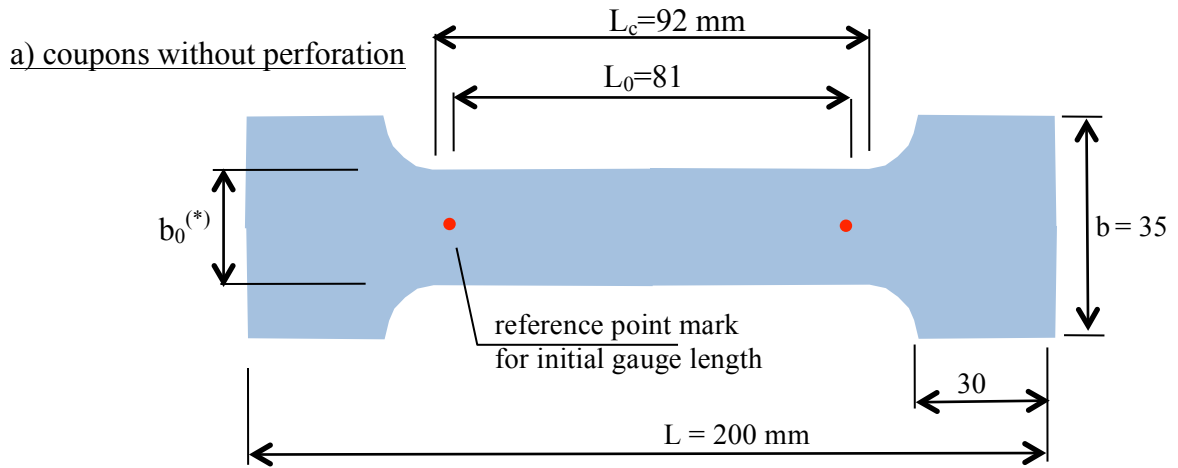
In order to avoid web crippling at the support opposite to the tested support and under the transversal beam, the timber blocks are used.

In order to avoid spreading of the sheets, the transverse ties (for example folded angles 35x35x1 fixed to the sheet edges with hex-head self-tapping screws  $d \geq 4.2 \text{ mm}$ ) are used (see Fig. 3.1.1.2)

### 3.2 Testing on coupon tests

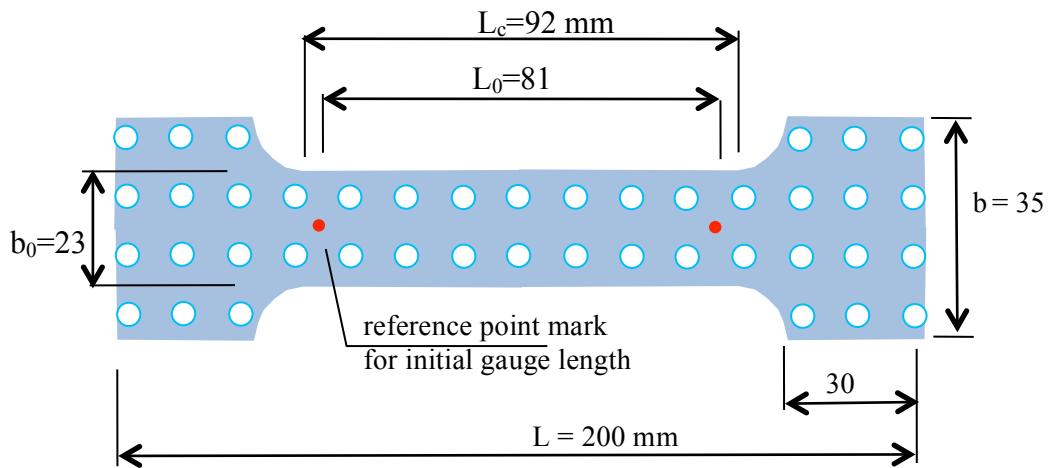
#### 3.2.1 Tensile testing

The coupons will be tested according to EN ISO 6892-1.



(\*)  $b_0 = 22$  mm and  $23$  mm - see specification, Table 4.3.1

b) coupons with new perforation arranged in squares



c) coupons with existing perforation arranged in triangles

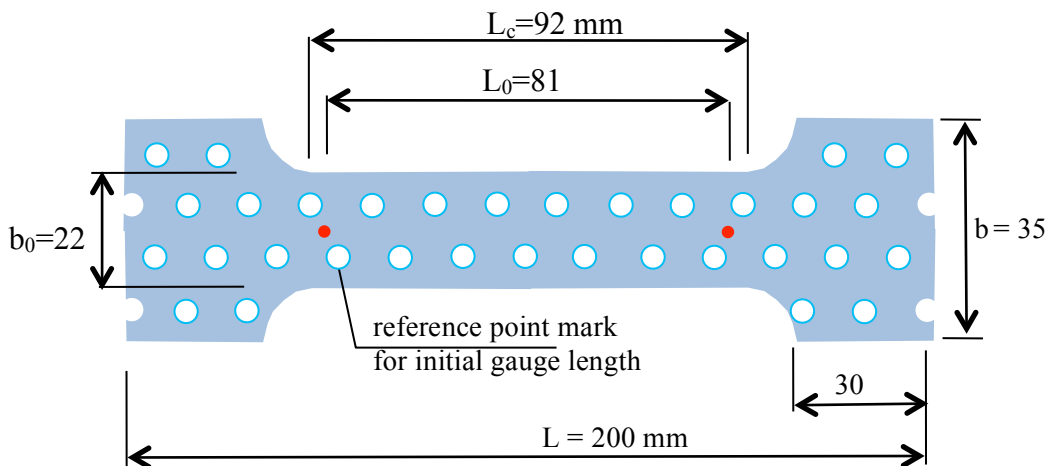


Fig. 3.2.1.1 Dimensions of coupons for tensile tests with perforated sheet



Key:

$L$  = total length

$L_c$  = parallel length

$L_0$  = initial gauge length

$b$  = total width

$b_0$  = width of the parallel reduced part

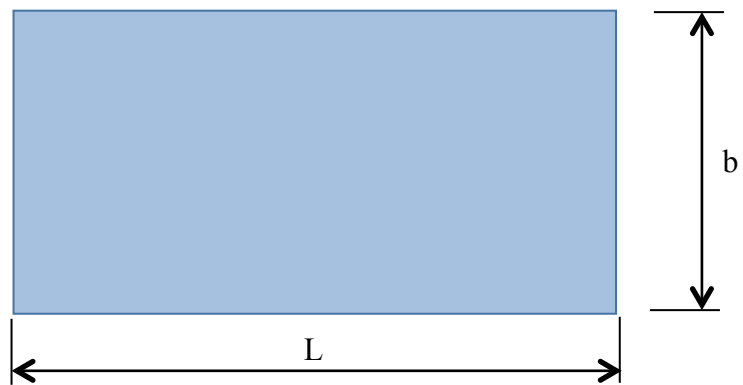
$e$  = perforations space (see Fig. 2.1 and 2.2)

The results of tests on coupons are interpreted in relation with core thickness.

