FLOODLIGHTING GENERAL INFORMATION

The proposed floodlighting is listed as HL330 with an approx height of 20 meters

Ref;FPL009



Base-hinged raising and lowering masts

Abacus base-hinged masts do exactly what they say on the tin: raise and lower from ground level up to a height of 50 metres. There are eight models to choose from – mainly used to mount floodlights, CCTV cameras, wind turbines and compact communication devices.

Since the first model was introduced over 40 years ago, Abacus base-hinged masts have become some of our most popular products worldwide. Robust, simple to install and easily accessible, they're incredibly cost-effective – especially since they require minimal ongoing maintenance.

The unique operating system – the first and still best of its kind on the market – is as safe as it is simple, with its gravity lock and quick-lowering mechanism.

Why base-hinged?

- Quick and simple to assemble and install – up to three times faster than fixed or winch-lowering models
- Safe – no climbing, as all maintenance and floodlight adjustments can be done at ground level
- Virtually maintenance free – thanks to straightforward design and robust engineering
- Attractive – with no ladder or platform to interrupt the mast's clean, modern lines
- Versatile – with eight models, all designed for different load weights
- Particularly suitable for high-wind or hurricane-prone zones, as masts can be lowered in advance of storms.

Specification

All masts are designed to the British High Mast standard, Institution of Lighting Engineers' Technical Report No. 7. All models are hot-dip galvanised to ISO EN 1461. Base-hinged raising and lowering masts with gravity locks are installed and operated using an independent hydraulic cylinder counterbalance unit.

Technical data

Mast ref	Mounting height (m)	Column weight (Kg)	Weight of heaviest part (Kg)	Max O.T.M KnM		Horiz.shear at ground level (kN)	Foundation bolts	Integral gear compartment	Foundation reference*
				raised	lowered				
HL250	12	398		45	29	6	4 No. M30 x 800mm	100 x 190 x 410	50M150/50P150
	15	432	253	45	29	5	Grade 4.6 on 400x400crs	100 x 170 x 650	50M150/50P150
HL330	15	750		121	82	11		170 x 270 x 350	150M150/150P150
	18	797	370	120	82	10	4 No. M30 x 1200mm	170 x 250 x 656	150M150/150P150
	20	812		120	82	10	Grade 8.8 on 460x460crs	One off	150M150/150P150
GL400	15	1019		147	123	12			150M150/150P150
	18	1151		159	133	11			200M150/200R150
	20	1194	691	161	132	11	8 No. M30 x 1200mm	2902 x 310 x 610	200M150/200R150
	25	1278		153	133	9	Grade 8.8 on 620PCD**	Two off	200M150/200P150
GL520	20	1929		278	258	18			300R150/300M150
	25	2124		297	267	16			300R150/300M150
	30	2267	1210	298	277	15	8 No. M36 x 1200mm	406 x 426 x 610	300R150/300M150
	35	2330		226	265	13	Grade 8.8 on 700PCD**	Two off	300R150/300M150
GL620	20	3174		711	521	41			750R150
	25	3450		673	528	33			750R150
	30	3618	1848	565	518	26	16 No. M36 x 1350mm	490 x 510 x 800	750R150
	35	3731		491	512	23	Grade 8.8 on 200crs	550 x 570 x 630	750R150
	40	3865		470	527	21	(800 x 800 overall)	One off	750R150
GL720	25	4687		720	639	37			750R150
	30	5203		703	730	33			750R150
	35	5497	3365	737	760	32	20 No. M36 x 1350mm	590 x 610 x 1000	1000R150
	40	5840		759	838	31	Grade 8.8 on 180crs	650 x 670 x 630	1000R150
	45	6586		820	867	31	(900 x 900 overall)	One off	1000R150
GL800	30	7196		912	898	43			1000R150
	35	7610		987	957	42			1000R150
	40	8514	4966	989	1148	40	20 No. M36 x 1350mm	970 x 690 x 1000	1250R150
	45	8893		989	1145	39	Grade 8.8 on 180crs	730 x 750 x 630	1250R150
	50	9510		989	1327	37	(900 x 900 overall)	One off	1500R150
GL1000	30	10600		2220	2110	116	20 No. M42 x 1700mm	950 x 950 x 600	3000R150
	35	11200		2840	2090	126	Grade 8.8 @ 240crs	850 x 850 x 1000	3000R150
	40	11600	6410	2650	2070	109	(1200 x 1200 overall)		3000R150
	45	11800		2240	2070	90			3000R150
	50	12050		1790	2060	74			3000R150

*Note: this reference is based strictly on a good ground pressure of at least 150kN/m²
**PCD = Pitch Circle Diameter



Fast and simple

Masts are assembled and installed at ground level using low-capacity equipment.



