
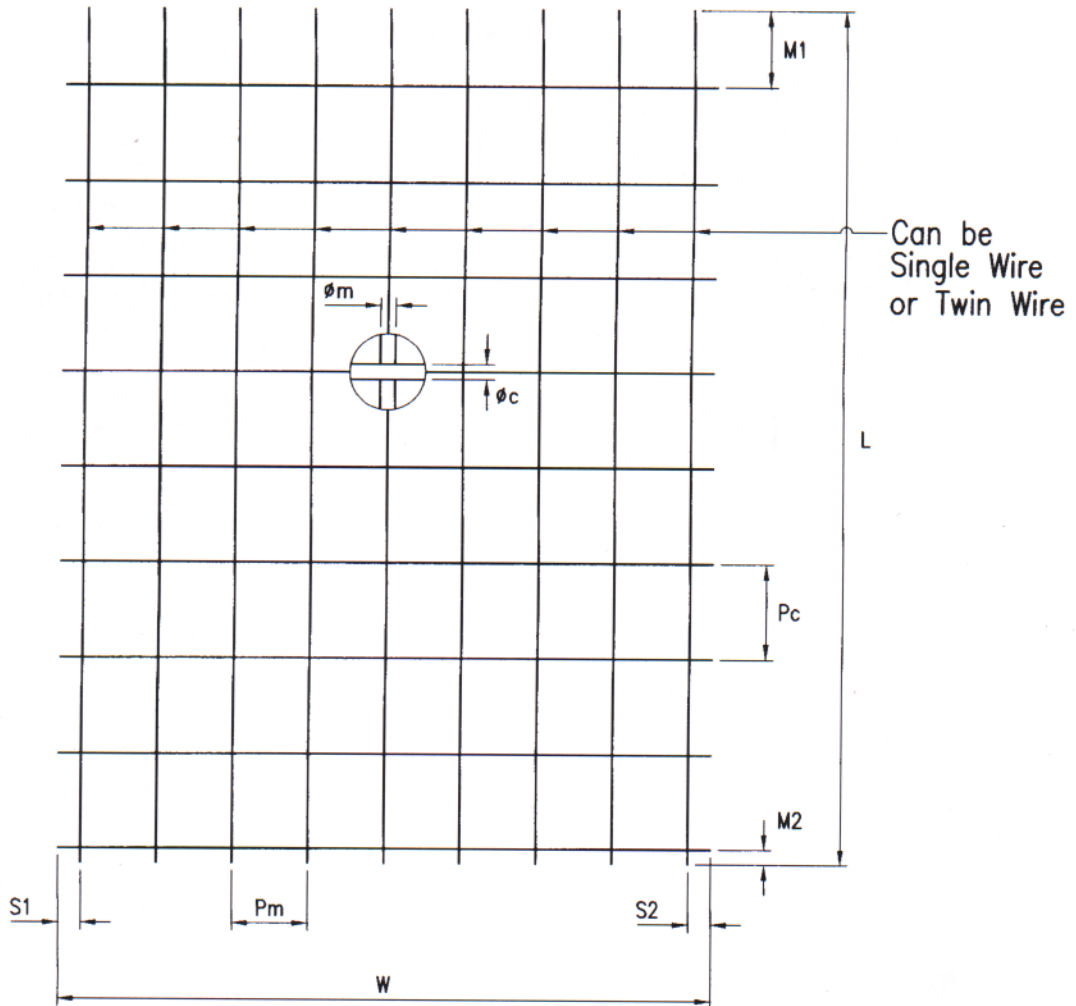


Appendix



Welded Wire Fabric Dimensions



Legend

L	- length of sheet	P_m	- pitch of main wire
W	- width of sheet	P_c	- pitch of cross wire
ϕ_m	- main wire diameter	M_1, M_2	- main wire overhang
ϕ_c	- cross wire diameter	S_1, S_2	- cross wire overhang

