CHEMİCAL ANCHOR SYSTEMS

TECHNİCAL DATA

Products :

* Spin-in Capsule
* Hammer-in Capsule

GENERAL COMPANY CONDITIONS

Products are checked regularly by the Turkish Institute of Standards and the Turkish Building Institute.

Technical data which has been formed and distributed by YBS doesn’t remove the mistakes that have been done out of quide.

Upon request, manufacturer and his agents undertake to give this technical data to the users with a copy and obligatory to show this data in constructions control.

Technical data must be complete and copied completely. The copy must be controled and
approved by YBS.

Technical data can be altered by the manufacturer or TSEK if new technical developments
become available.

COMPOSİTİON OF SPİN-İN AND HAMMER-İN

*Spin – in Capsule

Spin-in Capsule consists of glass, resin, hardener and quartz sand.

Spin-in Capsule is for anchoring in uncracked concrete, sizes M 8 to M 30. Spin-in Capsule is a chemical anchor
based on the interreaction of steel, resin mortar and concrete. Spin-in Capsule is used together with threaded rod,nut and washer.

See Appendix 1, 1a, 1b, 3 .

*Hammer – in Capsule

Hammer-in Capsule consists of double glass,resin and hardener.

Hammer-in Capsule is used for anchoring in uncracked concrete,sizes M 8 to M 30. Hammer-in Capsule is a chemical
anchor based on the interreaction between steel, resin, mortar and concrete. İdeal for rebar.

At least 80 % of the pull – out values obtained with Hammer-in Capsule can be attained using Hammer-in Capsule.

See Appendix 1 , 1b ,5.

AREAS OF APPLİCATİON

The anchor can be used in reinforced or non-reinforced form grades B 15 to B 55 DIN 1045,
Provided requirements are met on fire resistance for the anchor.
The anchor can only be used in uncracked concrete.
The area around the chemical anchoring must not be more then +50 C , or + 80 C for a short period.

The anchor can be used in conjunction with zinc galvanized threaded rod.
In damp areas, industrial areas and near the sea the chemical anchor should be used with a stainless steel threaded rod.

Beware of areas with chlrine e.g.a swimming bath where high corrosion occurs.

PACKİNG AND STORİNG

The chemical capsules should be kept out of the sun and hot environments.
Store in a cool area as per setting instructions.

PRODUCTİON CONTROL

- İn – house production control
- Continuous checks on production
- Lab. Tests on 3 capsules per size for every 10.000 capsules produced
- One check on each size Per week
- Standardization on measurements of all parts
- Check viscosity of the reaction resin
- Continuous check on capsule content – correct product mix
- Continuous checks of capsule measurements
- Checks on the adhesion qualities via pull-out tests in B 25 concrete, 30 minutes after
  hardening at approx. 20 C.,adhesion should reach 20 N/mm.

SETTİNG İNSTRUCTİONS

Spin-in Capsule

Setting as per instructions and drawings in Appendix 5. Note grade of concrete prior to testing.
Concrete grade should not be lower than B 15 / B 25 and not exceed B 55.
Using a hammer – drill keep to the data re hole diameter and imbedment depth.

Clean hole thoroughly using air – pump or brush.

Resin in the Spin-in Capsule should flow like honey.

Check hammer – drill for 250 to 750 rpm before setting threaded rod into the drill hole.
As soon as threaded rod has reached imbedment depth, do not continue to drill as this will cause chemical components to leave drill hole.

Setting correctly means that rod and chemical capsule fill hole flush to surface.
İf no mortar comes out of the hole take out rod and reset using another capsule.

İn overhead work ensure content of capsule does not run back.

Hammer-in Capsule

Setting as per instructions and drawings in Appendix 5. Note grade of concrete prior to testing.
Concrete grade should not be lower than B 15 / B 25 and not exceed B 55.
Using a hammer – drill keep to the data re hole diameter and imbedment depth.

Clean hole thoroughly using air – pump or brush.

Resin in the Hammer-in Capsule should flow like honey.

Hammer-in Capsule can be used together with either rebar or threaded rod by knocking in with a hammer.
As soon as the imbedment depth is reached it should not be knocked in any further.

