THEKWENI
REINFORCING

Specialists in:
Reinforcing Steel (cut, bend, deliver and fixing) & Mesh

Thekweni Reinforcing Pty Ltd is a wholly owned black company, providing reinforcing products and services to the construction, civil and engineering markets. This include the supply, cut, bend, deliver and installation of steel reinforcing.The company enjoys recognised industry track record of delivery of the highest quality products and service.

Thekweni Reinforcing Pty Ltd is an accredited distributor of all BRC mesh reinforcing products.

As an emerging company in the steel industry, **Thekweni Reinforcing Pty Ltd** operates to international standards and enjoys ISO 9001:2000 accreditation (SAI global). In addition we add value in the training and development of previously disadvantaged individuals.

Thekweni Reinforcing Pty Ltd products and services are available in Kwa Zulu- Natal and the Eastern Cape, through its branches in Stanger, Durban and Richards Bay.

We are dedicated to continuous development and growth by using all our resources and finding standards which are good for business, the environment, communities and its employees as we strive for continued job creation.

THEKWENI
REINFORCING

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186 Aberdare Drive, Phoenix Industrial Park, 4068

STANGER • Tel: 032 552 3910 • Fax: 032 552 3911
12 Lindsay Road • Stanger, 4405

RICHARDS BAY : Tel : 035 751 1095 • Fax : 086 508 1154
7 Ceramic Curve, Alton, 3900

REBAR (CUT AND BEND)

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Cross-sectional area and nominal mass per meter of steel bars

Size of Bar/ mm	Nominal Mass/ kg/m	Cross-sectional area mm
6	0,222	28,3
8	0,395	50,3
10	0,617	78,5
12	0,888	113,0
16	1,58	201,0
20	2,47	314,0
25	3,85	491,0
32	6,31	804,0
40	9,86	1 260,0

0 200mm 400mm 600mm 800mm 1000mm 1200mm 1400mm 1600mm 1800mm 2000mm 2200mm 2400mm 2600mm

REBAR (CUT AND BEND)

THEKWENI REINFORCING

Cross sectional area of given number of bars in mm²

Number of Bars										Length/Ton
Diameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**M**
8	50,3	101	151	201	252	302	352	402	453	503
10	78,5	157	236	314	393	471	550	628	707	785
12	113	226	339	452	565	678	791	904	1017	1130
16	201	402	603	804	1005	1206	1407	1608	1809	2010
20	314	628	942	1256	1570	1884	2198	2512	2826	3140
25	491	982	1473	1964	2455	2946	3437	3928	4419	4910
32	804	1608	2412	3216	4020	4824	5628	6432	7236	8040
40	1260	2520	3780	5040	6300	7560	8820	10080	11340	12600

Mass per sq meter for various bar spacings (kg): Spacing of bars in millimeters

Diameter	75	100	125	150	175	200	225	250	275	300
8	5,265	3,950	3,160	2,630	2,255	1,975	1,753	1,580	1,433	1,315
10	8,244	6,170	4,936	4,109	3,523	3,085	2,739	2,468	2,239	2,054
12	11,837	8,880	7,104	5,914	5,070	4,440	3,942	3,552	3,223	2,957
16	21,061	15,800	12,640	10,522	9,021	7,900	7,015	6,320	5,735	5,261
20	32,925	24,700	19,760	16,450	14,103	12,350	10,966	9,880	8,966	8,225
25	51,320	38,500	30,800	25,641	21,983	19,250	17,094	15,400	13,975	12,820
32	84,112	63,100	50,480	42,024	36,030	31,550	28,016	25,240	22,905	21,012
40	131,433	98,600	78,880	65,667	56,300	49,300	43,778	39,440	35,791	32,83

REBAR (CUT AND BEND)