TABLE FOR WELDED WIRE FABRIC

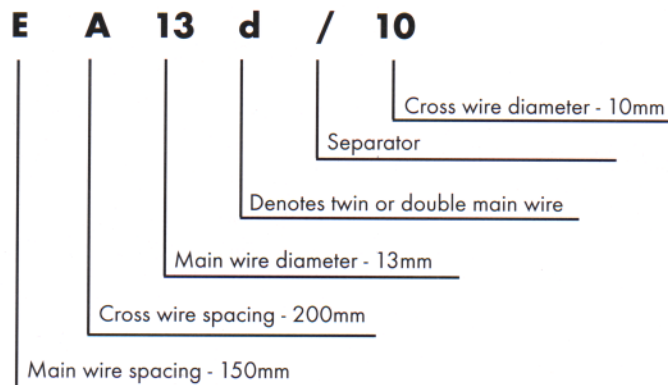
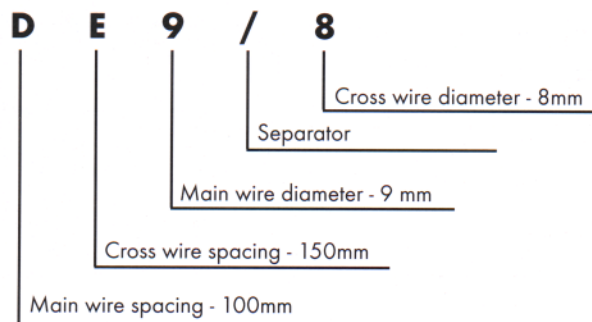
WWF Ref. No.	Cross- Sectional Area (mm ² /m)		Wire Spacing (mm)		Wire Diameter (mm)		Nominal Mass (kg/m ²)
	Main	Cross	Main	Cross	Main	Cross	
SQUARE FABRIC: A, D & E SERIES							
D13	1327	1327	100	100	13	13	20.84
D12	1131	1131	100	100	12	12	17.77
D11	950	950	100	100	11	11	14.92
E13	885	885	150	150	13	13	13.90
D10	786	786	100	100	10	10	12.35
E12	754	754	150	150	12	12	11.84
A13	664	664	200	200	13	13	10.43
D9	636	636	100	100	9	9	9.99
E11	634	634	150	150	11	11	9.96
A12	566	566	200	200	12	12	8.89
E10	524	524	150	150	10	10	8.23
D8	503	503	100	100	8	8	7.90
A11	475	475	200	200	11	11	7.46
E9	424	424	150	150	9	9	6.66
A10	393	393	200	200	10	10	6.17
D7	385	385	100	100	7	7	6.05
E8	335	335	150	150	8	8	5.26
A9	318	318	200	200	9	9	5.00
D6	283	283	100	100	6	6	4.45
E7	257	257	150	150	7	7	4.04
A8	251	251	200	200	8	8	3.94
A7	192	192	200	200	7	7	3.02
E6	189	189	150	150	6	6	2.97
A6	141	141	200	200	6	6	2.21
A5	98	98	200	200	5	5	1.54
RECTANGULAR FABRIC: B SERIES							
B13	1327	393	100	200	13	10	13.51
B12	1131	251	100	200	12	8	10.85
B11	950	251	100	200	11	8	9.43
B10	786	251	100	200	10	8	8.14
B9	636	251	100	200	9	8	6.97
B8	503	251	100	200	8	8	5.92
B7	385	192	100	200	7	7	4.53
B6	283	192	100	200	6	7	3.73

TABLE FOR WELDED WIRE FABRIC (continued)

WWF Ref. No.	Cross- Sectional Area (mm ² /m)		Wire Spacing (mm)		Wire Diameter (mm)		Nominal Mass (kg/m ²)
	Main	Cross	Main	Cross	Main	Cross	
DESIGNER FABRIC SERIES							
DE12/9	1131	424	100	150	12	9	12.21
DE11/9	950	424	100	150	11	9	10.79
DE10/9	786	424	100	150	10	9	9.50
DE9/9	636	424	100	150	9	9	8.33
DE8/9	503	424	100	150	8	9	7.28
DA13d/10	2655	393	100	200	2X13	10	23.94
EA13d/10	1770	393	150	200	2X13	10	16.99
DA10d/10	1571	393	100	200	2x10	10	15.43
DA12/10	1131	393	100	200	12	10	11.97
EA10d/10	1047	393	150	200	2X10	10	11.31
EA13/10	885	393	150	200	13	10	10.04
DA10/10	786	393	100	200	10	10	9.26
AA13/10	664	393	200	200	13	10	8.30
EA10/10	524	393	150	200	10	10	7.20
DE11/8	950	335	100	150	11	8	10.09
DE10/8	786	335	100	150	10	8	8.80
DE9/8	636	335	100	150	9	8	7.63
DE8/8	503	335	100	150	8	8	6.58
DE7/7	385	257	100	150	7	7	5.04
EA8/7	335	192	150	200	8	7	4.14

Interpretation of Designer Fabric Reference Number:

The first two alphabet denotes the spacing of the Designer fabric, i.e. A for 200 mm spacing, D for 100 mm spacing and E for 150 mm spacing. The diameter of the wire follows the spacing and a small letter "d" after the main wire diameter denotes twin or double wire fabric.