Setting capsule correctly means that rod and chemical capsule fill hole flush to surface.
İf no mortar comes out of the hole take out rod / rebar and reset using another capsule.

İn overhead work ensure contant of capsule does not run back.

HARDENİNG

Hardening of the resin depends on the temparature in the drill hole.
Therefore, please keep to the folowing waiting times between setting, tightening the fixture and loading the anchor.

Temperature in drill hole	Waiting time
> 20 C	10 min.
+ 10 C to + 20 C	20 min
0 C to + 10 C	1 hour
- 5 C to + 0 C	5 hours

Tests.

- 3 % of set threaded rod / rebar
- İf fixture is tested to 1.3 of the recommended working load and fixture does not creep by more than 2 mm – setting o.k.
- İf an anchor fails test 25 % of set anchors.
- İf a second anchor fails check all anchors.
- Contractor is responsible for organizing and checking anchors set.
- Test reports to be made available to authorities on demand and should be kept on size.
- Responsible party must keep test records for at least 5 years.

SETTİNG İNSTRUCTİONS AND CALCULATİON OF ANCHOR DİSTANCES

Anchoring should be calculated exactly and setting instructions Per Appendix 2 noted.

The fixture should be metallic and be flush against the concrete.

Data for drilling, diameters and depths see Appendix 1 ,1b.

See Appendix 5 for data on pull – out values in B 15 , B 25 to B 55 concrete.

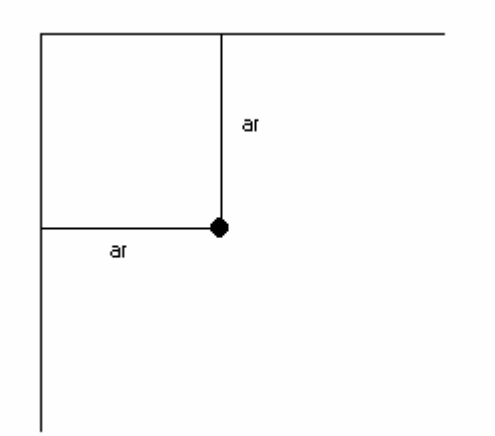
a) Fixture to be metallic and fastened onto threaded rod.

b) Capsule plus rod should fill drill hole and rot should pass through fixture.

c) See Appendix 1, 1b for drill hole diameters.

d) When hole diameters are different, make sure instructions are clear.

ar ---------- edge distance
a ---------- anchor spacing



Single anchors

Min. Ar ---------- 0,4 * ar
Min. A ---------- 0,4 * a

İf ar < a, values on anchor can be reduced by changing ar and a into Ka and Kar.

A – reduced edge distance = Kar = Kar / ar < 1

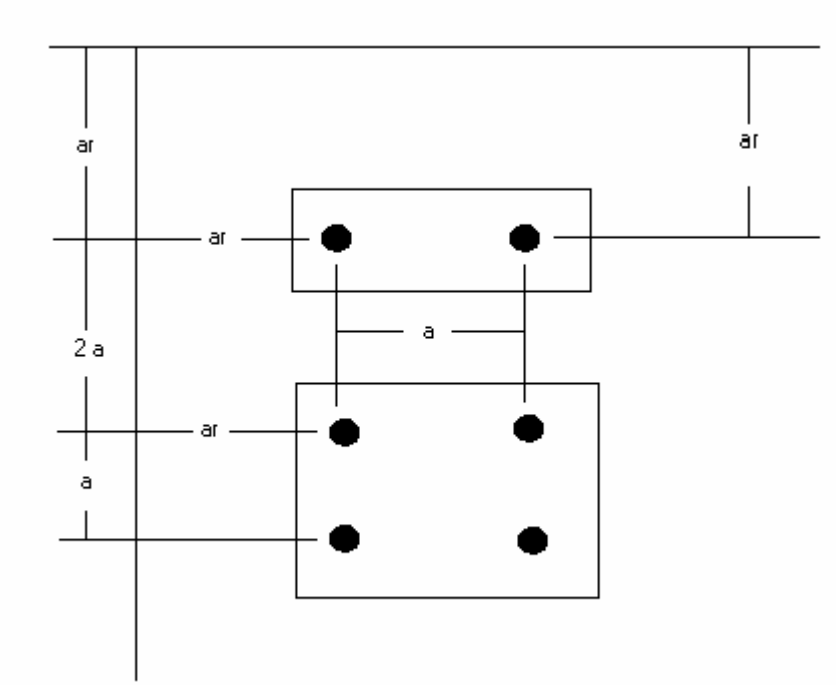
B – anchor loading = (Appendix 5) *Kar ----- kN
M 8 – M 30
kN

