

## Data sheet for Powerflex rain protection systems

### System specifications

- **Columns made from prestressed concrete:** The key advantage of prestressed concrete columns is that they offer consistent quality and durability (no corrosion), although quality does vary dramatically between different manufacturers. In addition, they can be produced relatively quickly in any length you want. The disadvantage is that they are heavier and less flexible than wooden columns.
- **Column type:** Prestressed concrete; bracing wires: inner columns 8.5 x 8.5 – 12 wires (4 x 3) or 18 wires (6 x 3); outer columns 10 x 12 – 18 wires (6 x 3) or 24 wires (8 x 3); shape: isosceles trapezium; edges: rounded.

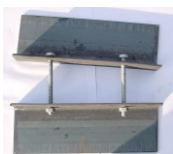
- **Column spacing:**

Guide values for film systems

<b>Prestressed concrete columns with at least 12 wires:</b>					
Terrain	Column thickness	4 m in length	4.5 m in length	5.0 m in length (18 wires)	
Level	8.5 x 8.5	7 m	6 m	5 m	
Slope of 10% or more	8.5 x 8.5	7 m	6 m	5 m	

If the rows run crossways to the slope, the column spacing should be reduced by at least 1 m because of the anticipated hail load.

- **Protection against sinking:** Concrete column and wooden column in the case of each outer column. The method of protection against sinking and the anchor design are dependent on the soil type. In the case of soft soil or closely spaced outer columns, the standard form of protection against sinking and the standard anchor are not sufficient. As a result, additional professional installation measures are required.
- **Anti-sinking plates:** Material: Angle steel 300/100/50/6, non-galvanised. Fastening: Two M12x130 8.8 bolts, hot-dip galvanised / two M12 nuts, hot-dip galvanised. The bolts must be tightened to a torque of 110 Nm. Must be installed at least 15 cm below ground.



- **Screw anchor:** For normal soil structures with a low coarse stone content, if any. Diameters: 25 cm, 30 cm, 40 cm, 50 cm, 60 cm. Lengths: 140 cm, 160 cm. Plate thickness: 6 mm, 8 mm. Rod thickness: 26 mm. Surface finish: non-galvanised.



- **Rambo:** This special anchor is suitable for extremely stony soils or hard gravel soils. Rod lengths: 120 cm, 150 cm, 180 cm. Material: cast iron part, round bar steel. Surface finish: non-galvanised.



- **Torpedo:** The Torpedo works in a similar way to the Rambo but has a much bigger plate, making it ideal for mixed soils, as well as those with stony and soft/gravelly properties.



**All anchors must be tested for a load of at least 3 t in the direction of tension with an appropriate anchor distance. If compromise solutions (i.e. a smaller anchor distance) prove necessary, the demand placed on the anchor may increase to +/- 6 t.**

- **Anchor distance:**
- Guide values for film systems

System height, ground to tip	Min. anchor distance	Max. column spacing
Up to 3 m	2 m min.	8 m max.
3.1 m–3.5 m	2.5 m min.	7 m max.
3.6 m–4.0 m	2.5 m min.	6 m max.
4.1 m–5.0 m	3.0 m min.	6 m max.
More than 5.0 m	3.0 m min.	5 m max.

**All anchors must be tested for a load of at least 3 t in the direction of tension.**

Any cavities above the anchor plate must be filled with rock flour or mountain sand and the infill compacted. Otherwise, a water channel will form all the way down to the anchor plate, thereby softening the soil. This can reduce the anchor holding capacity dramatically due to the entry of the water.

- **Anchor rope:** The anchor rope must be wrapped around the column so that it is directly below the column head at the edge and no more than 25 cm below the column head at the front – thereby creating a loop on the side where the anchor is located. The short and long ends of the rope must cross at the rear. These ends must be secured below the loop (approx. 30 cm) using two rope clamps. The longer end must be fed through the anchor loop to the anchor and then clamped in place with two cable tightening jaw and a pulley block. It must then be secured with two rope clamps. The front column inclination is 10–50 cm from the head to the foot of the column. The edge column inclination is 10–50 cm from the head to the foot of the column. Rope type: 8 mm, finely stranded. Definition: 7 strands, each with 7 wires. Surface finish: galvanised EN 10244-2 Class A (min. zinc coating of 145 g/m<sup>2</sup>)
- **Ridge wire:** up to a system width of 200 m  
Wiesel steel wire, zinc-aluminium. Thickness: 4 mm. Surface finish: zinc-aluminium alloy  
Min. breaking force: 1450 kg. R min–R max: 1250–1450 N/mm<sup>2</sup> max: 4% elongation  
The longitudinal and cross wires must run at right angles to each other.  
Each grid section should cover an area of approximately 25 m<sup>2</sup>, e.g. row width 4.0 m x column spacing 6 m = 24 m<sup>2</sup>.
- **Cross rope:** Rope type: 5 mm, thickly stranded, 1 x 19, galvanised. Breaking force: 2000 kg  
**The maximum cross bracing width is 200 m.**
- **Rope clamps:** The rope clamp is used to secure the ropes and the wires. Only the “Wiesel” type is to be used. Installation: The rope clamps must be staggered in accordance with the instructions from Fruit Security. At least two must be used per fastening and they must be tightened to a torque of 35 Nm.
- **Wire:** Wiesel steel wire, zinc-aluminium. Thickness: 4.0 mm. Surface finish: zinc-aluminium alloy. Min. breaking force: 1450 kg. R min–R max: 1250–1450 N/mm<sup>2</sup>. This wire serves as the longitudinal bracing for the hail net.
- **Rope:** 5 mm 1x19 WIESEL zinc-aluminium 2000 rope, 0.124 kg/m. Min. breaking force: 2365 kg. R min.: 1570 N/mm<sup>2</sup>. This rope serves as the longitudinal and cross bracing for the rain protection film.
- **Caps:** The various cap types are required to secure the ridge wire/rope, cross wire, hail net and rain protection film on the head of the column
  - Firstfix Uni: 100 / 120 / 140 / 160 mm in diameter
  - Power Firstfix: 100 / 140 / 180 mm in diameter
  - Powermatic: 7 x 7 / 8 x 7 / 8 x 8 / 8.5 x 8.5
  - Bolted ridge connection with: 30 Nm