TYPES OF FABRIC LAP

Plain welded wire fabric (plain WWF) bonds to concrete by the positive mechanical anchorage at each intersection. Deformed welded wire fabric (deformed WWF) utilises wire deformation plus the welded intersection for bond and anchorage. According to SS:32, the minimum weld shear stress requirement for plain WWF is 250 MPa and deformed WWF is 140 MPa. Based on this requirement, a lap splice with two welded intersection overlapping is sufficient to transfer the full yield strength for plain WWF. As for deformed WWF the lap length could be reduced depending on the number of welded intersection present with the lap.

Full Yield Strength Layered Lap

- The most common type lapping used.
- Transfer the full yield strength of the reinforcement.
- Too great an accumulation of laps can be avoided by staggering the sheet arrangement.



Full Yield Strength Layered Lap

Half Yield Strength Layered Lap

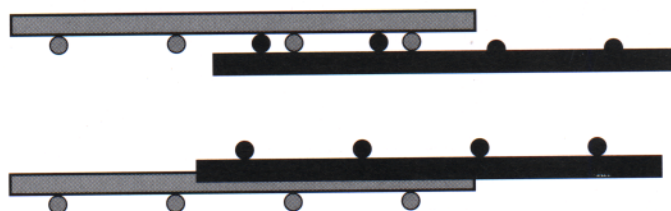
- Transfer half the yield strength of the reinforcement.
- May be use for side laps across beams.



Half Yield Strength Layered Lap

Reversed or Nested-in-Plane Lap

- Particularly useful in situations of maximum stress to maintain the lapped reinforcement in the same plane.



Reversed or Nested-in-Plane Lap

Flying Ends Lap

- Alternative method of in-plane lapping where one sheet is provided with a lap length overhang without welded intersections.
- The lap length is determined as for lapped bars (plain or deformed wires) and, without welded intersection on lapped wires, the ultimate anchorage bond stress of fabric do not apply



Flying Ends Lap

Non-yield strength transfer splice lap

- May be used for secondary direction lapping over beam or secondary direction lapping where splice transfer is not important.



Non-Yield Strength Transfer Splice Lap

BEAM LINK CAGE CONVERSION TABLE FOR PLAIN MILD STEEL BAR		
Link Spacing S_v (mm)	Characteristic Strength of Link Cage $f_{yv} = 250 \text{ N/mm}^2$	
	R10	R13
75	T10-125	T13-125
	D10-125	D13-125
	H10-125	H13-125
100	T10-150	T13-150
	D10-150	D13-150
	H10-150	H13-150
125	T10-200	T13-200
	D10-200	D13-200
	H10-200	H13-200
150	T10-250	T13-250
	D10-250	D13-250
	H10-250	H13-250
200	T10-300	T10-200
	D10-300	D10-200
	H10-300	H10-200
250	T10-300	T10-250
	D10-300	D10-250
	H10-300	H10-250
300	T10-300	T10-250
	D10-300	D10-300
	H10-300	H10-300

(1) Table above is derived from the following formulas:

$$\left(\frac{A_{sv}}{S_v}\right) = \left(2 \times \frac{\pi \phi^2}{4}\right) \left(\frac{1}{S_v}\right) \text{ mm}^2/\text{m}$$

$$= \frac{(v - v_c) b_v}{0.87 f_{yv}}$$

where,

A_{sv} - Area of two legs
of link with diameter ϕ

b_v - Width of the beam

v - Design shear stress

v_c - Design concrete shear stress

(2) Example for conversion for a specific grade of link cage with a specific spacing using table above.

=> Converting R10-100 link cage to link cage of other characteristic strength.

From table above:- T10-150, D10-150 or H10-150 is equivalent to R10-100.

