

Axle stands with a jack



Before using an axle stand

- 1) Always placed under a jacked-up vehicle using a jack just in-case the jack fails, which the axle stand takes vehicle load.
- 2) Ensure the floor is suitable (firm & levelled) to jack up vehicle to decrease risks.
- 3) Position axle stand under a load bearing on a car chassis (car base). Not doing so will cause vehicle damage and an unstable stand.
- 4) If in doubt regarding jacking/support point, consult the workshop manual.

High axle stands with a car lift



High axle stands are usually used with 4-post car lifts.

Lowering the vehicle on high axle stands allows the wheels to hang freely (this is necessary when working on breaks or suspensions)

How to use the high axle stand & 4-post car lift combination

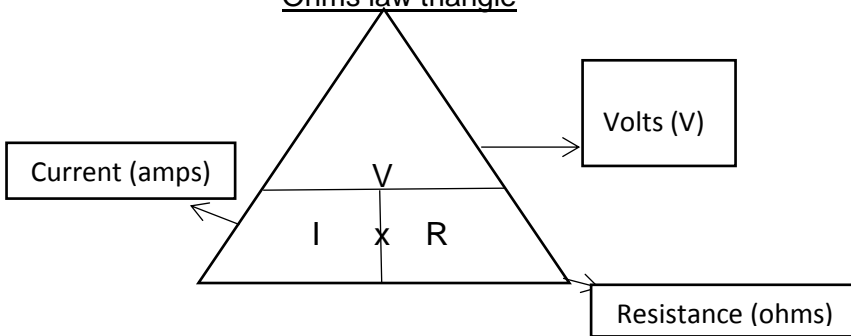
- 1) Position axle stand cups on load bearing.
- 2) Lower car lift about 2cm (don't lower car any further than recommended).
- 3) Move vehicle up & down to ensure that it's stable (Bring vehicle up if unstable & reposition axle stands).

Ohms & Watts triangle laws

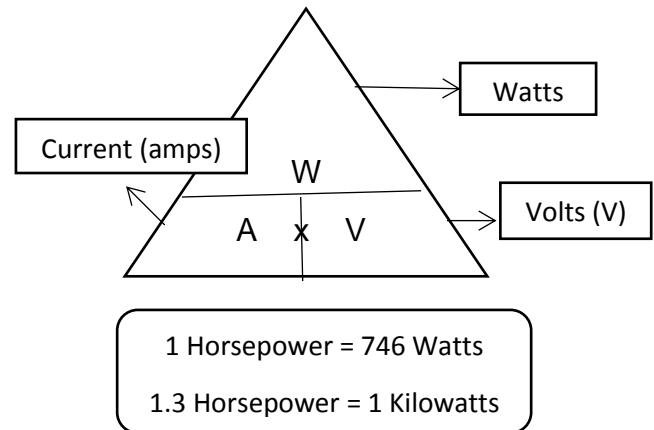
Ohms law: current is directly proportionate to voltage, but inversely proportionate to resistance, in a circuit.

Watts law: 1 watt = amount of work a charge of 1 amp can do in 1 second.

Ohms law triangle



Watts law triangle



Ohms law example:

Battery voltage = 12 V, Value of resistor = 4 ohms

Therefore, amperes flowing through circuit = V / R

$$12 / 4 = 3 \text{ amperes}$$

Watts law Example:

A circuit powered by 12 V battery with a current of 2 amperes. Calculate the power in watts?

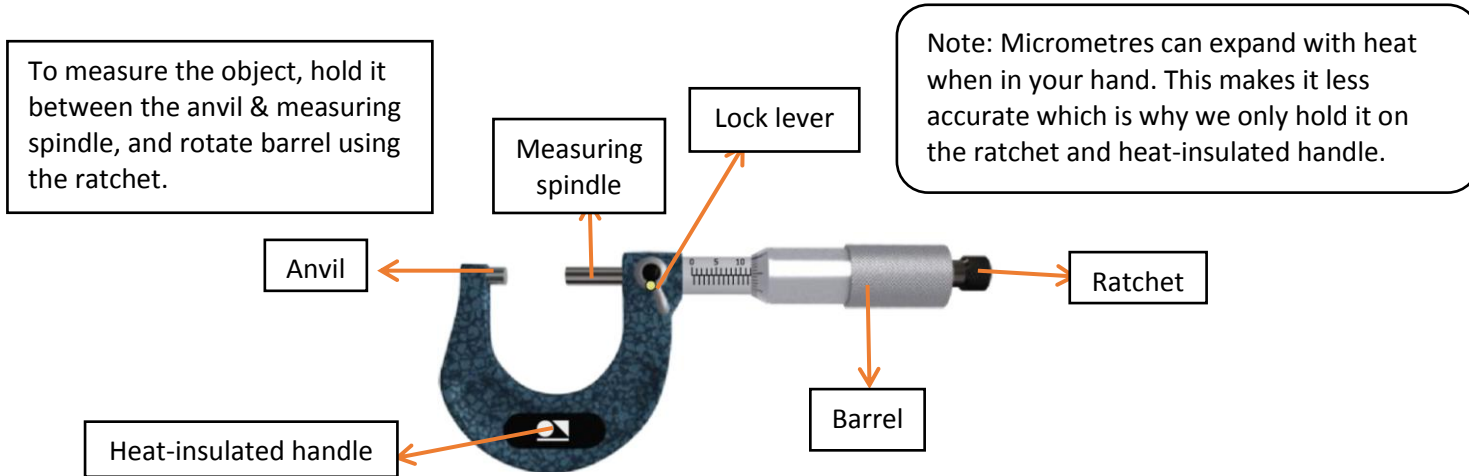
$$P = V \times A \text{ Therefore } 12 \times 2 = 24 \text{ Watts}$$