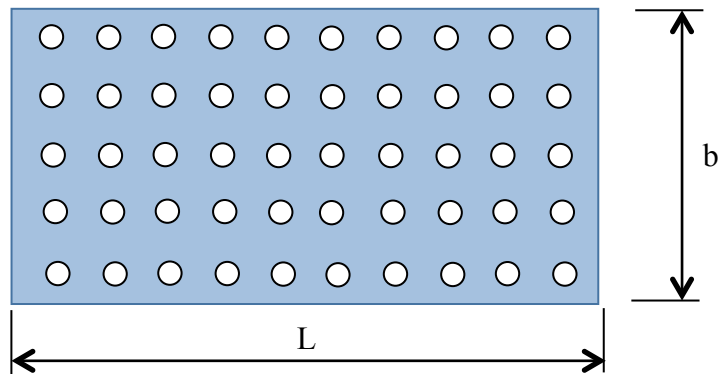
### 3.2.2 Plate flexion testing

Dimension of plates:

a) plates without perforation



b) plates with perforation arranged in squares



c) plates with perforation arranged in triangles

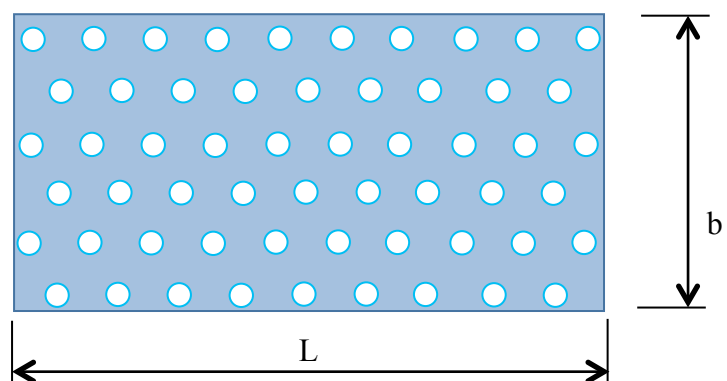


Fig. 3.2.2.1 Dimensions of coupons for plates flexion tests

The testing is performed on plates:

- a) without perforation
- b) with perforation arranged in triangles
- c) with perforation arranged in squares

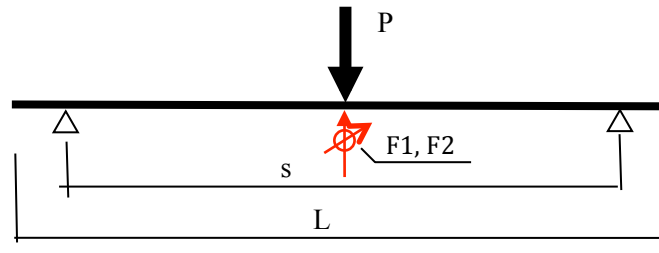


Fig. 3.2.2.2 Test set-up for plate flexion tests

Key:

e = perforations space (see Fig. 2.1 and 2.2)

L = coupon length

s = test span

b = coupon width

P = applied force

For the above data values see Table 4.3.2.

#### 4 Specification of samples

##### 4.1 Preparation of the sheeting samples

General requirements:

- The sheeting samples having the same thickness must be produced with the same coil
- The samples must be composed of integer number of ribs:
  - . as shown in the Fig. 4.1.1 when lateral edges are in tension
  - . as shown in the Fig. 4.1.2 when lateral edges are in compression

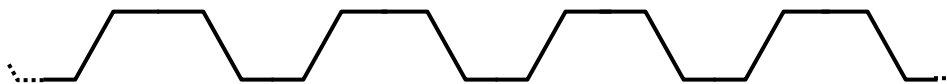


Fig. 4.1.1 Principle of cutting of the lateral edges in tension (the parts to remove are drawn in dotted lines)

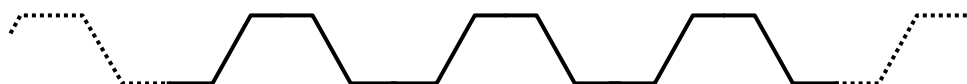


Fig. 4.1.2 Principle of cutting of the lateral edges in compression (the parts to remove are drawn in dotted lines)

## 4.2 Sheeting

### 4.2.1 Sheeting 4 (not perforated and perforated)

PML 73 SE/0.75 JORIS IDE

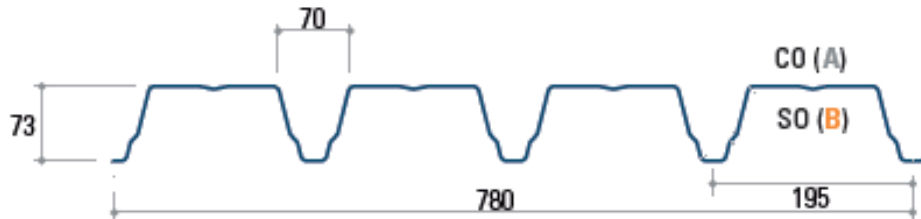


Fig. 4.2.1.1 Cross section

Table 4.2.1.1

PML 73 SE/0.75  
Profiles without perforation  
 $t=0.75$  mm

| Profiles without perforation |                              |                  | Dimensions    |             |                                  |             |      |
|------------------------------|------------------------------|------------------|---------------|-------------|----------------------------------|-------------|------|
|                              |                              |                  | Length        |             | Width                            | $t_N$<br>mm |      |
|                              |                              |                  | span<br>mm    | sheet<br>mm |                                  |             |      |
| Ref.                         | Type                         | Name             | span<br>mm    | sheet<br>mm | Width                            | $t_N$<br>mm |      |
| EC3                          | span<br>positive<br>flexion  | PF-4-075-1       | 3300          | 3500        | cf<br>Fig. 4.1.1                 | 0.75        |      |
|                              |                              | PF-4-075-2       |               |             |                                  |             |      |
|                              |                              |                  |               |             |                                  |             |      |
|                              | Inter-<br>mediate<br>support | IS6-4-075-11     | 500           | 700         | cf<br>Fig. 4.1.2                 |             |      |
|                              |                              | IS6-4-075-12     |               |             |                                  |             |      |
|                              |                              | IS6-4-075-21     | 1100          | 1300        |                                  |             |      |
|                              |                              | IS6-4-075-22     |               |             |                                  |             |      |
|                              |                              | $b_u=$<br>60 mm  | IS6-4-075-41  | 1700        |                                  |             | 1900 |
|                              |                              |                  | IS6-4-075-42  |             |                                  |             |      |
|                              | Inter-<br>mediate<br>support | IS16-4-075-11    | 500           | 700         | cf<br>Fig. 4.1.2                 |             |      |
|                              |                              | IS16-4-075-12    |               |             |                                  |             |      |
|                              |                              | IS16-4-075-21    | 1100          | 1300        |                                  |             |      |
|                              |                              | IS16-4-075-22    |               |             |                                  |             |      |
|                              |                              | $b_u=$<br>160 mm | IS16-4-075-41 | 1700        |                                  |             | 1900 |
|                              |                              |                  | IS16-4-075-42 |             |                                  |             |      |
|                              | End<br>support               | ES-4-075-1       | 700           | 900         | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |             |      |
| ES-4-075-2                   |                              |                  |               |             |                                  |             |      |
|                              |                              |                  |               |             |                                  |             |      |

Table 4.2.1.2

PML 73 SE PP/0.75  
 Profiles with Flange Perforation  
 $t=0.75$  mm

| Profiles with Flange Perforation |                              |                | Dimensions |                                  |                  |             |
|----------------------------------|------------------------------|----------------|------------|----------------------------------|------------------|-------------|
|                                  |                              |                | Length     |                                  | Width            | $t_N$<br>mm |
| Ref.                             | Type                         | Name           | span<br>mm | sheet<br>mm                      |                  |             |
| EC3                              | span<br>positive<br>flexion  | PF-4f-075-1    | 3300       | 3500                             | cf<br>Fig. 4.1.1 | 0.75        |
|                                  |                              | PF-4f-075-2    |            |                                  |                  |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  | Inter-<br>mediate<br>support | IS6-4f-075-11  | 500        | 700                              | cf<br>Fig. 4.1.2 |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  | $b_u=$<br>60 mm              | IS6-4f-075-41  | 1700       | 1900                             | cf<br>Fig. 4.1.2 |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  | Inter-<br>mediate<br>support | IS16-4f-075-11 | 500        | 700                              | cf<br>Fig. 4.1.2 |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  | $b_u=$<br>160 mm             | IS16-4f-075-41 | 1700       | 1900                             | cf<br>Fig. 4.1.2 |             |
|                                  |                              |                |            |                                  |                  |             |
| End<br>support                   | ES-4f-075-1                  | 700            | 900        | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |                  |             |
|                                  |                              |                |            |                                  |                  |             |
|                                  |                              |                |            |                                  |                  |             |