THEKWENI REINFORCING

Mass of groups of bars in kg/m

Number of Bars										Length/Ton
Diameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**M**
8	0,395	0,790	1,185	1,580	1,975	2,370	2,765	3,160	3,555	2531,6
10	0,617	1,234	1,851	2,468	3,085	3,702	4,319	4,936	5,553	1623,4
12	0,888	1,776	2,664	3,552	4,440	5,328	6,216	7,104	7,992	1126,1
16	1,580	3,160	4,740	6,320	7,900	9,480	11,060	12,640	14,220	633,3
20	2,470	4,940	7,410	9,880	12,350	14,820	17,290	19,760	22,230	405,5
25	3,850	7,700	11,550	15,400	19,250	23,100	26,950	30,800	34,650	259,5
32	6,310	12,620	18,930	25,240	31,550	37,860	44,170	50,480	56,790	158,4
40	9,860	19,720	29,580	39,440	49,300	59,160	69,020	78,880	88,740	101,4

Sectional areas per meter width for various spacing bars alternating (mm^2): Spacing of bars in millimeters

Diameter	75	100	125	150	175	200	225	250	275	300
8/10	859	644	515	429	368	323	286	258	234	214
10/12	1276	958	766	638	547	479	426	383	348	319
12/16	2093	1570	1256	1046	897	785	697	628	570	523
16/20	3433	2575	2060	1715	1471	1288	1143	1030	935	858
20/25	5366	4025	3220	2681	2299	2013	1787	1610	1461	1341
25/32	8631	6475	5180	4313	3698	3238	2875	2590	2351	2156
32/40	13757	10320	8256	6874	5893	5160	4582	4128	3747	3437

1:50

0 1m 2m 3m 4m 5m 6m 7m

REBAR (CUT AND BEND)

THEKWENI REINFORCING

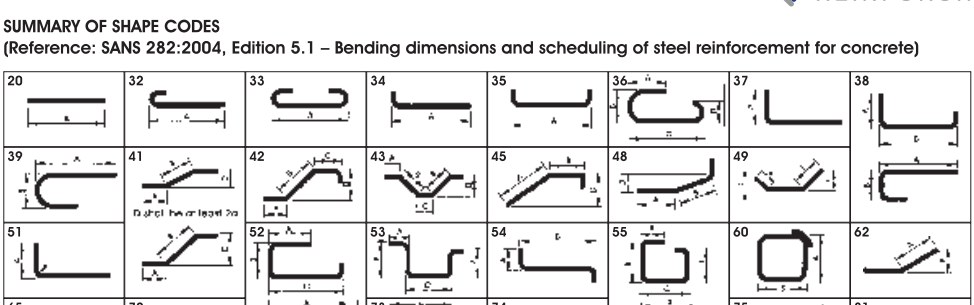
Sectional areas per meter width various bar spacings (mm^2): Spacing of bars in millimeters

Diameter	75	100	125	150	175	200	225	250	275	300
8	671	503	402	335	287	252	223	201	183	167
10	1046	785	628	523	448	393	349	314	285	261
12	1506	1130	904	753	645	565	502	452	410	376
16	2679	2010	1608	1339	1148	1005	892	804	730	669
20	4186	3140	2512	2091	1793	1570	1394	1256	1140	1046
25	6545	4910	3928	3270	2804	2455	2180	1964	1782	1635
32	10717	8040	6432	5355	4591	4020	3570	3216	2919	2677
40	16796	12600	10080	8392	7195	6300	5594	5040	4574	4196

SHAPE CODES

THEKWENI REINFORCING

SUMMARY OF SHAPE CODES
(Reference: SANS 282:2004, Edition 5.1 – Bending dimensions and scheduling of steel reinforcement for concrete)



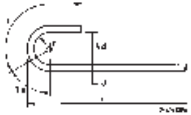
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
mm

MINIMUM HOOK, BEND AND RADIUS ALLOWANCES

THEKWENI REINFORCING

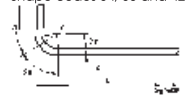
(Reference: SANS 282:2004 – Bending dimensions and scheduling of steel reinforcement for concrete)