Safety first

Safe and simple maintenance at ground level. No climbing, no high level platform with difficult access.



Versatile and robust

Up to 50m high and built to last, with low-cost maintenance.







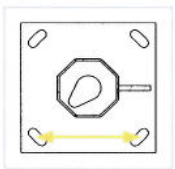
Mid range base-hinged

Grand range base-hinged



RLH5





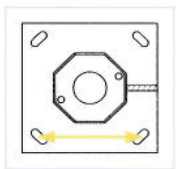
400mm

HL250



RLH11



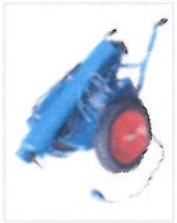


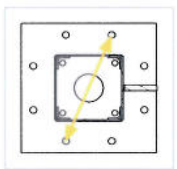
460mm

HL330



RLH12





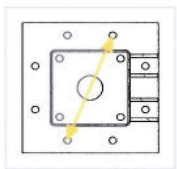
620mm
Pitch Circle Diameter

GL400



RLH13





700mm
Pitch Circle Diameter

GL520

Product code	Height (m)	Max head load (Kg)	Floodlight cap. no.*
HL250S10	10	175	7
HL250S12	12	150	6
HL250D15	15	105	4
Lid/base section: control gear and protection equipment capacity			
1kW/2kW		Cabinet only	
Foundation assembly			
Bolts and base template		FA003G	
Top template		FC023	
Counterbalance		RLH5	

Product code	Height (m)	Max head load (Kg)	Floodlight cap. no.*
HL33015	15	350	13
HL33017.3	18	260	9
HL33018	18	245	9
HL33019.3	20	220	8
HL33020	20	200	7
Lid/base section: control gear and protection equipment capacity			
1kW/2kW		Cabinet only	
Foundation assembly			
Bolts and base template		FA/HL330	
Top template		FC/HL330	
Counterbalance		RLH11	

Product code	Height (m)	Max head load (Kg)	Floodlight cap. no.*
GL40018SL	18	260	10
GL40018SH	18	450	16
GL40020SL	20	250	10
GL40020SH	20	380	14
GL40025SL	25	225	8
Lid/base section: control gear and protection equipment capacity			
1kW/2kW		x6	
Foundation assembly			
Bolts and base template		FA006G	
Top template		FC026	
Counterbalance		RLH12	

Product code***	Height (m)	Max head load (Kg)	Floodlight cap. no.*
GL52025SL	25	260	10
GL52025SH	25	530	17
GL52030SL	30	260	10
GL52030SH	30	340	12
GL52035SL	35	200	8
Lid/base section: control gear and protection equipment capacity			
1kW/2kW		x6	
Foundation assembly			
Bolts and base template		FA007G	
Top template		FC027	
Counterbalance		RLH13	

* Assumes a Challenger® 1 type floodlight, 20Kg and 0.13m² wind area. ** Assumes a Challenger® 3 type floodlight, 16Kg and 0.20m² wind area.
*** Refer to the bracket specification on your quotation for actual mast height requirement; mast may be shorter to accommodate height of the bracket, maintaining floodlight's central mounting height.

The HL330 base-hinged masts: 15m to 20m

Carrying up to eight Challenger® 1 2kW floodlights at 20m, the HL330 has the high-performance capability needed for medium to large projects.