C – İf the area for anchoring fixture is confined

See (Appendix 5) (M 8 – M 30) *Kar 1 *Kar 2 *Kar 3 *Kar 4
kN

1 tonne = 10 kN
1 kN = 0,1 tonne
1 kN = 100 kg

Groups of 2 or more anchors



- Anchor spacings must be 2 a.
- Load Per anchor must not exceed 60 kN.

A – Spacing reduction of the individual anchors:

$$Ka = (1 + Ka / a) * ½ < 1$$

B - Anchor loading : see Appendix 5
(M 8 – M 30) *Ka
kN

İf :

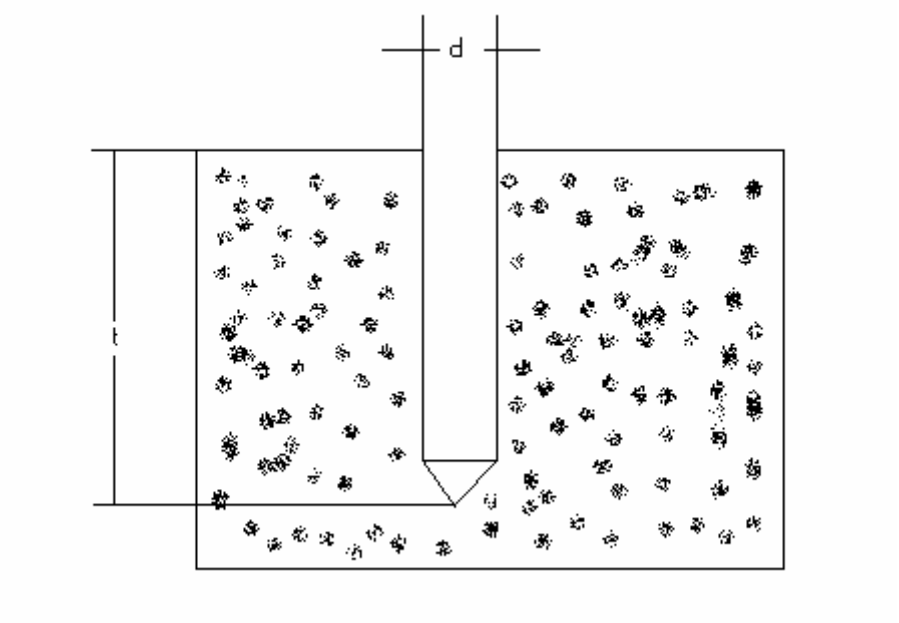
Kar < Ka calculate Ka 1 and Ka 2

C – Anchor load : see Appendix 5
(M 8 – M 30) *Ka 1 *Ka 2

İn case of insufficient edge distance, use lowest loading

- Appendix 1 -

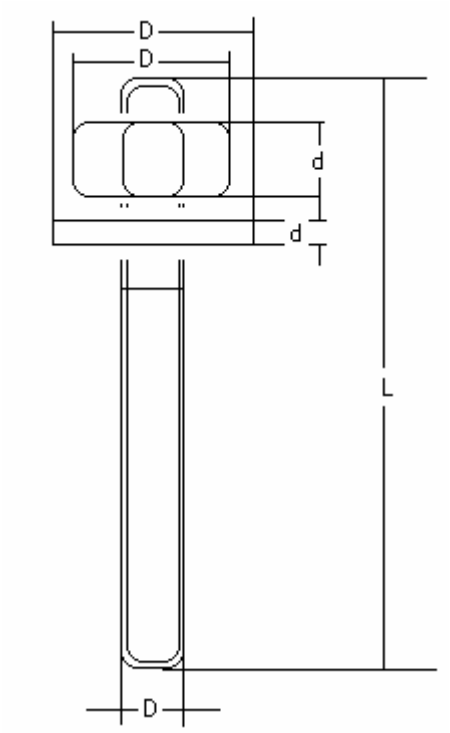
Hole diameters and depths in anchoring to the concrete