- **Hail net:** The Wiesel hail net is a two-thread net that has been specially developed to achieve the optimum balance between translucency, load-bearing capacity and weave stability. The weave is created through the positioning of the warp threads. This relies on the following method: two pairs are used in each case, with a spacing of 8.7 mm (along the row direction). Meanwhile, the weft threads are positioned individually with a spacing of 2.8 mm. Edge reinforcement: 15 cm, densely woven, two-thread. Thread thickness: 0.32 mm. Material: PEHD. Centre reinforcement: 9 cm, three-thread. When on the roll, the net must not be exposed to direct sunlight.
- **Connector clip type 1:** Wiesel (4-part) connector clip. Material: PEHD + POM. Handling: The connector clip can be opened with one hand by pinching and sliding.



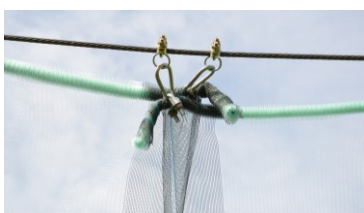
- **Connector clip type 2:** Wiesel (4-part) flat connector clip, white. Material: polyamide and polypropylene. Characteristics: net exit point not angled = protects the threads. Handling: single-handed superfast opening (can also be opened from the ground with an opening tool). We recommend using this type only in conjunction with additional scatter damage protection (which also provides protection against insects at the same time).



- **Net fastening:** The net must be secured on the ridge wire to prevent lateral slip. The net is fastened using a Wiesel net grip.



- **Ridge fastening:** There must be a net grip in place at least once every 1.5 m. The defining feature of the Wiesel net grip is that the tooth arrangement ensures a gap of approximately 1 cm between the grip walls. This prevents gripping of the weft threads. In turn, this stops fatigue breakage from occurring at the gripping edge as a result of gusts of wind (or similar).
- **Net termination:** Termination of the net at the front (entrance side) of the system is very important for tensioning the net and protecting the first set of trees.



- **Eaves wire fastening:** The 4.0 mm eaves wire must be secured to each cross rope using 10/12 mm eaves distance brackets. This stabilises both the eaves wire and the rain protection film. In addition, the eaves wire must be secured to the front columns at the front with a 6 mm rope.



- **Inner anchors:** At least every second inner column must be secured with a screw anchor measuring 800 mm/3 mm/150 mm, dia. 14, and a downward running 3.0 mm wire. All other inner columns need only be secured by attaching a 3.0 mm wire to a U-bolt halfway up the column.
- **Rain protection film:** Either a woven film (150g/m<sup>2</sup>) laminated on one side and with edge reinforcement on both sides or a PE film (150 microns) with edge reinforcement on both sides. The film types differ with regard to their characteristics, such as the degree of translucency and robustness.
- **UV protection film:** For the majority of the year, the 300 micron black thermoplastic sheet remains in place to protect the rain protection film against UV radiation.
- **Film fastening at the ridge:** The films are secured on the 5 mm ridge rope at intervals of 1.0 m using the WIESEL film grip (which includes 2 bolts).



- **Film fastening in the eaves:** In the eaves, the film is secured on the eaves wire at intervals of 1.0 m using the WIESEL S1 mod2017 PA SET film connector (which includes a bolt) and the 10 mm elastic rope (bungee) (max. 100% elongation) with PE casing.



It is absolutely essential to plan the system properly before setting it up and putting it into operation.

All the information has been formulated in a general way and only applies if the system is used correctly for its intended purpose and is regularly maintained in accordance with the instructions and specifications of Fruit Security. The data sheet does not constitute a set of installation instructions for your specific system. Depending on which version of the system you have, different installation and operating procedures and different values may apply in individual cases.

If anything is unclear, please contact Fruit Security.