As with the HL250, the HL330 product range can be delivered and installed in two ways:

Easy-fit on site

- The cabinet is delivered pre-wired and fitted with control gear and protection equipment, only the main power cable has to be connected into the mast
- Cabinet is mounted onto the mast's flange plate on site
- Allows fast on-site assembly and installation

Standard supply

- Mast and cabinet are supplied empty for your contractor to fit on-site



HL330 product range

Product codes	Mast height (m)	Sets of gears	1kW or 2kW	Switching	RCD socket	Abacus install
HL330 mast range						
HL33015	15	-	-	-	-	-
HL33017.3	18	-	-	-	-	-
HL33018	18	-	-	-	-	-
HL33019.3	20	-	-	-	-	-
HL33020	20	-	-	-	-	-
HL/330/BOX	Gear cabinet max. 4 gears	-	-	-	-	-
HL/330/BOX/A998	Gear cabinet to 10 gears	-	-	-	-	-
HL330 factory fitted control gear cabinets						
330BOX42	-	4	2			●/Client
330BOX43	-	2	2	●	●	●
330BOX52	-	4	2			●/Client
330BOX53	-	2	2	●	●	●
330BOX62	-	4	2			●/Client
330BOX63	-	2	2	●	●	●
330BOX72	-	4	2			●/Client
330BOX73	-	2	2	●	●	●
330BOX82	-	4	2			●/Client
330BOX83	-	2	2	●	●	●
330BOX92	-	4	2			●/Client
330BOX93	-	2	2	●	●	●
Foundation assembly						
FA/HL330	Bolts and base template					
FC/HL330	Top template					

Brackets for base-hinged masts

The SB bracket range is compatible with all base-hinged masts. Brackets incorporate a standard flange, enabling them to be fixed to the matching flange supplied with the mast.

The masts can also be fitted with an additional clamp-on bracket for lower-height floodlights (requiring on-site drilling to feed through additional cabling).

The brackets also feature an M20 bolt with an anti-rotation 'cup', which prevents the stirrup from moving.

In addition to the standard brackets shown, we can also design and supply bespoke brackets if required.

There are two categories of brackets – sports and area lighting. Both types are fitted with Abacus anti-rotation floodlight cups.

The brackets are supplied in easy-to-assemble kits, requiring the minimum equipment to put together.

SB bracket range



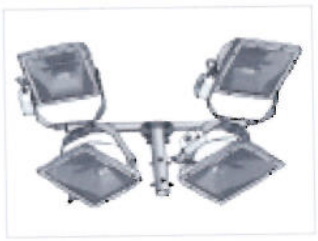
SB1



SB2



SB3



SB4



SB4H



SB5



SB6



SB8

The SB8 carries either seven or eight Challenger® 1 floodlights. To be used in conjunction with shortened 18m and 20m HL330 masts as follows: HL33017.3 / HL33019.3



Clamp on bracket

SBC16	Clamp on at 6m	HL250 only
SBC18	Clamp on at 8m	HL250 only
SBC3306	Clamp on at 6m	HL330 only
SBC3308	Clamp on at 8m	HL330 only



The Club range (15m–30m)

Choose from our standard range or commission a bespoke mast, depending on your project.

- 15–20m: Tubular or octagonal steel construction
- 20–30m: Multi-sided steel construction

Maintenance access

There are three options for maintaining our Club range:

- Ladder fixed permanently to mast, with security cable system
- Removable climbing rungs with security cable system
- Cherry picker vehicle mounted platform

Whichever option you choose, control and protection equipment can be factory-fitted into the base of the mast itself, or placed in an external cabinet close to the mast's base.

Fixed mast with ladder and twin platform



This fixed mast has electrical equipment factory-fitted and mounted into a cabinet in its base. Lights are accessed by a 'cherry picker' for maintenance.





Fixed mast system, Czech Republic



Foundation design

In this section, you'll find technical guidance on foundation designs – for both the range of high masts in this brochure and bespoke masts designed by Abacus for specific clients' projects. All foundations meet BS8004 standards and comply with the Institute of Lighting Engineers' Technical Report No.7.

Allowable ground-bearing pressures

A key factor in determining the size of mast foundations is the bearing pressure of the ground in which it will sit.

Over the following pages, each standard foundation reference incorporates the ground-bearing pressure within its code, making it quick and simple to identify the kind of foundation you need.

The table below shows subsoil classifications according to the BS8004 standard, against the approximate allowable bearing pressure. We're also working to the new eurocodes, so if you require any further help, please call us on +44 (0)1623 511 111.