d = diameter
t = embedment depth

Spin-in with Threaded Rod			Hammer-in with Rebar		
Metrics	**d (mm)**	**t (mm)**	**Rebar**	**d (mm)**	**t (mm)**
M 8	10	85	8	10	85
M 10	12	90	10	13	90
M 12	14	105	12	15	105
M 14	16	115	14	16	115
M 16	18	125	16	20	125
M 20	25	170	20	24	170
M 24	28	210	24	28	210
M 30	35	280	30	35	280

- Appendix 1a -

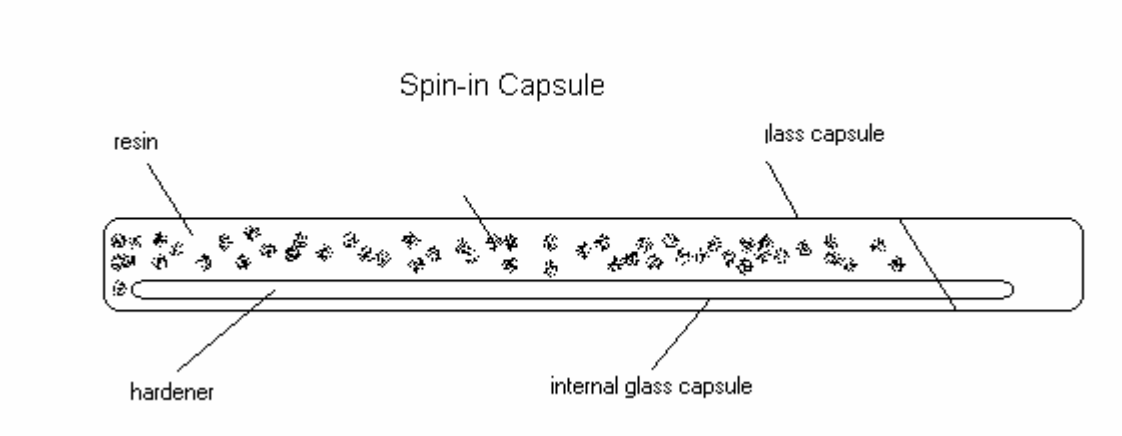


L = length
D = diam
d = thickness

Zinc galvanised and stainless steel

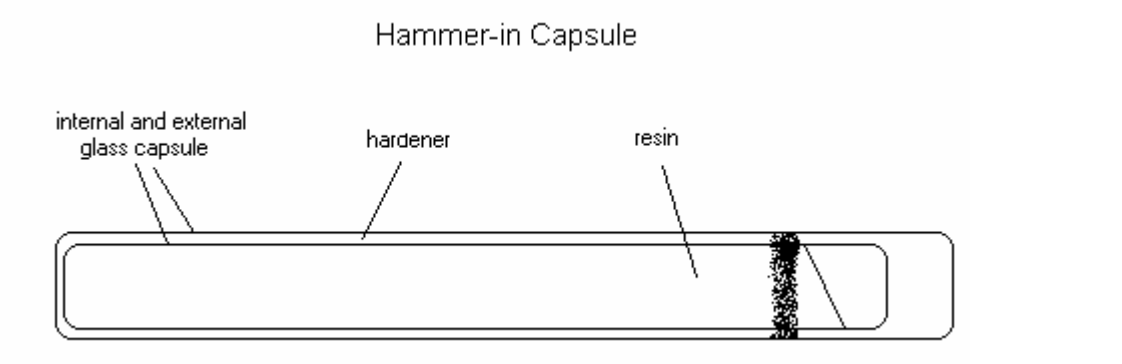
Threaded Rod / mm			Nut / mm		Washer / mm	
Metric	**D**	**L**	**Metric**	**D**	**D**	**d**
M 8	8	110	M 8	13	16	1,6
M 10	10	130	M 10	16	20	2
M 12	12	160	M 12	18	24	2,5
M 14	14	170	M 14	21	28	2,5
M 16	16	190	M 16	24	30	3
M 20	20	260	M 20	30	37	3
M 24	24	300	M 24	36	44	4
M 30	30	380	M 30	46	56	4

