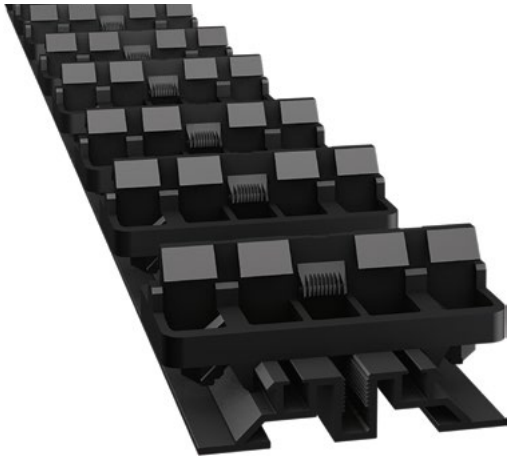
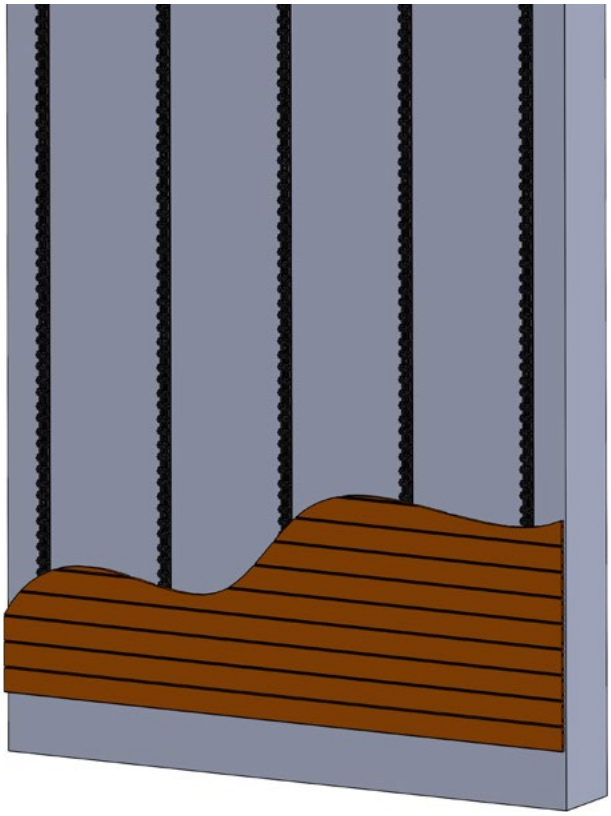
# FLAT RAIL - CLADDING

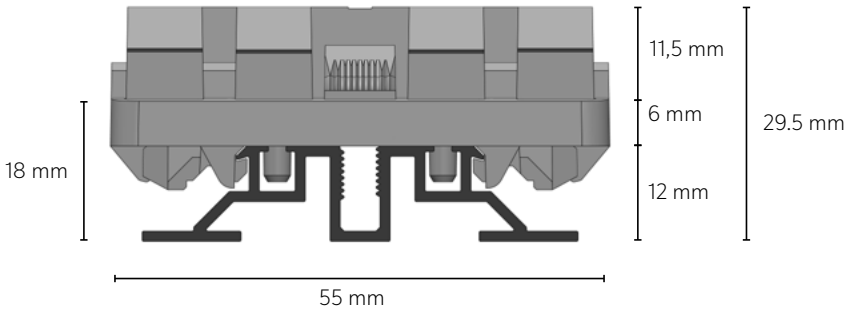
Use: allows for the installation of vertical or horizontal cladding

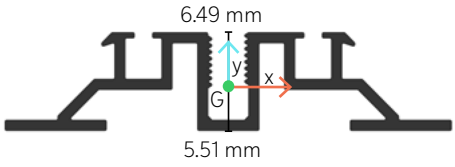


**FLAT RAIL**



## DIMENSIONS OF A FLAT RAIL WITH CLIPS




Position of the centre of gravity (G)

| MOMENTS OF INERTIA: |
|---|
| Ixx = 2384,2 $mm^4$ |
| Iyy = 28960 $mm^4$ |
| Ixx/v = 367,4 $mm^3$ |

## SUMMARY



## CALCULATION ASSUMPTIONS

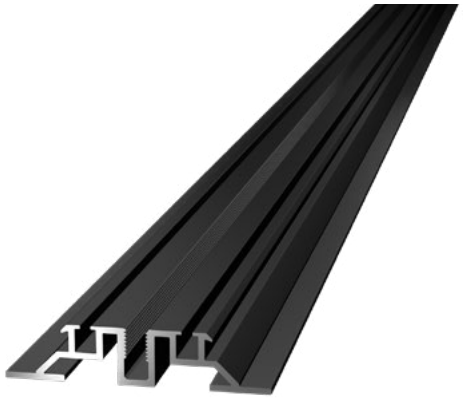
The scope of application of the approach used is that defined in NF DTU 41.2 (French norms):

- Maximum pressures on the building envelope (generally depression in the corners of the structure) calculated with the following pressure coefficients:
  - Cpe = -1.4
  - Cpi = 0
- Building heights limited to 10 m and 28 m,
- All wind zones,
- All categories of site roughness (protected, normal and exposed),
- Flat terrain (average slope ≤ 5%, orography coefficient Co = 1).

**FCBA study dated 30/05/2023**

The fastening methods shown in this document are valid for cladding and soffit applications.