If there is any doubt over ground conditions, it is the client's or contractor's responsibility to consult a qualified civil engineer to establish the true bearing pressures.

Typical foundation details are provided for guidance only and should be checked with the client before use. Abacus Lighting Limited will not accept responsibility for any foundations unless they are specifically designed by us at the client's request.

Types of subsoil

Types of subsoil	Condition of subsoil	Field test applicable	Approximate allowance bearing pressure kN/m²
Rock	Not inferior to sandstone, limestone or firm chalk	Requires at least a pneumatic or other mechanically operated pick for excavation	1000
Gravel, sand	Compact	Requires pick for excavation. Wooden peg 50mm² in cross section is hard to drive beyond 150mm	Dense to very dense 150-400 Loose to medium dense 50-250
Clay, sandy clay	Firm	Can be moulded by substantial pressure with the fingers and excavated with graft or spade	50-100
Sand*, silty sand*, clayey sand*	Loose	Can be excavated with a spade. Wooden peg 50mm² in cross section can be easily driven	<75
Silt*, clay*, sandy clay*, silty clay*	Soft	Fairly easily moulded with the fingers and readily excavated	<75
Silt*, clay*, sandy clay*, silty clay*	Very soft	Natural sample in winter conditions exudes between fingers when squeezed in fist	<75

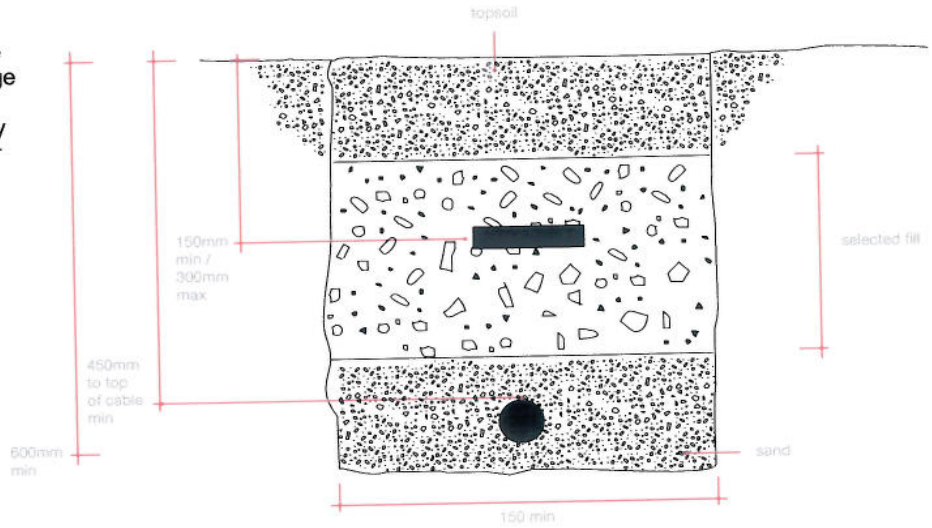
These values are provided for guidance only. If in any doubt, consult a qualified civil engineer.
*Foundations on these soils require assessment and design by a qualified civil engineer.

Planning the site: cable trenches

Cables buried directly in the ground must be marked by cable covers or a suitable marking tape.

Cables, conduits and ducts must be buried deep enough to avoid damage from any reasonably foreseeable ground disturbance. If you are in any doubt, refer to national guidelines or standards.

Typical cable trench



Foundations and flange plates

The principal method for installing a high mast involves a flange plate supported by a prepared foundation*.

