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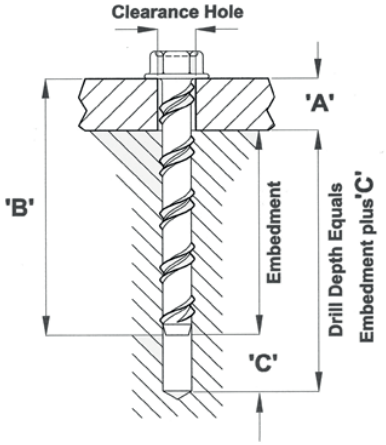

Excalibur Screwbolt Hexagon Head (HSB) 16mm

UPDATED: 29/01/2017

European Technical Approval - Option 1 for cracked concrete
ETA-11/0259

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 16mm Options

Screwbolt Diameter	Head Details and Diameter	Clearance Hole Diameter	Max Fixing Thickness 'A'	Thread Length 'B'	Clearance Depth 'C'	Box Quantity	Order code:
16mm	24mm Hex Drive. Flange Diameter 32mm	19mm	28mm	100mm	32mm	25	HSB 16 / 100
16mm		19mm	28mm	120mm	32mm	25	HSB 16 / 120
16mm		19mm	58mm	150mm	32mm	25	HSB 16 / 150
16mm		19mm	108mm	200mm	32mm	25	HSB 16 / 200

Drill Bit Diameter	Concrete	16.0mm
	Soft Materials	-

HSB 16mm 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/mm² Case hardened
Other sizes	Other lengths of all diameters are available to special order subject to quantity
Embedment concrete and brick	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)

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 ($N_{rd} = N_{rk/y_m}$)

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 ($N_{rec} = N_{rd}/y$)

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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Design Tables based on ETAG Approval (11/0259)

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

Anchor size (mm)	h_{nom} 120mm	h_{nom} 170mm
	16	20
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

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