## ALUMINIUM RAIL



| | |
|---|---|
| **Material** | Aluminium EN AW-6060 |
| **Mass per meter of rail without clips** | 0,423 kg |
| **Colour** | Black |
| **Thermal Treatment** | T6 |
| **Tensile strength (MPa)** | 190 |
| **Tensile stress at yield (MPa)** | 150 |
| **Minimal elongation (%)** | 6 |
| **Tensile modulus (MPa)** | 70000 |
| **Coefficient of linear expansion ($10^{-6}$/K)** | 24 |
| **Fusion Temperature (°C)** | 585-655 |
| **Thermal conductivity (W/mK)** | 160 |

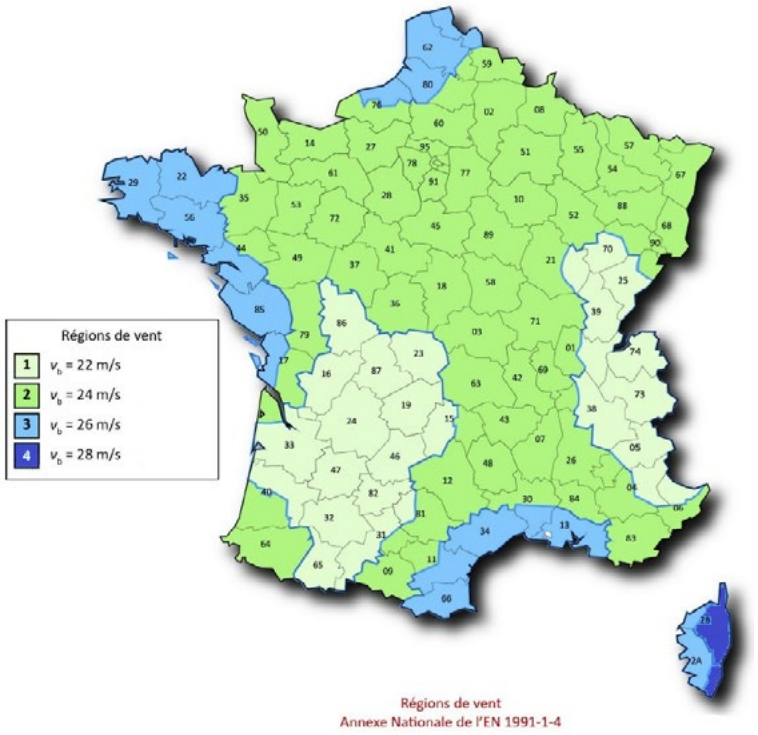
## GRAD CLIP

| | |
|---|---|
| **Material** | Polyoxymethylene |
| **Density (kg/m³)** | 1410 |
| **Colour** | Noir |
| **Tensile stress at yield (MPa)** | 64 |
| **Fusion temperature (°C)** | 190-220 |
| **Tensile modulus (MPa)** | 2850 |
| **Coefficient of linear expansion ($10^{-6}$/K)** | 110 |

## WIND ACTION IN FRANCE

In the Eurocode rules, the average wind speed and the categories of wind roughness must be taken into account.

Here we have provided examples using French wind roughness.
All projects must follow local regulations concerning wind loads.




Régions de vent
Annexe Nationale de l'EN 1991-1-4

**WIND ROUGHNESS CATEGORIES**

| 0 | II | IIIa | IIIb | IV |
|---|---|---|---|---|
| Sea or coastal area exposed to the sea. | - Airport<br>- Flat countryside, with or without isolated obstacles (trees, buildings, etc.) separated from each other by more than 20 times their height | Countryside with hedgerows; vineyards, groves, scattered settlements. | Urbanized or industrial areas; dense groves, orchards. | Urban areas, 15% of which are covered with buildings averaging 15 m in height, dense forest. |
|  |  <br>  |  |  <br>  |  <br>  |

Orography: The orography coefficient takes into account an acceleration in wind speed on the structure due to specific orography. If the terrain has an average slope <5% then Co=1, if the value obtained is >5% then Co=1.15. An orography study is required to validate the coefficient.

- Support spacing: 650 mm (maximum spacing in accordance with NF DTU 41.2 [French Norms]);

Properties of aluminium used for Grad rails grade: EN AW-6060 T6 :
- Modulus of elasticity: E = 70,000 MPa ;
- Strength at 0.2%: f0= 150 MPa ;
- Ultimate tensile strength: fu = 190 MPa ;
- Partial safety factors: $\gamma$1= 1.1 ;
- Factor of safety (cladding board on 3 supports): k = 1.25 ;

# WIND FORCE : DEPRESSION VALUES IN (KN/M²)

## BUILDING HEIGHT : 10 M

### Flat Land (Co = 1), H = 10 m

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 1,20 | 1,01 | 0,75 | 0,58 | 0,54 |
| **2** | 1,43 | 1,21 | 0,90 | 0,70 | 0,64 |
| **3** | 1,67 | 1,41 | 1,05 | 0,82 | 0,75 |
| **4** | 1,94 | 1,64 | 1,22 | 0,95 | 0,87 |
| **Guadeloupe** | 3,21 | 2,71 | 2,02 | 1,57 | 1,44 |
| **Guyane** | 0,72 | 0,60 | 0,45 | 0,35 | 0,32 |
| **Martinique** | 2,53 | 2,14 | 1,60 | 1,24 | 1,14 |
| **Réunion** | 2,86 | 2,42 | 1,80 | 1,40 | 1,28 |
| **Mayotte** | 2,24 | 1,81 | 1,42 | 1,09 | 1,00 |

