



KILGALLEN & PARTNERS

CONSULTING ENGINEERS

Structural Calculations

OCTINK

BERSTED PARK – FLAG POLE FOUNDATION

Octink	Document	Kilgallen & Partners
Bersted Park – Flag Pole	Reference	Consulting Engineers
Foundation	17-516-C16A	14 Cambridge Court
		210 Shepherd's Bush Road
		London W6 7NJ
April 2018		

DOCUMENT AMENDMENT HISTORY

Client	Octink
Project	Bersted Park – Flag Pole Foundation
Title	Structural Calculations for Octink

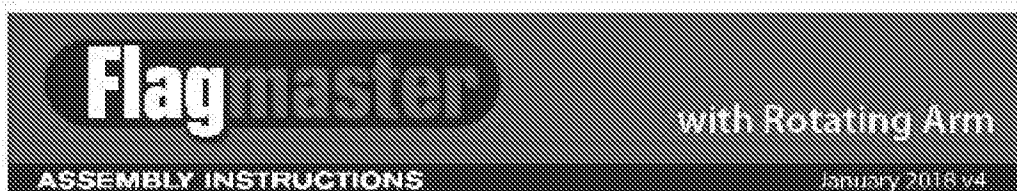
Date	Details of Issue	Issue No.	Origin	Checked	Approved
16/04/2018	Issue to Octink	T01	AD	AD	

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1.0 Scope of Report

- 1.1 Kilgallen and Partners have been engaged to fulfil the role of Checking Structural Engineer for Octink for the proposed flag pole foundation at Bersted Park. Please find below Flag Manufacturers proposal and structure, Fig 01 and 02.



1. Check contents, the rotating arm kit will come in a separate pack.
2. For permanent installation, excavate a foundation, (see table for dimensions). Concrete the socket into place, use a level to check the socket is vertical and plumb sitting on the soil at the bottom of the hole and plumb checking at intervals as you infill the hole. **DO NOT SIT THE POLE ON CONCRETE.** Make sure there is minimum of 20mm and maximum if 100mm of socket left above ground. (see fig1a)
3. For a temporary installation use a ground auger and pack with sharp sand and soil to secure the ground socket, use a level to check the socket is vertical and plumb checking at intervals as you infill the hole. Make sure there is minimum of 20mm and maximum if 100mm of socket left above ground. (see fig1b)
4. Place weight over pole (see fig 3a), mount rotating joint onto top of pole (see fig 3b), push on finial (see fig 3c).
If using an onion finial, push the whole finial / joint assembly onto the top of pole (see fig 3d).
5. Push rotating arm into joint, ensure button clips into place (see fig 4a), slide top sleeve on flag over the arm. (see fig 4b)
6. Secure plastic ties through the eyelets and around the pole. **DO NOT OVER-TIGHTEN** (see fig5a).
At the bottom of the flag attach the D-ring to the metal clip on the weight. (see fig 5b)
7. Assemble the pole sections. Make sure that the joints are fully home.
8. Once concrete has set (if applicable), insert the complete flagstaff into the ground socket (Care must be taken to not damage the arm, two persons are recommended for erection process)