(Note: Engineer can choose link type i.e. open or close link. If open beam link cage is used, material type for capping link is preferably similar to link cage shall also be adopted)

- (3) **Legends:**
- (a) Prefix 'S' denotes open link cage (e.g. $\underline{S}T$, $\underline{S}D$, $\underline{S}H$)
 - (b) Prefix 'L' denotes close link cage (e.g. $\underline{L}T$, $\underline{L}D$, $\underline{L}H$)
 - (c) 'R' denotes links using Plain Mild Bar ($f_{yv} = 250\text{N/mm}^2$)
 - (d) 'T' denotes links using Tempcore Deformed Wire ($f_{yv} = 460\text{N/mm}^2$)
 - (e) 'D' denotes links using Deformed Hard Drawn Wire ($f_{yv} = 485\text{N/mm}^2$)
 - (f) 'H' denotes links using Plain Hard Drawn Wire ($f_{yv} = 485\text{N/mm}^2$)

COLUMN LINK CAGE CONVERSION TABLE FOR PLAIN MILD STEEL BAR			
Link Spacing S_v (mm)	Characteristic Strength of Link Cage $f_{yv} = 250 \text{ N/mm}^2$		
	LR8	LR10	LR13
100	LD8-100	LD10-100	LD13-100
	LH8-100	LH10-100	LH13-100
125	LD8-125	LD10-125	LD13-125
	LH8-125	LH10-125	LH13-125
150	LD8-150	LD10-150	LD13-150
	LH8-150	LH10-150	LH13-150
200	LD8-200	LD10-200	LD13-200
	LH8-200	LH10-200	LH13-200
250	LD8-250	LD10-250	LD13-250
	LH8-250	LH10-250	LH13-250
300	LD8-300	LD10-300	LD13-300
	LH8-300	LH10-300	LH13-300

1. Example for conversion for a specific grade of link cage with a specific spacing using table above.

⇒ Converting 1 number complete column close link cage LR10-100 to link cage of other characteristic strength.

From table above: - LD10-150 or LH10-150 is equivalent to LR10-100.

2. **Legends:**
- (a) Prefix 'L' denotes column close link cage (e.g. LT, LD, LH)
 - (b) 'R' denotes links using Plain Mild Bar ($f_{yv} = 250 \text{ N/mm}^2$)
 - (c) 'T' denotes links using Tempcore Deformed Bar ($f_{yv} = 460 \text{ N/mm}^2$)
 - (d) 'D' denotes links using Deformed Hard Drawn Wire ($f_{yv} = 485 \text{ N/mm}^2$)
 - (e) 'H' denotes links using Plain Hard Drawn Wire ($f_{yv} = 485 \text{ N/mm}^2$)

**List of
Reinforcement
Fabricators**

LIST OF REINFORCEMENT FABRICATORS

	<u>Fabricators</u>	<u>Address</u>	<u>Telephone</u>	<u>Fax</u>
1	Asia Steel Welded Mesh Co Ltd	11 Tuas Avenue 3, S639410	861 7333	862 5968
2	Angkasa Marketing (S) Pte Ltd	10 Arumugam Road #09-00, Lion Industrial Building, S409957	759 5973	743 7252
3	B.R.C. Weldmesh (S.E.A.) Pte Ltd	350 Jalan Boon Lay, S619530	265 2333	266 4728
4	Burwill Trading Pte Ltd	35 Pioneer Road, S628503	862 2306	863 2865
5	Eastern Wire Pte Ltd	27 Jalan Buroh, S619483	265 0066	261 8562
6	Econ Industries Pte Ltd	2 Ang Mo Kio St 64, Ang Mo Kio Industrial Park 3, S569084	484 2222	484 2221
7	Legend Building Supplies Pte Ltd	4 Kian Teck Drive, S628821	265 2857	265 2849
8	LiSteel Singapore Pte Ltd	11 Tuas Avenue 16, Jurong, S638929	862 2467	862 1664
9	Natsteel Ltd	22 Tanjong Kling Road, S628048	265 1233	265 8317
10	Panwah Steel Pte Ltd	116 Middle Road, #08-01 ICB Enterprise House, S188972	337 2237	338 8221
11	Viewforth Trading & Engineering Pte Ltd	5 Tuas Avenue 1, S639490	862 0033	861 6448