*Table 1: Depression forces at 10 m height (kN/m²) flat terrain*

### Orography max (Co = 1,15), H = 10 m

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 1,59 | 1,34 | 0,99 | 0,77 | 0,71 |
| **2** | 1,89 | 1,60 | 1,19 | 0,93 | 0,85 |
| **3** | 2,21 | 1,86 | 1,39 | 1,08 | 0,99 |
| **4** | 2,57 | 2,17 | 1,61 | 1,26 | 1,15 |
| **Guadeloupe** | 4,25 | 3,58 | 2,67 | 2,08 | 1,90 |
| **Guyane** | 0,95 | 0,79 | 0,60 | 0,46 | 0,42 |
| **Martinique** | 3,35 | 2,83 | 2,12 | 1,64 | 1,51 |
| **Réunion** | 3,78 | 3,20 | 2,38 | 1,85 | 1,69 |
| **Mayotte** | 2,96 | 2,39 | 1,88 | 1,44 | 1,32 |

*Table 2: Depression forces at 10 m height (kN/m²) Maximum orography*

## BUILDING HEIGHT : 28 M

### Flat Land (Co = 1), H = 28 m

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 1,49 | 1,28 | 1,07 | 0,90 | 0,73 |
| **2** | 1,77 | 1,53 | 1,28 | 1,07 | 0,86 |
| **3** | 2,08 | 1,79 | 1,50 | 1,25 | 1,01 |
| **4** | 2,41 | 2,08 | 1,74 | 1,45 | 1,18 |
| **Guadeloupe** | 3,99 | 3,43 | 2,88 | 2,40 | 1,94 |
| **Guyane** | 0,89 | 0,77 | 0,64 | 0,54 | 0,43 |
| **Martinique** | 3,15 | 2,71 | 2,27 | 1,90 | 1,54 |
| **Réunion** | 3,56 | 3,06 | 2,57 | 2,14 | 1,73 |
| **Mayotte** | 2,72 | 2,34 | 1,96 | 1,62 | 1,31 |

*Table 3: Depression forces at 28 m height (kN/m²) flat terrain*

### Orography max (Co = 1,15), H = 28 m

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 1,97 | 1,69 | 1,42 | 1,19 | 0,97 |
| **2** | 2,34 | 2,02 | 1,69 | 1,42 | 1,14 |
| **3** | 2,75 | 2,37 | 1,98 | 1,65 | 1,34 |
| **4** | 3,19 | 2,75 | 2,30 | 1,92 | 1,56 |
| **Guadeloupe** | 5,28 | 4,54 | 3,81 | 3,17 | 2,57 |
| **Guyane** | 1,18 | 1,02 | 0,85 | 0,71 | 0,57 |
| **Martinique** | 4,17 | 3,58 | 3,00 | 2,51 | 2,04 |
| **Réunion** | 4,71 | 4,05 | 3,40 | 2,83 | 2,29 |
| **Mayotte** | 3,60 | 3,09 | 2,59 | 2,14 | 1,73 |

*Table 4: Depression forces at 28 m height (kN/m²) Maximum orography*

# MAXIMUM DESIGN PULL-OUT FORCE PER FASTENER FOR FAÇADE APPLICATION

## BUILDING HEIGHT : 10 M

**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 672 | 599 | 491 | 414 | 395 |
| **2** | 756 | 676 | 555 | 469 | 442 |
| **3** | 838 | 748 | 615 | 521 | 491 |
| **4** | 926 | 828 | 680 | 575 | 542 |
| **Guadeloupe** | 1295 | 1157 | 951 | 804 | 759 |
| **Guyane** | 478 | 423 | 350 | 296 | 278 |
| **Martinique** | 1105 | 988 | 814 | 687 | 650 |
| **Réunion** | 1199 | 1073 | 881 | 745 | 702 |
| **Mayotte** | 1019 | 884 | 752 | 630 | 595 |

**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 810 | 722 | 592 | 499 | 476 |
| **2** | 910 | 814 | 669 | 565 | 533 |
| **3** | 1009 | 902 | 741 | 628 | 592 |
| **4** | 1116 | 997 | 819 | 693 | 654 |
| **Guadeloupe** | 1561 | 1394 | 1146 | 969 | 915 |
| **Guyane** | 576 | 510 | 421 | 356 | 336 |
| **Martinique** | 1332 | 1191 | 981 | 828 | 783 |
| **Réunion** | 1445 | 1293 | 1061 | 897 | 845 |
| **Mayotte** | 1228 | 1065 | 906 | 760 | 717 |

Maximum design pull-out force - Building height 10 m for façade installation only

## BUILDING HEIGHT : 28 M

**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 776 | 702 | 623 | 555 | 483 |
| **2** | 871 | 790 | 702 | 623 | 538 |
| **3** | 970 | 878 | 780 | 691 | 599 |
| **4** | 1070 | 970 | 861 | 763 | 665 |
| **Guadeloupe** | 1439 | 1304 | 1205 | 1067 | 926 |
| **Guyane** | 551 | 500 | 442 | 395 | 339 |
| **Martinique** | 1279 | 1157 | 1028 | 913 | 794 |
| **Réunion** | 1354 | 1255 | 1117 | 988 | 858 |
| **Mayotte** | 1160 | 1049 | 932 | 821 | 713 |

