

UsefullInformationforBS7671:2008ElectricalFormfilling

Cutoutfuses

B.S.	Type	PSCC
BS1361	TypeI	16.5kA
BS1361	TypeII	33.0kA
BS88	Part6	16.5kA

MaximumZ_evalues supplied by RECs

System	Max.
TN-C-S	0.35Ω
TN-S	0.8 Ω
TT	21 Ω

Estimation of PSCC / Ze at intake (origin)

Length of supply cable (m)	16mm ² copper		25mm ² copper	
	PSCC (kA)	Ze (Ω)	PSCC (kA)	Ze (Ω)
5	10	0.02	12	0.02
10	7.8	0.03	9.3	0.025
15	6.0	0.04	7.4	0.03
20	4.9	0.05	6.2	0.04
25	4.1	0.06	5.3	0.045
30	3.5	0.07	4.6	0.05
40	2.7	0.09	3.6	0.07

30mA RCD Maximum tripping times and Z_s values at U_o of 230V

Type	×1	×5	Z _s
BSEN 61008 BSEN 61009	≤300ms (0.3s)	≤40ms (0.04s)	1667 Ω
BSEN 61008 delay S BSEN 61009 delay S	130-500ms (0.13-0.5s)	40-150ms (0.04-0.15s)	

BS and BS(EN) numbers for switchgear

ITEM DESCRIPTION	DESIGNATION
Isolator (Main switch)	BSEN 60947-3
RCD (Residual Current Device)	BSEN 61008
RCBO (Residual Current Circuit Breaker with Overcurrent Protection)	BSEN 61009
MCB (Miniature Circuit Breaker)	BSEN 60898 (B, C & D)

Continuity of Main Equipotential Bonding Conductors

Length Cable	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
6mm ²	0.02Ω	0.03Ω	0.05Ω	0.06Ω	0.08Ω	0.09Ω	0.11Ω	0.13Ω	0.14Ω	0.16
10mm ²	0.01Ω	0.02Ω	0.03Ω	0.04Ω	0.05Ω	0.06Ω	0.06Ω	0.07Ω	0.08Ω	0.09Ω

R₁ + R₂ values reproduced from Table 10.1 On-Site Guide

Values for the most commonly used Twin & Earth per metre are (from OSG Table 10.1):

Cable	1m	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
1.0/1.0	0.036	0.18Ω	0.36Ω	0.54Ω	0.72Ω	0.9Ω	1.09Ω	1.27Ω	1.45Ω	1.63Ω	1.81Ω
2.5/1.5	0.02Ω	0.10Ω	0.20Ω	0.30Ω	0.39Ω	0.49Ω	0.59Ω	0.68Ω	0.78Ω	0.88Ω	0.98Ω
4.0/1.5	0.017	0.08Ω	0.17Ω	0.25Ω	0.33Ω	0.42Ω	0.50Ω	0.58Ω	0.67Ω	0.75Ω	0.84Ω
6.0/2.5	0.01Ω	0.05Ω	0.1Ω	0.15Ω	0.21Ω	0.26Ω	0.31Ω	0.37Ω	0.42Ω	0.47Ω	0.52Ω
10/4.0	0.006	0.03Ω	0.06Ω	0.09Ω	0.13Ω	0.16Ω	0.19Ω	0.22Ω	0.26Ω	0.29Ω	0.32Ω

R₁ + R₂ values for SWA cables (Single phase application see gsub-mains)

2 core SWA (Steel Armouring used as CPC)						3 core SWA (Third core used as CPC)					
Cable	5m	10m	15m	20m	25m	Cable	5m	10m	15m	20m	25m
1.5	0.11Ω	0.23Ω	0.34Ω	0.46Ω	0.57Ω	1.5	0.12Ω	0.24Ω	0.36Ω	0.48Ω	0.61Ω
2.5	0.08Ω	0.16Ω	0.25Ω	0.33Ω	0.41Ω	2.5	0.07Ω	0.15Ω	0.22Ω	0.30Ω	0.37Ω
4.0	0.06Ω	0.12Ω	0.18Ω	0.24Ω	0.30Ω	4.0	0.05Ω	0.09Ω	0.14Ω	0.18Ω	0.23Ω
6.0	0.05Ω	0.10Ω	0.15Ω	0.20Ω	0.25Ω	6.0	0.03Ω	0.06Ω	0.09Ω	0.12Ω	0.15Ω
10.0	0.03Ω	0.07Ω	0.10Ω	0.13Ω	0.17Ω	10.0	0.02Ω	0.04Ω	0.05Ω	0.07Ω	0.09Ω

