



MaxCell®

Technical Manual

Application Guide

EM Product Line

Milliken & Company

MaxCell® Application Guide

Recommended MaxCell Placement by Conduit ID

Assuming: 250 Meter Unoccupied Conduit with Two 90 degree 1 M Radius Sweeps

Product *	Max. Cable Diameter, mm **	Total Width, mm	Recommended Minimum Conduit ID, mm		
			3 Cell Configuration	2 Cell Configuration	1 Cell Configuration
EM 9636 - x	36	96	100	75	75
EM 7126 - x	26	71	75	75	75
EM 5621 - x	21	56	50	50	40
EM 4616 - x	16	46	40	38	38
EM 4014 - x	14	40	38	32	32
EM 3614 - 2	14	36	Not Offered	32	Not Offered
EM 3212 - 2	12	32	Not Offered	28	Not Offered
EM 2810 - 2	10	28	Not Offered	28	Not Offered

- "x" indicates products are available in 1, 2 and 3 cell configurations,
 Styles 3614-2, 3212-2 and 2810-2 are only available in the 2 cell configuration.
- ** Cable OD without cable grip, assumes use of Kellums grip cable attachment.

General Guidelines:

Cell Configuration	Minimum Conduit ID, mm Equals MaxCell Width Minus
3	MaxCell Width MINUS 6 mm
2	MaxCell Width MINUS 8 mm
1	MaxCell Width MINUS 10 mm

Example

- For EM 5621-3 - Minimum conduit ID = 50 mm = 56 mm - 6 mm
- For EM 4014-2 - Minimum conduit ID = 32 mm = 40 mm - 8 mm




MaxCell® Application Guide

Expected MaxCell Fabric Installation Tension, kgs

Assuming: 250 Meter Unoccupied Conduit with Two 90 Degree 1 M Radius Sweeps

Product	Conduit ID, mm						
	28 mm	32 mm	38 mm	42 mm	50 mm	75 mm	100 mm
EM 9636 - 3							< 35
2						< 75	< 20
1						< 50	< 20
EM 7126 - 3						< 25	< 15
2						< 20	< 15
1						< 15	< 15
EM 5621 - 3					< 75		
2					< 50		
1					< 25		
EM 4616 - 3				< 75	< 15		
2			< 75	< 50	< 15		
1			< 50	< 25	< 15		
EM 4014 - 3			< 35	< 20			
2		< 75	< 20	< 15			
1		< 50	< 20	< 15			
EM 3614 - 2		< 75					
EM 3212 - 2	< 50	< 50					
EM 2810 - 2	< 25	< 25					

 Estimated Fabric Installation Tension 100 kg or more

 Estimated Fabric Installation Tension 15 kg or less

Notes:

1. Pulling tensions are dependent on conduit conditions, total pull lengths and cumulative angle or degrees of all sweeps and bends.
2. Pulling tensions in straight duct pulls, where the cumulative angle or degrees of all sweeps approaches zero, can be 25% to 50% less than estimated in the above chart.



MaxCell® Application Guide

Expected Cable Installation Tension, kgs

Assuming: 250 Meter Unoccupied Conduit with Two 90 Degree 1 M Radius Sweeps

Product	Conduit ID, mm	Cable OD, mm	Maximum Cables Placed	Fill Ratio, %	Expected Cable Pulling Tension, Kgs					
					1 st	2 nd	3 rd	4 th	5 th	6 th
EM 9636 - 2	100	32	4	41%	35	40	45	50		
EM 7126 - 3	75	26	6	43%	45	55	75	50	55	60
EM 5621 - 3	50	20	3	39%	60	40	50			
EM 4616 - 2	50	16	4	41%	70	90	80	85		
* EM 4014 - X	42	13	5	41%	60	65	55	45	55	

- This application requires one 3 celled pack and one 2 celled pack of style 4014.

For a complete analysis of both MaxCell fabric and fiber optic cable installation tensions reference the “Qualification and Field Test Results” presentation.



MaxCell® Application Guide

How Many Cables can be Placed Utilizing MaxCell?

Assumes placing the same cable OD in a given conduit

Cable Diameter, mm	Conduit ID, mm						
	28 mm	32 mm	38 mm	42 mm	50 mm	75 mm	100 mm
34						2	4
26					1	3	6
22				1	2	5	9
20			1	1	2	6	11
18			2	2	3	8	14
16		1	2	3	4	10	18
14	1	2	3	4	5	13	
12	2	3	4	5	7	18	
10	3	4	6	8	11		
8	5	7	11				



= Not Recommended



= Consult Manufacturing

General Guidelines:

The above data is based on a maximum "Cross Area Fill Ratio" of 45%

Cross Area Fill Ratio = Sum of Area of Cable (s) divided by Area of Conduit

Where Area = $3.141 \times ((\text{diameter} / 2) ^ 2)$

Notes:

- This chart estimates the Maximum Number of Cables that can be placed in a conduit.
- Any combination of 1, 2 or 3 celled MaxCell Packs can be utilized to achieve these numbers or optimize the fill ratio of a conduit.
- For different combinations of cable diameters please utilize the Fill Ratio Calculation



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