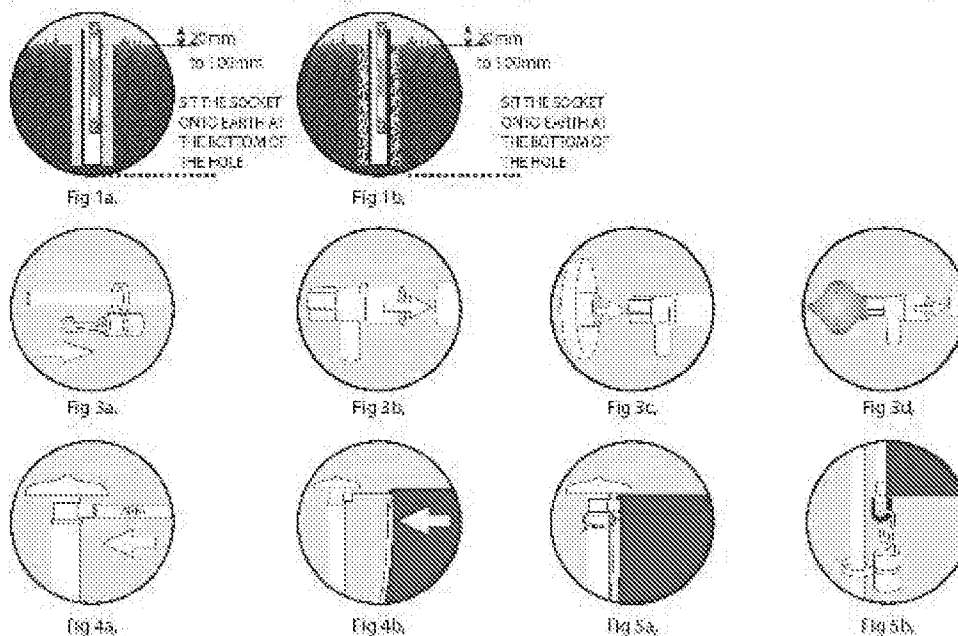


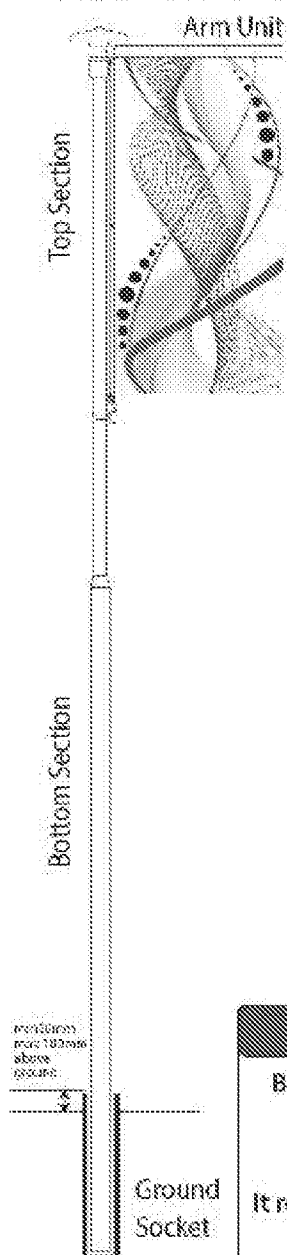
Fig. 01

Flagmaster

with Rotating Arm

ASSEMBLY INSTRUCTIONS

January 2018 v1



Pack 1:	Pack 2:
2 Flagstaff sections	1m Rotating Arm and ties
& Ground Socket	Rotating Joint & Finial
	(or joint and Onion Finial)
CONTENTS	Weight

Flagmaster Pole Specifications

Nominal Pole length Size (2 sections)	6m
Height above Ground	6.0m
Top section diameter	64mm
Length of top section	3.2m
Bottom section diameter	75mm
Length of bottom section	2.8m
Ground socket internal diameter	77mm
Ground socket external diameter	89mm
Length of ground socket	600mm
Overall length of flagstaff	6.5m
Packed Size	3.8 x 0.1 x 0.1m
Packed weight	15kg
Foundation square*	500mm
Foundation depth*	580mm
Arm length	1m
Arm Outside diameter	20.4mm
Arm Inside diameter	17.96mm
Wall thickness	1.75mm
Packed size	1.2 x 0.1 x 0.3m
Weight	2kg
Max flag size (portrait)	100cm x 250cm
Max flag size (portrait double sided)	100cm x 200cm

*These are suggested dimensions only, actual measurements will depend on ground conditions

WARNINGS

BEFORE INSTALLATION, CHECK FOR UNDERGROUND SERVICES

Do not fly flag when wind speed exceeds Force 7 (32mph)

Re-usable ties must never be over tightened

It remains the responsibility of the user to establish the suitability of the product /s for the use/s to which they are put

Fig. 01

2.0 Loading

- 2.1 Dead loading is calculated based on the self-weight of the new structure.
- 2.2 Proposed frame has not been checked for Live and Snow Loadings



Alan Dowling, Chartered Engineer

Kilgallen and Partners Consulting Engineers

3.0 Wind Analysis and wind loadings

Wind loading has been calculated to BS6399:Part 2. The site is located at Bersted Park, Chichester Road PO21 5BS. The wind analysis for the sign is denoted on the following pages


Kilgallen & Partners Consulting Eng.'s

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TEST PROJECT

Revision

Job No:

17516

Page:

Prepared By:

AD

Date:

16/04/2018

Section:

WIND ANALYSIS
SITE AND BUILDING (STRUCTURE) DATA
Site location or nearest city: **Brighton**Site topography: **non significant**Building (structure) orientation: **unknown**Nearby buildings/obstructions: **ignore**Building (structure) height 'h' [m] = **6.0**Site altitude 'A' [m] = **3.0**Fundamental basic wind velocity 'v_{b,map}' [m/s] = **21.6**Building (structure) design life [years] = **10.0**Season factor 'c_{season}' = **1.00**Probability factor 'c_{prob}' = **0.90**Altitude factor 'c_{alt}' = **1.00**
CALCULATIONS: BASIC WIND VELOCITY
Building (structure) rotation from North 'Ø' [deg] = **N/A**Wind direction: **ANY** **II** **III** **IV**Angle from North 'Ø_d' [deg] = **-** **-** **-** **-**Direction factor 'c_{dir}' = **1.00** **-** **-** **-**Basic wind velocity 'v_b' [m/s] = **19.55** **-** **-** **-**Basic velocity pressure 'q_b' [kN/m²] = **0.234** **-** **-** **-**
CALCULATIONS: EFFECTIVE HEIGHT
Wind direction: **ANY** **II** **III** **IV**Terrain in upwind direction: **country**Distance upwind to shoreline [km] = **2.5** **-** **-** **-**Distance upwind inside town [km] = **-** **-** **-** **-**
NEARBY BUILDINGS DATA:
Average height 'h_{ave}' [m] = **-** **-** **-** **-**Upwind spacing 'x' [m] = **-** **-** **-** **-**Effective height 'h_{ef}' [m] = **6.00** **-** **-** **-**
CALCULATIONS: PEAK VELOCITY PRESSURE
Wind direction: **ANY** **II** **III** **IV**Topography factor 'c_{te}' = **-** **-** **-** **-**Roughness factor 'c_{pe}' = **-** **-** **-** **-**Correction factor 'c_{pe}' = **-** **-** **-** **-**Turbulence factor 'k_z' = **-** **-** **-** **-**Turbulence correction factor 'k_z' = **-** **-** **-** **-**Exposure factor 'c_{e(z)}' = **2.27** **-** **-** **-**Exposure correction factor 'c_{e,T}' = **1.00** **-** **-** **-**Peak velocity pressure 'q_p' [kN/m²] = **0.53** **-** **-** **-**
Designer's Notes:

4.0 Design check of foundation and sketched up detail

The calculations for the various elements are outlined in the following pages

5.0 Marked up structural sketch

BERSTAD PARK

Part of Structure

Flag Pole Foundation

Job No.

Drawing Ref.

Date

17516

16/4/18

Sheet No.

Calculation By

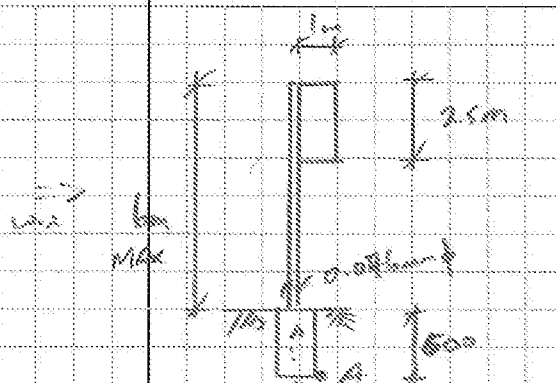
Checked By

①

AD

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Ref.	Calculations	Output
	 Wind $w = 0.57 \text{ kPa}$ $C_f = 2$ Wind Load = $0.57 \times 2 = 1.14 \text{ kPa}$ NOTE: Flag can free to rotate therefore not contributing to the wind load. Although for these calculations take $g = 1.0$ as a contributing load from the flag. TAKEN INTO ACCOUNT • OVERTURNING MOMENT = $1.1 \times 0.076 \times \left(\frac{6}{2} \times 0.5\right) \times 6$ $+ 0.57 \times 1 \times 2.5 \times \left(\frac{5 + 2.5}{2} \times 6\right)$ $= 1.8 + 7 = 8.8 \text{ kNm}$ • BASTARDING MOMENT = $24 \times 0.6 \times 0.6 \times 0.5 \times \frac{0.5}{2}$ $+ \left(3 \times 18 \times \frac{0.6}{2} \times \frac{0.6}{3} \times \frac{0.6}{3}\right) \times 2$ $= 0.9 + 3.9 = 4.8 \text{ kNm}$ POINT WINDING TO 1m DEEP • BASTARDING MOMENT = $24 \times 1 \times 0.5 \times 0.5 \times \frac{0.5}{2}$ $+ \left(3 \times 18 \times 1 \times \frac{1}{2} \times \frac{1}{3}\right) \times 2 = 17.5 \text{ kNm}$	

BOSTON PARK

Part of Structure

Flag Pole Foundation

Job No.

Drawing Ref.

Date

Sheet No.

Calculation By

Checked By

②

NO



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Ref.	Calculations	Output
	<u>Sliding</u> $\text{Sliding Force} = (1.1 \times 0.076 \times 6) + (0.53 \times 1 \times 2.5)$ $= 0.5 + 1.3 = 1.8 \text{ kN}$ $\text{Resisting Force} = 24 \times 1 \times 0.5 \times 0.5 \times 0.3$ $+ 3 \times 18 \times 1 \times \frac{1}{2} \times 2$ $= 3.5 \text{ kN}$ $F.O.S. = \frac{3.5}{1.8} = 1.9 \text{ OK.}$ <u>SKETCH DETAIL</u>	