

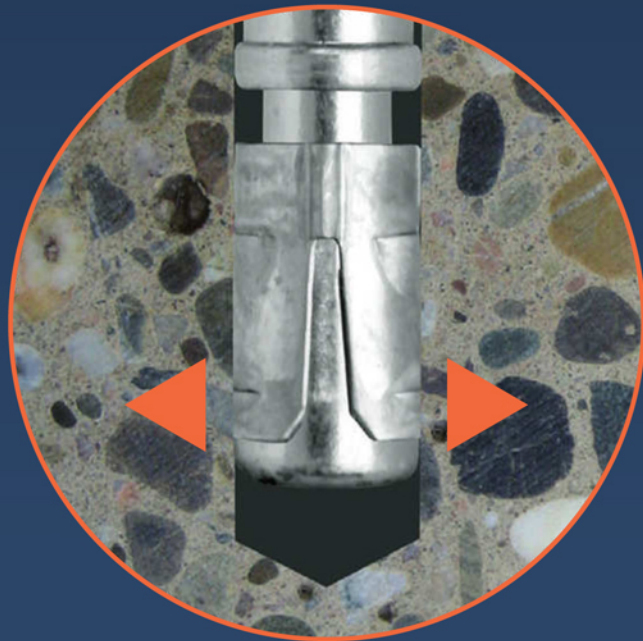
THROUGHBOLT BOA-X AND BOAX-II

For simple and economical applications.

Function: Application of the installation torque draws the cone end of the stud into the expansion clip. The expansion clip expands and develops a frictional grip with the sidewalls of the hole. This gives the anchor its resistance to tension loads.

Benefits:

- Economical anchor for medium-duty loads
- Approved for use in cracked and non-cracked concrete



SIMPSON
Strong-Tie

LEBIC



B.S.N. the professional fastener

BOA-X AND BOAX-II**CONSTRUCTION:****BoA-X / BoAX-II** with hex nut and washer**MATERIAL:**

- Carbon steel, zinc plated and blue passivated
- A4 stainless steel

BASE MATERIAL:

Cracked and non-cracked concrete: C20/25 to C50/60 (B25 to B55)
Also suitable for high density natural stones ($\sigma_p \geq 25 \text{ N/mm}^2$)

APPROVALS:

ETA-08/0276 - Option 1: M8-M16, carbon steel, zinc plated
ETA-08/0276 - Option 1: M8-M16, A4 stainless steel

LOAD RANGE:

Tension: $N_{perm} = 1.8 - 21.4 \text{ [kN]}$
Shear: $V_{perm} = 1.8 - 22.4 \text{ [kN]}$

PRODUCT RANGE:

BoAX-II: M8 - M16, carbon steel, zinc plated and blue passivated
BoAX-II A4: M8 - M16, A4 stainless steel
BoA-X: M6 + M20, carbon steel, zinc plated and blue passivated
BoA-X A4: M6 + M20, A4 stainless steel

APPLICATIONS:

- Steel construction
- Railing
- Brackets
- Facades
- Cable trays
- Ladders

BENEFITS:

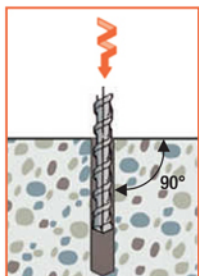
- Economical anchor for medium duty loads
- Less drilling effort: Anchor diameter = Drill bit diameter

PRODUCT DESCRIPTION:

- The throughbolt anchor is installed through the fixture
- Torquing draws the cone end of the stud into the expansion clip. The expansion clip expands and develops a frictional grip with the sidewalls of the hole.