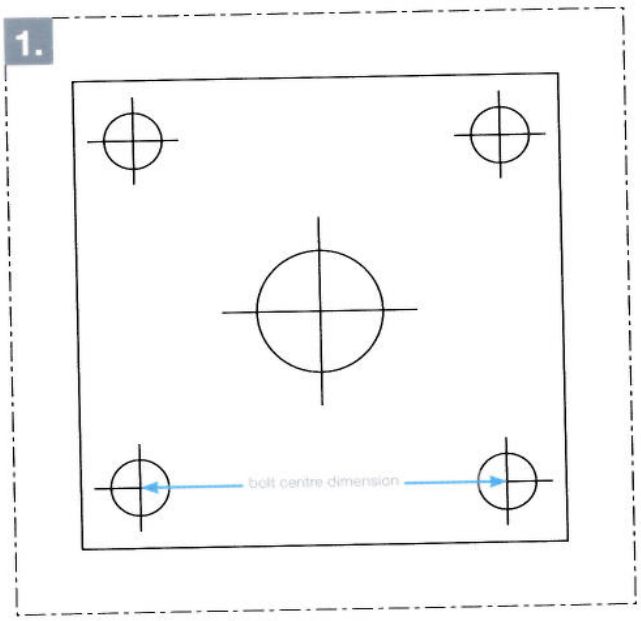
The flange plate, which is welded to the base of the mast, is designed to accommodate the overturning moments (forces) for each specific mast.

Bolt holes in the flange plate are arranged in one of two ways:

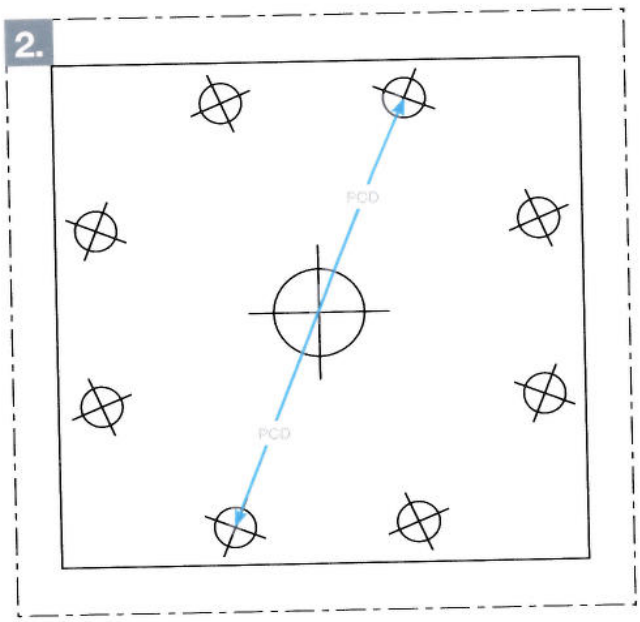
1. In a square, where the stated 'bolt centre' dimension is given.
2. In a circle, where the 'pitch circle diameter' (PCD), is given.

This diameter is stated for the dimension between bolt-hole centres (see diagram).

*Root-mounting can be an option up to a height of 18m, but we don't cover this here. If you'd like more information on this method, please contact the Abacus sales office.



Square bolt configuration, with bolt centre dimensions



Circular bolt configuration, with PCD bolt centre dimensions

Assembling foundation bolts into concrete

Foundation bolts

Foundation bolts are supplied with nuts, washers, a spacer plate and a fixing template in either wood (smaller masts) or steel. Make sure the foundation bolt is put together accurately with bolts vertical and fixed rigidly so it won't be displaced or misaligned during concreting. Also, check that bolts project correctly above the foundation.

After the concrete has cured, the mast is erected and levelled on the double nuts.

The bolts should then be tightened in accordance with the final torque value, as shown in the table to the right.

Concrete

Foundations should be constructed in accordance with the following design and dimensional details. Unless otherwise specified, they should use:

- For reinforced foundations: grade C28/35 concrete and high tensile reinforcement with a yield stress of 485N/mm²
- For unreinforced foundations: C20/25 grade concrete.

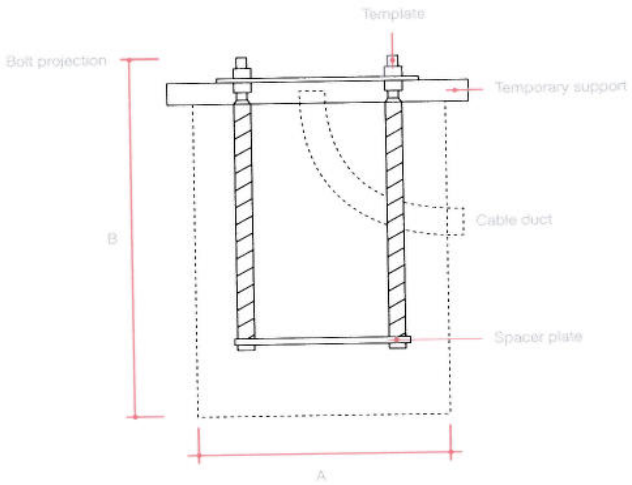
Cable entry ducts should be placed centrally within the concrete to facilitate entry into (and in some cases out of) the mast itself.

