المدونات العالمية والمواصفات العراقية والهندسة

قسم هندسة القدرة والمكائن الكهربائية

مقدمـــــــــــةعن المدونات والمواصفات العالمية 1- BS STD

Editions

The following editions have been published:

FIRST EDITION	Entitled 'Rules and Regulations for the Prevention of Fire Risks Arising from Electric Lighting'. Issued in 1882.
SECOND EDITION	Issued in 1888.
THIRD EDITION	Entitled 'General Rules recommended for Wiring for the Supply of Electrical Energy'. Issued in 1897.
FOURTH EDITION	Issued in 1903.
FIFTH EDITION	Entitled 'Wiring Rules'. Issued in 1907.
SIXTH EDITION	Issued in 1911.
SEVENTH EDITION	Issued in 1916.
EIGHTH EDITION	Entitled 'Regulations for the Electrical Equipment of Buildings'. Issued in 1924.
NINTH EDITION	Issued in 1927.
TENTH EDITION	Issued in 1934.
ELEVENTH EDITION	Issued in 1939. Revised, issued in 1943. Reprinted with minor Amendments, 1945. Supplement issued, 1946. Revised Section 8 issued, 1948.
TWELFTH EDITION	Issued in 1950. Supplement issued, 1954.
THIRTEENTH EDITION	Issued in 1955. Reprinted 1958, 1961, 1962 and 1964.
FOURTEENTH EDITION	Issued in 1966. Reprinted incorporating Amendments, 1968. Reprinted incorporating Amendments, 1969. Supplement on use in metric terms issued, 1969. Amendments issued, 1970. Reprinted in metric units incorporating Amendments, 1970.

1- BS STD

BRITISH STANDARD

BS 7671:2008

incorporating
Amendment
No 1: 2011

Requirements for Electrical Installations

American National Standards Institute (ANSI)

has served in its capacity as administrator and coordinator of the United States private sector voluntary standardization system for more than 90 years. Founded in 1918 by five engineering societies and three government agencies, the Institute remains a private, nonprofit membership organization supported by a diverse constituency of private and public sector organizations.

History of American Concrete Institute (A

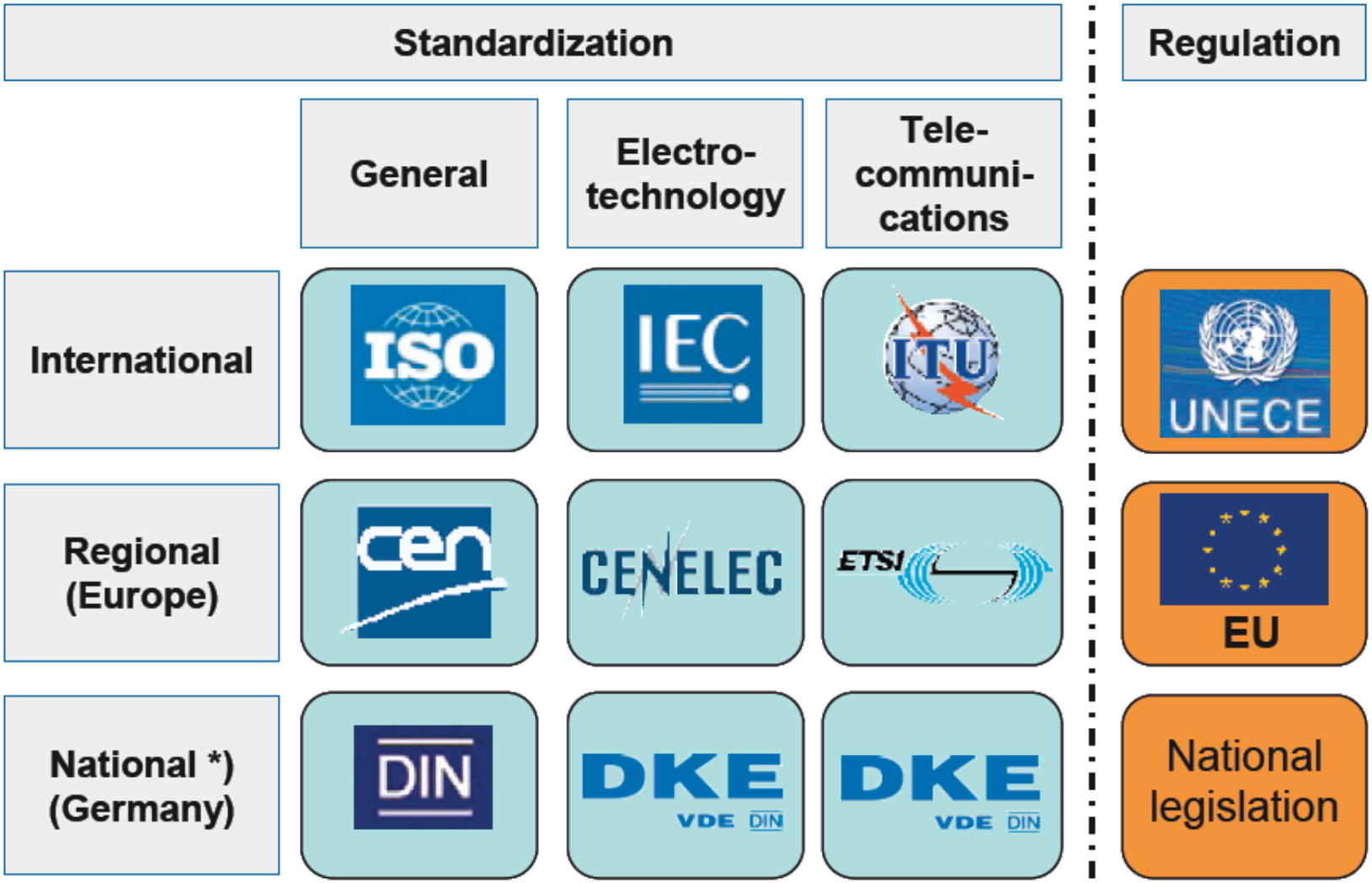
Founded in 1904 and headquartered in Farmington Hills, MI, the American Concrete Institute (ACI) is a leading authority and resource worldwide for the development and distribution of consensus-based standards, technical resources, educational & training programs, certification programs, and proven expertise for individuals and