Table 4.2.1.3

PML 73 SE PO/0.75  
 Profiles with Web Perforation  
 $t=0.75$  mm

| Profiles with Web Perforation |                              |                  | Dimensions     |                                  |                  |             |
|-------------------------------|------------------------------|------------------|----------------|----------------------------------|------------------|-------------|
|                               |                              |                  | Length         |                                  | Width            | $t_N$<br>mm |
| Ref.                          | Type                         | Name             | span<br>mm     | sheet<br>mm                      |                  |             |
| EC3                           | span<br>positive<br>flexion  | PF-4w-075-1      | 3300           | 3500                             | cf<br>Fig. 4.1.1 |             |
|                               |                              | PF-4w-075-2      |                |                                  |                  |             |
|                               |                              |                  |                |                                  |                  |             |
|                               | Inter-<br>mediate<br>support | IS6-4w-075-11    | 500            | 700                              | cf<br>Fig. 4.1.2 |             |
|                               |                              | IS6-4w-075-12    |                |                                  |                  |             |
|                               |                              | IS6-4w-075-21    | 1100           | 1300                             |                  |             |
|                               |                              | IS6-4w-075-22    |                |                                  |                  |             |
|                               |                              | $b_u=$<br>60 mm  | IS6-4w-075-41  | 1700                             |                  | 1900        |
|                               |                              |                  | IS6-4w-075-42  |                                  |                  |             |
|                               | Inter-<br>mediate<br>support | IS16-4w-075-11   | 500            | 700                              | cf<br>Fig. 4.1.2 |             |
|                               |                              | IS16-4w-075-12   |                |                                  |                  |             |
|                               |                              | IS16-4w-075-21   | 1100           | 1300                             |                  |             |
|                               |                              | IS16-4w-075-22   |                |                                  |                  |             |
|                               |                              | $b_u=$<br>160 mm | IS16-4w-075-41 | 1700                             |                  | 1900        |
|                               |                              |                  | IS16-4w-075-42 |                                  |                  |             |
| End<br>support                | ES-4w-075-1                  | 700              | 900            | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |                  |             |
|                               | ES-4w-075-2                  |                  |                |                                  |                  |             |
|                               |                              |                  |                |                                  |                  |             |

Table 4.2.1.4

PML 73 SE PT/0.75  
 Profiles with Total Perforation  
 $t=0.75$  mm

| Profiles with Total Perforation |                              |                | Dimensions |             |                                  |
|---------------------------------|------------------------------|----------------|------------|-------------|----------------------------------|
|                                 |                              |                | Length     |             | Width                            |
| Ref.                            | Type                         | Name           | span<br>mm | sheet<br>mm |                                  |
| EC3                             | span<br>positive<br>flexion  | PF-4t-075-1    | 3300       | 3500        | cf<br>Fig. 4.1.1                 |
|                                 |                              | PF-4t-075-2    |            |             |                                  |
|                                 |                              |                |            |             |                                  |
|                                 | Inter-<br>mediate<br>support | IS6-4t-075-11  | 500        | 700         | cf<br>Fig. 4.1.2                 |
|                                 |                              | IS6-4t-075-12  |            |             |                                  |
|                                 |                              | IS6-4t-075-21  | 1100       | 1300        |                                  |
|                                 |                              | IS6-4t-075-22  |            |             |                                  |
|                                 | $b_u=$<br>60 mm              | IS6-4t-075-41  | 1700       | 1900        |                                  |
|                                 |                              | IS6-4t-075-42  |            |             |                                  |
|                                 | Inter-<br>mediate<br>support | IS16-4t-075-11 | 500        | 700         |                                  |
|                                 |                              | IS16-4t-075-12 |            |             |                                  |
|                                 |                              | IS16-4t-075-21 | 1100       | 1300        |                                  |
|                                 |                              | IS16-4t-075-22 |            |             |                                  |
|                                 | $b_u=$<br>160 mm             | IS16-4t-075-41 | 1700       | 1900        |                                  |
|                                 |                              | IS16-4t-075-42 |            |             |                                  |
|                                 | End<br>support               | ES-4t-075-1    | 700        | 900         | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |
|                                 |                              | ES-4t-075-2    |            |             |                                  |
|                                 |                              |                |            |             |                                  |

Table 4.2.1.5  
 Complementary detailed information for  
 the end support set-up (see Fig. 3.1.3.1)

| h  | s   | a   | c  | d   | u  | e   | L   | $b_s$ |
|----|-----|-----|----|-----|----|-----|-----|-------|
| mm | mm  | mm  | mm | mm  | mm | mm  | mm  | mm    |
| 77 | 700 | 230 | 80 | 320 | 80 | 120 | 900 | 60    |

#### 4.2.2 Sheeting 5 (not perforated and perforated)

ALTEO 73.780/1.00 BACACIER

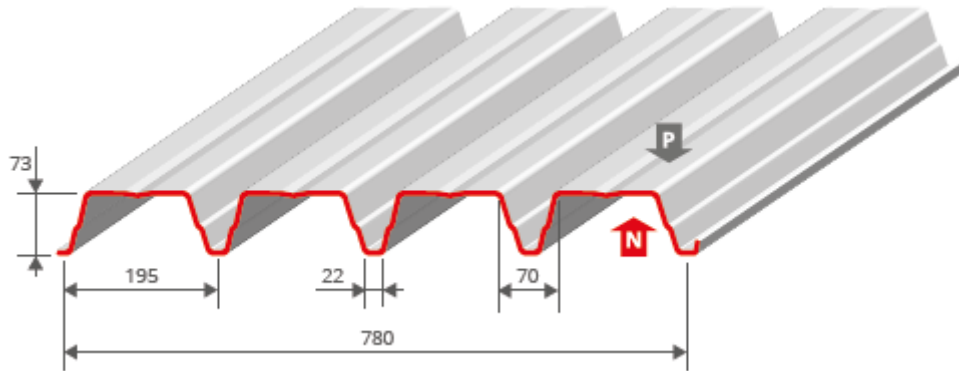


Fig. 4.2.2.1 Sheeting ALTEO 73.780 - general view

Table 4.2.2.1

ALTEO 73.780/1.00  
Profiles without perforation  
 $t=1.00$  mm

| Profiles without perforation |                              |               | Dimensions |                                  |                  |                  |
|------------------------------|------------------------------|---------------|------------|----------------------------------|------------------|------------------|
|                              |                              |               | Length     |                                  | Width            | $t_N$<br>mm      |
| Ref.                         | Type                         | Name          | span<br>mm | sheet<br>mm                      |                  |                  |
| EC3                          | span<br>positive<br>flexion  | PF-5-100-1    | 3300       | 3500                             | cf<br>Fig. 4.1.1 |                  |
|                              |                              | PF-5-100-2    |            |                                  |                  |                  |
|                              |                              |               |            |                                  |                  |                  |
|                              | Inter-<br>mediate<br>support | IS6-5-100-11  | 500        | 700                              | cf<br>Fig. 4.1.2 |                  |
|                              |                              | IS6-5-100-12  |            |                                  |                  |                  |
|                              |                              | IS6-5-100-21  | 1100       | 1300                             |                  |                  |
|                              |                              | IS6-5-100-22  |            |                                  |                  |                  |
|                              | $b_u=$<br>60 mm              | IS6-5-100-51  | 1700       | 1900                             |                  |                  |
|                              |                              | IS6-5-100-52  |            |                                  |                  |                  |
|                              | Inter-<br>mediate<br>support | IS16-5-100-11 | 500        | 700                              |                  | cf<br>Fig. 4.1.2 |
|                              |                              | IS16-5-100-12 |            |                                  |                  |                  |
|                              |                              | IS16-5-100-21 | 1100       | 1300                             |                  |                  |
|                              |                              | IS16-5-100-22 |            |                                  |                  |                  |
|                              | $b_u=$<br>160 mm             | IS16-5-100-51 | 1700       | 1900                             |                  |                  |
| IS16-5-100-52                |                              |               |            |                                  |                  |                  |
| End<br>support               | ES-5-100-1                   | 700           | 900        | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |                  |                  |
|                              | ES-5-100-2                   |               |            |                                  |                  |                  |
|                              |                              |               |            |                                  |                  |                  |