INSTALLATION:

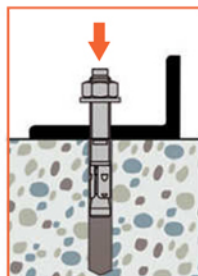
Through-fix installation



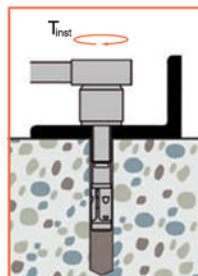
Drill hole



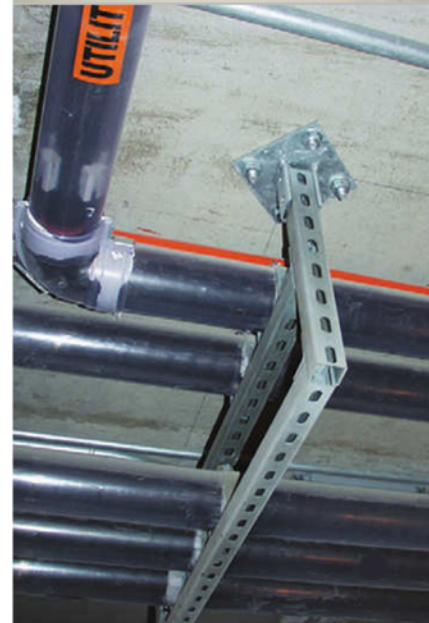
Clean hole (blowing)



Insert anchor through fixture



Apply recommended fastening torque with a calibrated torque-wrench



B.S.N. the professional fastener

When many anchors are to be installed, setting tools BoA-ST M6-M10 and BoA-ST M12-M20 are recommended to make the job easier.

BOA-X AND BOAX-II**Carbon steel, zinc plated****THROUGHBOLT BOA-X AND BOAX-II**

With hex nut and washer

Material: Carbon steel, zinc plated and blue passivated

Approval: ETA-08/0276 (M8 - M16) - Option 1

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Thread Length	Weight	Box Quantity
			$d_o \times h_1$	t_{fix}	d_f	h_{ef}	L	f		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg/100 pcs]	[pcs]
BoA-X 6/15*	BOAX0606035015	M6	6 x 50	15	7	35	65	28	1.54	100
BoA-X 6/50*	BOAX0606035050	M6	6 x 50	50	7	35	100	28	2.27	100
BoAX-II 8/10	BOAXII08045010	M8	8 x 60	10	9	45	72	32	2.91	50
BoAX-II 8/30	BOAXII08045030	M8	8 x 60	30	9	45	92	52	3.53	50
BoAX-II 8/50	BOAXII08045050	M8	8 x 60	50	9	45	112	72	4.14	40
BoAX-II 8/85	BOAXII08045085	M8	8 x 60	85	9	45	147	107	5.21	40
BoAX-II 10/10	BOAXII10060010	M10	10 x 75	10	12	60	92	47	5.92	40
BoAX-II 10/20	BOAXII10060020	M10	10 x 75	20	12	60	102	57	6.41	25
BoAX-II 10/30	BOAXII10060030	M10	10 x 75	30	12	60	112	67	6.91	25
BoAX-II 10/50	BOAXII10060050	M10	10 x 75	50	12	60	132	87	7.89	25
BoAX-II 10/80	BOAXII10060080	M10	10 x 75	80	12	60	162	115	9.37	25
BoAX-II 12/5	BOAXII12070005	M12	12 x 90	5	14	70	103	53	9.53	20
BoAX-II 12/20	BOAXII12070020	M12	12 x 90	20	14	70	118	68	10.60	20
BoAX-II 12/30	BOAXII12070030	M12	12 x 90	30	14	70	128	78	11.31	20
BoAX-II 12/50	BOAXII12070050	M12	12 x 90	50	14	70	148	98	12.73	20
BoAX-II 12/65	BOAXII12070065	M12	12 x 90	65	14	70	163	113	13.80	20
BoAX-II 12/80	BOAXII12070080	M12	12 x 90	80	14	70	178	115	14.87	20
BoAX-II 16/5	BOAXII16085005	M16	16 x 110	5	18	85	123	65	20.16	10
BoAX-II 16/20	BOAXII16085020	M16	16 x 110	20	18	85	138	80	22.17	10
BoAX-II 16/50	BOAXII16085050	M16	16 x 110	50	18	85	168	110	26.19	10
BoAX-II 16/60	BOAXII16085060	M16	16 x 110	60	18	85	178	115	27.53	10
BoA-X 16/95*	BOAX1616085095	M16	16 x 110	95	18	80	213	55	35.01	10
BoA-X 20/20*	BOAX2020110020	M20	20 x 130	20	22	110	170	55	44.83	5
BoA-X 20/70*	BOAX2020110070	M20	20 x 130	70	22	110	220	55	57.02	5
BoA-X 20/130*	BOAX2020110130	M20	20 x 130	130	22	110	280	55	71.78	5

