

Measured holding force of a single APAK 11.4 snowguard : **0.34** [kN]

D: distance between snowguards' rows on the PV array surface (= module width for landscape/horizontal configurations, or module length for portrait/vertical configurations) : **1.14** [m]

Number of APAK 11.4 snowguards per linear meter of horizontal or landscape modules

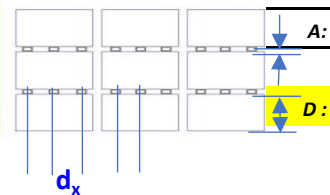
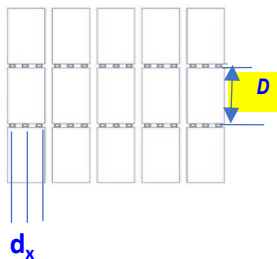
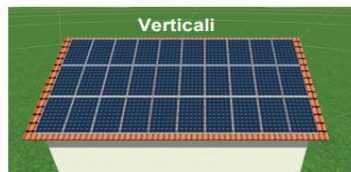
| Snow height on the ground [cm] |         |     |     | Snow load        |                   | Roof pitch in degrees [°] |    |      |    |      |    |      |    |      |    |      |    |      |    |      |    |      |    |      |    |      |    |      |    |
|--------------------------------|---------|-----|-----|------------------|-------------------|---------------------------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|
| Fresh                          | Settled | Old | Wet | N/m <sup>2</sup> | kN/m <sup>2</sup> | 5                         | 10 | 15   | 20 | 25   | 30 | 35   | 40 | 45   | 50 | 55   | 60 |      |    |      |    |      |    |      |    |      |    |      |    |
| 50                             | 25      | 14  | 13  | 500              | 0.5               | 0.05                      | 3  | 0.10 | 3  | 0.14 | 3  | 0.18 | 3  | 0.22 | 3  | 0.25 | 3  | 0.27 | 3  | 0.28 | 3  | 0.29 | 3  | 0.28 | 3  | 0.27 | 3  | 0.25 | 3  |
| 75                             | 38      | 21  | 19  | 750              | 0.8               | 0.07                      | 3  | 0.15 | 3  | 0.21 | 3  | 0.27 | 3  | 0.33 | 3  | 0.37 | 3  | 0.40 | 3  | 0.42 | 3  | 0.43 | 3  | 0.42 | 3  | 0.40 | 3  | 0.37 | 3  |
| 100                            | 50      | 29  | 25  | 1000             | 1.0               | 0.10                      | 3  | 0.19 | 3  | 0.29 | 3  | 0.37 | 3  | 0.44 | 3  | 0.49 | 3  | 0.54 | 3  | 0.56 | 3  | 0.57 | 3  | 0.56 | 3  | 0.54 | 3  | 0.49 | 3  |
| 125                            | 63      | 36  | 31  | 1250             | 1.3               | 0.12                      | 3  | 0.24 | 3  | 0.36 | 3  | 0.46 | 3  | 0.55 | 3  | 0.62 | 3  | 0.67 | 3  | 0.70 | 3  | 0.71 | 3  | 0.70 | 3  | 0.67 | 3  | 0.62 | 3  |
| 150                            | 75      | 43  | 38  | 1500             | 1.5               | 0.15                      | 3  | 0.29 | 3  | 0.43 | 3  | 0.55 | 3  | 0.65 | 3  | 0.74 | 3  | 0.80 | 3  | 0.84 | 3  | 0.86 | 3  | 0.84 | 3  | 0.80 | 3  | 0.74 | 3  |
| 175                            | 88      | 50  | 44  | 1750             | 1.8               | 0.17                      | 3  | 0.34 | 3  | 0.50 | 3  | 0.64 | 3  | 0.76 | 3  | 0.86 | 3  | 0.94 | 3  | 0.98 | 3  | 1.00 | 3  | 0.98 | 3  | 0.94 | 3  | 0.86 | 3  |
| 200                            | 100     | 57  | 50  | 2000             | 2.0               | 0.20                      | 3  | 0.39 | 3  | 0.57 | 3  | 0.73 | 3  | 0.87 | 3  | 0.99 | 3  | 1.07 | 4  | 1.12 | 4  | 1.14 | 4  | 1.12 | 4  | 1.07 | 4  | 0.99 | 3  |