1019-1991 - IEEE Recommended Practice for Specifying Electric Submersible Pump Cable - Polypropylene Insulation

Status: Inactive - Superseded

IEEE Iraq Section

German National Standards



*) Other national organizations outside Germany include SAE, ANSI/UL International, etc.

STD IN INDUSTRY

1 Standards

COUNTRY	Symbol	Mark designation	Applicability/Organization
GERMANY		VDE Mark	For appliances and technical equipment, installation accessories such as plugs, sockets, fuses, wires and cables, as well as other components (capacitors, earthing systems, lamp holders and electronic devices)
GERMANY		VDE Identification Thread	Cables and cords
GERMANY		VDE Cable Mark	For cables, insulated cords, installation conduits and ducts
GERMANY		VDE-GS Mark for technical equipment	Safety mark for technical equipment to be affixed after the product has been tested and certified by the VDE Test Laboratory in Offenbach; the conformity mark is the mark VDE, which is granted both to be used alone as well as in combination with the mark GS
HUNGARY		MEEI	Hungarian Institute for Testing and Certification of Electrical Equipment
JAPAN		JIS Mark	Mark which guarantees compliance with the relevant Japanese Industrial Standard(s).
IRELAND		IIRS Mark	Electrical equipment
IRELAND		IIRS Mark	Electrical equipment