Semi-circular hooks
Shape codes 32, 33 and 72



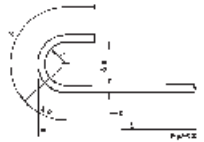
Cutting length of bar equals L + h

Bends that form end anchorages
Shape codes 34, 35 and 42

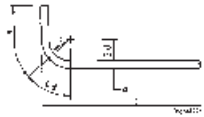


Cutting length of bar equals L + n

Minimum hook, bend and radius allowances for hot-rolled mild steel bars that comply with SANS 920



Cutting length of bar equals L + h



Cutting length of bar equals L + n

Minimum hook, bend and radius allowances for high yield stress steel bars and cold-worked steel bars that comply with SANS 920

Dimensions in millimeters

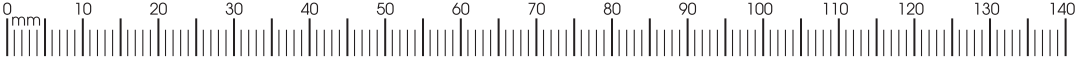
1		2	3	4	5	6	7	8	9	10
Nominal size of bar	d	6[1)]	8	10	12	16	20	25	32	40
Hook allowance	h	100	100	120	120	160	200	260	320	400
Bend allowance	n	100	100	100	100	100	120	160	200	240
Radius	r	12	16	20	24	32	40	50	64	80

[1)] Non-preferred

Dimensions in millimeters

1		2	3	4	5	6	7	8	9	10
Nominal size of bar	d	6[1)]	8[1)]	10	12	16	20	25	32	40
Hook allowance	h	100	100	120	160	200	240	300	400	480
Bend allowance	n	100	100	100	100	120	140	180	220	260
Radius	r	18	24	30	36	48	60	75	96	120

[1)] Non-preferred



MESH

THEKWENI REINFORCING

Reinforcing Mesh

Quality Control

Reinforcing mesh is produced to highest quality standards and complies to ISO 9002. Thorough testing of wire strength, welds and aperture sizes is continuously performed at all stages of the manufacturing process. Final inspections ensure that highest standards are maintained.

Standard Sizes

Reinforcing mesh is available in rolls (60m x 2,4m) and sheets (6m x 2,4m), manufactured according to standard sizes. Wire diameters vary from 3,55mm to 12mm. Mesh aperture can be as small as 100mm x 100mm.

Special Mesh

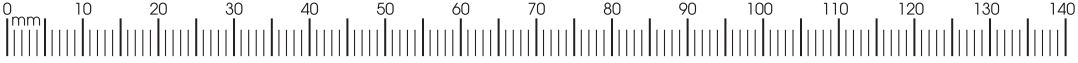
Specialised machinery is used to produce weldmesh with non-standard aperture sizes. The spacing of wires in either direction is variable between 25mm and 150mm. Customised mesh is available on request according to specif cations provided. Customers and design engineers should contact Thekweni Reinforcing before embarking on the design of such mesh.

Hard Drawn Wire

Standard wire sizes available:

- 3,55mm (smooth only, maximum length 3m)
- 4mm to 12mm (smooth and deformed)
- 4mm and 5mm (maximum length 6m)

Hard drawn wire is supplied smooth/round bar or deformed/curry pattern (cold rolled wire), in 1 ton coils or in standard lengths of 2,4m, 6m or 13m. It has a minimum breaking strength of 510MPa and a maximum yield point of 485MPa.



MESH

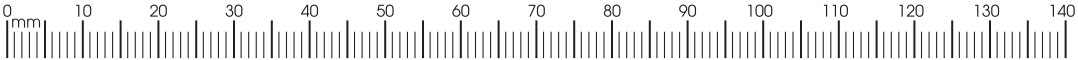
THEKWENI REINFORCING

Standard sizes of welded mesh fabric
Specifications: Sheets: 6m x 2,4m or Rolls: 60m x 2,4m

Based on SANS 1024:2006 specifications for welded steel fabric for concrete reinforcement.