Maximum Permissible Values (in Ω) of Loop Impedance (Z_s) as permitted by BS7671:2008

Protective device (MCB/Fuse)	Disconnection time (s)	Rating of Protective Device															
		5A	6A	10	15A	16A	20A	25A	30A	32A	40A	45A	50A	60A	63A	80A	100A
BSEN60898 Type B	0.4&5	9.20	7.67	4.60	3.07	2.87	2.30	1.84	1.60	1.44	1.15	1.03	0.92		0.73	0.57	0.46
BSEN60898 Type C	0.4&5		3.83	2.30		1.44	1.15	0.92		0.72	0.57		0.46		0.36	0.29	0.23
BSEN60898 Type D	0.4&5		1.92	1.15		0.72	0.57	0.46		0.36	0.29		0.23		0.18	0.14	0.11
BS 1361 Cartridge Fuse	0.4	10.45			3.28		1.70		1.15			0.60					
	5	16.4			5.00		2.80	0.96	1.84	0.70		0.96		0.70		0.50	0.36
BS 88-2, BS88-6 HBC fuse	0.4		8.52	5.11		2.70	1.77	1.44		1.04	0.82		0.60				
	5		13.5	7.42		4.18	2.91	2.30		1.84	1.35		1.04		0.82	0.57	0.42

Note: BSEN60898 MCB values also relate to BSEN61009 RCBOs

Maximum Values of Loop Impedance (Z_s) for comparison with test readings based on 80% of maximum values above (as per Appendix 14)

Protective device (MCB/Fuse)	Disconnection time (s)	Rating of Protective Device															
		5A	6A	10	15A	16A	20A	25A	30A	32A	40A	45A	50A	60A	63A	80A	100A
BSEN60898 Type B	0.4&5	7.36	6.14	3.68	2.46	2.30	1.84	1.47	1.28	1.15	0.92	0.82	0.74		0.58	0.46	0.37
BSEN60898 Type C	0.4&5		3.06	1.84		1.15	0.92	0.74		0.58	0.46		0.37		0.29	0.23	0.18
BSEN60898 Type D	0.4&5		1.54	0.92		0.58	0.46	0.37		0.29	0.23		0.18		0.14	0.11	0.09
BS 1361 Cartridge Fuse	0.4	8.36			2.62		1.36		0.92			0.48					
	5	13.12			4.00		2.24	0.77	1.47	0.56		0.77		0.56		0.40	0.29
BS 88 HBC fuse	0.4		6.82	4.09		2.16	1.42	1.15		0.83	0.66		0.48				
	5		10.8	5.94		3.34	2.33	1.84		1.47	1.08		0.83		0.66	0.46	0.34

Note: BSEN60898 MCB values also relate to BSEN61009 RCBOs

Maximum Values of Loop Impedance (Z_s) for 110v (U_0 of 55v), e.g. reduced low voltage systems

Protective device (MCB/Fuse)	Disconnection Time-	Rating of Protective Device															
		5A	6A	10	15A	16A	20A	25A	30A	32A	40A	45A	50A	60A	63A	80A	100A
BSEN60898 Type B	5	7.36	1.83	1.10		0.69	0.55	0.44		0.34	0.28		0.22		0.17	0.14	0.11
BSEN60898 Type C	5		0.92	0.55		0.34	0.28	0.22		0.17	0.14		0.11		0.09	0.07	0.05
BSEN60898 Type D	5		0.47	0.28		0.18	0.14	0.11		0.09	0.07		0.06		0.04	0.04	0.03
BS 88-2.2, 88-6 fuse	5		3.20	1.77		1.00	0.69	0.55		0.44	0.32		0.25		0.20	0.14	0.10

Note: BSEN60898 MCB values also relate to BSEN61009 RCBOs

Maximum Values of Loop Impedance (Z_s) for 110v, for comparison with test readings based on 80% of maximum values above.