| 225                            | 113     | 64  | 56  | 2250             | 2.3               | 0.22                      | 3  | 0.44 | 3  | 0.64 | 3  | 0.82 | 3  | 0.98 | 3  | 1.11 | 4  | 1.21 | 4  | 1.26 | 4  | 1.28 | 4  | 1.26 | 4  | 1.21 | 4  | 1.11 | 4  |
| 250                            | 125     | 71  | 63  | 2500             | 2.5               | 0.25                      | 3  | 0.49 | 3  | 0.71 | 3  | 0.92 | 3  | 1.09 | 4  | 1.23 | 4  | 1.34 | 4  | 1.40 | 5  | 1.43 | 5  | 1.40 | 5  | 1.34 | 4  | 1.23 | 4  |
| 275                            | 138     | 79  | 69  | 2750             | 2.8               | 0.27                      | 3  | 0.54 | 3  | 0.78 | 3  | 1.01 | 3  | 1.20 | 4  | 1.36 | 4  | 1.47 | 5  | 1.54 | 5  | 1.57 | 5  | 1.54 | 5  | 1.47 | 5  | 1.36 | 4  |
| 300                            | 150     | 86  | 75  | 3000             | 3.0               | 0.30                      | 3  | 0.58 | 3  | 0.86 | 3  | 1.10 | 4  | 1.31 | 4  | 1.48 | 5  | 1.61 | 5  | 1.68 | 5  | 1.71 | 6  | 1.68 | 5  | 1.61 | 5  | 1.48 | 5  |
| 325                            | 163     | 93  | 81  | 3250             | 3.3               | 0.32                      | 3  | 0.63 | 3  | 0.93 | 3  | 1.19 | 4  | 1.42 | 5  | 1.60 | 5  | 1.74 | 6  | 1.82 | 6  | 1.85 | 6  | 1.82 | 6  | 1.74 | 6  | 1.60 | 5  |
| 350                            | 175     | 100 | 88  | 3500             | 3.5               | 0.35                      | 3  | 0.68 | 3  | 1.00 | 3  | 1.28 | 4  | 1.53 | 5  | 1.73 | 6  | 1.87 | 6  | 1.96 | 6  | 2.00 | 6  | 1.96 | 6  | 1.87 | 6  | 1.73 | 6  |
| 375                            | 188     | 107 | 94  | 3750             | 3.8               | 0.37                      | 3  | 0.73 | 3  | 1.07 | 4  | 1.37 | 5  | 1.64 | 5  | 1.85 | 6  | 2.01 | 6  | 2.11 | 7  | 2.14 | 7  | 2.11 | 7  | 2.01 | 6  | 1.85 | 6  |
| 400                            | 200     | 114 | 100 | 4000             | 4.0               | 0.40                      | 3  | 0.78 | 3  | 1.14 | 4  | 1.47 | 5  | 1.75 | 6  | 1.97 | 6  | 2.14 | 7  | 2.25 | 7  | 2.28 | 7  | 2.25 | 7  | 2.14 | 7  | 1.97 | 6  |
| 425                            | 213     | 121 | 106 | 4250             | 4.3               | 0.42                      | 3  | 0.83 | 3  | 1.21 | 4  | 1.56 | 5  | 1.86 | 6  | 2.10 | 7  | 2.28 | 7  | 2.39 | NO | 2.42 | NO | 2.39 | NO | 2.28 | 7  | 2.10 | 7  |
| 450                            | 225     | 129 | 113 | 4500             | 4.5               | 0.45                      | 3  | 0.88 | 3  | 1.28 | 4  | 1.65 | 5  | 1.96 | 6  | 2.22 | 7  | 2.41 | NO | 2.53 | NO | 2.57 | NO | 2.53 | NO | 2.41 | NO | 2.22 | 7  |
| 475                            | 238     | 136 | 119 | 4750             | 4.8               | 0.47                      | 3  | 0.93 | 3  | 1.35 | 4  | 1.74 | 6  | 2.07 | 7  | 2.34 | 7  | 2.54 | NO | 2.67 | NO | 2.71 | NO | 2.67 | NO | 2.54 | NO | 2.34 | 7  |