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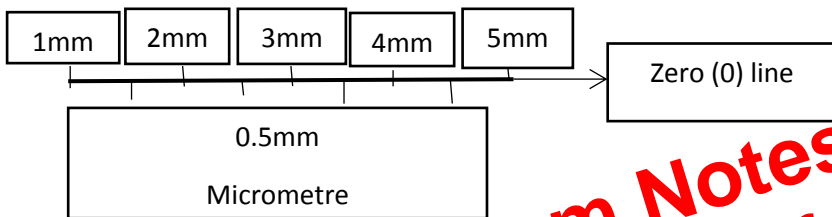
Measuring equipment (Micrometre)

Keywords:

Tolerance = minimum and max variation you can tolerate of your parts sizes.



How to read the micrometre



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How to read the micrometre

- 1) Top scale represents whole millimetres. Bottom scale represents half a millimetre (micrometre). And the barrel scale represents decimals e.g. 30 would be 0.3 & 25 = 0.25 etc.
- 2) Add the top scale value (10mm) to the bottom scale value (0.5) and the barrel scale value (0.30) you get the width of the object you're measuring. $10\text{mm} + 0.5\text{mm} + 0.30 = \underline{10.80\text{mm}}$

Tolerance question: a measurement is stated as 2 ± 0.5 . What reading is outside tolerance?

- A) 2.0mm
- B) 2.4mm
- C) 1.9mm
- D) 1.4mm

Answer:

$2 + 0.5 = 2.5$

$2 - 0.5 = 1.5$

outside

1.4

1.5

→

2.5

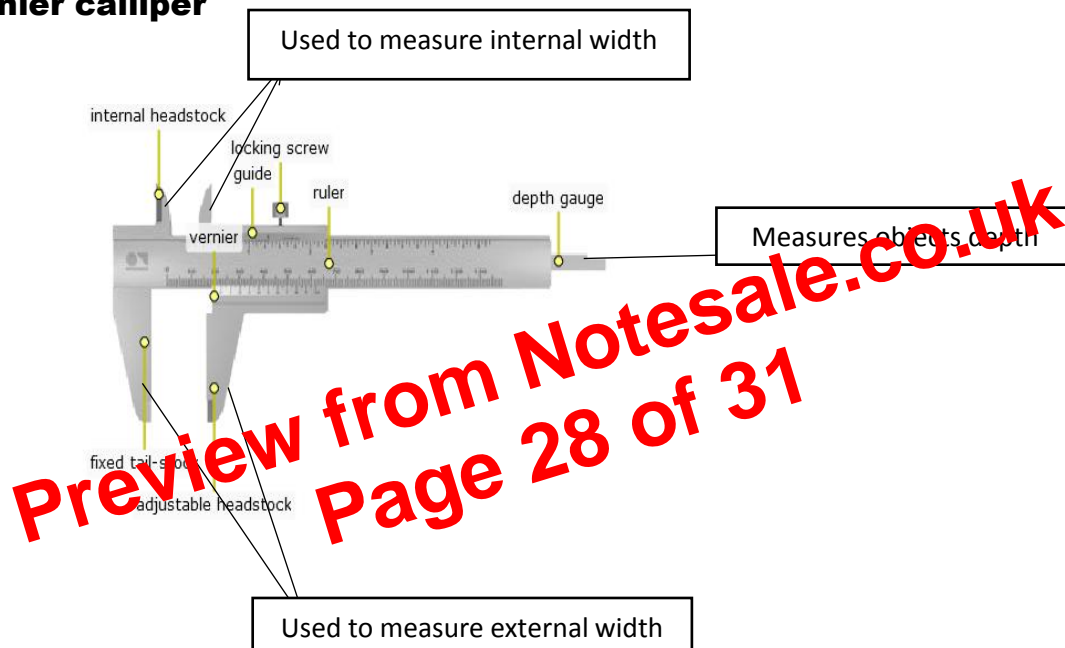
1.9, 2.0, 2.4 etc.

Joining methods & materials

Keywords:

- Spot welding = Welding in a single point.
- Mig welding = similar to arc welding but requires a mask.
- Arc welding = Welding using heat generated by an electric arc.
- Rivets = Short metal pin or bolt that holds metals together.
- Ferrous metals = magnetic metal that doesn't contain a lot of iron.
- Non-ferrous metals = not magnetic. (Aluminium alloy, copper, brass) Resistant to corrosion.

Vernier calliper



Vehicle body components

Chassis (vehicle base)



Monocoque chassis = thin frame whereby loads are supported through external skin of car. Streamlined; used for ace cars.



Backbone chassis = uses a body-on-frame design. Used on trucks and sometimes race cars.



Integrated chassis = used in normal modern-day cars (most common). Has a crumple zone to reduce impact for safety.



Ladder chassis = usually used for heavy vehicles such as trucks & tractors.

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