Concrete will typically take a minimum of 14 days to cure – enough to erect the mast subject to various factors and in accordance with recommendations.

Holding-down bolt projection and final torque values

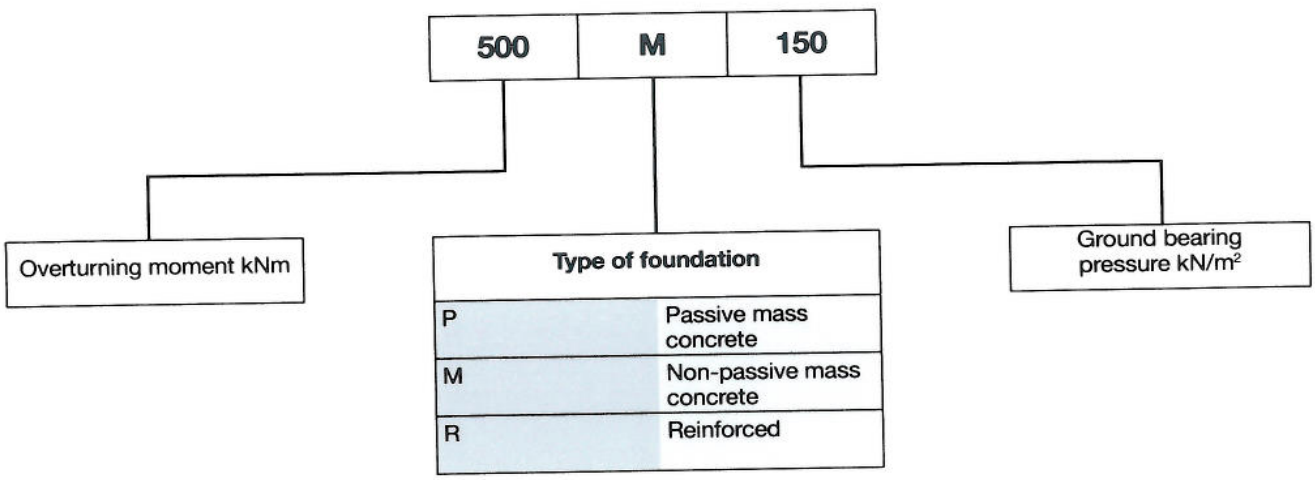
Bolt size and grade	Projection (mm)	Torque (Nm)
M16*500 long grade 4.6	125	25
M20*500 long grade 4.6	125	50
M24*600 long grade 4.6	125	160
M30*800 long grade 4.6	150	310
M24*880 long grade 8.8	150	425
M30*1220 long grade 8.8	150	850
M36*1200 long grade 8.8	175	1450
M36*1350 long grade 8.8	175	1450
M36*1590 long grade 8.8	175	1450
M42*1700 long grade 8.8	210	2350
M48*1870 long grade 8.8	210	3500

Typical section through foundation



Glossary of foundation reference codes

The foundation reference codes on the following pages are put together like this:



Standard-mass concrete: passive and non-passive foundations

We offer two standard concrete types for non-reinforced-mass foundation designs – passive and non-passive.

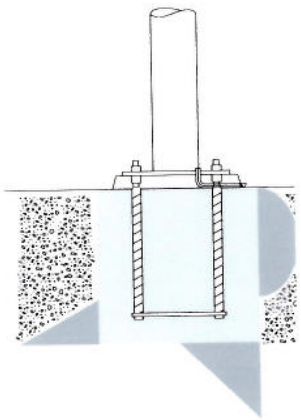
Passive concrete foundation Standard sizes