*Not included in approval.

Setting Tool BoA-ST

The setting tool is recommended for applications where many BoA-X or BoAX-II anchors are to be installed.

Type	Order Code	Weight	Box Quantity
		[kg/100 pcs]	[pc]
BoA-ST M6 - M10	BOASTM06M10	6.0	1
BoA-ST M12 - M20	BOASTM12M20	9.0	1

Carbon steel, zinc plated

Permissible loads for single anchors with no influencing edge distances or spacings. Loads are calculated using partial safety factors from ETAG 001 and the characteristic anchor and installation data from this catalogue. Design calculations shall follow the requirements of ETA-08/0276.

Material: Carbon steel, zinc plated and blue passivated

Thread size	M6 ⁵⁾	M8	M10	M12	M16 ⁵⁾	M20 ⁵⁾
Effective embedment depth (h_{ef}) [mm]	35	45	60	70	85	110
Type BoA-...	BoA-X 6/...	BoAX-II 8/...	BoAX-II 10/...	BoAX-II 12/...	BoAX-II 16/...	BoA-X 20/...

Permissible tension loads¹⁾

N_{perm}	Cracked Concrete	C20/25	[kN]	-	2.0	3.6	4.8	9.5	-
		C30/37	[kN]	-	2.2	4.0	5.3	10.5	-
		C40/50	[kN]	-	2.4	4.3	5.8	11.4	-
		C50/60	[kN]	-	2.6	4.6	6.1	12.2	-
Non-cracked concrete ³⁾		C20/25	[kN]	1.8	3.6	6.3	7.9	16.7	13.9
		C30/37	[kN]	1.8	3.9	6.9	8.7	18.4	13.9
		C40/50	[kN]	1.8	4.3	7.6	9.5	20.0	13.9
		C50/60	[kN]	1.8	4.6	8.1	10.1	21.4	13.9

Permissible shear loads¹⁾²⁾

V_{perm}	Cracked Concrete	C20/25	[kN]	-	4.8	8.7	11.0	21.0	-
		C30/37	[kN]	-	4.8	8.7	11.0	21.0	-
		C40/50	[kN]	-	4.8	8.7	11.0	21.0	-
		C50/60	[kN]	-	4.8	8.7	11.0	21.0	-
Non-cracked concrete ³⁾		C20/25	[kN]	1.8	4.8	8.7	11.0	21.0	13.9
		C30/37	[kN]	1.8	4.8	8.7	11.0	21.0	13.9
		C40/50	[kN]	1.8	4.8	8.7	11.0	21.0	13.9
		C50/60	[kN]	1.8	4.8	8.7	11.0	21.0	13.9

Permissible bending moments¹⁾

M_{zul} ⁴⁾	[Nm]	4.1	10.0	22.9	34.3	88.6	173.0
-------------------------	------	-----	------	------	------	------	-------

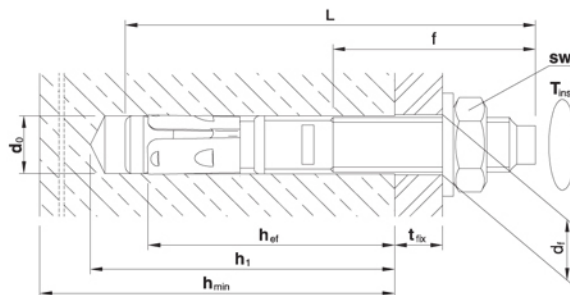
Spacings, edge distances and member thicknesses