**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 936 | 845 | 750 | 669 | 581 |
| **2** | 1049 | 952 | 845 | 750 | 649 |
| **3** | 1169 | 1057 | 940 | 832 | 722 |
| **4** | 1289 | 1169 | 1037 | 919 | 801 |
| **Guadeloupe** | 1698 | 1548 | 1452 | 1286 | 1116 |
| **Guyane** | 664 | 602 | 533 | 476 | 409 |
| **Martinique** | 1503 | 1394 | 1239 | 1100 | 956 |
| **Réunion** | 1607 | 1460 | 1346 | 1191 | 1034 |
| **Mayotte** | 1397 | 1264 | 1123 | 989 | 859 |

Max. design pull-out force - Building height 28 m for façade installation only

# MAXIMUM DESIGN PULL-OUT FORCE PER FASTENER FOR SOFFIT APPLICATION

## BUILDING HEIGHT : 10 M

**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 756 | 687 | 587 | 517 | 500 |
| **2** | 834 | 759 | 646 | 567 | 542 |
| **3** | 913 | 828 | 702 | 615 | 587 |
| **4** | 998 | 903 | 763 | 665 | 634 |
| **Guadeloupe** | 1356 | 1222 | 1022 | 881 | 838 |
| **Guyane** | 575 | 526 | 460 | 414 | 400 |
| **Martinique** | 1171 | 1058 | 891 | 770 | 734 |
| **Réunion** | 1263 | 1140 | 954 | 824 | 783 |
| **Mayotte** | 1088 | 957 | 831 | 716 | 683 |

**MAX. CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 886 | 803 | 680 | 594 | 573 |
| **2** | 983 | 891 | 752 | 656 | 625 |
| **3** | 1078 | 974 | 821 | 714 | 680 |
| **4** | 1181 | 1067 | 895 | 775 | 738 |
| **Guadeloupe** | 1616 | 1453 | 1211 | 1039 | 987 |
| **Guyane** | 665 | 605 | 524 | 466 | 448 |
| **Martinique** | 1392 | 1255 | 1051 | 903 | 860 |
| **Réunion** | 1503 | 1354 | 1128 | 970 | 920 |
| **Mayotte** | 1291 | 1132 | 979 | 838 | 798 |

Maximum design pull-out force - Building height 10 m for underside installation only

## BUILDING HEIGHT : 28 M

**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 854 | 783 | 709 | 646 | 579 |
| **2** | 945 | 868 | 783 | 709 | 630 |
| **3** | 1040 | 951 | 858 | 773 | 687 |
| **4** | 1137 | 1040 | 935 | 841 | 748 |
| **Guadeloupe** | 1481 | 1356 | 1268 | 1134 | 998 |
| **Guyane** | 642 | 595 | 542 | 500 | 451 |
| **Martinique** | 1285 | 1222 | 1096 | 985 | 871 |
| **Réunion** | 1367 | 1317 | 1182 | 1058 | 932 |
| **Mayotte** | 1224 | 1117 | 1004 | 897 | 794 |

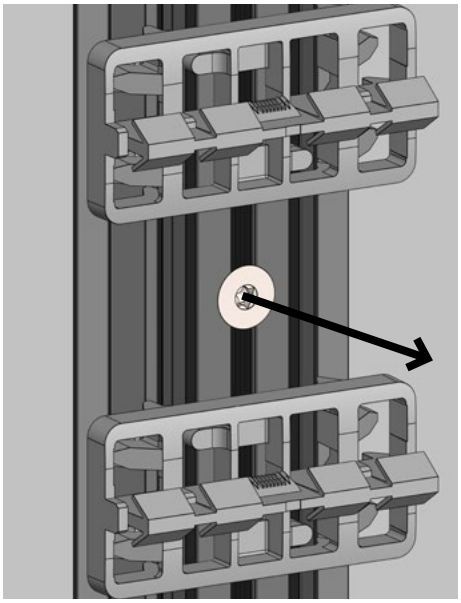
**MAX CALCULATED PULL-OUT FORCE (ELU-STR VALUE) IN N**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 1007 | 920 | 829 | 752 | 670 |
| **2** | 1117 | 1023 | 920 | 829 | 733 |
| **3** | 1233 | 1125 | 1011 | 908 | 803 |
| **4** | 1350 | 1233 | 1106 | 991 | 878 |
| **Guadeloupe** | 1718 | 1580 | 1418 | 1347 | 1181 |
| **Guyane** | 747 | 690 | 625 | 573 | 512 |
| **Martinique** | 1500 | 1453 | 1301 | 1166 | 1027 |
| **Réunion** | 1637 | 1501 | 1406 | 1255 | 1102 |
| **Mayotte** | 1456 | 1326 | 1189 | 1059 | 933 |

Maximum design pull-out force - Building height 28 m for underside installation only

