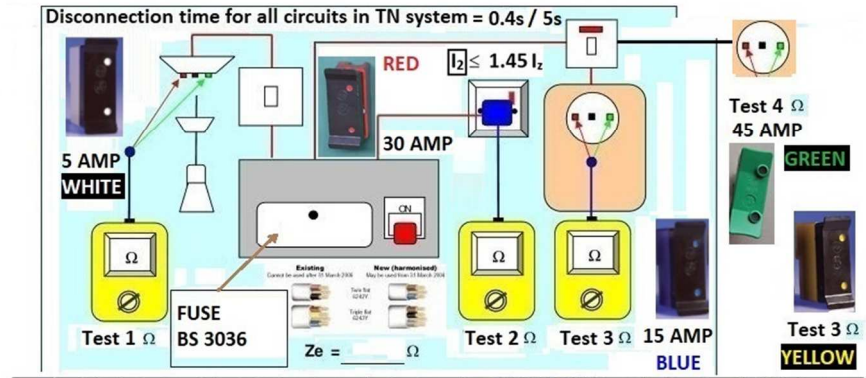
EFLI

(5 to 45 Amp BS 3036 FUSE)



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

$I_2 \leq 1.45 \times I_z$ **>>Overload Conditions** $I_B \leq I_n \leq I_z$

$I_B \leq I_n \leq I_t \leq I_z$ $I_n \leq 0.725\, I_z$

U_0 is the nominal a.c. rms line voltage to Earth.

I_a is the current causing operation of the protective device within the specified time.

The results given below have been obtained from circuits in a domestic installation.

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

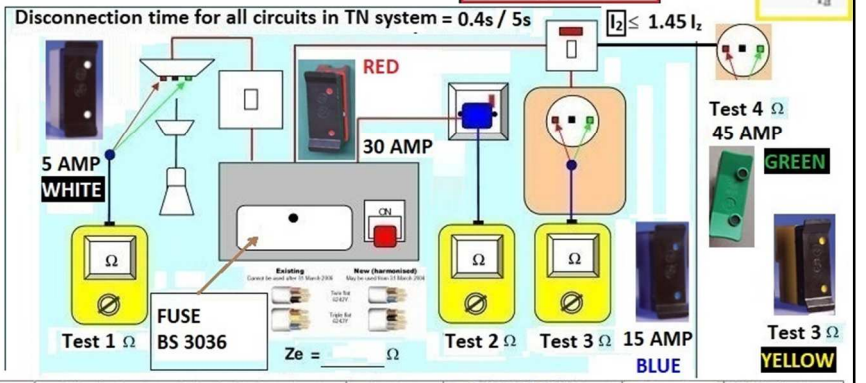
I_2 is the... I_n x 2 fusing current of a device within conventional time

To satisfy the fact that rewirables have a fusing factor up to 2 times

Fusing Current = Fusing Factor x Fuse Rating $\therefore\ I_n \leq \frac{1.45}{2} \times I_z \leq 0.725\, I_z$

Rated current of fuse elements (A)	Nominal diameter of wire (mm)
3	0.15
5	0.2
10	0.35
15	0.5
20	0.6
25	0.75
30	0.85
45	1.25

$Z_s = \frac{U_0}{I_a}$



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

EFLI

(5 to 45 Amp BS 3036 FUSE)

1997 16th Edition (1992 +Amd 2 1997) C & G 2391 - EFLI
MCB + RCBO (0.4 or 5 seconds disconnection time) (Zs)

$I_n \leq 0.725\ I_z$

U_0 is the nominal a.c. rms line voltage to Earth.

I_a is the current causing operation of the protective device within the specified time.

The results given below have been obtained from circuits in a domestic installation.

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

To satisfy the fact that rewirables have a fusing factor up to 2 times

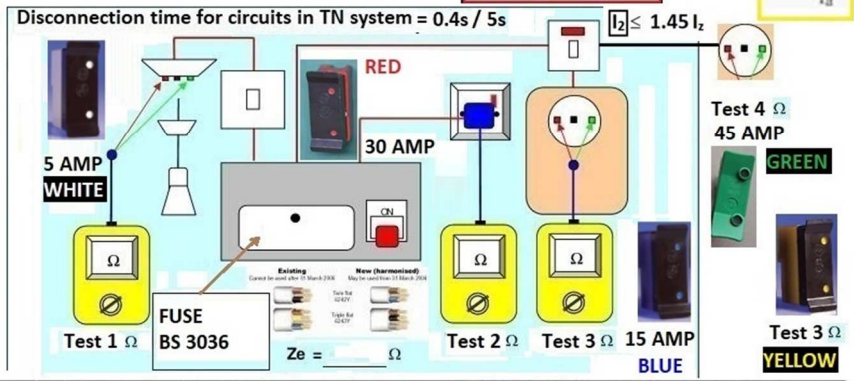
I_2 is the... I_n x 2 fusing current of a device within conventional time

Fusing Current = Fusing Factor x Fuse Rating

$\therefore\ I_n \leq \frac{1.45}{2} \times I_z \leq 0.725\ I_z$

$Z_s = \frac{U_0}{I_a}$

Rated current of fuse elements (A)	Nominal diameter of wire (mm)
3	0.15
5	0.2
10	0.35
15	0.5
20	0.6
25	0.75
30	0.85
45	1.25



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

BS7671 16th EDITION (No.1 2002 + No. 2 2004) (BROWN BOOK) C & G 2391 - EFLI (Zs)
MCB + RCBO (0.4 or 5 seconds disconnection time)

$U_{oc} = 240$ V

U_{oc} is the open circuit voltage at the distribution transformer.