Effective embedment depth	h_{ef}	[mm]	35	45	60	70	85	110
Characteristic spacing ⁴⁾	$s_{cr,N}$	[mm]	120	135	180	210	255	400
Minimum spacing	s_{min}	[mm]	120	50	55	60	70	400
Characteristic edge distance ⁴⁾	$c_{cr,N}$	[mm]	90	68	90	105	128	300
Minimum edge distance	c_{min}	[mm]	90	50	50	55	85	300
Minimum member thickness	h_{min}	[mm]	60	100	120	140	170	180

Installation data

Drill hole diameter	d_0	[mm]	6	8	10	12	16	20
Drill hole depth <td>h_1</td> <td>[mm]</td> <td>50</td> <td>60</td> <td>75</td> <td>90</td> <td>110</td> <td>130</td>	h_1	[mm]	50	60	75	90	110	130
Clearance hole in the fixture <td>d_f</td> <td>[mm]</td> <td>7</td> <td>9</td> <td>12</td> <td>14</td> <td>18</td> <td>22</td>	d_f	[mm]	7	9	12	14	18	22
Width across flats <td>sw</td> <td>[mm]</td> <td>10</td> <td>13</td> <td>17</td> <td>19</td> <td>24</td> <td>30</td>	sw	[mm]	10	13	17	19	24	30
Installation torque <td>T_{inst}</td> <td>[Nm]</td> <td>7</td> <td>20</td> <td>35</td> <td>50</td> <td>120</td> <td>240</td>	T_{inst}	[Nm]	7	20	35	50	120	240

Installed anchor



- The permissible loads have been calculated using the partial safety factors for resistances stated in the ETA-approval and a partial safety factor for actions of $\gamma_f = 1.4$. The permissible loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing $s \geq 15$ cm and reinforced concrete with a rebar spacing $s \geq 10$ cm if the rebar is 10 mm or smaller.
- The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c < 10 h_{ef}$ or $< 60 d$) concrete edge failure must be checked per ETAG 001, Annex C, design method A.
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_c + \sigma_n \leq 0$. In the absence of detailed verification $\sigma_n = 3$ N/mm² can be assumed (σ_c equals the tensile stress within the concrete as a result of external loads, forces on anchors included).
- If spacings or edge distances become smaller than the characteristic values (i.e. $s \leq s_{cr,N}$ and/or $c \leq c_{cr,N}$) a calculation per ETAG 001, Annex C, design method A must be performed. For details, see ETA-08/0276.
- Not included in the approval ETA-08/0276.
- Type BoA-X 16/95 is not included in ETA-08/0276. Permissible loads in C20/25 to C50/60 cracked concrete: $N_{perm} = 6.4$ [kN]; $V_{perm} = 6.4$ [kN]. Permissible loads in C20/25 to C50/60 non-cracked concrete: $N_{perm} = 10.0$ [kN]; $V_{perm} = 10.0$ [kN].

Complete your designs more easily by downloading our LIEBIG anchor software from our home-page: www.simpson-liebig.com

A4 stainless steel**THROUGHBOLT BOA-X-A4 AND BOAX-II A4**

With hex nut and washer
Material: A4 stainless steel
Approval: ETA-08/0276 (M8 - M16) - Option 1