- Appendix 1 b -



= Spin-in Capsule =

Size	M 8	M 10	M 12	M 14	M 16	M 20	M 24	M 30
Diam.	9	11	13	15	17	22	24	33
Length	85	85	95	95	100	170	210	265



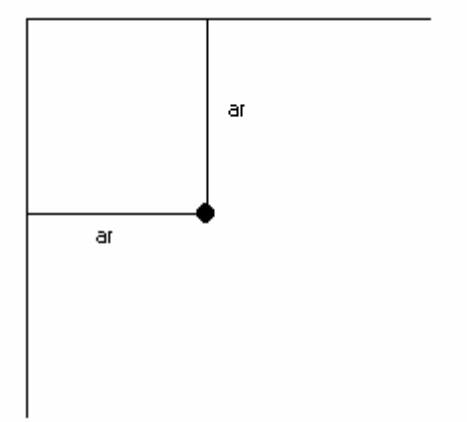
= Hammer-in Capsule =

Size	M 8	M 10	M 12	M 14	M 16	M 20	M 24	M 30
Diam.	10	11	13	15	17	17	24	33
Lenght	85	85	95	95	100	170	210	265

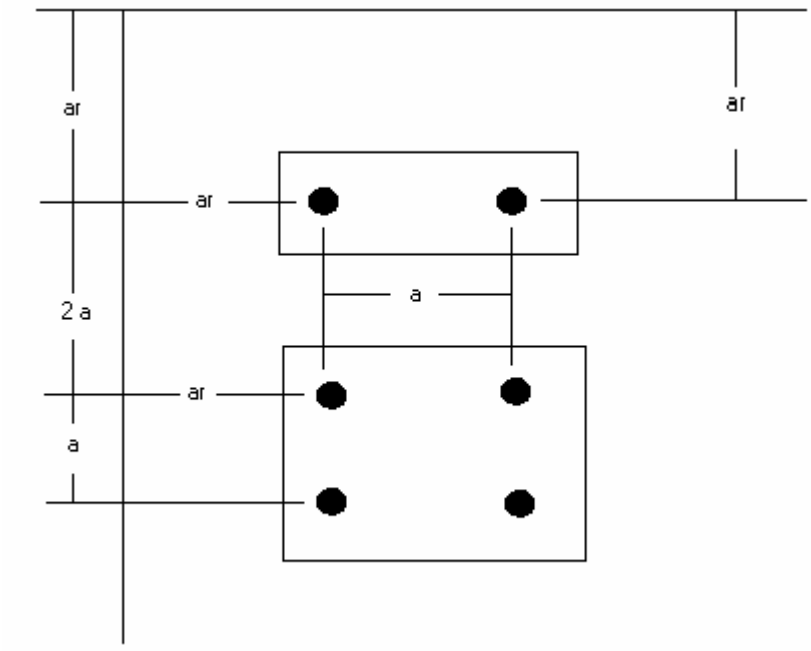
- Appendix 2 -

Single anchorings:

ar---------- edge distance
a---------- anchor spacing



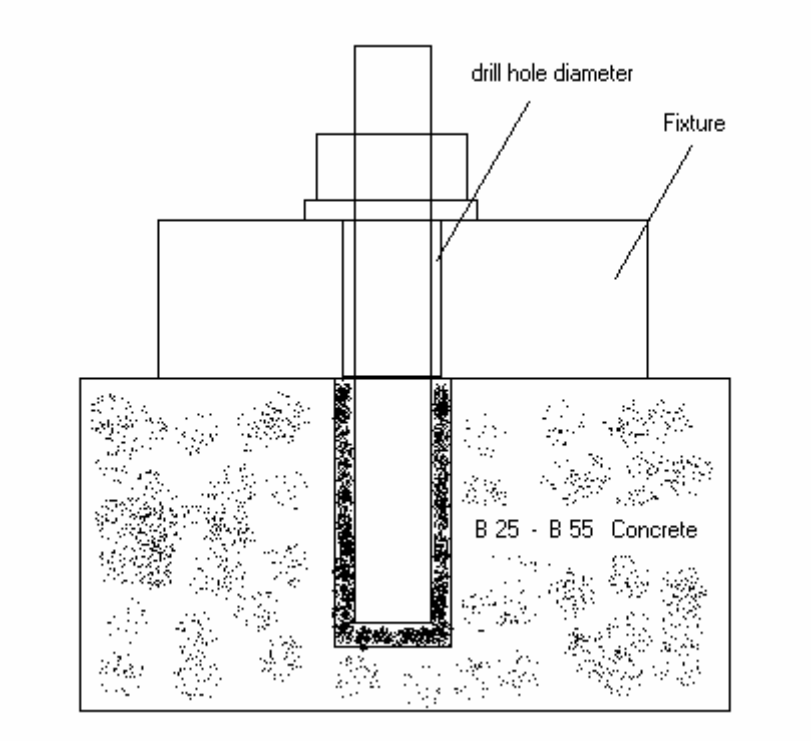
Anchor groups of two or more:



- İn anchor groups the distance must be 2 a

1 tonne = 10 kN 1 kN = 0,1 tonne 1 kN = 100 kg

- Appendix 3 -



Measurements of anchors, threaded rod and fixture :

Metric	Anchor		Drill hole		Threaded rod		Fixture	
	Diam mm	Length mm	Diam mm	Depth mm	Diam mm	Length mm	Thickness	Hole diam.
M 8	9	85	10	85	8	110	13	9
M 10	11	85	12	90	10	130	14	12
M 12	13	95	14	105	12	160	16	14
M 14	15	95	16	115	14	170	17	16
M 16	17	100	18	125	18	190	17,5	18
M 20	22	170	25	170	25	260	22	22
M 24	24	210	28	210	28	300	26	26
M 30	33	265	35	280	35	380	33	33

- Appendix 4 -

Anchor spacing = a
Edge Distance = ar
Reduction factors = Ka and Kar
mid – point to mid – point spacing