I_a is the current causing operation of the protective device within the specified time.

$Z_s = \frac{U_{oc}}{I_a}$

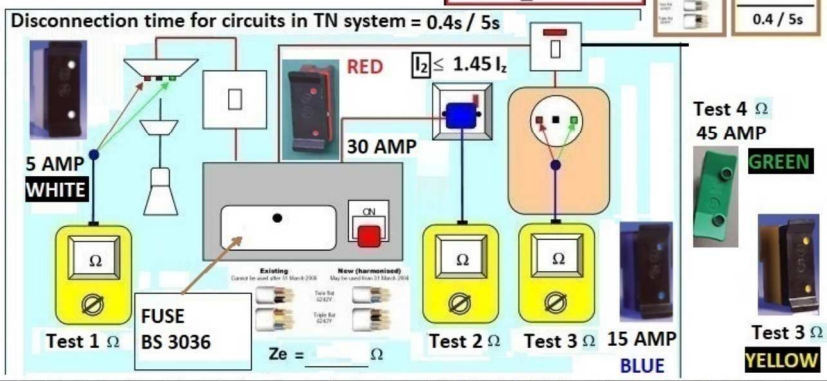
The results given below have been obtained from circuits in a domestic installation.

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

Fusing Current = Fusing Factor x Fuse Rating

$\therefore\ I_n \leq \frac{1.45}{2} \times I_z \leq 0.725\ I_z$

U_{oc} 240V AC 0.4 / 5s



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

EFLI

(5 to 45 Amp BS 3036 FUSE)

2008 BS7671 17th EDITION (RED BOOK) C & G 2391 - EFLI

MCB + RCBO (0.4 or 5 seconds disconnection time) (Zs)

$Z_s = \frac{U_0}{I_a}$

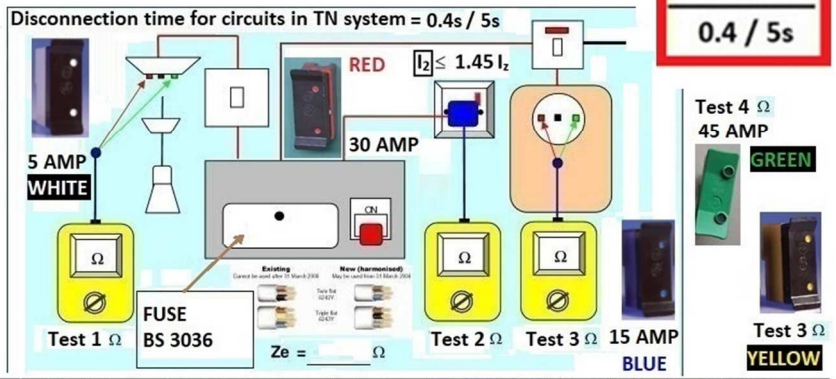
U_0 is the nominal a.c. rms line voltage to Earth.

Ze = _____ Ω I_a is the current causing operation of the protective device within the specified time.

The results given below have been obtained from circuits in a domestic installation.

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

U_0 230V AC 0.4 / 5s



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

BS7671:2008 17th EDITION (Amendment No 1 :2011)

EARTH FAULT LOOP IMPEDANCE (Zs)

$Z_s = \frac{U_0}{I_a}$

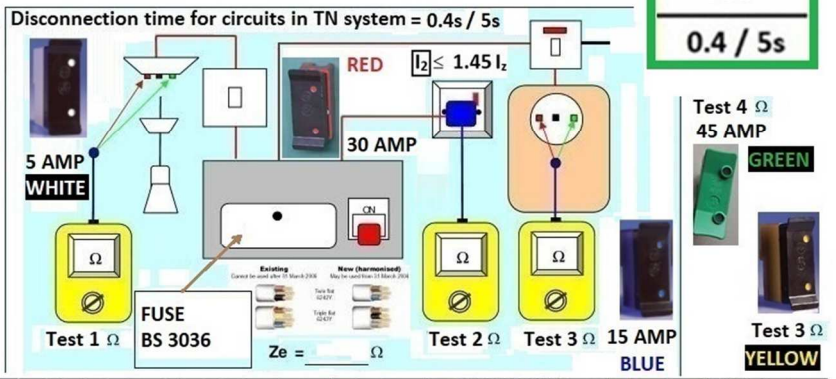
U_0 is the nominal a.c. rms line voltage to Earth.

Ze = _____ Ω I_a is the current causing operation of the protective device within the specified time.

The results given below have been obtained from circuits in a domestic installation.

