



S.M CONSTRUCTION

First class (combined) Government contractor, General Supplier & ABB Authorized Reseller



IREQ Laboratory (Canada - 2009)



Contact us:



S.M CONSTRUCTION

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Product Picture	S.L No.	Current Rating (A)	Breaking Capacity (KA)	Model Description	Price	Origin
Miniature Circuit Breaker (SP MCB) Breaking Capacity 6kA Made In Germany 	01	06A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	02	10A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	03	16A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	04	20A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	05	25A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	06	32A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	07	40A	6 kA	Miniature Circuit Breaker (SP MCB)	860.00	Germany
	08	50A	6 kA	Miniature Circuit Breaker (SP MCB)	2550.00	Germany
	09	63A	6 kA	Miniature Circuit Breaker (SP MCB)	2550.00	Germany
Miniature Circuit Breaker (DP MCB) Breaking Capacity 6kA Made In Germany 	10	06A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	11	10A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	12	16A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	13	20A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	14	25A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	15	32A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	16	40A	6 kA	Miniature Circuit Breaker (DP MCB)	2200.00	Germany
	17	50A	6 kA	Miniature Circuit Breaker (DP MCB)	4800.00	Germany
	18	63A	6 kA	Miniature Circuit Breaker (DP MCB)	4800.00	Germany
Miniature Circuit Breaker (TP MCB) Breaking Capacity 6kA Made In Germany 	19	06A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	20	10A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	21	16A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	22	20A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	23	25A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	24	32A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	25	40A	6 kA	Miniature Circuit Breaker (TP MCB)	3800.00	Germany
	26	50A	6 kA	Miniature Circuit Breaker (TP MCB)	7750.00	Germany
	27	63A	6 kA	Miniature Circuit Breaker (TP MCB)	7750.00	Germany

Moulded Case Circuit Breaker (MCCB)

Product Picture	S.L No.	Current Rating (A)	Breaking Capacity (KA)	Model Description	Price	Origin
	01	16A	18 kA	XT1B 160 TMD 16-450 3p F F	13,200.00	ITALY
	02	20A	18 kA	XT1B 160 TMD 20-450 3p F F	13,200.00	ITALY
	03	25A	25 kA	XT1B 160 TMD 25-450 3p F F	14,800.00	ITALY
	04	32A	25 kA	XT1B 160 TMD 32-450 3p F F	14,800.00	ITALY
	05	40A	25 kA	XT1B 160 TMD 40-450 3p F F	14,800.00	ITALY
	06	50A	25 kA	XT1B 160 TMD 50-500 3p F F	14,800.00	ITALY
	07	63A	25 kA	XT1B 160 TMD 63-630 3p F F	14,800.00	ITALY
	08	80A	25 kA	XT1B 160 TMD 80-800 3p F F	14,800.00	ITALY
	09	100A	25 kA	XT1B 160 TMD 100-1000 3p F F	14,800.00	ITALY
	10	125A	25 kA	XT1B 160 TMD 125-1250 3p F F	16,800.00	ITALY
	11	160A	25 kA	XT1B 160 TMD 160-1600 3p F F	21,500.00	ITALY
	12	200A	36kA	XT3N 250 TMD 200-2000 3p F F	34,500.00	ITALY
	13	250A	36kA	XT3N 250 TMD 250-2500 3p F F	41,500.00	ITALY

Moulded Case Circuit Breaker (MCCB)

	15	400A	36kA	T5N 400 PR221DS -LS/I In=400 3p F EF	79,000.00	ITALY
	16	500A	36kA	T5N 630 TMA 500-5000 3p F EF	86,000.00	ITALY
	17	630A	36kA	T5N 630 PR221DS -LS/I In=630 3p F EF	89,000.00	ITALY
	18	800A	50kA	T6S 800 PR221DS -LS/I In=800 3p F EF	1,35,000.00	ITALY
	19	1000A	50kA	T6S 1000 PR221DS -LS/I In=1000 3p F EF	1,90,000.00	ITALY
	20	1250A	50kA	T7S 1250 PR231/P LDS -LS/I In=1250 4p F EF	3,24,000.00	ITALY
	21	1600A	70kA	T7H 1600 PR231/P LDS -LS/I In=1250 4p F EF	4,89,000.00	ITALY

Lightning Protection System (LPS)



SL No.	Model / Description	Coverage Area	Unit Price (BDT)	Origin
1	Lightning Arrestor (OPR60)	Protection Level -III Top Plane Height-5M 97 M Radius	3,50,000.00	France
2	Lightning Arrestor (OPR30)	Protection Level -III Top Plane Height-5M 63 M Radius	2,50,000.00	France
3	Lightning Stroke Counter	Counting - 0 to 999	90,000.00	France