# PULL-OUT FORCE

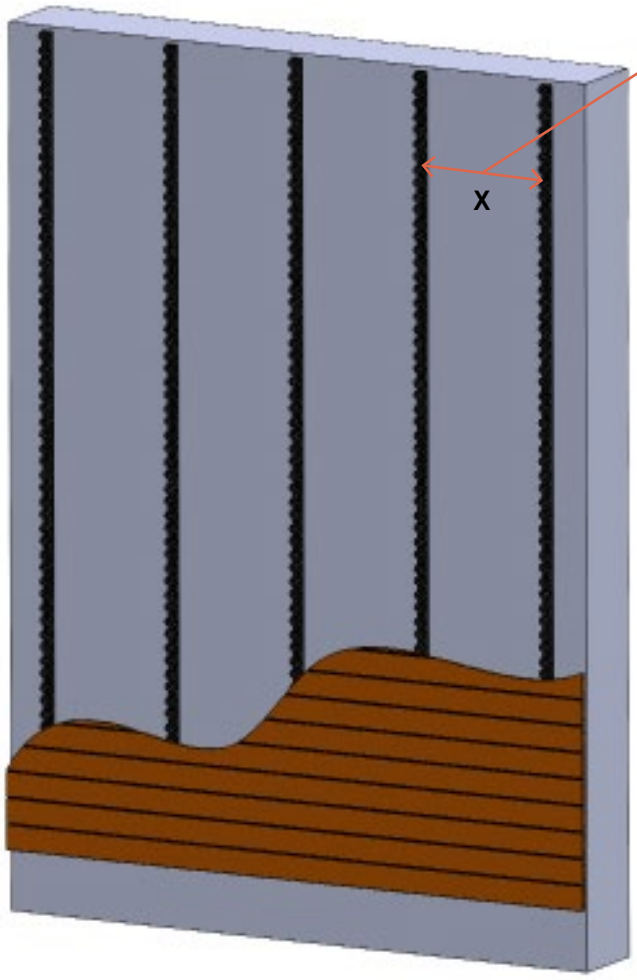


The pull-out force is an essential value for sizing fasteners.

A calculation note is also available to help with fastener sizing.

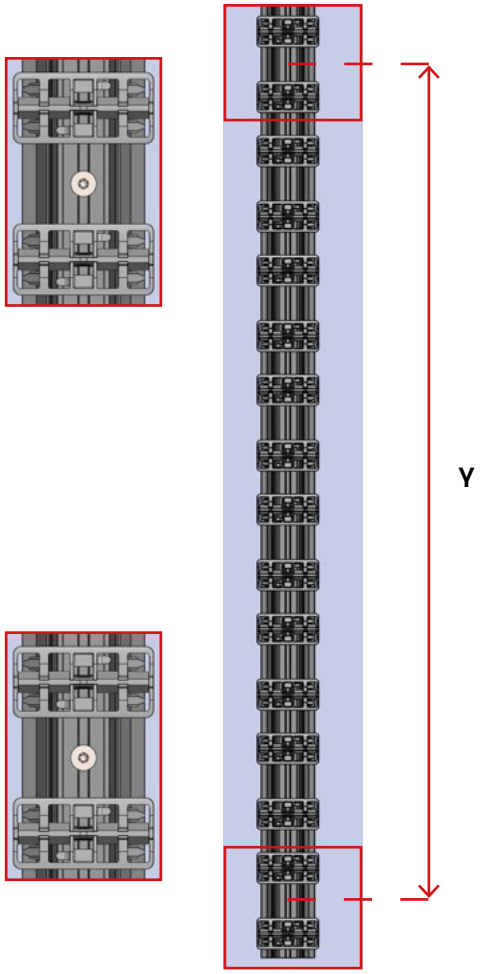
Pull-out force:
Ftens,k

# RAIL FASTENING DIRECTLY TO THE WALL




**Maximum rail spacing is 650 mm.**

Maximum fastener spacing is 890 mm; this value may vary according to geographical area (see table p.10).



# MAXIMUM DISTANCE BETWEEN FASTENERS FOR FAÇADE APPLICATIONS

Calculations made by the Serviceability Limit State

## BUILDING HEIGHT: 10 M

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,57 | 0,61 | 0,67 | 0,73 | 0,75 |
| **2** | 0,54 | 0,57 | 0,63 | 0,69 | 0,71 |
| **3** | 0,51 | 0,54 | 0,60 | 0,65 | 0,67 |
| **4** | 0,49 | 0,52 | 0,57 | 0,62 | 0,64 |
| **Guadeloupe** | 0,41 | 0,44 | 0,48 | 0,53 | 0,54 |
| **Guyane** | 0,68 | 0,72 | 0,80 | 0,87 | 0,89 |
| **Martinique** | 0,45 | 0,47 | 0,52 | 0,57 | 0,58 |
| **Réunion** | 0,43 | 0,45 | 0,50 | 0,55 | 0,56 |
| **Mayotte** | 0,47 | 0,50 | 0,54 | 0,59 | 0,61 |

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,52 | 0,55 | 0,61 | 0,67 | 0,68 |
| **2** | 0,49 | 0,52 | 0,58 | 0,63 | 0,65 |
| **3** | 0,47 | 0,50 | 0,55 | 0,59 | 0,61 |
| **4** | 0,45 | 0,47 | 0,52 | 0,57 | 0,58 |
| **Guadeloupe** | 0,38 | 0,40 | 0,44 | 0,48 | 0,49 |
| **Guyane** | 0,62 | 0,66 | 0,73 | 0,79 | 0,81 |
| **Martinique** | 0,41 | 0,43 | 0,48 | 0,52 | 0,53 |
| **Réunion** | 0,39 | 0,41 | 0,46 | 0,50 | 0,51 |
| **Mayotte** | 0,43 | 0,46 | 0,49 | 0,54 | 0,56 |

Max. fixing distance to justify L/167 minimum - Building height 10 m for façade installation only