			Sheets only						Sheets or rolls					Sheets only									Sheets or rolls	
Reference Number			888	746	617	500	395	311	245	193	100	156	200	1085	943	772	655	517	433	341	289	278	226	133
Mesh Size	Nominal Pitch of Wires	Main mm	200	200	200	200	200	200	200	200	200	100	100	100	100	100	100	100	100	100	100	100	100	100
		Cross mm	200	200	200	200	200	200	200	200	200	100	100	200	200	200	200	200	200	200	200	300	300	300
Wire Sizes		Main mm	12	11	10	9	8	7,1	6,3	5,6	4,0	3,55	4,0	12	11	10	9	8	7,1	6,3	5,6	6,3	5,6	4,0
		Cross mm	12	11	10	9	8	7,1	6,3	5,6	4,0	3,55	4,0	8	8	7,1	7,1	6,3	6,3	5,6	5,6	4,0	4,0	4,0
Cross Sectional Area per Meter Width		Main mm^2	566	475	393	318	251	198	156	123	63	99	126	1131	951	786	636	503	396	312	246	312	246	126
		Cross mm^2	566	475	393	318	251	198	156	123	63	99	126	251	251	198	198	156	156	123	123	42	42	42
Nominal mass/m^2		kg	8,88	7,46	6,17	5,00	3,95	3,11	2,45	1,93	1,00	1,56	2,00	10,85	9,43	7,72	6,55	5,17	4,33	3,41	2,89	2,78	2,26	1,33
			Square									Gunite		Structural								Longitudinal		

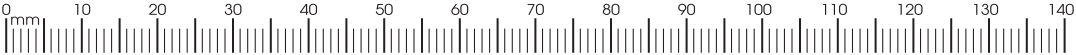
The Reference Number is the nominal mass in kilograms per square meter multiplied by 100.
The sizes given above are standard and are the most generally used. We can, however, manufacture mesh to other specif cations, both in size of wires and spacing.
Hard drawn wire to British standards 4482 has a minimum breaking strength of 510MPa and a minimum yield point of 485MPa.



THEKWENI REINFORCING

BAR SPACING, SECTIONAL AREAS PER METER WIDTH (mm^2)

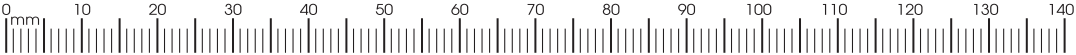
Bar	Bar spacing mm											
mm	50	75	80	100	125	150	175	200	225	250	275	300
8	1010	671	628	503	402	335	287	252	223	201	183	167
10	1570	1046	982	785	628	523	448	393	349	314	285	261
12	2260	1506	1414	1130	904	753	645	565	502	452	410	376
16	4020	2679	2512	2010	1608	1339	1148	1005	892	804	730	669
20	6280	4186	3927	3140	2512	2091	1793	1570	1394	1256	1140	1046
25	9820	6545	6136	4910	3928	3270	2804	2455	2180	1964	1782	1635
32	16100	10717	10050	8040	6432	5355	4591	4020	3570	3216	2919	2677
40	25100	16796	15700	12600	10080	8392	7195	6300	5594	5040	4574	4196



THEKWENI REINFORCING

SECTIONAL AREAS OF GROUPS OF BARS (mm^2)

Diameter of bars (mm)	Number of Bars									
	1	2	3	4	5	6	7	8	9	10
8	50.3	101	151	201	251	302	352	402	453	503
10	78.5	157	236	314	393	471	550	628	707	785
12	113	226	339	452	565	678	791	905	1017	1130
16	201	402	603	804	1005	1206	1407	1608	1809	2010
20	314	628	942	1256	1570	1884	2198	2512	2826	3140
25	491	982	1473	1964	2455	2946	3437	3928	4419	4910
32	804	1608	2412	3216	4020	4824	5628	6432	7236	8040
40	1260	2520	3780	5040	6300	7560	8820	10080	11340	12600