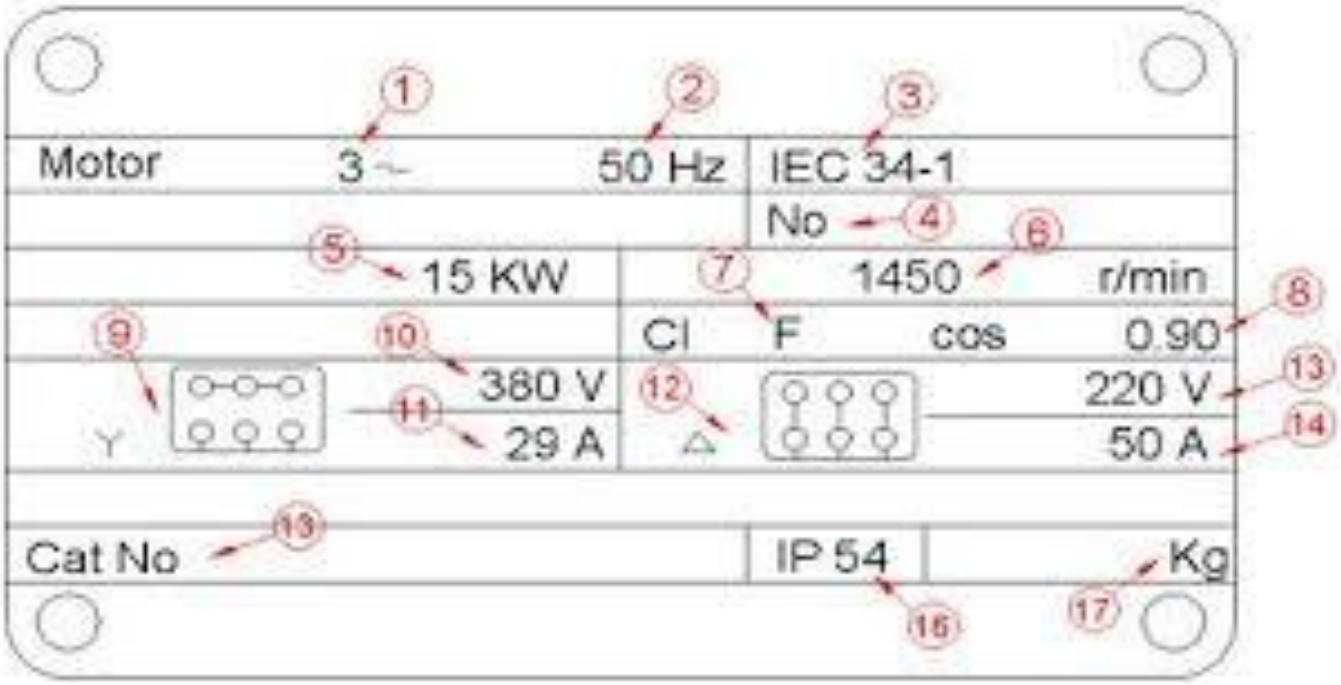
1 Standards

STANDARD	YEAR	TITLE
IEC 60079-10	2002	Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas
IEC 60079-14	2002	Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines)
IEC 60079-17	2002	Electrical apparatus for explosive gas atmospheres - Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines)
IEC 60269-1	1998	Low-voltage fuses - Part 1: General requirements
IEC 60269-2	1986	Low-voltage fuses. Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application)
IEC 60269-3-1	2004	Low-voltage fuses - Part 3-1: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) - Sections I to IV: Examples of types of standardized fuses

http://www.codat.imariskan.gov.iq/aboutus.php

الهندسة : العملي والنظري وحكاية السنافر

واقع مرير يحتاج وقفة



CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30 °C
Conductor operating temperature: 90 °C

Conductor cross-sectional area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray etc horizontal or vertical etc) Touching			Reference Method G (in free air) Spaced by one cable diameter	
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat	3 cables, three-phase a.c. flat	3 cables, three-phase a.c trefoil	2 cables, single-phase a.c. or d.c. or 3 cables three-phase a.c. flat	
										Horizontal	Vertical
1	2	3	4	5	6	7	8	9	10	11	12
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	14	13	17	15	19	17.5	-	-	-	-	-
1.5	19	17	23	20	25	23	-	-	-	-	-
2.5	26	23	31	28	34	31	-	-	-	-	-
4	35	31	42	37	46	41	-	-	-	-	-
6	45	40	54	48	59	54	-	-	-	-	-
10	61	54	75	66	81	74	-	-	-	-	-
16	81	73	100	88	109	99	-	-	-	-	-
25	106	95	133	117	143	130	161	141	135	182	161
35	131	117	164	144	176	161	200	176	169	226	201
50	158	141	198	175	228	209	242	216	207	275	246

النتيجة : تماس كهربائي وحريق

1-ممكن راح بيها مهندسنا
او احد العاملين
2- خسائر فادحة وتقيد ضد مجهول
3- اتهامات احيانا باطلة لجهات معينة
4- والحقيقة التصميم فاشل

لمحة عن طريقة التصميم

. Design Procedure Step by Step

1. Determine the design current Ib .
2. Select the rating of the protection In .
3. Select the relevant rating factors (CFs).