Table 4.2.2.2

ALTEO 73.780 PP/1.00  
 Profiles with Flange Perforation  
 $t=1.00$  mm

| Profiles with Flange Perforation |                              |                | Dimensions |             |                                  |       |
|----------------------------------|------------------------------|----------------|------------|-------------|----------------------------------|-------|
|                                  |                              |                | Length     |             | Width                            | $t_N$ |
| Ref.                             | Type                         | Name           | span<br>mm | sheet<br>mm |                                  |       |
| EC3                              | span<br>positive<br>flexion  | PF-5f-100-1    | 3300       | 3500        | cf<br>Fig. 4.1.1                 | 1.00  |
|                                  |                              | PF-5f-100-2    |            |             |                                  |       |
|                                  |                              |                |            |             |                                  |       |
|                                  | Inter-<br>mediate<br>support | IS6-5f-100-11  | 500        | 700         | cf<br>Fig. 4.1.2                 |       |
|                                  |                              |                |            |             |                                  |       |
|                                  |                              |                |            |             |                                  |       |
|                                  | $b_u=$<br>60 mm              | IS6-5f-100-51  | 1700       | 1900        | cf<br>Fig. 4.1.2                 |       |
|                                  |                              |                |            |             |                                  |       |
|                                  | Inter-<br>mediate<br>support | IS16-5f-100-11 | 500        | 700         | cf<br>Fig. 4.1.2                 |       |
|                                  |                              |                |            |             |                                  |       |
|                                  |                              |                |            |             |                                  |       |
|                                  | $b_u=$<br>160 mm             | IS16-5f-100-51 | 1700       | 1900        | cf<br>Fig. 4.1.2                 |       |
|                                  |                              |                |            |             |                                  |       |
|                                  | End<br>support               | ES-5f-100-1    | 700        | 900         | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |       |
|                                  |                              |                |            |             |                                  |       |
|                                  |                              |                |            |             |                                  |       |



Table 4.2.2.3

ALTEO 73.780 PA/1.00  
 Profiles with Web Perforation  
 $t=1.00$  mm

| Profiles with Web Perforation |                              |                | Dimensions |                                  |                  |       |
|-------------------------------|------------------------------|----------------|------------|----------------------------------|------------------|-------|
|                               |                              |                | Length     |                                  | Width            | $t_N$ |
| Ref.                          | Type                         | Name           | span<br>mm | sheet<br>mm                      |                  |       |
| EC3                           | span<br>positive<br>flexion  | PF-5w-100-1    | 3300       | 3500                             | cf<br>Fig. 4.1.1 | 1.00  |
|                               |                              | PF-5w-100-2    |            |                                  |                  |       |
|                               |                              |                |            |                                  |                  |       |
|                               | Inter-<br>mediate<br>support | IS6-5w-100-11  | 500        | 700                              | cf<br>Fig. 4.1.2 |       |
|                               |                              | IS6-5w-100-12  |            |                                  |                  |       |
|                               |                              | IS6-5w-100-21  | 1100       | 1300                             |                  |       |
|                               |                              | IS6-5w-100-22  |            |                                  |                  |       |
|                               | $b_u=$<br>60 mm              | IS6-5w-100-51  | 1700       | 1900                             |                  |       |
|                               |                              | IS6-5w-100-52  |            |                                  |                  |       |
|                               | Inter-<br>mediate<br>support | IS16-5w-100-11 | 500        | 700                              | cf<br>Fig. 4.1.2 |       |
|                               |                              | IS16-5w-100-12 |            |                                  |                  |       |
|                               |                              | IS16-5w-100-21 | 1100       | 1300                             |                  |       |
|                               |                              | IS16-5w-100-22 |            |                                  |                  |       |
|                               | $b_u=$<br>160 mm             | IS16-5w-100-51 | 1700       | 1900                             |                  |       |
| IS16-5w-100-52                |                              |                |            |                                  |                  |       |
| End<br>support                | ES-5w-100-1                  | 700            | 900        | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |                  |       |
|                               | ES-5w-100-2                  |                |            |                                  |                  |       |
|                               |                              |                |            |                                  |                  |       |

Table 4.2.2.4

ALTEO 73.780 PT/1.00  
Profiles with Total Perforation  
t=1.00 mm

| Profiles with Total Perforation |                              |                | Dimensions |             |                                  |
|---------------------------------|------------------------------|----------------|------------|-------------|----------------------------------|
|                                 |                              |                | Length     |             | Width                            |
| Ref.                            | Type                         | Name           | span<br>mm | sheet<br>mm |                                  |
| EC3                             | span<br>positive<br>flexion  | PF-5t-100-1    | 3300       | 3500        | cf<br>Fig. 4.1.1                 |
|                                 |                              | PF-5t-100-2    |            |             |                                  |
|                                 |                              |                |            |             |                                  |
|                                 | Inter-<br>mediate<br>support | IS6-5t-100-11  | 500        | 700         | cf<br>Fig. 4.1.2                 |
|                                 |                              | IS6-5t-100-12  |            |             |                                  |
|                                 |                              | IS6-5t-100-21  | 1100       | 1300        |                                  |
|                                 |                              | IS6-5t-100-22  |            |             |                                  |
|                                 | b <sub>u</sub> =<br>60 mm    | IS6-5t-100-51  | 1700       | 1900        |                                  |
|                                 |                              | IS6-5t-100-52  |            |             |                                  |
|                                 | Inter-<br>mediate<br>support | IS16-5t-100-11 | 500        | 700         |                                  |
|                                 |                              | IS16-5t-100-12 |            |             |                                  |
|                                 |                              | IS16-5t-100-21 | 1100       | 1300        |                                  |
|                                 |                              | IS16-5t-100-22 |            |             |                                  |
|                                 | b <sub>u</sub> =<br>160 mm   | IS16-5t-100-51 | 1700       | 1900        |                                  |
|                                 |                              | IS16-5t-100-52 |            |             |                                  |
|                                 | End<br>support               | ES-5t-100-1    | 700        | 900         | cf<br>Fig. 4.1.1<br>Fig. 3.1.3.1 |
|                                 |                              | ES-5t-100-2    |            |             |                                  |
|                                 |                              |                |            |             |                                  |

Table 4.2.2.5  
Complementary detailed information for  
the end support set-up (see Fig. 3.1.3.1)

| h  | s   | a   | c  | d   | u  | e   | L   | b <sub>s</sub> |
|----|-----|-----|----|-----|----|-----|-----|----------------|
| mm | mm  | mm  | mm | mm  | mm | mm  | mm  | mm             |
| 77 | 700 | 230 | 80 | 320 | 80 | 120 | 900 | 60             |

### 4.2.3 Sheeting 4 - PML 73 SE/0.75 JORIS IDE

#### a) With circular hole

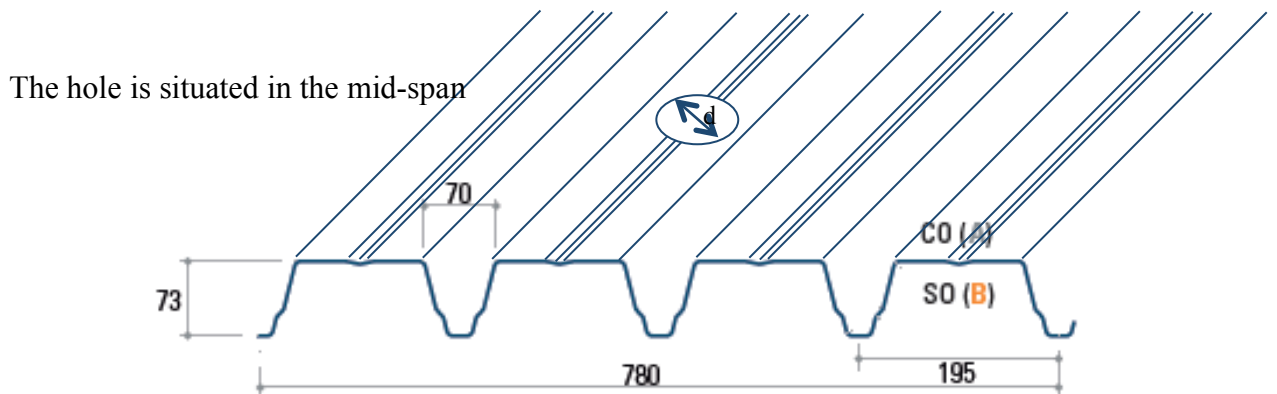


Fig. 4.2.3.1 Sheeting PML 73 SE with circular hole - general view

Key:

Holes  $d=120$  mm;  $d=105$  mm;  $d=90$  mm

Table 4.2.3.1  
Profiles with circular hole  $d=120$  mm  
 $t=0.75$  mm

| Profiles with circular hole<br>$d=120$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                      | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                       | span<br>positive<br>flexion | PF-4Hc1-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|   |                             | PF-4Hc1-075-2 |            |             |                  |       |

Table 4.2.3.2  
Profiles with circular hole  $d=105$  mm  
 $t=0.75$  mm

| Profiles with circular hole<br>$d=105$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                      | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                       | span<br>positive<br>flexion | PF-4Hc2-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|   |                             | PF-4Hc2-075-2 |            |             |                  |       |

Table 4.2.3.3  
Profiles with circular hole  $d=90$  mm  
 $t=0.75$  mm

| Profiles with circular hole<br>$d=90$ mm |                             |               | Dimensions |             |                  |       |
|--|-----------------------------|---------------|------------|-------------|------------------|-------|
|  |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                     | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                      | span<br>positive<br>flexion | PF-4Hc3-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|  |                             | PF-4Hc3-075-2 |            |             |                  |       |

**b) With square hole**

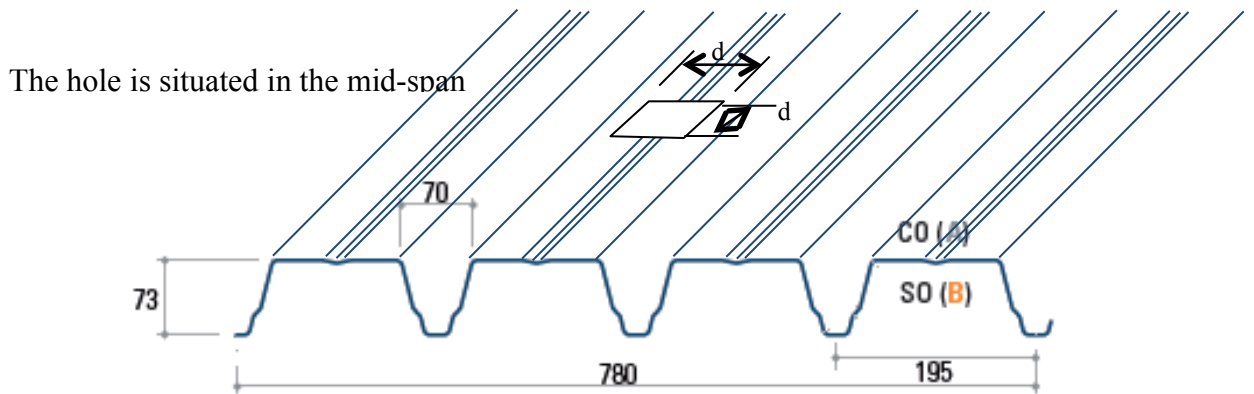


Fig. 4.2.3.2 Sheeting PML 73 SE with square hole - general view

Key:

Holes  $d=120$  mm;  $d=105$  mm;  $d=90$  mm

Table 4.2.3.4  
Profiles with square hole  $d=120$  mm  
 $t=0.75$  mm

| Profiles with square hole<br>$d=120$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                    | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                     | span<br>positive<br>flexion | PF-4Hs1-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|   |                             | PF-4Hs1-075-2 |            |             |                  |       |

Table 4.2.3.5  
Profiles with square hole d=105 mm  
t=0.75 mm

| Profiles with square hole<br>d=105 mm |                             |               | Dimensions |             |                  |                |
|---------------------------------------|-----------------------------|---------------|------------|-------------|------------------|----------------|
|                                       |                             |               | Length     |             | Width            | t <sub>N</sub> |
| Ref.                                  | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                |
| EC3                                   | span<br>positive<br>flexion | PF-4Hs2-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75           |
|                                       |                             | PF-4Hs2-075-2 |            |             |                  |                |
|                                       |                             |               |            |             |                  |                |

Table 4.2.3.6  
Profiles with square hole d=90 mm  
t=0.75 mm

| Profiles with square hole<br>d=90 mm |                             |               | Dimensions |             |                  |                |
|--------------------------------------|-----------------------------|---------------|------------|-------------|------------------|----------------|
|                                      |                             |               | Length     |             | Width            | t <sub>N</sub> |
| Ref.                                 | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                |
| EC3                                  | span<br>positive<br>flexion | PF-4Hs3-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75           |
|                                      |                             | PF-4Hs3-075-2 |            |             |                  |                |
|                                      |                             |               |            |             |                  |                |

#### 4.2.4 Sheeting 5 - ALTEO 73.780/1.00 BACACIER

##### a) With circular hole

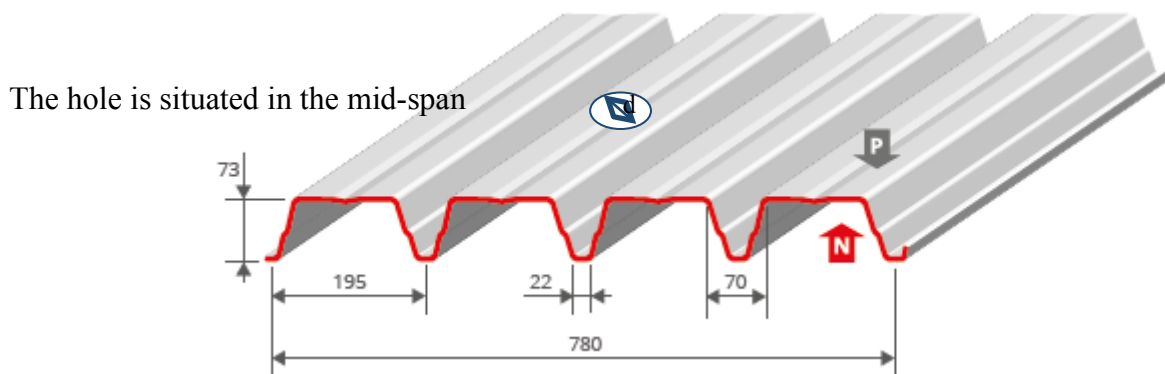


Fig. 4.2.4.1 General view

##### Key:

Holes d=120 mm; d= 105 mm; d=90 mm

Table 4.2.4.1  
 Profiles with circular hole d=120 mm  
 t=1.00 mm

| Profiles with circular hole<br>d=120 mm |                             |               | Dimensions |             |                  |                |
|---|-----------------------------|---------------|------------|-------------|------------------|----------------|
|   |                             |               | Length     |             | Width            | t <sub>N</sub> |
| Ref.                                    | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                |
| EC3                                     | span<br>positive<br>flexion | PF-5Hc1-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00           |
|   |                             | PF-5Hc1-100-2 |            |             |                  |                |
|   |                             |               |            |             |                  |                |

Table 4.2.4.2  
 Profiles with circular hole d=105 mm  
 t=1.00 mm

| Profiles with circular hole<br>d=105 mm |                             |               | Dimensions |             |                  |                |
|---|-----------------------------|---------------|------------|-------------|------------------|----------------|
|   |                             |               | Length     |             | Width            | t <sub>N</sub> |
| Ref.                                    | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                |
| EC3                                     | span<br>positive<br>flexion | PF-5Hc2-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00           |
|   |                             | PF-5Hc2-100-2 |            |             |                  |                |
|   |                             |               |            |             |                  |                |