| 500                            | 250     | 143 | 125 | 5000             | 5.0               | 0.49                      | 3  | 0.97 | 3  | 1.43 | 5  | 1.83 | 6  | 2.18 | 7  | 2.47 | NO | 2.68 | NO | 2.81 | NO | 2.85 | NO | 2.81 | NO | 2.68 | NO | 2.47 | NO |
| 525                            | 263     | 150 | 131 | 5250             | 5.3               | 0.52                      | 3  | 1.02 | 4  | 1.50 | 5  | 1.92 | 6  | 2.29 | 7  | 2.59 | NO | 2.81 | NO | 2.95 | NO | 2.99 | NO | 2.95 | NO | 2.81 | NO | 2.59 | NO |
| 550                            | 275     | 157 | 138 | 5500             | 5.5               | 0.54                      | 3  | 1.07 | 4  | 1.57 | 5  | 2.02 | 6  | 2.40 | NO | 2.71 | NO | 2.95 | NO | 3.09 | NO | 3.14 | NO | 3.09 | NO | 2.95 | NO | 2.71 | NO |
| 575                            | 288     | 164 | 144 | 5750             | 5.8               | 0.57                      | 3  | 1.12 | 4  | 1.64 | 5  | 2.11 | 7  | 2.51 | NO | 2.84 | NO | 3.08 | NO | 3.23 | NO | 3.28 | NO | 3.23 | NO | 3.08 | NO | 2.84 | NO |
| 600                            | 300     | 171 | 150 | 6000             | 6.0               | 0.59                      | 3  | 1.17 | 4  | 1.71 | 6  | 2.20 | 7  | 2.62 | NO | 2.96 | NO | 3.21 | NO | 3.37 | NO | 3.42 | NO | 3.37 | NO | 3.21 | NO | 2.96 | NO |
| 625                            | 313     | 179 | 156 | 6250             | 6.3               | 0.62                      | 3  | 1.22 | 4  | 1.78 | 6  | 2.29 | 7  | 2.73 | NO | 3.09 | NO | 3.35 | NO | 3.51 | NO | 3.56 | NO | 3.51 | NO | 3.35 | NO | 3.09 | NO |
| 650                            | 325     | 186 | 163 | 6500             | 6.5               | 0.64                      | 3  | 1.27 | 4  | 1.85 | 6  | 2.38 | NO | 2.84 | NO | 3.21 | NO | 3.48 | NO | 3.65 | NO | 3.71 | NO | 3.65 | NO | 3.48 | NO | 3.21 | NO |
| 675                            | 338     | 193 | 169 | 6750             | 6.8               | 0.67                      | 3  | 1.32 | 4  | 1.92 | 6  | 2.47 | NO | 2.95 | NO | 3.33 | NO | 3.62 | NO | 3.79 | NO | 3.85 | NO | 3.79 | NO | 3.62 | NO | 3.33 | NO |

Resulting snow load on snowguards in kN, depending on snow load in kN/m<sup>2</sup> and roof pitch, according to EN 1991-1-3, cl. 6.4

Color coding - n. of APAK snowguards per linear meter in the horizontal direction:

|      |      |      |      |      |                          |
|------|------|------|------|------|--------------------------|
| 3    | 4    | 5    | 6    | 7    | NO                       |
| 50.0 | 33.3 | 25.0 | 20.0 | 16.7 | Snowguards not effective |

Resulting distance  $d_x$  between snowguards [cm]:



A: Distance between two adjacent PV modules' edges **11.4 mm**  
 INPUT: maximum distance in the horizontal plan between rows of snowguards or between the first row of hooks from top and the ridge