THEKWENI REINFORCING

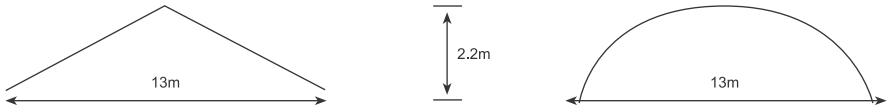
TABLE OF SIZES, AREA, PERIMETER AND MASS

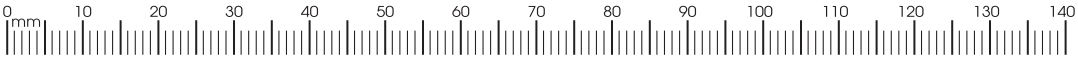
Diameter mm	6*1	8*2	10	12	16	20	25	32	40*2
Area mm^2	28.3	50.3	78.5	113	201	314	491	804	1260
Perimeter	18.8	25.1	31.4	37.7	50.3	62.9	78.6	100.6	125.7
Mass Kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	6.31	9.86

*1. Normal stock in mild steel grade only
*2. Not a stock item
Non stock items only available subject to a special order, possible delay and additional cost.

STOCK LENGTHS: 9m to 13m in 1 metre increments. Longer lengths are available by special arrangement, subject to possible delay and additional cost.

TRANSPORTATION: For convenience in transporting bars, dimensions should not exceed the following:

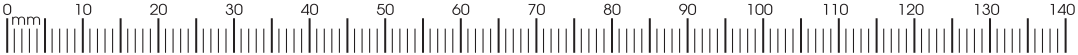




THEKWENI REINFORCING

WELDED MESH FABRIC REINFORCEMENT STANDARD FABRICS

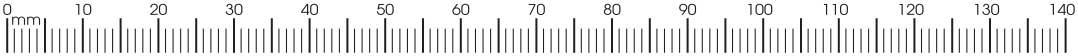
	Fabric Nominal Pitch of wire	Mesh Size		Wire Sizes area/m width		Cross Sectional mass/m2		Nominal	
	Ref No.	Main mm	Cross mm	Main mm	Cross mm	Main mm	Cross mm	Kg	Supplied in
Square Mesh Fabric	888	200	200	12	12	566	566	8.88	Sheets only 6m x 2.4m
	746	200	200	11	11	475	475	7.46	
	617	200	200	10	10	393	393	6.17	
	500	200	200	9	9	318	318	5.00	
	395	200	200	8	8	251	251	3.95	
	311	200	200	7.1	7.1	198	198	3.11	
	245	200	200	6.3	6.3	156	156	2.45	
	193	200	200	5.6	5.6	123	123	1.93	Sheets or rolls
	100	200	200	4.0	4.0	63	63	1.00	
Design Mesh Fabric	1085	100	200	12	8	1131	251	10.85	Sheets only 6m x 2.4m
	943	100	200	11	8	951	251	9.43	
	772	100	200	10	7.1	786	198	7.72	
	655	100	200	9	7.1	636	198	6.55	
	517	100	200	8	6.3	503	156	5.17	
	433	100	200	7.1	6.3	396	156	4.33	
	341	100	200	6.3	5.6	312	123	3.41	
	289	100	200	5.6	5.6	246	123	2.89	
Longitudinal Mesh Fabric	278	100	300	6.3	4.0	312	42	2.78	Sheets only 6m x 2.4m
	226	100	300	5.6	4.0	246	42	2.26	
	133	100	300	4.0	4.0	126	42	1.33	
Special Mesh	200	100	100	4.0	4.0	126	126	2.00	Sheets or rolls 60m x 2.4m
	156	100	100	3.55	3.55	99	99	1.56	



THEKWENI REINFORCING

STRUCTURAL FABRIC REINFORCEMENT DESIGN DATA
Cross sectional areas at various spacing mm²/m, MASS AT VARIOUS SPACING KG/M²