Table 4.2.4.3  
 Profiles with circular hole d=90 mm  
 t=1.00 mm

| Profiles with circular hole<br>d=90 mm |                             |               | Dimensions |             |                  |                |
|--|-----------------------------|---------------|------------|-------------|------------------|----------------|
|  |                             |               | Length     |             | Width            | t <sub>N</sub> |
| Ref.                                   | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                |
| EC3                                    | span<br>positive<br>flexion | PF-5Hc3-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00           |
|  |                             | PF-5Hc3-100-2 |            |             |                  |                |
|  |                             |               |            |             |                  |                |

b) With square hole

ALTEO 73.780/1.00 BACACIER

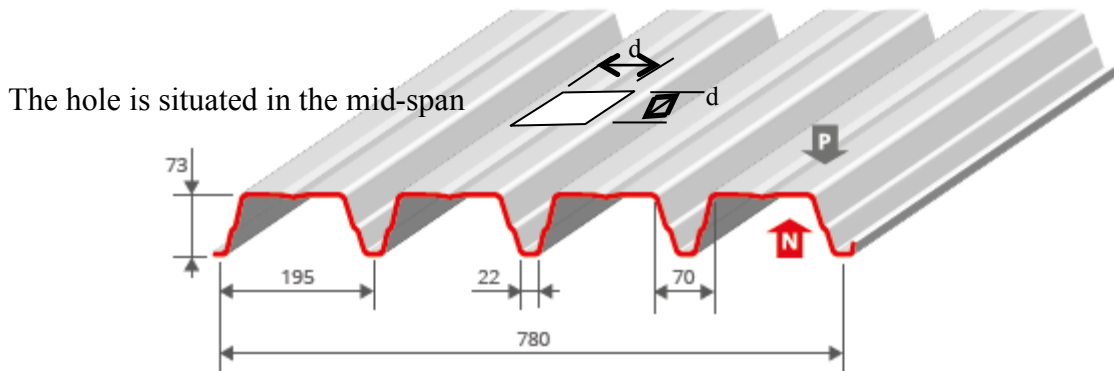


Fig. 4.2.4.2 General view

Key:

Holes  $d=120$  mm;  $d=105$  mm;  $d=90$  mm

Table 4.2.4.4  
Profiles with square hole  $d=120$  mm  
 $t=1.00$  mm

| Profiles with square hole<br>$d=120$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                    | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                     | span<br>positive<br>flexion | PF-5Hs1-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00  |
|   |                             | PF-5Hs1-100-2 |            |             |                  |       |

Table 4.2.4.5  
Profiles with square hole  $d=105$  mm  
 $t=1.00$  mm

| Profiles with square hole<br>$d=105$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                    | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                     | span<br>positive<br>flexion | PF-5Hs2-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00  |
|   |                             | PF-5Hs2-100-2 |            |             |                  |       |

Table 4.2.4.6  
Profiles with square hole d=90 mm  
t=1.00 mm

| Profiles with square hole<br>d=90 mm |                             |               | Dimensions |             |                  |                |
|--------------------------------------|-----------------------------|---------------|------------|-------------|------------------|----------------|
|                                      |                             |               | Length     |             | Width            | t <sub>N</sub> |
| Ref.                                 | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                |
| EC3                                  | span<br>positive<br>flexion | PF-5Hs3-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00           |
|                                      |                             | PF-5Hs3-100-2 |            |             |                  |                |
|                                      |                             |               |            |             |                  |                |

#### 4.2.5 Sheeting 6 - ALTEO 59.900/0.75 BACACIER

##### a) without hole

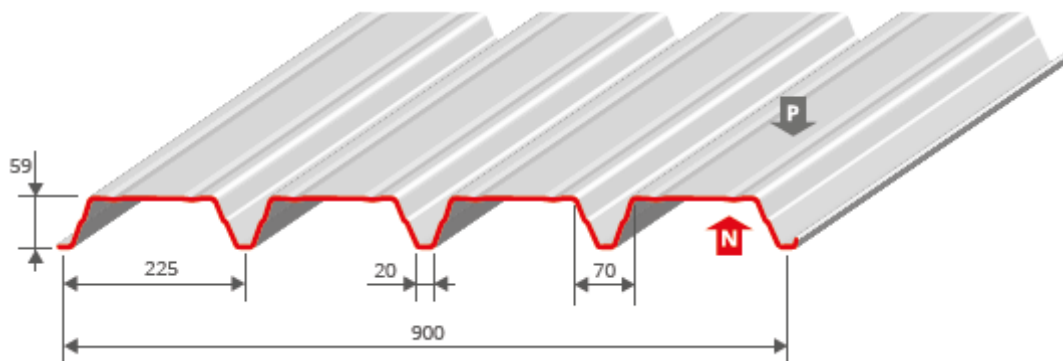


Fig. 4.2.5.1 General view

Table 4.2.5.1  
Profiles without hole  
t=0.75 mm

| Profiles without hole |                             |              | Dimensions |             |                  |                |
|-----------------------|-----------------------------|--------------|------------|-------------|------------------|----------------|
|                       |                             |              | Length     |             | Width            | t <sub>N</sub> |
| Ref.                  | Type                        | Name         | span<br>mm | sheet<br>mm |                  |                |
| EC3                   | span<br>positive<br>flexion | PF-6H1-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75           |
|                       |                             | PF-6H1-075-2 |            |             |                  |                |
|                       |                             |              |            |             |                  |                |



**b) With circular hole**

The hole is situated in the mid-span

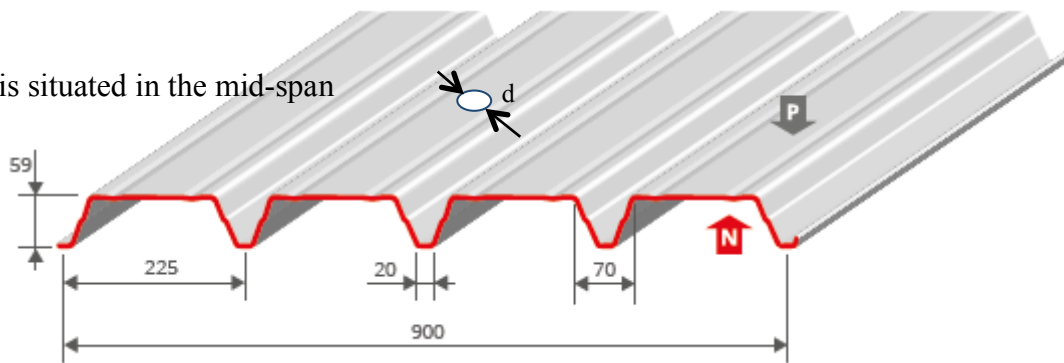


Fig. 4.2.5.2 General view

Key:

Holes  $d=100$  mm;  $65$  mm

Table 4.2.5.2  
Profiles with circular hole  $d=100$  mm  
 $t=0.75$  mm

| Profiles with circular hole<br>$d=100$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                      | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                       | span<br>positive<br>flexion | PF-6Hc1-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|   |                             | PF-6Hc1-075-2 |            |             |                  |       |

Table 4.2.5.3  
Profiles with circular hole  $d=65$  mm  
 $t=0.75$  mm

| Profiles with circular hole<br>$d=65$ mm |                             |               | Dimensions |             |                  |       |
|--|-----------------------------|---------------|------------|-------------|------------------|-------|
|  |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                     | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                      | span<br>positive<br>flexion | PF-6Hc2-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|  |                             | PF-6Hc2-075-2 |            |             |                  |       |