Surge Protection Device (SPD)

	SL No.	Model	Voltage Protection Level UP [kV]	Max. Discharge Current Imax 8/20 [kV]	Unit Price (BDT)	Origin
	1	OVR T1+2 3N 7 -275s P	1.4	80	45,000.00	Bulgariya

Ground Enhancing Materials (GEM)

	SL No.	Model	Weight /Bag	Brand	Unit Price (BDT)	Origin
	1	CM025	25 KG	ABB	25,000.00	UK

MCB DISTRIBUTION BOARD (SPN)

Serial No	Part/Model No	Product Description	Size	MRP
1	1SYN142111Y1655	E-SPN (08+2) WAY/T-NSTD-2999-00	H.255mm X W.300mm X D.95mm	3,700
2	1SYN142111Y1656	E-SPN (10+2) WAY/T-NSTD-2999-00	H.255mm X W.335mm X D.95mm	4,300
3	1SYN142111Y1657	E-SPN (14+2) WAY/T-NSTD-2999-00	H.255mm X W.410mm X D.95mm	5,100
4	1SYN142111Y1658	E-SPN (20+2) WAY/T-NSTD-2999-00	H.255mm X W.515mm X D.95mm	6,000

MCCB DISTRIBUTION BOARD (TPN LOAD LINE)

Serial No	Part/Model No	Product Description	Size	MRP
1	1SYN142111Y1659	E-VTPN 6/160AXR1/T-NSTD-3000-B-01/02	H.610mm X W.440mm X D.123mm	18,500
2	1SYN142111Y1660	E-VTPN 8/160AXR1/T-NSTD-3000-B-01/02	H.670mm X W.440mm X D.123mm	22,500
3	1SYN142111Y1661	E-VTPN 12/160AXR1/T-NSTD-3000-B-01/02	H.775mm X W.440mm X D.123mm	28,200



FurseCEM™ is a granulated electrically conductive aggregate that replaces normal concrete fine aggregates such as sand, permitting electrically conductive concretes to be designed by applying conventional concrete technology.

Application

FurseCEM™ conductive concrete may be used to reduce the contact resistance and increase the effective size of earth electrodes, e.g. as a backfill for earth rods installed in drilled holes or as a layer encapsulating horizontal earth conductors buried in a trench.

The backfill will help reduce an earth electrodes' resistance to earth by making intimate contact with the electrode and the surrounding soil, this has the added advantage of helping to protect the electrode from corrosion.

In addition, the conductive concrete may be used in other applications such as screening, conductive or anti-static flooring and in building foundations as a permanent electrode.

Compared to metals, the volume resistivity of conductive concrete is high and can range from 0.5 Ohm cm or lower for pre-formed sections cured under pressure to 20 Ohm cm for troweled floor screeds.

Installation Procedure - Borehole

For the installation of a rod in a borehole the following procedure is recommended. See Figure 1.

1. Boreholes are made at the desired rod location of 75 - 100 mm (3 - 4 inches) diameter. The depth of the bore hole should be determined by the designer of the earthing system.
2. Insert the earth rod into the borehole. Ensure that the top of the earth rod is at the correct level for its connection.
3. Backfill the borehole with a FurseCEM™/cement slurry. Regular agitation of the earth rod should ensure that no voids are formed within the backfill.
4. Remove any standing water from the top of the borehole.
5. Make final connections to the earth rod and make good i.e. Fit an inspection chamber.

Installation Procedure - Trench

For the installation of a strip conductor in a trench the following procedure is recommended. See Figure 2.

1. Dig a trench at the desired strip electrode location of 200 - 300 mm (8 - 12 inches) wide. The depth of the trench (typically 600 mm) should be determined by the designer of the earthing system.
2. Cover the bottom of the trench with a stiff mix of FurseCEM™/cement 25 - 50 mm (1 - 2 inches) thick. Lay the earth strip into the trench. Ensure that the strip electrode is not depressed too far into the FurseCEM™.
3. Apply another layer of FurseCEM™/cement 25 - 50 mm (1 - 2 inches) thick. Ensure that the strip electrode is fully covered.
4. Carefully backfill and compact the remainder of the trench.