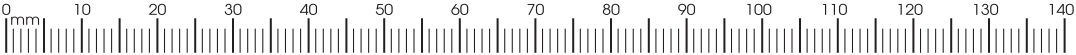
DIA mm	Area mm²	Mass kg/m	Wire Spacing mm											
			50	75	100	125	150	175	200	225	250	275	300	DIA
12	113.11	0.888	2262 17.76	1508 11.84	1131 8.88	905 7.10	754 5.92	646 5.07	566 4.44	503 3.95	452 3.55	411 3.23	377 2.96	12
11	95.05	0.746	1901 14.92	1267 9.95	950 7.46	760 5.97	634 4.97	543 4.26	475 3.73	422 3.32	380 2.98	346 2.71	317 2.49	11
10	78.55	0.617	1571 12.34	1047 8.23	786 6.17	628 4.94	524 4.11	449 3.53	393 3.09	349 2.74	314 2.47	286 2.24	262 2.06	10
9	63.63	0.500	1273 10.00	848 6.67	636 5.00	509 4.00	424 3.33	364 2.86	318 2.50	283 2.22	255 2.00	231 1.82	212 1.67	9
8	50.27	0.395	1005 7.9	670 5.27	503 3.95	402 3.16	335 2.63	287 2.26	251 1.98	223 1.76	201 1.58	183 1.44	168 1.32	8
7.1	39.6	0.311	792 6.22	528 4.15	396 3.11	317 2.49	264 2.07	226 1.78	198 1.56	176 1.38	158 1.24	144 1.13	132 1.04	7.1
6.3	31.18	0.245	624 4.9	416 3.27	312 2.45	249 1.96	208 1.63	178 1.40	156 1.23	139 1.09	125 0.98	113 0.89	104 0.82	6.3
5.6	24.63	0.193	493 3.86	328 2.57	246 1.93	197 1.54	164 1.29	141 1.10	123 0.97	109 0.86	99 0.77	90 0.70	82 0.64	5.6
4	12.57	0.100	251 2.00	168 1.33	126 1.00	101 0.8	84 0.67	72 0.57	63 0.50	56 0.44	50 0.40	46 0.36	42 0.33	4



THEKWENI REINFORCING

DETAILER'S CHECKLIST OF DRAWINGS AND SCHEDULES

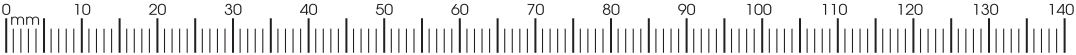
- Can the reinforcement as detailed be fixed?
- Does the detailing permit sensible location of construction joints, staged construction and scheduling of reinforcing deliveries?
- Is the reinforcement congested? Will this affect fixing or proper compaction of concrete?
- Would alternative detailing (e.g. staggered laps, bars reversed, two lapped bars replacing a single bar) provide greater flexibility or ease of fixing?
- Is there scope for prefabrication? Is this desirable?
- What is the (best) fixing sequence?
- Is the reinforcement detailed to provide sufficient rigidity and stability of cages during concreting?
- Are set-up bars, bracing bars, chairs, spacers, etc. detailed and scheduled?
- Are bars of a weight that can readily be handled?
- Do schedules agree with drawings e.g. numbers, types, sizes of bars?
- Does reinforcement in one member clash with that in an adjacent member (e.g. at a beam/column junction)?
- Do numbers of bars or sheets of fabric allow for two faces and not just one?
- Are scheduled bending dimensions compatible with member dimensions and specified concrete cover?
- Are starter bars detailed (and scheduled) with the concrete element in which they are first cast?
- Starter bars are frequently the last to be fixed to ensure positional accuracy. Does the detailing permit this?
- If closed links (or similar) are detailed, do they cause problems by requiring threading through of main bars during fixing?