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Thread Length	Weight [kg/100 pcs]	Box Quantity [pcs]
			$d_o \times h_i$	t_{fix}	d_f	h_{ef}	L	f		
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
BoA-X 6/15 A4*	BOAX0606035015A4	M6	6 x 50	15	7	35	65	28	1.5	100
BoAX-II 8/10 A4	BOAXII08045010A4	M8	8 x 60	10	9	45	72	32	2.9	50
BoAX-II 8/30 A4	BOAXII08045030A4	M8	8 x 60	30	9	45	92	52	3.5	50
BoAX-II 8/50 A4	BOAXII08045050A4	M8	8 x 60	50	9	45	112	72	4.1	40
BoAX-II 10/10 A4	BOAXII10060010A4	M10	10 x 75	10	12	60	92	47	5.9	40
BoAX-II 10/20 A4	BOAXII10060020A4	M10	10 x 75	20	12	60	102	57	6.4	25
BoAX-II 10/30 A4	BOAXII10060030A4	M10	10 x 75	30	12	60	112	67	6.9	25
BoAX-II10/50 A4	BOAXII10060050A4	M10	10 x 75	50	12	60	132	87	7.9	25
BoAX-II 12/5 A4	BOAXII12070005A4	M12	12 x 90	5	14	70	103	53	9.5	20
BoAX-II 12/20 A4	BOAXII12070020A4	M12	12 x 90	20	14	70	118	68	10.6	20
BoAX-II 12/30 A4	BOAXII12070030A4	M12	12 x 90	30	14	70	128	78	11.3	20
BoAX-II 12/50 A4	BOAXII12070050A4	M12	12 x 90	50	14	70	148	98	12.7	20
BoAX-II 12/65 A4	BOAXII12070065A4	M12	12 x 90	65	14	70	163	113	13.8	20
BoAX-II 16/5 A4	BOAXII16085005A4	M16	16 x 110	5	18	85	123	65	20.2	10
BoAX-II 16/20 A4	BOAXII16085020A4	M16	16 x 110	20	18	85	138	80	22.2	10
BoAX-II 16/50 A4	BOAXII16085050A4	M16	16 x 110	50	18	85	168	110	26.2	10
BoA-X 20/20 A4*	BOAX2020110020A4	M20	20 x 130	20	22	110	170	55	44.8	5
BoA-X 20/70 A4*	BOAX2020110070A4	M20	20 x 130	70	22	110	220	55	57.0	5

*Not included in approval.

Setting Tool BoA-ST

The setting tool is recommended for applications where many BoA-X or BoAX-II anchors are to be installed.

Type	Order Code	Weight	Box Quantity
		[kg/100 pcs]	[pc]
BoA-ST M6 - M10	BOASTM06M10	6.0	1
BoA-ST M12 - M20	BOASTM12M20	9.0	1

A4 stainless steel

Permissible loads for single anchors with no influencing edge distances or spacings. Loads are calculated using partial safety factors from ETAG 001 and the characteristic anchor and installation data from this catalogue. Design calculations shall follow the requirements of ETA-08/0276.

Material: A4 stainless steel

Thread size		M6 ⁵⁾	M8	M10	M12	M16	M20 ⁵⁾
Effective embedment depth (h_{ef})	[mm]	35	45	60	70	85	110
Type BoA-...		BoA-X 6/...	BoAX-II 8/...	BoAX-II 10/...	BoAX-II 12/...	BoAX-II 16/...	BoA-X 20/...

Permissible tension loads¹⁾

N_{perm}	Cracked Concrete	C20/25	[kN]	-	2.0	3.6	4.8	9.5	-	
		C30/37	[kN]	-	2.2	4.0	5.3	10.5	-	
N_{perm}	Cracked Concrete	C40/50	[kN]	-	2.4	4.3	5.8	11.4	-	
		C50/60	[kN]	-	2.6	4.6	6.1	12.2	-	
		Non-cracked concrete ³⁾	C20/25	[kN]	1.8	3.6	6.3	7.9	16.7	13.9
			C30/37	[kN]	1.8	3.9	6.9	8.7	18.4	13.9
	C40/50		[kN]	1.8	4.3	7.6	9.5	20.0	13.9	
	C50/60		[kN]	1.8	4.6	8.1	10.1	21.4	13.9	

