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| Amendment        | A5         |

## Product Data Sheet - BIRDFLAPPA

*Help prevent bird collisions with transmission and distribution powerlines.*

### Key Features:

- Most durable dynamic bird flight diverter on the market
- When installing from the ground, a special quick release tool can be attached to industry standard telescopic hot sticks, for fast and efficient installation and removal from line
- Lab based slip tests prove better performance than alternate products on the market
- Duration tested to 114mph
- Fatigue tested to over 5 million cycles
- Built in reflector flashes sunlight increasing visibility
- Glow-in-Dark material supports performance in post-dusk and low light environments
- Range taking clamp fits most powerline conductors
- Can be installed on guy wires
- Installable via drone (coming soon)

### Applications:

- Tragically it is estimated that millions of birds are killed each year in collisions with power lines & wires. These bird collisions have a human impact as well, as they can disturb the power grid leading to outages.
- The **BIRDFLAPPA** has been developed in response to this significant issue. Studies have shown that properly installed bird flight diverters can reduce bird collisions by up to 90%.
- The **BIRDFLAPPA** is a dynamic bird flight diverter (BFD) combining wind-driven movement with reflective properties to increase visibility of powerlines and cables
- Scientific studies have shown that dynamic flapper style BFDs are more effective than static BFDs at reducing bird mortality (NABU, 2013; Liesenjohann et al, 2019; Martin 2022)



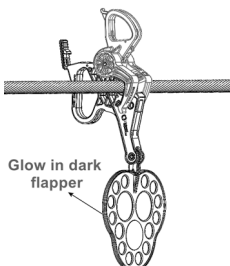
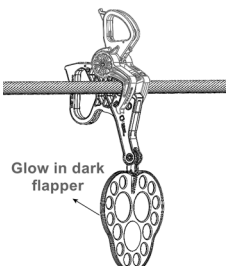
Figure 1  
BIRDFLAPPA  
P/No.: BD-SC-1K-GID





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### Part No. Table (A)

| Part No.    | BD-SC-1K-GID                                                                      | BD-SC-1K0-GID                                                                                 |
|-------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Description | BIRDFLAPPA Spring clamp with glow in dark flapper*                                | BIRDFLAPPA Spring clamp with glow in dark flapper, V-0 Flame Retardant grade without trigger* |
| Image       |  |            |

\*The glow in dark flapper contains fluorescent pigment which will emit a glow-in-the-dark light after dusk

### Dimensions Table (B)

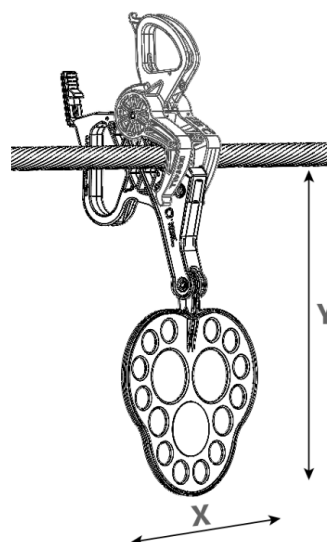
| X                                                                                                         | Y     | Clamp Closes To** | Clamp Opens To** | Weight |
|-----------------------------------------------------------------------------------------------------------|-------|-------------------|------------------|--------|
| 175mm                                                                                                     | 280mm | 2mm               | 50mm             | 330 g  |
| <b>X</b> = The width of the flapper<br><b>Y</b> = Drop from conductor when installed as depicted adjacent |       |                   |                  |        |

\*\*Suitability of the conductor are subject to the engineering requirements of the asset owner.

Note: Any dimensions or weights figure are estimates only.

### Materials Table (C)

| Part No.          | BD-SC-1K-GID                              | BD-SC-1K0-GID                                |
|-------------------|-------------------------------------------|----------------------------------------------|
| Components        |                                           |                                              |
| <b>Clamps</b>     | Nylon 6, V-2 Grade                        | Nylon 6, V-0 Grade                           |
| <b>Flapper</b>    | Nylon 6 with glow in dark pigment, non-FR | Nylon 6 with glow in dark pigment, V-0 Grade |
| <b>Cylinder</b>   | FR PA, V0 Grade                           |                                              |
| <b>Soft Jaws</b>  | TPE, V0 Grade                             |                                              |
| <b>Spring</b>     | Stainless Steel                           |                                              |
| <b>Hinge Pins</b> | Brass                                     |                                              |
| <b>Reflectors</b> | 3M Diamond Grade Reflective Sheeting      |                                              |





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**Spacing**

The general recommendation is to space the devices 15ft to 30ft or 5 meters to 10 metres apart. However, please refer to our Instructions For Use (IFU) for more detailed information.