## BUILDING HEIGHT: 28 M

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,53 | 0,56 | 0,60 | 0,63 | 0,68 |
| **2** | 0,50 | 0,53 | 0,56 | 0,60 | 0,64 |
| **3** | 0,48 | 0,50 | 0,53 | 0,57 | 0,61 |
| **4** | 0,46 | 0,48 | 0,51 | 0,54 | 0,58 |
| **Guadeloupe** | 0,37 | 0,39 | 0,43 | 0,46 | 0,49 |
| **Guyane** | 0,63 | 0,67 | 0,71 | 0,75 | 0,81 |
| **Martinique** | 0,42 | 0,44 | 0,46 | 0,49 | 0,53 |
| **Réunion** | 0,39 | 0,42 | 0,45 | 0,47 | 0,51 |
| **Mayotte** | 0,44 | 0,46 | 0,49 | 0,52 | 0,56 |

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,49 | 0,51 | 0,54 | 0,58 | 0,62 |
| **2** | 0,46 | 0,48 | 0,51 | 0,54 | 0,58 |
| **3** | 0,44 | 0,46 | 0,49 | 0,52 | 0,55 |
| **4** | 0,41 | 0,44 | 0,46 | 0,49 | 0,53 |
| **Guadeloupe** | 0,34 | 0,35 | 0,39 | 0,42 | 0,45 |
| **Guyane** | 0,58 | 0,61 | 0,65 | 0,68 | 0,74 |
| **Martinique** | 0,37 | 0,40 | 0,42 | 0,45 | 0,48 |
| **Réunion** | 0,35 | 0,37 | 0,41 | 0,43 | 0,46 |
| **Mayotte** | 0,40 | 0,42 | 0,44 | 0,47 | 0,51 |

Max. fixing distance to justify L/167 minimum - Building height 28 m for façade installation only

# MAXIMUM DISTANCE BETWEEN FASTENERS FOR SOFFIT APPLICATION

Calculations made by the Serviceability Limit State

## BUILDING HEIGHT: 10 M

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,54 | 0,57 | 0,61 | 0,65 | 0, 67 |
| **2** | 0,52 | 0, 54 | 0,59 | 0,63 | 0,64 |
| **3** | 0,49 | 0,52 | 0,56 | 0,60 | 0,61 |
| **4** | 0,47 | 0,50 | 0,54 | 0,58 | 0,59 |
| **Guadeloupe** | 0,40 | 0,43 | 0,47 | 0,50 | 0,51 |
| **Guyane** | 0,62 | 0,65 | 0,69 | 0,73 | 0,75 |
| **Martinique** | 0,44 | 0,46 | 0,50 | 0,54 | 0,55 |
| **Réunion** | 0,42 | 0,44 | 0,48 | 0,52 | 0,53 |
| **Mayotte** | 0,45 | 0,48 | 0,52 | 0,56 | 0,57 |

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**All Orography (Co = 1,15)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,50 | 0,53 | 0,57 | 0,61 | 0,62 |
| **2** | 0,48 | 0,50 | 0,54 | 0,58 | 0,60 |
| **3** | 0,45 | 0,48 | 0,52 | 0,56 | 0,57 |
| **4** | 0,43 | 0,46 | 0,50 | 0,53 | 0,55 |
| **Guadeloupe** | 0,37 | 0,39 | 0,43 | 0,46 | 0,47 |
| **Guyane** | 0,58 | 0,61 | 0,65 | 0,69 | 0,70 |
| **Martinique** | 0,40 | 0,42 | 0,46 | 0,50 | 0,51 |
| **Réunion** | 0,38 | 0,40 | 0,44 | 0,48 | 0,49 |
| **Mayotte** | 0,41 | 0,44 | 0,48 | 0,51 | 0,53 |

Max. fixing centre distance to justify L/167 minimum - Building height 10 m for soffit installation only

## BUILDING HEIGHT: 28 M

**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

**Flat Land (Co = 1)**

| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,51 | 0,53 | 0,56 | 0,59 | 0,62 |
| **2** | 0,48 | 0,51 | 0,53 | 0,56 | 0,59 |
| **3** | 0,46 | 0,48 | 0,51 | 0,54 | 0,57 |
| **4** | 0,44 | 0,46 | 0,49 | 0,51 | 0,54 |
| **Guadeloupe** | 0,36 | 0,38 | 0,42 | 0,44 | 0,47 |
| **Guyane** | 0,59 | 0,61 | 0,64 | 0,67 | 0,70 |
| **Martinique** | 0,39 | 0,43 | 0,45 | 0,47 | 0,50 |
| **Réunion** | 0,37 | 0,41 | 0,43 | 0,46 | 0,49 |
| **Mayotte** | 0,43 | 0,45 | 0,47 | 0,50 | 0,53 |

