

## Apply core land-based engineering principles: calculations

**Overview**

This standard covers the application of core land-based engineering principles: calculations. It includes the units of measurement with conversion factors (which could include area/volume, length/thickness, measurement used in a variety of systems) and the related laws and calculations surrounding them, e.g. Ohm's law, Pascal's law, Newton's law of motion, Boyle's law, speed, power, torque, velocity, pressure, volume, flow, temperature, area.

This standard is for those who work in land-based engineering.

Note: due to current regulations an approved electrician should be involved when working with mains electricity.

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## Performance criteria

You must be able to:

1. apply ratios and **units of measurement** to express values in engines, transmissions, hydraulic, pneumatic, electrical and machine performance
2. apply conversion factors to convert measurement values from one unit of measurement to another
3. apply core land-based engineering principles to calculate/measure areas, weights, volumes, angles, flow rates and speeds as appropriate
4. apply physical and/or theoretical methods to establish measurements
5. verify by calculation the calibration of machinery and equipment
6. calculate measurements from a scale drawing

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## Knowledge and understanding

You need to know and understand:

1. linear, area, volume, weight and temperature units of measurement and values
2. units of measurement used to express values in engines, transmissions, hydraulic, pneumatic, electrical and machine performance
3. how to use conversion tables and the conversion factors for calculations
4. the mathematical formulas for area, volume, circumference
5. a basic knowledge of Ohm's law, Newton's law of motion, Boyle's law and Pascal's law and when to apply these
6. the relationship between speed and torque
7. centrifugal force and its applications and effects
8. how to calculate power, torque, force, consumption and application rates
9. the methods and equipment required to carry out a given measuring task
10. the factors that can distort measurements
11. the methods used to check calibration/application rates
12. the **power ratings** and what they represent
13. the measurement of speed, velocity, acceleration, deceleration and coefficient of friction
14. how to calculate speed from given ratios and input or output speed
15. the interpretation of scales used in an engineering drawing

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## Glossary

**power ratings** - e.g. bhp (brake horse power), kW (kilowatt)

**units of measurement** - e.g. power, energy, torque, force, specific gravity, pressure, velocity, acceleration, deceleration, reduction ratios, friction, density, flow, resistance, load, current and noise

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<b>Developed by</b>	Lantra
<b>Version Number</b>	2
<b>Date Approved</b>	December 2015
<b>Indicative Review Date</b>	December 2020
<b>Validity</b>	Current
<b>Status</b>	Original
<b>Originating Organisation</b>	Lantra
<b>Original URN</b>	LANLEO7
<b>Relevant Occupations</b>	Land-based Engineering
<b>Suite</b>	Land-based Engineering Operations
<b>Keywords</b>	engineering; calculations; Ohm's law; Pascal's law; Newton's law; Boyle's law; speed; power; torque; velocity; pressure; volume; flow; temperature; area