4. Divide In by the relevant CFs to give tabulated cable current carrying capacity It .
5. Choose a cable size to suit It .
6. Check the voltage drop.
7. Check for shock risk constraints.
8. Check for thermal constraints

2-SELECT THE RATING OF THE PROTECTION IN

(for RCBOs see also Regulation 411.4.9)

(a) Type B circuit-breakers to BS EN 60898 and the overcurrent characteristics of RCBOs to BS EN 61009-1

Rating (amperes)	3	6	10	16	20	25	32	40	50	63	80	100	125	I_n
Z_s (ohms)	15.33	7.67	4.60	2.87	2.30	1.84	1.44	1.15	0.92	0.73	0.57	0.46	0.37	$46/I_n$

(b) Type C circuit-breakers to BS EN 60898 and the overcurrent characteristics of RCBOs to BS EN 61009-1

Rating (amperes)	6	10	16	20	25	32	40	50	63	80	100	125	I_n
Z_s (ohms)	3.83	2.30	1.44	1.15	0.92	0.72	0.57	0.46	0.36	0.29	0.23	0.18	$23/I_n$

(c) Type D circuit-breakers to BS EN 60898 and the overcurrent characteristics of RCBOs to BS EN 61009-1

Rating (amperes)	6	10	16	20	25	32	40	50	63	80	100	125	I_n
Z_s (ohms)	1.92	1.15	0.72	0.57	0.46	0.36	0.29	0.23	0.18	0.14	0.11	0.09	$11.5/I_n$