Protective device (MCB/Fuse)	Disconnection Time-	Rating of Protective Device															
		5A	6A	10	15A	16A	20A	25A	30A	32A	40A	45A	50A	60A	63A	80A	100A
BSEN60898 Type B	5	7.36	1.83	1.10		0.69	0.55	0.44		0.34	0.28		0.22		0.17	0.14	0.11
BSEN60898 Type C	5		0.92	0.55		0.34	0.28	0.22		0.17	0.14		0.11		0.09	0.07	0.05
BSEN60898 Type D	5		0.47	0.28		0.18	0.14	0.11		0.09	0.07		0.06		0.04	0.04	0.03
BS 88-2.2, 88-6 fuse	5		3.20	1.77		1.00	0.69	0.55		0.44	0.32		0.25		0.20	0.14	0.10

CODES FOR TYPES OF WIRING								
A	B	C	D	E	F	G	H	O (other please state)
PVC/PVC CABLES	PVC CABLES IN METALLIC CONDUIT	PVC CABLES IN NON-METALIC CONDUIT	PVC CABLES IN METALIC TRUNKING	PVC CABLES IN NON-METALIC TRUNKING	PVC/SWA CABLES	XLPE/SWA CABLES	MINERAL-INSULATED CABLES	

CODES FOR REFERENCE METHOD								
A	B	C	D	100	101	102	103	
Singles or multi core cables run in a conduit buried in insulation	<p>Surface mini Trunking.</p> <p>Run under floor boards if NO insulation.</p> <p>Running down in or on a brick wall in conduit</p> <p>Running down in cavity wall with no insulation. With or without conduit</p>	<p>Clipped to a wall or ceiling.</p> <p>Buried direct in plaster.</p> <p>SWA running down wall.</p>	SWA buried in the ground.	100, under thermal insulation less than 100mm	101, under thermal insulation greater than 100mm	102, in a stud wall with cable at the edge's and full of insulation	103, in a stud wall with cable running through the middle of the insulation.	

Twin and Earth L-N Conductors MM	Twin and Earth CPC Conductors MM	Rating A
1	1	14
1.5	1	18
2.5	1.5	24
4.0	1.5	32
6.0	2.5	40
10	4.0	53
16	6.0	70

SWA L-N-E Conductors MM	SWA Cable Type	Rating A
1.5	6942X 2 core	27
2.5	6942X 2 core	36
4.0	6942X 2 core	49
6.0	6942X 2 core	62
10	6942X 2 core	85
16	6942X 2 core	110
1.5	6943X 3 core	23
2.5	6943X 3 core	31
4.0	6943X 3 core	42
6.0	6943X 3 core	53
10	6943X 3 core	73
16	6943X 3 core	94
1.5	6944X 4 core	23
2.5	6944X 4 core	31
4.0	6944X 4 core	42
6.0	6944X 4 core	53
10	6944X 4 core	73
16	6944X 4 core	94

Type:	Description:	Short Circuit Capacity kA
BS 3036	(Rewireable Fuses)	1. S1A - 1kA, 2. S2A - 2kA, 3. S4A - 4kA
BS 1361 Type I	Cartridge Fuses (Consumer Unit Type)	16.5
BS 1361 Type II	Cartridge Fuses (Consumer Unit Type)	33
BS 1363	Plug Top Fuses	2
BS 88	Cartridge Fuses (General purpose)	16.5
BS EN 60898	Miniature Circuit Breakers	3-6 (check label)
BS 3871	Miniature Circuit Breaker (Old Style)	2-5
BS EN 60947-3	Main Isolators	65
BS EN 61008	Main RCDs	6-15 (check label)
BS EN 61009 1	RCBOs	3-6 (check label)
BS 7288	RCD Sockets	n/a