**c) With square hole**

The hole is situated in the mid-span

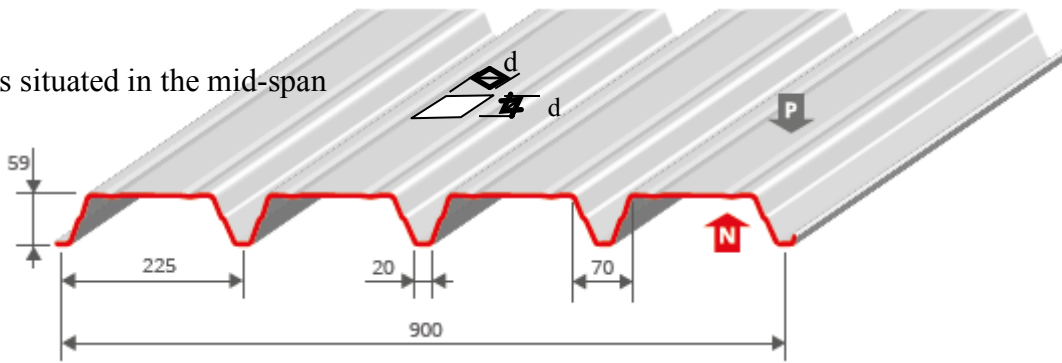


Fig. 4.2.5.3 General view

Key:

Holes  $d=100$  mm;  $60$  mm

Table 4.2.5.4  
Profiles with square hole  $d=100$  mm  
 $t=0.75$  mm

| Profiles with square hole<br>$d=100$ mm |                             |               | Dimensions |             |                  |       |
|---|-----------------------------|---------------|------------|-------------|------------------|-------|
|   |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                    | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                     | span<br>positive<br>flexion | PF-6Hs1-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|   |                             | PF-6Hs1-075-2 |            |             |                  |       |

Table 4.2.5.5  
Profiles with square hole  $d=65$  mm  
 $t=0.75$  mm

| Profiles with square hole<br>$d=65$ mm |                             |               | Dimensions |             |                  |       |
|--|-----------------------------|---------------|------------|-------------|------------------|-------|
|  |                             |               | Length     |             | Width            | $t_N$ |
| Ref.                                   | Type                        | Name          | span<br>mm | sheet<br>mm |                  |       |
| EC3                                    | span<br>positive<br>flexion | PF-6Hs1-075-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 0.75  |
|  |                             | PF-6Hs1-075-2 |            |             |                  |       |

#### 4.2.6 Sheeting 7 - ALTEO 59.900/1.00 BACACIER

##### a) without hole

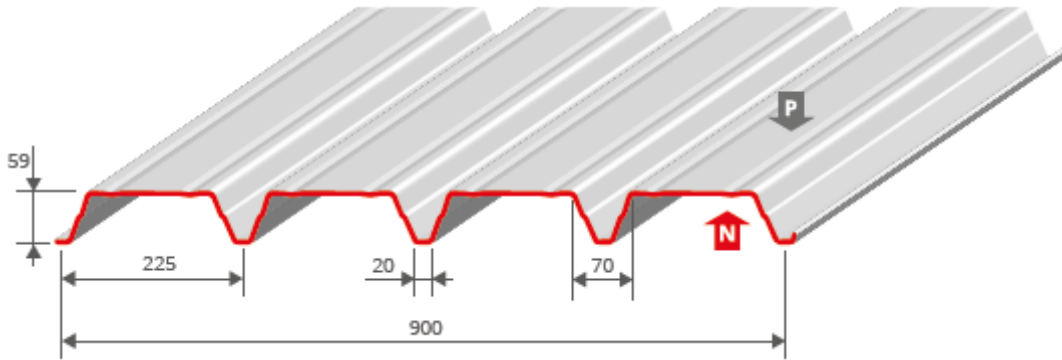


Fig. 4.2.6.1 General view

Table 4.2.6.1  
Profiles without hole  
 $t=1.00$  mm

| Profiles without hole |                             |              | Dimensions |             |                  |       |
|-----------------------|-----------------------------|--------------|------------|-------------|------------------|-------|
|                       |                             |              | Length     |             | Width            | $t_N$ |
| Ref.                  | Type                        | Name         | span<br>mm | sheet<br>mm |                  |       |
| EC3                   | span<br>positive<br>flexion | PF-7H1-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00  |
|                       |                             | PF-7H1-100-2 |            |             |                  |       |

##### b) With circular hole

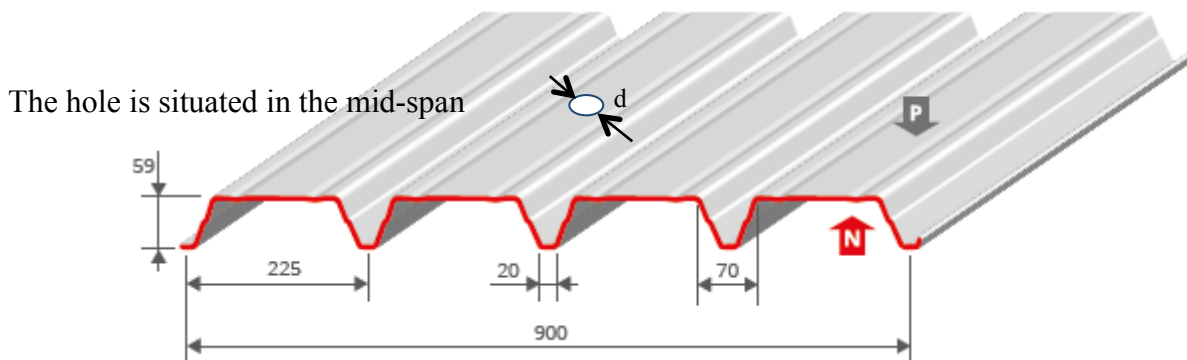


Fig. 4.2.6.2 General view

Key:

Holes  $d=100$  mm;  $d=65$  mm

Table 4.2.6.2  
Profiles with circular hole  $d=100$  mm  
 $t=1.00$  mm

| Profiles with circular hole<br>$d=100$ mm |                             |               | Dimensions |             |                  |             |
|---|-----------------------------|---------------|------------|-------------|------------------|-------------|
|   |                             |               | Length     |             | Width            | $t_N$<br>mm |
| Ref.                                      | Type                        | Name          | span<br>mm | sheet<br>mm |                  |             |
| EC3                                       | span<br>positive<br>flexion | PF-7Hc1-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 |             |
|   |                             | PF-7Hc1-100-2 |            |             |                  |             |
|   |                             |               |            |             |                  |             |

Table 4.2.6.3  
Profiles with circular hole  $d=65$  mm  
 $t=1.00$  mm

| Profiles with circular hole<br>$d=65$ mm |                             |               | Dimensions |             |                  |             |
|--|-----------------------------|---------------|------------|-------------|------------------|-------------|
|  |                             |               | Length     |             | Width            | $t_N$<br>mm |
| Ref.                                     | Type                        | Name          | span<br>mm | sheet<br>mm |                  |             |
| EC3                                      | span<br>positive<br>flexion | PF-7Hc2-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 |             |
|  |                             | PF-7Hc2-100-2 |            |             |                  |             |
|  |                             |               |            |             |                  |             |

c) With square hole

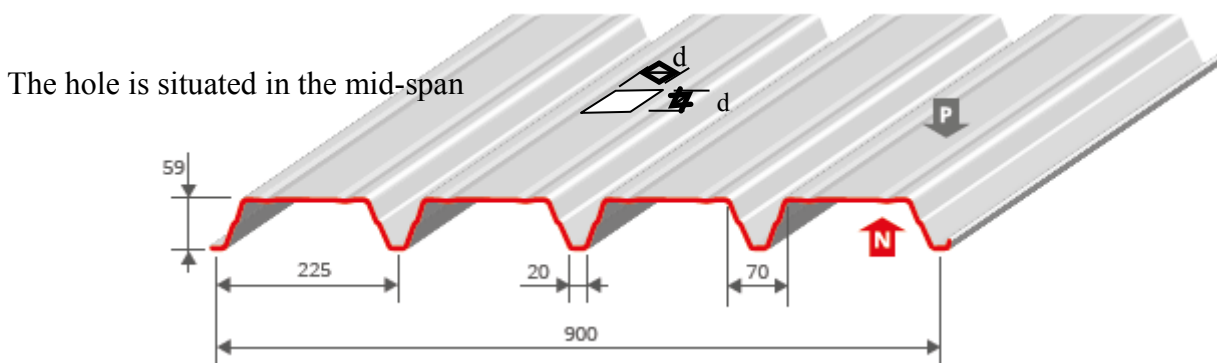


Fig. 4.2.6.3 General view

Key:

Holes  $d=100$  mm;  $d=65$  mm

Table 4.2.6.4  
 Profiles with square hole d=100 mm  
 t=1.00 mm

| Profiles with square hole<br>d=100 mm |                             |               | Dimensions |             |                  |                      |
|---------------------------------------|-----------------------------|---------------|------------|-------------|------------------|----------------------|
|                                       |                             |               | Length     |             | Width            | t <sub>N</sub><br>mm |
| Ref.                                  | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                      |
| EC3                                   | span<br>positive<br>flexion | PF-7Hs1-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00                 |
|                                       |                             | PF-7Hs1-100-2 |            |             |                  |                      |
|                                       |                             |               |            |             |                  |                      |

Table 4.2.6.5  
 Profiles with square hole d=65 mm  
 t=1.00 mm

| Profiles with square hole<br>d=65 mm |                             |               | Dimensions |             |                  |                      |
|--------------------------------------|-----------------------------|---------------|------------|-------------|------------------|----------------------|
|                                      |                             |               | Length     |             | Width            | t <sub>N</sub><br>mm |
| Ref.                                 | Type                        | Name          | span<br>mm | sheet<br>mm |                  |                      |
| EC3                                  | span<br>positive<br>flexion | PF-7Hs1-100-1 | 3300       | 3500        | cf<br>Fig. 4.1.1 | 1.00                 |
|                                      |                             | PF-7Hs1-100-2 |            |             |                  |                      |
|                                      |                             |               |            |             |                  |                      |

### 4.3 Coupon testing

Table 4.3.1 Tensile testing corresponding to the analysis of the effects of perforation

Note:

The coupons  $t_N = 0.75$  mm in rapport with sheeting 4 (PML 73 SE/0.75)

The coupons  $t_N = 1.00$  mm in rapport with sheeting 5 (ALTEO 73.780/1.00)

| Ref.         | $b_0$ | $t_N$ |
|--------------|-------|-------|
|              | mm    | mm    |
| TT-4fs-075-1 | 23    | 0.75  |
| TT-4fs-075-2 |       | 0.75  |
| TT-4fs-075-3 |       | 0.75  |
| TT-4ft-075-1 | 22    | 0.75  |
| TT-4ft-075-2 |       | 0.75  |
| TT-4ft-075-3 |       | 0.75  |
| TT-4s-075-1  | 23    | 0.75  |
| TT-4s-075-2  |       | 0.75  |
| TT-4s-075-3  |       | 0.75  |
| TT-4t-075-1  | 22    | 0.75  |
| TT-4t-075-2  |       | 0.75  |
| TT-4t-075-3  |       | 0.75  |
| TT-5fs-100-1 | 23    | 1.00  |
| TT-5fs-100-2 |       | 1.00  |
| TT-5fs-100-3 |       | 1.00  |
| TT-5ft-100-1 | 22    | 1.00  |
| TT-5ft-100-2 |       | 1.00  |
| TT-5ft-100-3 |       | 1.00  |
| TT-5s-100-1  | 23    | 1.00  |
| TT-5s-100-2  |       | 1.00  |
| TT-5s-100-3  |       | 1.00  |
| TT-5t-100-1  | 22    | 1.00  |
| TT-5t-100-2  |       | 1.00  |
| TT-5t-100-3  |       | 1.00  |

Key (see Fig. 3.2.1.1)

s = perforation arranged in Squares

t = perforation arranged in Triangles

fs = Full (without perforation) for comparison with Square arrangement

ft = Full (without perforation) for comparison with Triangular arrangement

Table 4.3.2 Plate flexion testing corresponding to the analysis of the effects of perforation

Note:

The coupons  $t_N = 0.75$  mm in rapport with sheeting 4 (PML 73 SE/0.75)

The coupons  $t_N = 1.00$  mm in rapport with sheeting 5 (ALTEO 73.780/1.00)

| Ref.          | $t_N$ | b  | L   | s   | Perfo- | P  |
|---------------|-------|----|-----|-----|--------|----|
|               | mm    | mm | mm  | mm  | ration | N  |
| FT-4fs-075-1  | 0.75  | 46 | 120 | 104 | no     | 20 |
| FT-4fs-075-2  | 0.75  | 46 | 120 | 104 | no     | 20 |
| FT-4fs-075-3  | 0.75  | 46 | 120 | 104 | no     | 20 |
| FT-4FT-4075-1 | 0.75  | 43 | 120 | 108 | no     | 20 |
| FT-4FT-4075-2 | 0.75  | 43 | 120 | 108 | no     | 20 |
| FT-4FT-4075-3 | 0.75  | 43 | 120 | 108 | no     | 20 |
| FT-4s-075-1   | 0.75  | 46 | 120 | 104 | square | 20 |
| FT-4s-075-2   | 0.75  | 46 | 120 | 104 | square | 20 |
| FT-4s-075-3   | 0.75  | 46 | 120 | 104 | square | 20 |
| FT-4t-075-1   | 0.75  | 43 | 120 | 108 | triang | 20 |
| FT-4t-075-2   | 0.75  | 43 | 120 | 108 | triang | 20 |
| FT-4t-075-3   | 0.75  | 43 | 120 | 108 | triang | 20 |
| FT-5fs-100-1  | 1.00  | 46 | 120 | 104 | no     | 50 |
| FT-5fs-100-2  | 1.00  | 46 | 120 | 104 | no     | 50 |
| FT-5fs-100-3  | 1.00  | 46 | 120 | 104 | no     | 50 |
| FT-5FT-5100-1 | 1.00  | 43 | 120 | 108 | no     | 50 |
| FT-5FT-5100-2 | 1.00  | 43 | 120 | 108 | no     | 50 |
| FT-5FT-5100-3 | 1.00  | 43 | 120 | 108 | no     | 50 |
| FT-5s-100-1   | 1.00  | 46 | 120 | 104 | square | 50 |
| FT-5s-100-2   | 1.00  | 46 | 120 | 104 | square | 50 |
| FT-5s-100-3   | 1.00  | 46 | 120 | 104 | square | 50 |
| FT-5t-100-1   | 1.00  | 43 | 120 | 108 | triang | 50 |
| FT-5t-100-2   | 1.00  | 43 | 120 | 108 | triang | 50 |
| FT-5t-100-3   | 1.00  | 43 | 120 | 108 | triang | 50 |

Key (see 3.2.2.1)

s = perforation arranged in Squares

t = perforation arranged in Triangles

fs = Full (without perforation) for comparison with Square arrangement

ft = Full (without perforation) for comparison with Triangular arrangement

Table 4.3.3 Tensile testing corresponding to the analysis of the effects of hole

Note:

These coupons in rapport with sheeting 6 (ALTEO 59.900/0.75) and 7 (ALTEO 59.900/1.00)

| Ref.       | b <sub>0</sub> | t <sub>N</sub> |
|------------|----------------|----------------|
|            | mm             | mm             |
| TT-6-075-1 | 22             | 0.75           |
| TT-6-075-2 |                | 0.75           |
| TT-6-075-3 |                | 0.75           |
| TT-6-075-4 |                | 0.75           |
| TT-6-075-5 |                | 0.75           |
| TT-7-075-1 | 22             | 1.00           |
| TT-7-075-2 |                | 1.00           |
| TT-7-075-3 |                | 1.00           |
| TT-7-075-4 |                | 1.00           |
| TT-7-075-5 |                | 1.00           |

Key

L = 200 mm (total length)

L<sub>c</sub> = 92 mm (parallel length)

L<sub>0</sub> = 81 mm (initial gauge length)

b = 35 mm (total width)

The samples with suffix 6 correspond to the sheeting 6 (ALTEO 59.900/0.75)

The samples with suffix 7 correspond to the sheeting 7 (ALTEO 59.900/1.00)