3- CORRECTION FACTORS

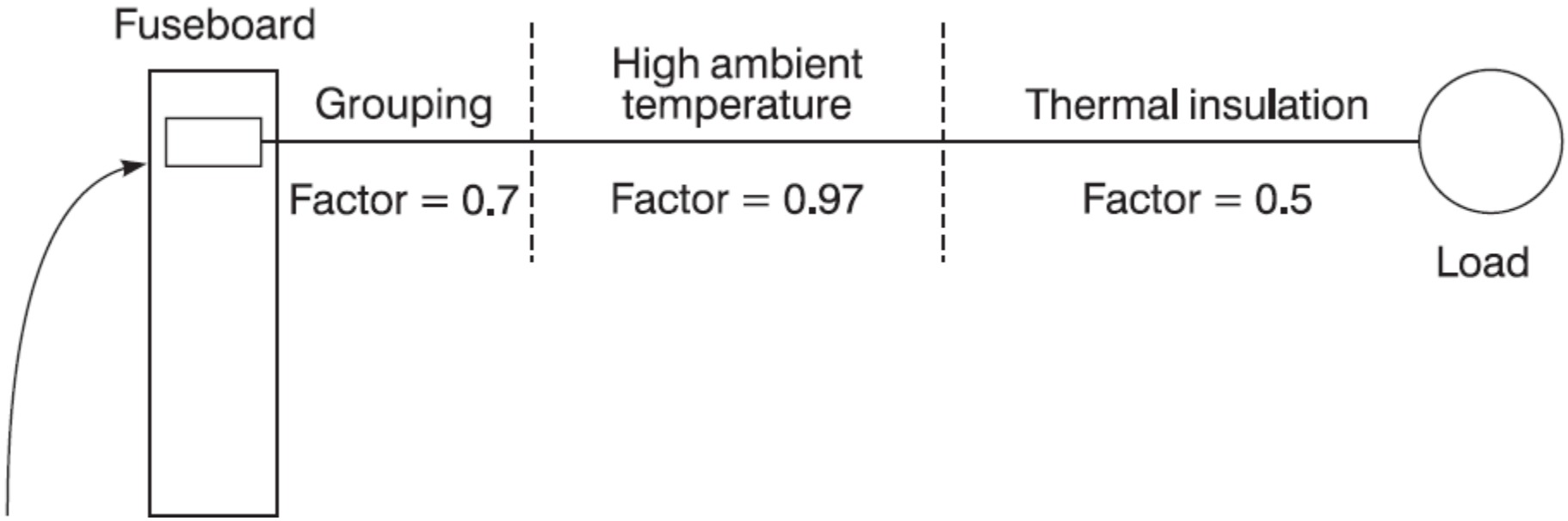


TABLE 4B1 – Rating factors (C_a) for ambient air temperatures other than 30 °C

Ambient temperature [a] °C	Insulation				
	60 °C thermosetting	70 °C thermoplastic	90 °C thermosetting	Mineral [a]	
				Thermoplastic covered or bare and exposed to touch 70 °C	Bare and not exposed to touch 105 °C
25	1.04	1.03	1.02	1.07	1.04
30	1.00	1.00	1.00	1.00	1.00
35	0.91	0.94	0.96	0.93	0.96
40	0.82	0.87	0.91	0.85	0.92
45	0.71	0.79	0.87	0.78	0.88
50	0.58	0.71	0.82	0.67	0.84
55	0.41	0.61	0.76	0.57	0.80

TABLE 4C1 – Rating factors for one circuit or one multicore cable or for a group of circuits, or a group of multicore cables, to be used with current-carrying capacities of Tables 4D1A to 4J4A

Item	Arrangement (cables touching)	Number of circuits or multicore cables											To be used with current-carrying capacities, Reference Method
		1	2	3	4	5	6	7	8	9	12	16	20	
1.	Bunched in air, on a surface, embedded or enclosed	1.00	0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.45	0.41	0.38	A to F
2.	Single layer on wall or floor	1.00	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	0.70	0.70	0.70	C
	Single layer													

4- APPLY CORRECTION FACTORS

Tabulated conductor current carrying capacity I_t

$$I_t \geqslant \frac{I_n}{C_a \times C_g \times C_f \times C_i}$$

5- SELECT CABLE SIZE

6- VOLTAGE DROP

$$\text{Volt drop} = \frac{\text{mV} \times I_b \times \text{length voltss}}{1000}$$