Mixing Procedure

The FurseCEM™/cement/water ratios necessary for a particular application will depend on the workability and compressive strength required of the conductive concrete. A typical specification would be 3:1 by weight e.g.

$$\begin{aligned} & 975 \text{ kg (39 bags) FurseCEM™} \\ & + 325 \text{ kg (13 bags) Cement} \\ & + 250 \text{ l to 300 l of Water} \\ & = 1 \text{ m}^3 \text{ of conductive concrete} \end{aligned}$$

The mixing and placing of the concrete conforms to normal practices

Example: To backfill 10 no. Earth rods in 3.6 m deep, 0.1 m diameter boreholes will require the following quantity of FurseCEM™:



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$$\begin{aligned} \text{Volume of boreholes} &= 10 \times \pi r^2 \times h \\ &= 10 \times \pi \times 0.05^2 \times 3.6 \\ &= 0.28 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Number of bags of FurseCEM™} &= 0.28 \times 39 = 11 \text{ bags} \\ \text{Number of bags of Cement} &= 0.28 \times 13 = 3.6 \text{ bags} \end{aligned}$$

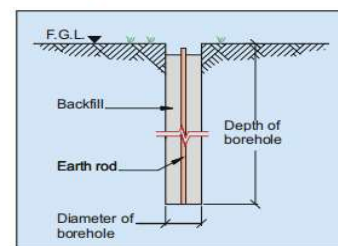


Figure 1.

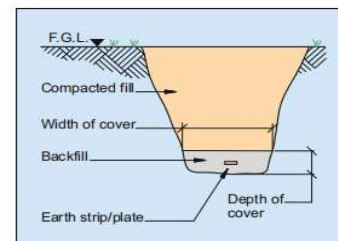


Figure 2.

Ordering information

Description	Weight	Part No.
FurseCEM™	25 kg	CM025
FurseCEM™ (with cement)	25 kg	CM030

Thomas & Betts

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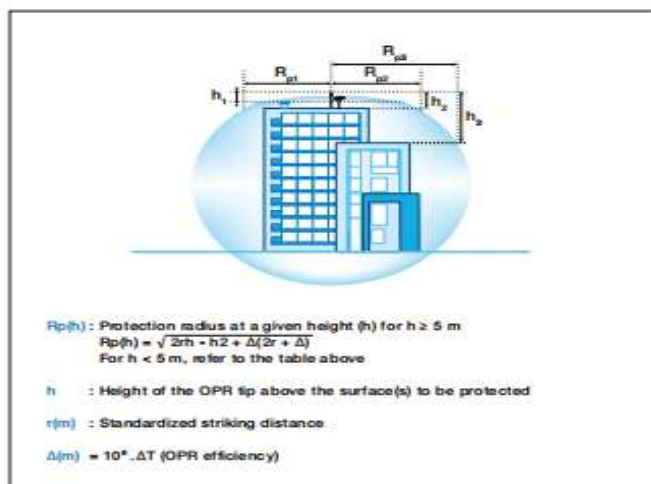
Lightning air terminal range Early Streamer Emission Air Terminal - ESEAT

Calculating protected areas

The radius of protection R_p of an OPR is given by French standard NF C 17-102 (September 2011 edition).

It depends on the ESEAT efficiency ΔT of the OPR measured in the high voltage laboratory, on the levels of protection I, II, III or IV calculated according to the lightning risk assessment guides or standards (NF C 17-102 annex A or IEC 62305-2, guides UTE C 17-100-2 or UTE C 17-108) and on the height h of the lightning air terminal over the area to be protected (minimum height = 2 m).

The protection radius is calculated according to Annex C in French standard NF C 17-102. For OPR 60, limiting the value of ΔT used in the protection radius calculations to 60 μs (limited 60 μs in accordance with the paragraph 5.2.2 of the NF C 17-102 standard).



	LPL I	LPL II	LPL III	LPL IV
Rolling sphere radius $r(m)$	20	30	45	60

OPR radius of protection

Level of protection	I ($r = 20$ m)			II ($r = 30$ m)			III ($r = 45$ m)			IV ($r = 60$ m)		
Type	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60
h (m)	Radius of protection R_p (m)											
2	19	25	31	22	28	35	25	32	39	28	36	43
3	29	38	47	33	42	52	38	48	58	43	57	64
4	38	51	63	44	57	69	51	65	78	57	72	85
5	48	63	79	55	71	86	63	81	97	71	89	107
6	48	63	79	55	71	86	64	81	97	72	90	107
8	49	64	79	56	72	87	65	82	98	73	91	108
10	49	64	79	57	72	88	66	83	99	75	92	109
15	50	65	80	58	73	89	69	85	101	78	95	111
20	50	65	80	59	74	89	71	86	102	81	97	113
45	43	65	76	58	75	89	75	90	105	89	104	119
50	40	65	74	57	75	88	75	90	105	89	104	120
55	36	65	72	55	75	86	74	90	105	90	105	120
60	30	65	69	52	75	85	73	90	104	90	105	120

Note: the optimized radius of protection is reached when placing the ESE lightning conductor at 5 m above the highest point of the structure to protect. A minimum of 2 m is a must.