



## Excalibur Screwbolt Hexagon Head (HSB) 20mm

UPDATED: 29/01/2017

### PLEASE NOTE

From time to time, materials and specifications are changed to improve performance, please check for the latest information.



For additional technical data please call the Sales Desk:  
**01702 206 962 / 01702 207 909**

### HSB 20mm Options

Screwbolt Diameter	Head Details and Diameter	Clearance Hole Diameter	Max Fixing Thickness 'A'	Thread Length 'B'	Clearance Depth 'C'	Box Quantity	Order code:
20mm	30mm Across Flats Flange Diameter 40mm	23.0mm	28mm	100mm	40mm	20	HSB 20 / 100
20mm		23.0mm	58mm	150mm	40mm	20	HSB 20 / 150
20mm		23.0mm	158mm	200mm	40mm	10	HSB 20 / 200
20mm		23.0mm	258mm	300mm	60mm	10	HSB 20 / 300

Drill Bit Diameter	Concrete	20.0mm
	Soft Materials	-

### HSB 20mm Technical Data

Material	Boron Steel BS3111/9/2.1.A
Finish	Mechanical Zinc as standard, or Zinc & Yellow passivated
Other finishes	Other platings & finishes are available to special order subject to quantity
Tensile strength	800N/mm <sup>2</sup> Case hardened
Other sizes	Other lengths of all diameters are available to special order subject to quantity
Embedment concrete	Minimum recommended is 4.5 × bolt diameter
Soft block	Not recommended for soft block
Edge distance & spacings	For Edge distances between 5mm dia. and 10mm dia. see reduction factors

All dimensions in millimetres (mm)

## Design Tables based on ETAG Approval (11/0259) page 1 of 2

**Table 1: Mean Ultimate resistance ( $N_{rum}$  from test results)**

Anchor Size (mm)	16	16	20	20	20	20
$H_{ef}$ nominal (mm)	120	120	170	170	250	250
Non-Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rum}$ [kN]	44.30	74.60	82.90	121.75	206.40	223.56
Shear $V_{rum}$ [kN]	94.90	94.00	155.40	155.4	155.4	155.4
Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rum}$ [kN]	31.80	43.84	44.60	79.37	NT	NT
Shear $V_{rum}$ [kN]	94.00	94.00	155.40	155.4	NT	NT

**Table 2: Characteristic resistance ( $N_{rk} = N_{rum} (1 - k_{5\%} V)$ )**

Anchor Size (mm)	16	16	20	20	20	20
$H_{ef}$ nominal (mm)	120	120	170	170	250	250
Non-Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rk}$ [kN]	32.30	54.30	40.60	92.77	143.70	171.18
Shear $V_{rk}$	91.70	91.70	139.50	139.5	139.50	139.50
Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rk}$ [kN]	19.90	21.48	26.40	38.89	NT	NT
Shear $V_{rk}$ [kN]	91.70	91.70	139.50	139.50	NT	NT

**Table 3: Design Resistance ( $N_{rd} = N_{rk}/\gamma_m$ )**

Anchor Size (mm)	16	16	20	20	20	20
$H_{ef}$ nominal (mm)	120	120	170	170	250	250
Non-Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rd}$ [kN]	17.90	30.16	22.60	51.53	79.90	95.1
Shear $V_{rd}$ [kN]	73.30	73.3	111.6	111.6	111.6	111.6
Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rd}$ [kN]	9.95	10.74	13.20	19.45	NT	NT
Shear $V_{rd}$ [kN]	73.30	73.30	111.6	111.6	NT	NT

**Table 4: Recommended Load ( $N_{rec} = N_{rd}/\gamma$ )**

Anchor Size (mm)	16	16	20	20	20	20
$H_{ef}$ nominal (mm)	120	120	170	170	250	250
Non-Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rec}$ [kN]	12.80	21.54	16.14	36.80	57.07	67.92
Shear $V_{rec}$ [kN]	52.40	52.40	79.70	79.70	79.70	79.70
Cracked Concrete	C20/25	C50/60	C20/25	C50/60	C20/25	C50/60
Tensile $N_{rec}$ [kN]	7.10	7.70	9.40	13.90	NT	NT
Shear $V_{rec}$ [kN]	52.40	52.40	79.70	79.70	NT	NT

Revised Oct 6th 2014 (shear values extended)  
 NT = Not Tested



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### Minimum thickness of concrete member, minimum spacing and minimum edge distance for cracked and non-cracked concrete (without reduction factors)

Anchor size (mm)	h <sub>nom</sub> 120mm	h <sub>nom</sub> 170mm
		16
Min. thickness of member	165mm	220mm
Min. edge distance	185mm	180mm
Min. spacing	240mm	340mm

### Reduction factors for edge distances between 5 x diameter and 10 x diameter

Edge distance	80	100	120	140	160
M16 anchors in tension	0.70	0.78	0.87	0.96	1.00
M16 anchors in shear	0.32	0.52	0.71	0.90	1.00

### Reduction factors for edge distances between 5 x diameter and 10 x diameter

Edge distance	100	120	140	160	180	200
M20 anchors in tension	0.75	0.82	0.89	0.92	0.96	1.00
M20 anchors in shear	0.32	0.52	0.71	0.80	0.90	1.00

### Factors for space reduction in tension

Space (mm)	80	110	140	170	210	240
M16 anchors	0.75	0.80	0.85	0.90	0.95	1.00
Space (mm)	100	150	200	250	300	340
M20 anchors	0.70	0.76	0.82	0.88	0.94	1.00

### Increasing factors for cracked and non-cracked concrete

	M16	M20
C30/37	1.22	1.22
C40/50	1.41	1.41
C50/60	1.55	1.55