THEKWENI REINFORCING

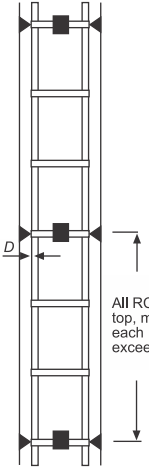
PRE-CONCRETING CHECKLIST

- Check inherent rigidity of the cage or mat
- Check correct numbers of bars have been fixed
- Check adequate provision of continuity reinforcement or connection to previous starter bars
- Check that all laps are of the correct length and lie in the correct plane
- Check that starter bars, starter boxes, void formers, fixing etc. are present and in correct locations
- Check correct use of adequate cover blocks, reinforcement spacers, etc. to prevent cage movement during concreting
- Check for damaged reinforcement (particularly coated bars); repair or replace as necessary
- Check cover to reinforcement is correct at all locations
- Check that the cage is in the correct position (either line and level or relative to previously checked formwork)
- Check that all twisted ends of ties are bent inwards away from concrete faces
- Ensure adequate access for concrete compaction (e.g. by poker vibrator)
- Ensure overall cleanliness of formwork (removal of water, tie clippings etc.)
- Ensure that harmful chemicals have not been used anywhere.



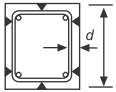
Correct use of Reinforcing Cover Devices

Reinforcing Cover Devices for columns

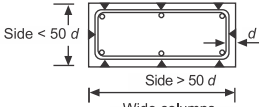


All RCDs fixed to stirrups at top, middle and bottom of each lift and at centres not exceeding 100*D*

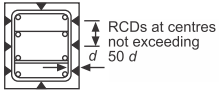
RCDs along column



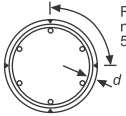
Small columns



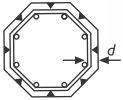
Wide columns



Double stirrups



Circular columns



Multi-faceted columns

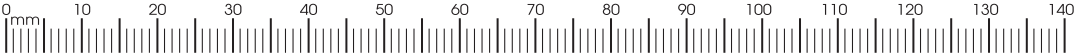
■ Plan view of RCD

▲ Side view of RCD

d Stirrup size

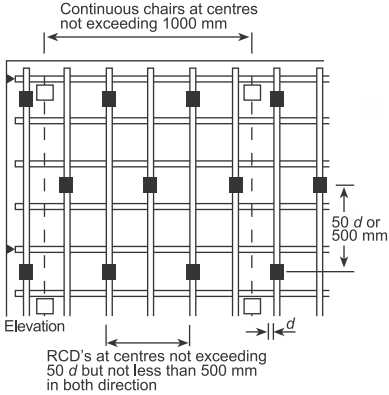
D Size of main bars

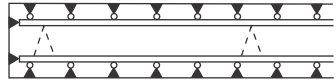
THEKWENI REINFORCING



Correct use of Reinforcing Cover Devices

Reinforcing Cover Devices for walls

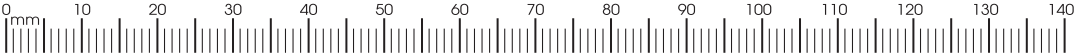




Key

- Plan view of RCD
- Side view of RCD
- Plan view of continuous chair
- Side view of continuous chair
- End view of continuous chair

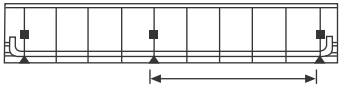
THEKWENI REINFORCING



Correct use of Reinforcing Cover Devices

Reinforcing Cover Devices for columns

a) Beam elevation



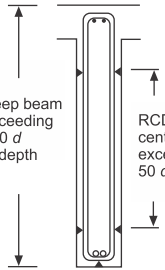
Every bar end should have a suitable RCD