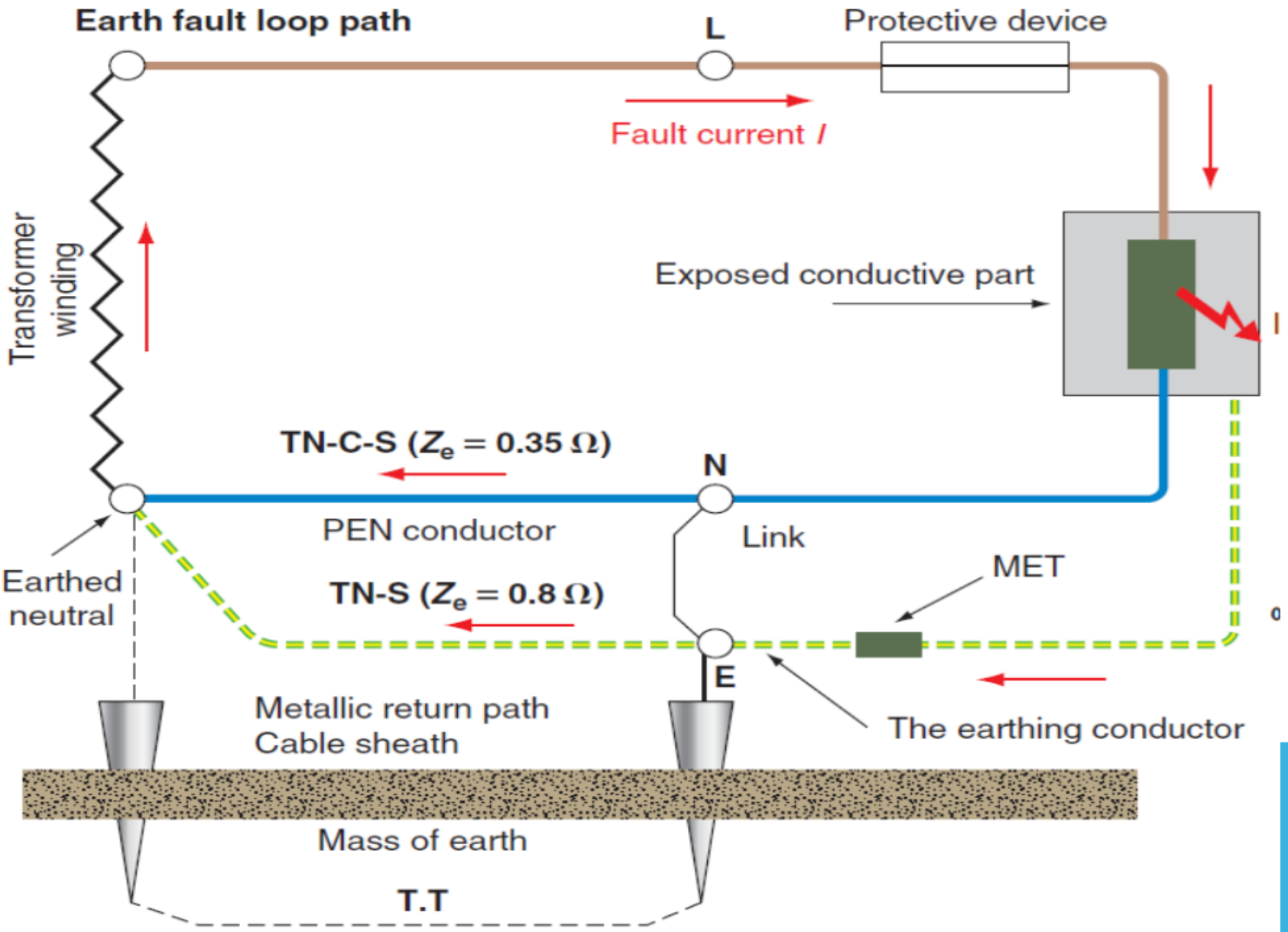
VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70 °C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.											
		Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C & F (clipped direct, on tray or in free air)						Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C & F (clipped direct, on tray or in free air),					
					Cables touching			Cables spaced*						Cables touching, Trefoil			Cables touching, Flat			Cables spaced*, Flat		
1	2	3			4			5			6			7			8			9		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	44	44			44			44			38			38			38			38		
1.5	29	29			29			29			25			25			25			25		
2.5	18	18			18			18			15			15			15			15		
4	11	11			11			11			9.5			9.5			9.5			9.5		
6	7.3	7.3			7.3			7.3			6.4			6.4			6.4			6.4		
10	4.4	4.4			4.4			4.4			3.8			3.8			3.8			3.8		
16	2.8	2.8			2.8			2.8			2.4			2.4			2.4			2.4		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
25	1.75	1.80	0.33	1.80	1.75	0.20	1.75	1.75	0.29	1.80	1.50	0.29	1.55	1.50	0.175	1.50	1.50	0.25	1.55	1.50	0.32	1.55
35	1.25	1.30	0.31	1.30	1.25	0.195	1.25	1.25	0.28	1.30	1.10	0.27	1.10	1.10	0.170	1.10	1.10	0.24	1.10	1.10	0.32	1.15
50	0.93	0.95	0.30	1.00	0.93	0.190	0.95	0.93	0.28	0.97	0.81	0.26	0.85	0.80	0.165	0.82	0.80	0.24	0.84	0.80	0.32	0.86
70	0.63	0.65	0.29	0.72	0.63	0.185	0.66	0.63	0.27	0.69	0.56	0.25	0.61	0.55	0.160	0.57	0.55	0.24	0.60	0.55	0.31	0.63
95	0.46	0.49	0.28	0.56	0.47	0.180	0.50	0.47	0.27	0.54	0.42	0.24	0.48	0.41	0.155	0.43	0.41	0.23	0.47	0.40	0.31	0.51