Foundation	O.T.M (kNm)	Bearing pressure (kN/m²)	A Width (mm)	B depth (mm)
3P150	3	150	650	750
4P150	4	150	700	800
5P150	5	150	750	800
6P150	6	150	750	900
8P150	8	150	850	950
10P150	10	150	900	950
15P150	15	150	950	1100
20P150	20	150	1050	1200
30P150	30	150	1200	1250
40P150	40	150	1250	1300
50P150	50	150	1350	1400
75P150	75	150	1450	1600
100P150	100	150	1600	1700
150P150	150	150	1800	1850
200P150	200	150	1950	2000
300P150	300	150	2250	2150
400P150	400	150	2450	2250
500P150	500	150	2700	2300
750P150	750	150	3050	2600

Ground bearing pressures below 150 kN/m² are not applicable.

Passive concrete

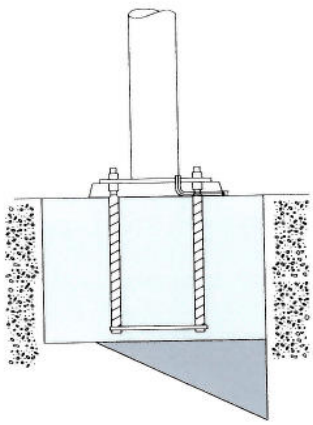
Typically used in firm ground with ground-bearing pressure of no less than 150kN/m²



Soil pressure distribution

Non-passive concrete

Typically used with uniform or poor subsoil with ground-bearing pressure of 75-150kN/m²



Soil pressure distribution

Non-passive concrete foundation Standard sizes

Foundation	O.T.M (kNm)	Bearing pressure (kN/m²)	A Width (mm)	B depth (mm)
3M75	3	75	880	590
3M100	3	100	880	590
3M150	3	150	880	590
4M75	4	75	950	625
4M100	4	100	950	625
4M150	4	150	950	625
5M75	5	75	1050	675
5M100	5	100	1050	675
5M150	5	150	1050	675
6M75	6	75	1100	700
6M100	6	100	1100	700
6M150	6	150	1100	700
8M75	8	75	1150	725
8M100	8	100	1150	725
8M150	8	150	1150	725
10M75	10	75	1250	775
10M100	10	100	1250	775
10M150	10	150	1250	775
15M75	15	75	1400	850
15M100	15	100	1350	825
15M150	15	150	1350	825
20M75	20	75	1500	900
20M100	20	100	1500	900
20M150	20	150	1500	900
30M75	30	75	1700	1000
30M100	30	100	1700	1000
30M150	30	150	1700	1000
40M75	40	75	1900	1100
40M100	40	100	1800	1050
40M150	40	150	1800	1050
50M75	50	75	2100	1200
50M100	50	100	1900	1100
50M150	50	150	1900	1100
75M75	75	75	2400	1350
75M100	75	100	2200	1250
75M150	75	150	2200	1250
100M75	100	75	2650	1475
100M100	100	100	2400	1350
100M150	100	150	2300	1300
150M75	150	75	3200	1750
150M100	150	100	2700	1650
150M150	150	150	2500	1400
200M75	200	75	3900	2100
200M100	200	100	3000	1650
200M150	200	150	2700	1500
300M100	300	100	3500	1900
300M150	300	150	3100	1700
400M100	400	100	2100	3900
400M150	400	150	3400	1850
500M100	500	100	4500	2400
500M150	500	150	3600	1950
750M150	750	150	4100	2200

