INSULATION RESISTANCE, AND THE TEST VOLTAGES

WHICH INSTRUMENT DOES THE INSULATION TEST?

INSULATION RESISTANCE: WHAT IT IS, AND WHAT YOU TEST WITH

Continuity asked for the **lowest possible** resistance — an unbroken path for fault current. Insulation resistance asks for the opposite.

Ω	MΩ
Continuity	**Insulation resistance**
Very	Very
low	**high**
resistance	resistance — millions of ohms
Low resistance ohmmeter	**Insulation resistance tester**

✋ **Get the instrument names right.** If the exam asks what instrument carries out an insulation resistance test, the answer is an **insulation resistance tester** — something capable of reading **megohms**. Not "a multifunction tester". The MFT contains both; the question is about the function.

What you're checking is that the **insulation around the copper** is in good enough condition that the conductors **aren't touching** — and aren't leaking to each other or to earth. During continuity you deliberately linked conductors together. Here you want them completely separated.

Watch the display.

Switch to insulation resistance and the **MΩ** symbol appears — capital M, megohms. That's your confirmation you're on the right function before you apply any voltage.

GN3 · 2.6.7 · p.68 · insulation resistance ★

TEST VOLTAGES, AND WHEN TO DROP TO 250 V

Guidance Note 3 carries the table of test voltages against circuit voltage. Three rows:

CIRCUIT	TEST VOLTAGE	MINIMUM
SELV and PELV	**250 V DC**	**0.5 MΩ**
Up to and including 500 V Single phase and three phase both live here	**500 V DC**	**1 MΩ**
Above 500 V	**1000 V DC**	**1 MΩ**

The middle row is yours.
Single-phase and three-phase LV installations both fall into "up to and including 500 V", so your test voltage is **500 V DC**. Highlight the whole table in your book, because questions come up on all three rows.

? **Where does DC come from?** The installation is AC. The **instrument** generates the DC test voltage — from its **batteries** and internal electronics. Most MFTs offer 250 V, 500 V and 1000 V; some offer 750 V.

WHEN YOU DROP TO 250 V

Some things will not survive 500 V. Where a circuit contains:

- **USB socket outlets**
- **Neon indicators** in switches or sockets
- **Dimmer switches**
- An **SPD** or an **AFDD** anywhere in the circuit

OPTION	WHAT YOU DO
Drop the voltage	Test at **250 V** between the **live conductors (joined) and earth**, and note it in the **remarks** column
Bypass it	Drop the plate, disconnect the cables into a connector, and test the wiring at 500 V
Do it early	**Test the cable before you terminate it.** Nothing is connected, so 500 V is safe

Which test voltage, and the one that is yours

Guidance Note 3 carries the table — three bands of circuit voltage

SELV and PELV	250 V DC test · 0.5 MΩ minimum
up to and including 500 V	500 V DC test voltage · 1 MΩ minimum — single phase and three phase both live in this band — this is the row you use
above 500 V	1000 V DC test · 1 MΩ minimum

drop to 250 V DC where sensitive equipment cannot be removed — and write down that you did, and why

Three bands, and the middle one is almost always yours: an ordinary LV installation, single or three phase, is tested at **500 V DC** against a **1 MΩ** minimum. The outer bands: SELV and PELV at **250 V DC** (0.5 MΩ minimum), and above 500 V at **1000 V DC** (1 MΩ minimum).

§ The book says it plainly: during initial verification, a test of the installed wiring at **500 V DC prior to connection of equipment** is required to be carried out **between live conductors**, and **between the live conductors connected together and the protective conductor**.

The sensible order.
Run the cable, test it at 500 V before terminating, then wire it up and test again at 250 V, live conductors to earth, if the accessories need it. Best of both.

✋ **Don't attempt a 500 V insulation test on an ordinary multimeter.** And don't hold the metal of a clip while the other lead is on a live test point — 500 V will give you a belt. Very little current behind it, so you shouldn't come to harm, but connect the leads before you press test.

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