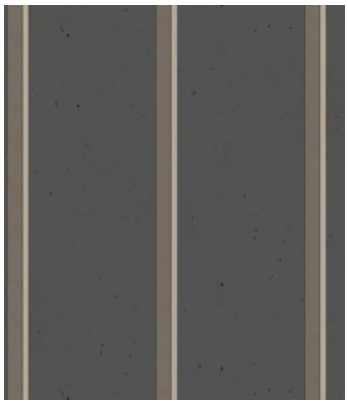
**MAX DISTANCE BETWEEN FASTENERS TO JUSTIFY L/167 IN M**

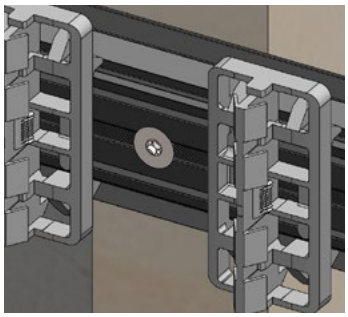
**All Orography (Co = 1,15)**

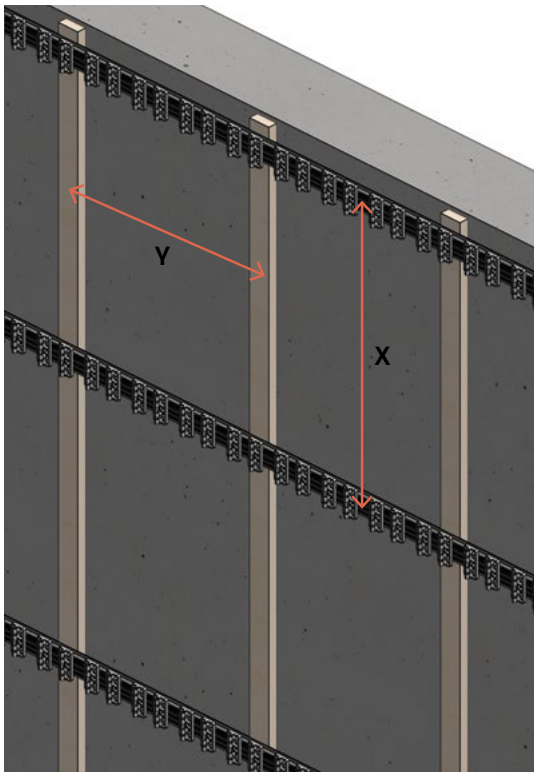
| | WIND ROUGHNESS | | | | |
|---|---|---|---|---|---|
| **ZONE** | **0** | **II** | **IIIa** | **IIIb** | **IV** |
| **1** | 0,47 | 0,49 | 0,52 | 0,54 | 0,58 |
| **2** | 0,45 | 0,47 | 0,49 | 0,52 | 0,55 |
| **3** | 0,42 | 0,44 | 0,47 | 0,49 | 0,53 |
| **4** | 0,41 | 0,42 | 0,45 | 0,47 | 0,50 |
| **Guadeloupe** | 0,32 | 0,34 | 0,36 | 0,41 | 0,43 |
| **Guyane** | 0,54 | 0,57 | 0,60 | 0,62 | 0,66 |
| **Martinique** | 0,35 | 0,39 | 0,41 | 0,44 | 0,46 |
| **Réunion** | 0,34 | 0,36 | 0,40 | 0,42 | 0,45 |
| **Mayotte** | 0,39 | 0,41 | 0,43 | 0,46 | 0,49 |

Max. fixing centre distance to justify L/167 minimum - Building height 28 m for soffit installation only

# FASTENING RAILS TO A CLEAT SYSTEM



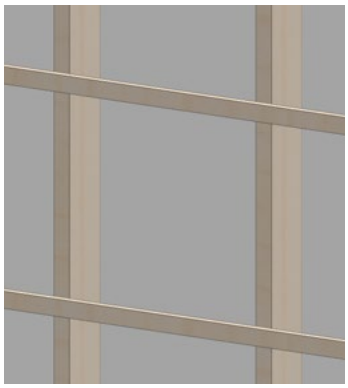


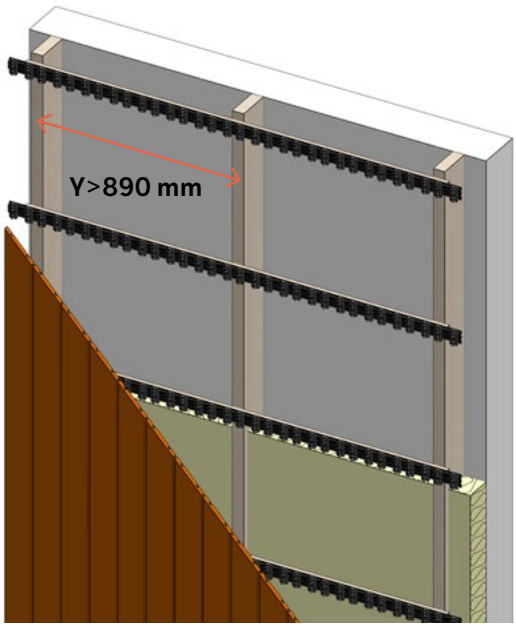



If the rails are fastened to a timber structure with existing cleats, it is important to ensure that the cleat spacing is **similar to or less than the maximum rail fastening spacing of 890 mm.**

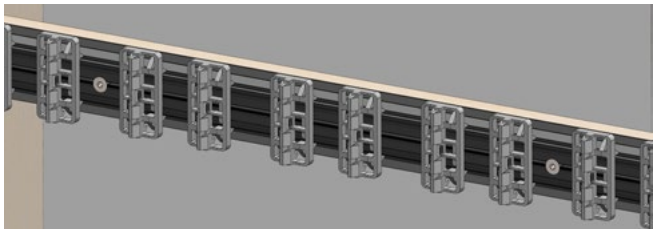
Rails should also be fastened with fasteners suitable for this type of structure.

When the center-to-center distance of the existing wood structure is greater than the maximum rail fastening center-to-center distance (890 mm), the structure must be adapted with a double cleat system.