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

U_0 230V AC 0.4 / 5s



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

EFLI

(5 to 45 Amp BS 3036 FUSE)

BS7671:2008 17th EDITION 2015 (Amendments 1, 2 + 3) EARTH FAULT LOOP IMPEDANCE $Z_s \times I_a \leq U_0 \times C_{min}$

Ze = _____ Ω

The results given below have been obtained from circuits in a domestic installation.

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

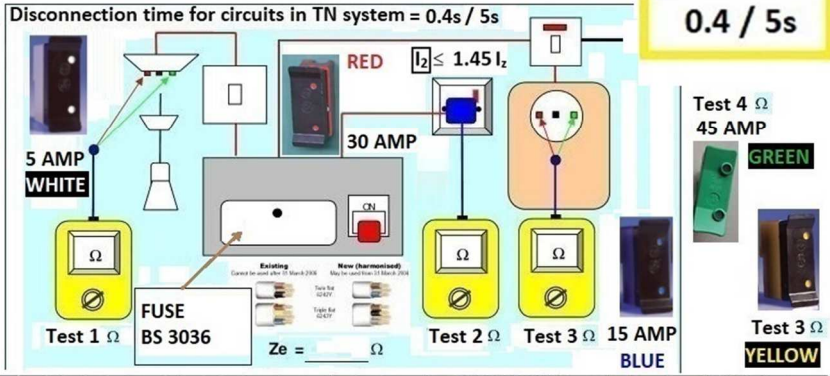
C_{min} 0.95

$U_0 \leq 230$ V

AC

0.4 / 5s

Disconnection time for circuits in TN system = 0.4s / 5s



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)

THE EARTH FAULT LOOP IMPEDANCE 18th Edition BS7671 (2018)

Earth Fault Loop Impedance analysis for final circuits with a rated current not exceeding: (i) 63 A with one or more socket-outlets, and $Z_s \times I_a \leq U_0 \times C_{min}$

(ii) 32 A supplying only fixed connected current-using equipment

The results given below have been obtained from circuits in a domestic installation.

Ze = _____ Ω

NB: Assumption that the cables are Twin with reduced CPC and establishes whether or not the measured values are acceptable.

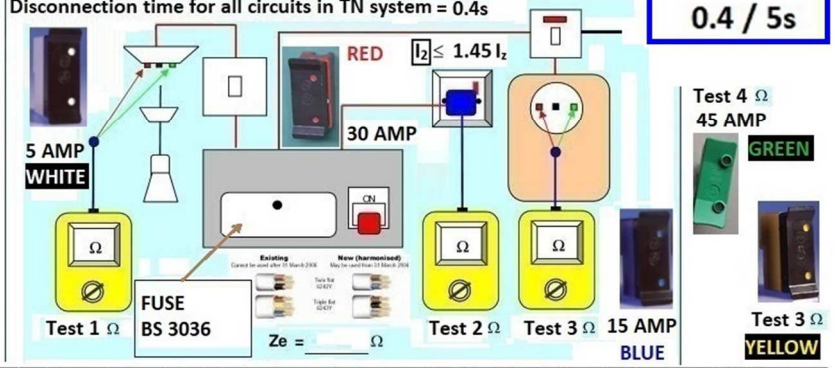
C_{min} 0.95

$U_0 \leq 230$ V

AC

0.4 / 5s

Disconnection time for all circuits in TN system = 0.4s



Test	Circuit Description	BS7671 Value	BS7671 Value multiply by 0.8 3/4 Rule of Thumb	Measured Value	Satisfactory Yes / No
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	
		Ω	Ω	Ω	

3/4 or 0.8? The Max Zs values in the "BS7671" are prior to any correction factors allowing for things such as ambient temperature of conductors during fault condition. The Zs values in the "On-site-guide" are all 0.8 (80%) of the values in the "Regs Book"...this to my understanding is the 0.8 "Rule of Thumb" figure allowing suitable correction for temperature, generally used when testing your new installed work.

However, the BS7671 16th EDITION (No.1 2002 + No. 2 2004) GN3 Inspection & Testing (4th Edition) April 2006 Rule of thumb refers to a 3/4 Zs value..see page 56 of GN3, point 4) "rule of thumb figures"

GN3 also mentions allowances for unknown CPC conductor sizes.. which to my understanding is when tested unknown cables (e.g. PIR / EICR) although a ring may have a 2.5 with 1.5mm CPC at the fuse box / Consumer Unit. **Older wires with 1.0mm CPC may be present at other parts of the circuit!** So, a **3/4 or 75% Zs value gives and extra 5% margin of safety compared to the 80% on site guide values!** OSG...aimed at new work you are designing & installing (known cables) GN3...more aimed at other persons work, such as PIR (EICR) type, unknown cables sizes.

both '3/4' and '0.8' apply to 16th edition for example

32A type B 60898

16th = 1.50 OSG=1.20 (80% of 16th) 17th =1.44 (96% of 16th)

15A 3036 0.4sec

16th =2.67 OSG= 2.14 (80% of 16th) 17th =2.55 (96% of 16th)