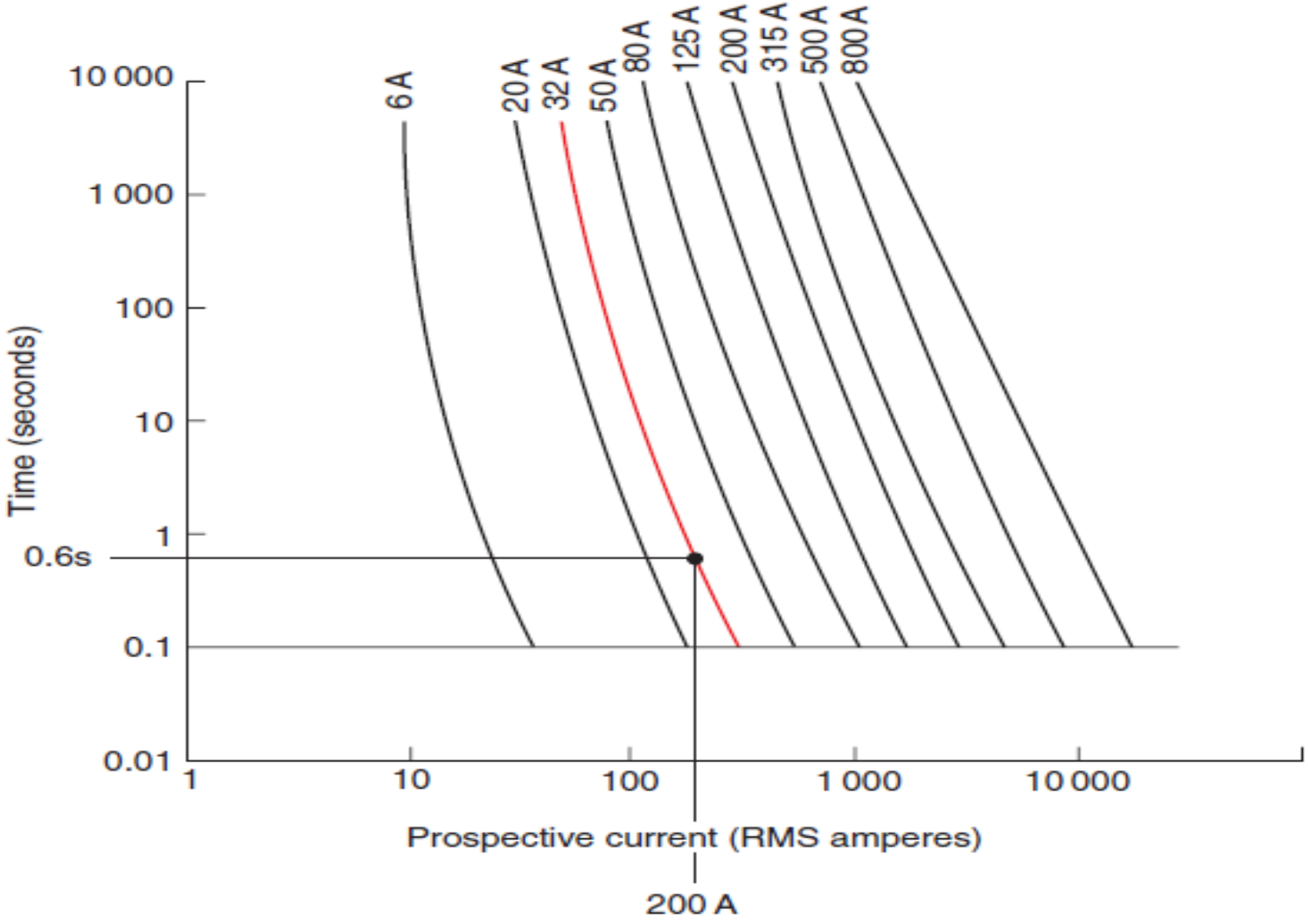
7- CHECK FOR SHOCK RISK CONSTRAINT

Remember Zs = Ze + R1 +R2. ,

(a) Type B circuit-breakers to BS EN 60898 and the overcurrent characteristics of RCBOs to BS EN 61009-1														
Rating (amperes)	3	6	10	16	20	25	32	40	50	63	80	100	125	I_n
Z_s (ohms)	15.33	7.67	4.60	2.87	2.30	1.84	1.44	1.15	0.92	0.73	0.57	0.46	0.37	$46/I_n$
(b) Type C circuit-breakers to BS EN 60898 and the overcurrent characteristics of RCBOs to BS EN 61009-1														


Earth fault loop path
L
Protective device
Fault current I
Transformer winding
Exposed conductive part
I
TN-C-S ($Z_e = 0.35\ \Omega$)
N
PEN conductor
Link
Earthed neutral
TN-S ($Z_e = 0.8\ \Omega$)
MET
E
Metallic return path
Cable sheath
The earthing conductor
Mass of earth
T.T

8- CHECK FOR THERMAL CONSTRAINTS



$$s = \frac{\sqrt{I^2 t}}{k}$$

where: s = minimum csa of the CPC
I = fault current
t = disconnection time in seconds
k = factor taken from IEE Regulations Tables 54B to 54F

THANK YOU