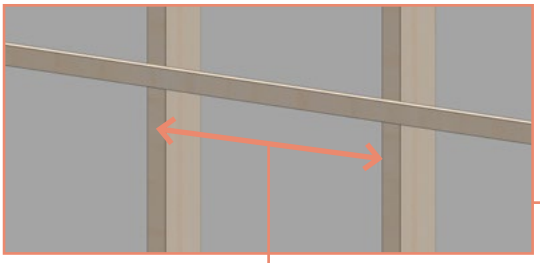

The cleats are fastened to the other cleats using countersunk screws, so that the screw head can be flush and does not interfere with the installation of the rail on the cleat.



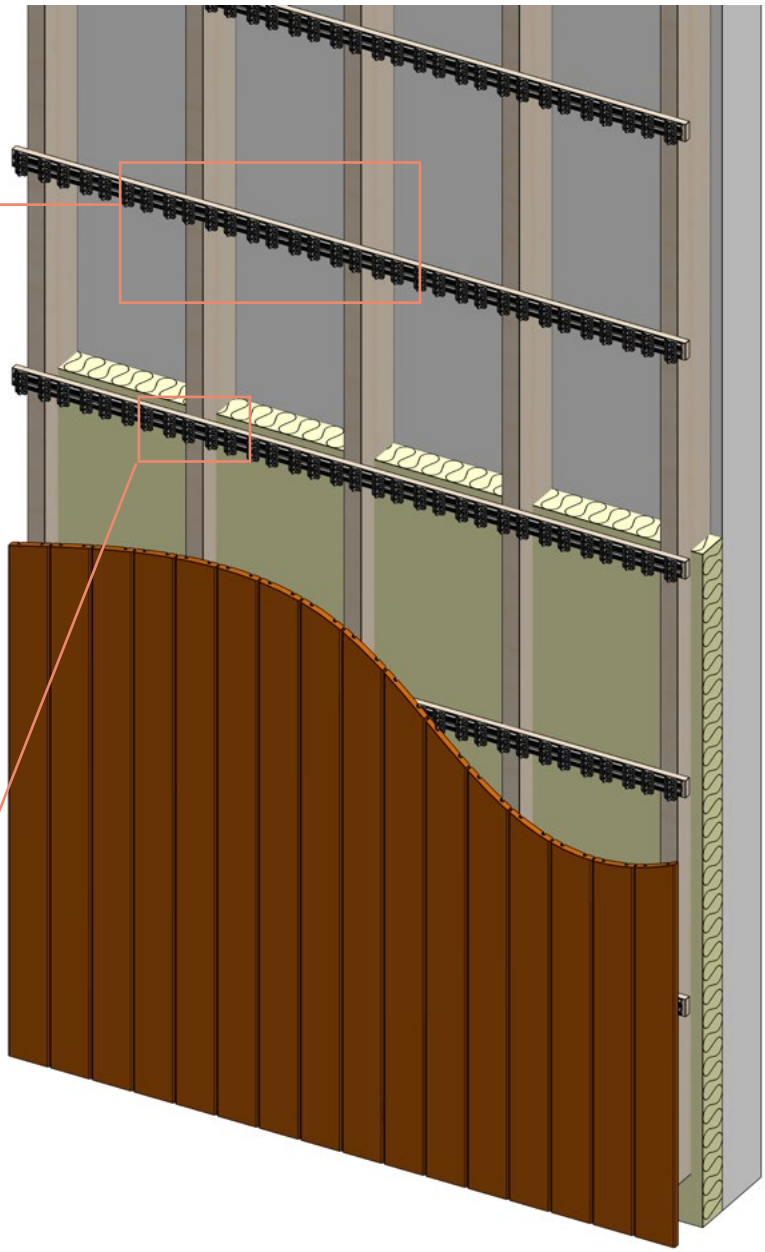
# RAIL FASTENING ON DOUBLE CLEAT SYSTEM

## VERTICAL CLADDING

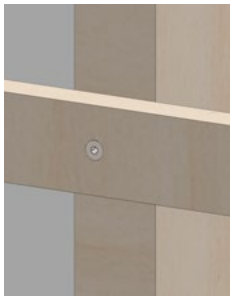
*Horizontal cladding uses the same fastening principle, only the structure undergoes a few modifications*



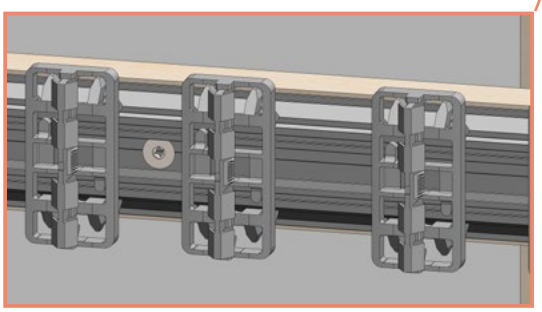
In cases where the spacing of the cleats is greater than the maximum spacing for fastening the Flat Rail, a double-cleat structure must be created and the rails fastened to these cleats.

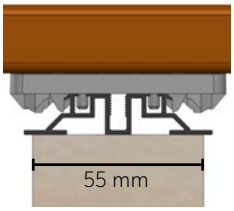


The horizontal cleats are fastened to the existing cleats using countersunk screws, so that the screw head can be embedded in the cleat without interfering with the installation of the Flat Rail on the cleat.



The rails are fastened to the horizontal cleats with a screw suitable for this type of structure.






Minimum cleat width is 55 mm