This recommendation is subject to the requirements of the asset owner and dependent on environmental

**Ratings Table (D)**

| No. | Test Description                                                                      | Test Results                                                                    | No. | Test Description                                                                                                        | Test Results                                                                                                                             |
|-----|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | <b>Withstand voltage test</b><br>IEC 60060-1:2010,<br>AS 1931.1-1996,<br>AS 2225-1994 | No flash over occurred up to an equivalent of 178kV Ø-Ø                         | 2   | <b>Salt spray corrosion test</b><br>ISO 9227,<br>ISO 10289                                                              | Brass = 7 - 8<br>Stainless Steel = 10                                                                                                    |
| 3   | <b>Slip test (load when device started to slip)</b><br>IEC 61897-2020 test method     | 145 N <sup>(a)</sup>                                                            | 4   | <b>Ozone resistance of Clamps and Flapper materials test specimen 1000 hours</b>                                        | No visual signs of damage                                                                                                                |
| 5   | <b>Testing of clamp assembly on 247°F/120°C heated rod for 1h</b>                     | No adverse functional effect on unit                                            | 6   | <b>Testing of clamp assembly to - 31°F/-35°C</b><br>IEEE 1656-2010                                                      | No adverse functional effect on unit                                                                                                     |
| 7   | <b>Snow and ice testing</b>                                                           | No adverse functional effect on unit, approx. 5g additional load <sup>(b)</sup> | 8   | <b>Wind Tunnel testing at a maximum of 51m/s (114mph/183kph) in accordance with standardised testing protocols</b>      | No adverse functional effect on unit <sup>(c)</sup>                                                                                      |
| 9   | <b>Ice loading effect on 22mm conductor</b><br>EN 50341-2-4:2016                      | 1.3% increase at 10m spacing <sup>(d)</sup>                                     | 10  | <b>Reflectors Colour and Retro Reflectivity</b>                                                                         | ASTM D4956 Type XI, AS/NZS 1906.1 Class 1W, DTMR QLD Class 1X, RTA NSW Class 1X <sup>(e)</sup>                                           |
| 11  | <b>Coefficient of drag</b>                                                            | 1.17 <sup>(f)</sup>                                                             | 12  | <b>Line load (per unit) at a wind speed of:</b><br>1) 0kph<br>2) 18kph<br>3) 36kph<br>4) 108kph                         | 1) 3.24 N (330g) <sup>(f)</sup><br>2) 3.26 N (333g) <sup>(f)</sup><br>3) 3.58 N (365g) <sup>(f)</sup><br>4) 9.23 N (941g) <sup>(f)</sup> |
| 13  | <b>UL Flame Retardant Rating</b><br>(all Non-Metal components of BD-SC-1K0-GID)       | UL 94 V-0 <sup>(g)</sup>                                                        | 14  | <b>UV aging test of Clamps and Flapper materials test specimen 1000 hours</b><br>ISO 4892-3,<br>ASTM D 638,<br>ISO 4582 | Changes in colour (Colour Fastness Grading): 4<br>Changes in other appearance properties: Slight                                         |



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| No. | Test Description                                                           | Test Results                                                                                                                       | No. | Test Description                                                       | Test Results                                                                          |
|-----|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 15  | <b>Corona inception test</b><br>IEC 61284-1997                             | Occurred at an equivalent of 188kV Ø-Ø                                                                                             | 16  | <b>Corona extinction test</b><br>IEC 61284-1997                        | Occurred at an equivalent of 176kV Ø-Ø                                                |
| 17  | <b>Radio interference voltage (RIV) test</b><br>IEC 61284-1997             | <ul style="list-style-type: none"> <li>•162.2µV at 173kV Ø-Ø</li> <li>•98.9µV at 116kV Ø-Ø</li> <li>•81.3µV at 43kV Ø-Ø</li> </ul> | 18  | <b>Michelson contrast</b><br>(BD-SC-1K-GID)                            | ≈ 0.971 <sup>(d)</sup>                                                                |
| 19  | <b>Max. projected area of the unit in a single plane</b>                   | ~21,770mm <sup>2</sup>                                                                                                             | 20  | <b>Max. horizontal visible area of reflective element surface area</b> | ~1,963.5mm <sup>2</sup>                                                               |
| 21  | <b>Max. horizontal visible area of phosphorescent element surface area</b> | ~14,028mm <sup>2</sup>                                                                                                             | 22  | <b>Phosphorescent pigment decay time</b><br>DIN 67510-1:2009           | Over 16hours <sup>(h)</sup>                                                           |
| 23  | <b>Flapper Swing Fatigue test over 5 million cycles</b>                    | No adverse functional effect on unit <sup>(d)</sup>                                                                                | 24  | <b>OPGW vibration test</b><br>IEC 60794-1-21 test method               | Tested up to 10,000,000 cycles<br>No adverse functional effect on OPGW <sup>(i)</sup> |
| 25  | <b>Max. installation Guy Wire angle (to horizontal)</b>                    | 45°                                                                                                                                |     |                                                                        |                                                                                       |

(a) Results obtained from standardised indoor lab tests performed on the same Spring Clamp tested on Ø21.6mm OD ASCR conductor.

(b) Testing performed in Hokkaido, Japan. Load inclusive of snow/ice build-up on device per unit.

(c) Results obtained from the device performance conducted in a leading Australian University Wind Tunnel Test lab.

(d) Results obtained from Balmoral inhouse test or research.

(e) Results obtained from the 3M Reflective Sheeting Datasheet. Same series of sheeting specimens passed ASTM E162 Flame Spread test.

(f) The Line load is inclusive of the device weight; it's calculated based on the given Coefficient of Drag and the maximum projected area of the device at different wind speeds. The actual value may vary depending on the state of the device at different wind speeds.

(g) Results obtained from the Non-Metal Components of BD-SC-1K0-GID materials datasheet.

(h) Results obtained from the phosphorescent pigment manufacturer lab test.

(i) Results obtained from Balmoral inhouse test referring to the IEC 60794-1-21 E19 test method but simplified the testing process.

The data herein is an indication of product capabilities in known predetermined lab conditions and actual outdoor environments may vary. Where stated, "unit" refers to a BIRDFLAPPA device.

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