Permissible shear loads¹⁾²⁾

V_{perm}	Cracked Concrete	C20/25	[kN]	-	5.2	8.1	11.9	22.4	-	
		C30/37	[kN]	-	5.2	8.1	11.9	22.4	-	
V_{perm}	Cracked Concrete	C40/50	[kN]	-	5.2	8.1	11.9	22.4	-	
		C50/60	[kN]	-	5.2	8.1	11.9	22.4	-	
		Non-cracked concrete ³⁾	C20/25	[kN]	1.8	5.2	8.1	11.9	22.4	13.9
			C30/37	[kN]	1.8	5.2	8.1	11.9	22.4	13.9
	C40/50		[kN]	1.8	5.2	8.1	11.9	22.4	13.9	
	C50/60		[kN]	1.8	5.2	8.1	11.9	22.4	13.9	

Permissible bending moments¹⁾

M_{zul} ⁴⁾	[Nm]	4.4	10.5	21.4	37.6	95.2	185.4
-------------------------	------	-----	------	------	------	------	-------

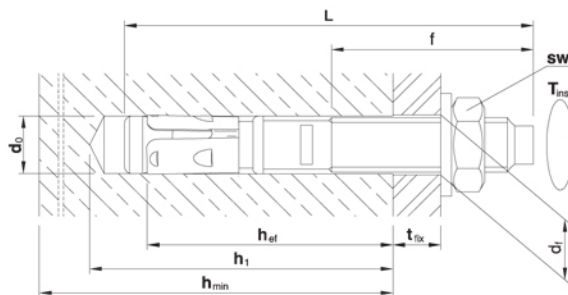
Spacings, edge distances and member thicknesses

Effective embedment depth	h_{ef}	[mm]	35	45	60	70	85	110
Characteristic spacing ⁴⁾	$s_{cr,N}$	[mm]	120	135	180	210	255	400
Minimum spacing	s_{min}	[mm]	120	50	55	60	70	400
Characteristic edge distance ⁴⁾	$c_{cr,N}$	[mm]	90	68	90	105	128	300
Minimum edge distance	c_{min}	[mm]	90	50	50	55	85	300
Minimum member thickness	h_{min}	[mm]	60	100	120	140	170	180

Installation data

Drill hole diameter	d_0	[mm]	6	8	10	12	16	20
Drill hole depth <td>h_1</td> <td>[mm]</td> <td>50</td> <td>60</td> <td>75</td> <td>90</td> <td>110</td> <td>130</td>	h_1	[mm]	50	60	75	90	110	130
Clearance hole in the fixture <td>d_f</td> <td>[mm]</td> <td>7</td> <td>9</td> <td>12</td> <td>14</td> <td>18</td> <td>22</td>	d_f	[mm]	7	9	12	14	18	22
Width across flats <td>sw</td> <td>[mm]</td> <td>10</td> <td>13</td> <td>17</td> <td>19</td> <td>24</td> <td>30</td>	sw	[mm]	10	13	17	19	24	30
Installation torque <td>T_{inst}</td> <td>[Nm]</td> <td>7</td> <td>20</td> <td>35</td> <td>50</td> <td>120</td> <td>240</td>	T_{inst}	[Nm]	7	20	35	50	120	240

Installed anchor



- The permissible loads have been calculated using the partial safety factors for resistances stated in the ETA-approval and a partial safety factor for actions of $\gamma_F = 1.4$. The permissible loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing $s \geq 15$ cm and reinforced concrete with a rebar spacing $s \geq 10$ cm if the rebar is 10 mm or smaller.
- The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c < 10 h_{ef}$ or $c < 60 d$) concrete edge failure must be checked per ETAG 001, Annex C, design method A.
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_t + \sigma_n \leq 0$. In the absence of detailed verification $\sigma_n = 3$ N/mm² can be assumed (σ_t equals the tensile stress within the concrete as a result of external loads, forces on anchors included).
- If spacings or edge distances become smaller than the characteristic values (i.e. $s \leq s_{cr,N}$ and/or $c \leq c_{cr,N}$) a calculation per ETAG 001, Annex C, design method A must be performed. For details, see ETA-08/0276.
- Not included in the approval ETA-08/0276.

Complete your designs more easily by downloading our LIEBIG anchor software from our home-page: www.simpson-liebig.com