All RCD's fixed to stirrups at centres not exceeding 1 000 mm

Key

- ■ Plan view of RCD
- ▲ Side view of RCD
- *d* Stirrup size

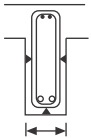
c) RCD's for the sides of deep beams



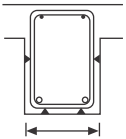
Deep beam exceeding 100 *d* in depth

RCDs at centres not exceeding 50 *d*

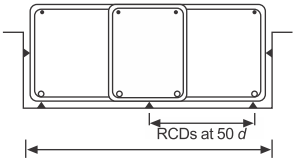
b) RCD's for the bottom faces beams



i) Narrom beam less than 250 mm in width, one RCD

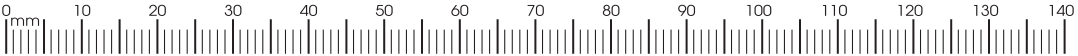


ii) Normal beam 250 mm to 500 mm in width, two RCD's



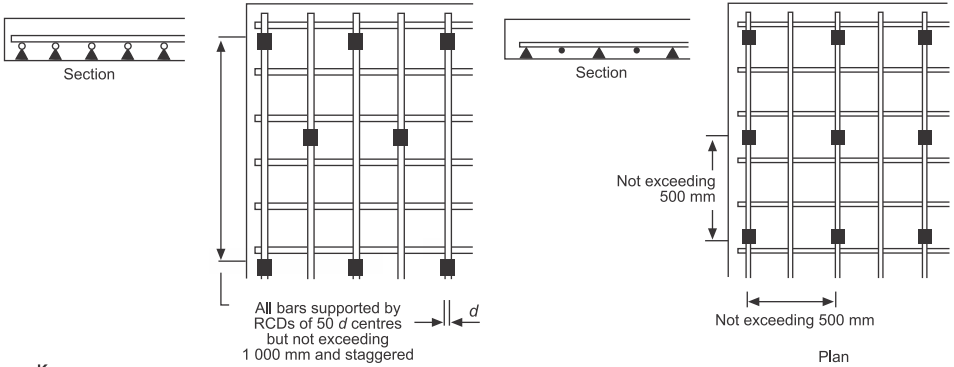
iii) Wide beam exceeding 500 mm in width

THEKWENI REINFORCING



Correct use of Reinforcing Cover Devices

Reinforcing Cover Devices for bottom reinforcement in slabs



Key

■ Plan view of RCD

▲ Side view of RCD

THEKWENI REINFORCING

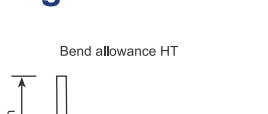
0 mm 10 20 30 40 50 60 70 80 90 100 110 120 130 140

Cutting and bending tolerances

Hook allowance HT

Cutting length of bar equals L + h

Bend allowance HT

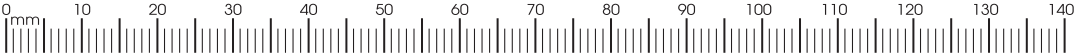


Cutting length of bar equals L + h

Minimum hook, bend the radius allowances for high yield stress steel bars and cold-worked steel bars that comply with SANS 920

1	2	3	4	5	6	7	8	9	10
Nominal size of bar d	6[1)]	8[1)]	10	12	16	20	25	32	40
Hook allowance h	100	100	120	160	200	240	300	400	480
Bend allowance n	100	100	100	100	120	140	180	220	260
Radius r	18	24	30	36	48	60	75	96	120
1) Non-preferred.									

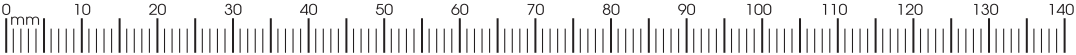
THEKWENI REINFORCING



THEKWENI
REINFORCING

0 mm 10 20 30 40 50 60 70 80 90 100 110 120 130 140

APPLICABLE STANDARDS

- SANS 282: 2004: Bending dimensions and scheduling of steel reinforcement for concrete
- SANS 10100-1: 2000: The structural use of concrete-Part 1: Design
- SANS 10100-2: 1992: The structural use of concrete-Part 2: Materials and execution of work
- SANS 0144: 1995: Detailing of steel reinforcement of concrete
- SANS 920: 2005: Steel bars for concrete reinforcing
- SABS ARP: 040: 1998: The use of reinforcement cover devices for reinforced concrete
- SANS 1024: 2006: Welding steel fabric for reinforcement of concrete

THEKWENI REINFORCING