615-4590 (10-144) Marsh Resistance Board

Warranty & Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

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Description:

This set has eight different diameters of nickel-chromium wire mounted on a board that has measurement increments silk screened upon it. The general idea behind this board is that the student can take a multimeter and check the resistances of different diameter wires and record these values. (Record resistances at 5cm increments). The student can then calculate the cross sectional area of the wire, making sure to measure the wires first. Since the lengths have been recorded, the resistivity of the wire can then be calculated after graphing.

Theory:

The resistance of a wire is directly related to its diameter by the formula:

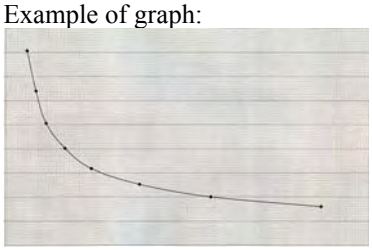
$$R = \frac{kL}{A}$$

Where **R** is resistance in ohms; **L** is the length; **A** is the cross-sectional area, and ***k*** is the resistivity of the material of which the wire is made. If **L** is in meters and **A** is in square meters, the unit of ***k*** is the ohm-meter. The resistivity in ohm-meters is numerically equal to the resistance of a block of the material one square meter in cross-sectional area and one meter long.

Instructions:

1.) To begin, place the Marsh Resistance Board on a level surface.
2.) Next, set your multimeter to a scale that will read 100Ω or less.
3.) Take one of the probes from the multimeter, (color does not matter) and place it into one of the end caps.
4.) Place the other probe onto the wire that is attached to the end cap with which you placed the first probe at one hash mark (5cm).
5.) Read the multimeter and record the reading.
6.) Move the second probe, which is placed on the wire, to the next location on the same wire, using the measurements on the board to help with placement of the probe.
7.) Read the multimeter and record the reading. Continue taking readings for the entire length of the wire.
8.) Next, take the first probe out of the end cap and place it in another end cap on the same side of the board.
9.) Again, take the second probe, which is being placed on the wire and move it to different locations on the board.
10.) Read the multimeter and record the reading.
11.) Repeat process of moving the first probe to the different end caps and placing the second probe on different locations on the wire until you have enough readings to create a graph to compare actual results with the theory.

Example of graph:



Note: Do **NOT** strum or pluck wires on the board. The smaller gauge wires are delicate and may snap.

Related Products:

- **615-4540 Wheatstone Bridge:**

Classic way of measuring resistance in a conductor by comparing a wire with known resistance to one with unknown resistance. Traditional slidewire construction with meter-long high resistance nichrome wire and double-ended sliding knife edge contact.

- **615-4545 Unknown Resistance:**

Good for use with Wheatstone Bridge or as an exercise in measuring individual unknowns. Contains 9 unique precision "unknown" 1% resistors ranging from 1 to 100 kilohm with terminals, which can connect in the series if desired.

- **615-4500 Resistance Coils:**

Show how resistance varies with type, length and diameter of wire used. Includes: 8 labeled coils wound on individual plastic spools with 2 brass terminals.

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