Standard reinforced foundations

Foundation ref	O.T.M. (kNm)	Bearing pressure (kN/m²)	A (mm)	B (mm)	C (mm)	D (mm)	Base reinforcement (Each way S.C. 21)	Column reinforcement (All round S.C. 11)	Top reinforcement (Each way S.C. 21)
75R75	75	75	1100	950	600	2400	H16@250 t and b	H20@225	
75R150	75	150	1100	950	600	2050	H16@250 t and b	H20@225	
100R75	100	75	1100	950	600	2600	H16@250 t and b	H20@225	
100R150	100	150	1100	950	600	2300	H16@250 t and b	H20@225	
150R75	150	75	1100	1350	600	2900	H16@250 t and b	H20@225	
150R150	150	150	1100	1350	600	2500	H16@250 t and b	H20@225	
200R75	200	75	1100	1350	600	3200	H16@250 t and b	H20@225	
200R150	200	150	1100	1350	600	2750	H16@250 t and b	H20@225	
300R75	300	75	1500	1350	750	3700	H16@200 t and b	H20@150	
300R150	300	150	1500	1350	750	3100	H16@200 t and b	H20@150	
400R75	400	75	1500	1500	750	4100	H16@200 t and b	H20@150	H16@175
400R150	400	150	1500	1500	750	3400	H16@200 t and b	H20@150	
500R75	500	75	1500	1500	750	4400	H16@200 t and b	H20@150	
500R150	500	150	1500	1500	750	3700	H16@200 t and b	H20@150	
750R75	750	75	1500	1500	750	5000	H16@200 t and b	H20@125	
750R150	750	150	1500	1500	750	4200	H16@200 t and b	H20@125	
1000R75	1000	75	1500	1850	750	5500	H20@250 t and b	H25@150	
1000R150	1000	150	1500	1850	750	4700	H20@250 t and b	H25@150	
1250R75	1250	75	1500	1850	750	5900	H20@200 t and b	H25@125	
1250R150	1250	150	1500	1850	750	5000	H20@200 t and b	H25@125	
1500R75	1500	75	1500	1850	1000	6800	H20@150 t and b	H32@175	
1500R150	1500	150	1500	1850	1000	5400	H16@150 t and b	H32@175	
2000R75	2000	75	2000	2000	1000	7000	H20@250t and b	H25@150	
2000R100	2000	100	2000	2000	1000	6000	H20@250t and b	H25@150	
2000R150	2000	150	2000	2000	1000	5500	H20@250t and b	H25@150	
3000R75	3000	75	2100	2000	1250	7750	H20@200t and b	H25@150	
3000R100	3000	100	2100	2000	1250	7000	H20@200t and b	H25@150	
3000R150	3000	150	2100	2000	1250	6250	H20@200t and b	H25@150	
4000R75	4000	75	2100	2000	1500	8500	H20@175t and b	H32@150	
4000R100	4000	100	2100	2000	1500	7750	H20@175t and b	H32@150	
4000R150	4000	150	2100	2000	1500	7000	H20@175t and b	H32@150	
5000R75	5000	75	2100	2000	1500	9000	H20@175t and b	H32@150	
5000R100	5000	100	2100	2000	1500	8250	H20@175t and b	H32@150	
5000R150	5000	150	2100	2000	1500	7500	H20@175t and b	H32@150	H16@175
6000R75	6000	75	2500	2000	1500	9500	H20@250t and b	H32@150	
6000R100	6000	100	2500	2000	1500	8750	H20@250t and b	H32@150	
6000R150	6000	150	2500	2000	1500	8000	H20@250t and b	H32@150	
7000R75	7000	75	2500	2000	1500	10000	H25@225t and b	H32@150	
7000R100	7000	100	2500	2000	1500	9250	H25@225t and b	H32@150	
7000R150	7000	150	2500	2000	1500	8250	H25@225t and b	H32@150	
8000R75	8000	75	2600	2000	1500	10500	H32@200b + H25@250t	H32@150	
8000R100	8000	100	2600	2000	1500	9600	H25@225t and b	H32@150	
8000R150	8000	150	2600	2000	1500	8700	H25@225t and b	H32@150	
9000R75	9000	75	2600	2000	1500	11000	H32@175b H25@225t	H32@125	
9000R100	9000	100	2600	2000	1500	10000	H25@200t and b	H32@125	
9000R150	9000	150	2600	2000	1500	9000	H25@225t and b	H32@125	

Notes:

1. Concrete to have a minimum characteristic strength of 35 N/mm² at 28 days. Minimum cement content to be 300Kg/m³ with a maximum water cement ratio of 0.60. Coarse aggregate size to be 20mm nominal.
2. Reinforcement to be high-yield type 2 to BS4449 – minimum yield strength to be 485N/mm². Cover reinforcement to be 40mm.
3. Links to column section to be H10@200 c/c – shape code 51 to BS8666: 2005-plus H10 internal lacers at 450 max centres horizontal and 250 centres vertical shape code 99.
4. Above table is based on the water table being below the base of the foundation.