	M 8	M 10	M 12	M 16	M 20	M 22	M 24	M 30		M 8	M 10	M 12	M 16	M 20	M 22	M 24	M 30
35,00								1,00	70,00								1,00
34,00								0,97	68,00								0,99
33,00								0,94	66,00								0,97
32,00								0,91	64,00								0,96
31,00								0,89	62,00								0,94
30,00								0,83	60,00								0,93
29,00								0,80	58,00								0,91
28,00								0,77	56,00								0,90
27,00								0,74	54,00								0,89
26,00							1,00	0,71	52,00							1,00	0,87
25,00							0,96	0,69	50,00							0,98	0,86
24,00							0,92	0,67	47,00						1,00	0,95	0,84
23,50						1,00	0,90	0,63	45,00						0,98	0,93	0,82
22,00						0,94	0,85	0,60	44,00						0,97	0,92	0,81
21,00					1,00	0,89	0,81	0,57	42,00					1,00	0,95	0,90	0,80
20,00					0,95	0,85	0,77	0,54	40,00					0,98	0,93	0,88	0,79
19,00					0,90	0,81	0,73	0,51	38,00					0,95	0,90	0,87	0,77
18,00					0,86	0,77	0,69	0,49	36,00					0,93	0,88	0,85	0,76
17,00					0,81	0,72	0,65	0,46	34,00					0,90	0,86	0,83	0,74
16,00					0,76	0,68	0,62	0,44	32,00					0,88	0,84	0,81	0,73
15,50				1,00	0,74	0,66	0,60	0,43	31,00				1,00	0,87	0,83	0,80	0,72
15,00				0,97	0,71	0,64	0,58	0,40	30,00				0,98	0,86	0,82	0,79	0,71
14,00				0,90	0,67	0,60	0,54		28,00				0,95	0,83	0,80	0,77	0,70
13,50			1,00	0,87	0,64	0,57	0,52		27,00			1,00	0,94	0,82	0,79	0,76	
13,00			0,96	0,84	0,62	0,55	0,50		26,00			0,98	0,92	0,81	0,78	0,75	
12,00			0,87	0,77	0,57	0,51	0,46		24,00			0,94	0,89	0,79	0,76	0,73	
11,00		1,00	0,81	0,71	0,52	0,47	0,42		22,00		1,00	0,91	0,85	0,76	0,73	0,71	
10,40		0,95	0,77	0,67	0,50	0,44	0,40		20,80		0,97	0,89	0,84	0,75	0,72	0,70	
10,00	1,00	0,91	0,74	0,65	0,48	0,43			20,00	1,00	0,95	0,87	0,82	0,74	0,71		
9,40	0,94	0,85	0,70	0,61	0,45	0,40			18,80	0,97	0,93	0,85	0,80	0,72	0,70		
9,00	0,90	0,82	0,67	0,58	0,43				18,00	0,95	0,91	0,83	0,79	0,71			
8,40	0,84	0,76	0,62	0,54	0,40				16,80	0,92	0,88	0,81	0,77	0,70			
8,00	0,80	0,73	0,59	0,52					16,00	0,90	0,86	0,80	0,76				
7,00	0,70	0,64	0,52	0,45					14,00	0,85	0,82	0,76	0,73				
6,20	0,62	0,56	0,46	0,40					12,40	0,81	0,78	0,73	0,70				
6,00	0,60	0,55	0,44						12,00	0,80	0,77	0,72					
5,40	0,54	0,49	0,40						10,80	0,77	0,75	0,70					
5,00	0,50	0,45							10,00	0,75	0,73						
4,40	0,44	0,40							8,80	0,72	0,70						
4,00	0,40								8,00	0,70							
	M 8	M 10	M 12	M 16	M 20	M 22	M 24	M 30		M 8	M 10	M 12	M 16	M 20	M 22	M 24	M 30

- Appendix 5 -

Maximum load per anchor in uncracked concrete (BS 15, BS 50, BS 55) and suitable measurements for fixture

Centripetalpulling in concretes without any cracks,maximum acceptable KN type loads for pulling single anchor in length and all angles.	**M 8**	**M 10**	**M 12**	**M 14**	**M 16**	**M 20**	**M 24**	**M 30**
Concrete Strength								
> BS 25 and < BS 55	4	7	10	12	15	27	37	60
> BS 15	3	5	7	8	10	19	26	42
Acceptable NM type bending moments,								
Zinc galvanised thraded rod	10,7	21,4	37,4	59,4	94,9	186	321	642
Stainless steel threaded rod A4	12,1	24,1	42,7	66,9	107	209	201	402
Spin-in Nominal Hole Diameter mm	10	13	15	16	20	24	28	35
Spin-in Hole Depth=Assembling Depth mm	85	90	105	115	125	170	210	280
Hammer-in Nominal Hole Diameter mm	10	12	14	16	18	24	28	35
Hammer-in Hole Depth=Assembling Depthmm	85	90	105	115	125	170	210	280
Distance between anchors a > cm	20	22	27	30	31	42	52	70
Distance Min ar = cm	8	9	11	12	12,5	17	21	28
Edge distance ar > cm	10	11	13,5	15	15,5	21	26	35
Min ar = cm	4	4,5	5,5	6	6,5	8,5	10,5	14
Width of structural element > cm	20	22	27	30	31	42	52	70
Min ar = cm	8	9	11	12	12,5	17	21	28
Thickness of structural element > cm	13	14	16	17	17,5	22	26	33
Hole in the material to be assembled mm	9	12	14	16	18	22	26	33
Max. Torc with dinamometric handles Nm	10	20	40	60	80	150	200	400