Contents

Before you begin

This learner guide is based on the unit of competency *TLIE3002 Estimate/calculate mass, area and quantify dimensions*, Release 1. Your trainer or training organisation must give you information about this unit of competency as part of your training program. You can access the unit of competency and assessment requirements at: www.training.gov.au.

How to work through this learner guide

Your trainer will advise which parts of the learner guide you need to read, and which activities you need to complete. This learner guide will help you in your training.

Icon	Feature	How you can use each feature
	Learning content	Read each topic. Speak to your trainer if you need help.
	Activities	Activities give you the opportunity to put your skills and knowledge into action. Your trainer will tell you which activities to complete.
	Video clips	Where you see a QR code, you can use a smartphone or tablet to access video clips about the content. For information about how to download an app that will read the QR code, or for more help, visit our website: www.aspirelr.com.au/help
	Workplace examples	Workplace examples at the end of each topic show how your learning applies in practice.
	Summaries	Key learning points are provided at the end of each topic.
	Words to remember	As you read the learner guide, use the table at the back of the book to write down any words you need to remember. There is a space for you to write the word and a space for you to write down what the word means. You can also access a full glossary of terms via this QR code.

Topic 1 | What you need to know about estimating/calculating mass and area, and quantifying dimensions

{ *Estimation is a major part of determining the handling, storage and transport needs of a load.* }

In this topic you will learn about:

1A Regulations and guidelines

1B Calculations

Accurate mathematical calculation is also a vital part of this function, particularly when load limits of equipment, storage locations and vehicles must not be exceeded. Before allocating load to a vehicle or storage location, you have to be sure of applicable load and storage limitations.

Regulations

Australia has nationally regulated maximum mass and dimensions for different types of transport vehicles that must be followed. The Heavy Vehicle National Law (HVNL) Regulations apply to the maximum mass and dimensions for different types of transport vehicles, and may vary between each state and territory.

Load requirements

The following terms apply to the weight of a vehicle and its load.

Gross vehicle mass (GVM)

The GVM refers to the weight limit for a vehicle. It includes the weight of the vehicle, plus the weight of passengers, fuel, cargo and any additional accessories. The vehicle must never be loaded over the weight specified as the GVM, which is a safety standard used to prevent overloading. If a vehicle is overloaded, the brakes may not work efficiently, tyres may not hold and the suspension of the vehicle may break under the weight of the load.

Tare weight

The weight of the actual container or vehicle when unloaded.

Kerb weight

The kerb weight includes the vehicle tare weight plus the weight of oil and a full fuel tank, but does not include the weight of cargo or passengers.

Net weight

The weight of the actual load or cargo, sometimes referred to as a payload.

Gross weight

The total combined weight of the tare plus the net weight.

1B | Calculations

Calculations are needed to determine the overall weight, dimensions and area of goods.

Factors that affect transport and storage decisions include weight/mass, shape/size and balance characteristics, such as the centre of gravity. These factors, either on their own or combined, determine materials-handling equipment needs, work and storage space requirements, and the vehicle size and type needed to transport the load.

Load characteristics

When estimating and calculating storage and transport requirements for loads, you should observe and consider load characteristics.

How goods are stored and transported depends on the characteristics of the load. Here are some examples. Here are some examples.

Shape of the load

The shape of the load determines its storage location, the equipment required to move the load and the size and types of transport vehicles required. Long item lengths, high loads and odd shapes all require different storage and transport solutions.

Load mass/weight

Load mass/weight determines the storage location and the type equipment needed to move, store and transport the load.

Activity 2

Question 1

Draw a line from the words on the left to match the correct meaning on the right.

* Balance of load

* Shape of load

* Load mass/weight

* Determines the storage location and equipment required to move the load, and the size and types of transport vehicles required.

* Determines the storage location and the type of equipment needed to move, store and transport the load.

* Determines lift points and may limit the storage options.

Question 2

Circle the correct answer.

Problems with estimations occur when a decision relating to the amount of space, area or capacity is incorrect.

* True

* False

Question 3

Which of the following sentences apply to why procedures and policies should be followed when making estimations? Tick all that apply.

☐ To minimise the risk of a WHS incident occurring

☐ To avoid breaches of operational regulations

☐ To avoid exceeding racking and storage area safety recommendations

☐ To avoid staying within equipment limitations

Workplace example for Topic 1

Read the following workplace example to see how the concepts you have learned are applied in a real-life situation.

It's 7.00 am Monday morning and orders for the 15 stores have been received by the administration department of Warehouse Manufacturing Supplies. These have been passed to Andrew's warehouse team. His supervisor is busy allocating tasks to team members.

Andrew scans the order and observes the weights, volumes and sizes of the goods involved. From this, he quickly estimates what types of warehouse equipment is required to move the loads. Some need the hand trolley, some need to be moved by forklift, while others need the reach truck.

Andrew notes that the load consists of 40 pallets with a total weight of 4,800kg plus a heavy over-pack weighing 3,300kg. He estimates that each pallet is a little over 100kg – well below the maximum safe weight for the pallet racking.

Andrew makes arrangements for the goods to be transported and stored by David, a forklift driver.

Watch the workplace example video [02m:12s] here.

Summary of Topic 1

1. The load limits of equipment, vehicles, storage racking and containers used for storage or transport must not be exceeded.
2. Certain rules must be followed in relation to warehouse operations, the type of equipment that is used and storage requirements.
3. You must not operate or use a piece of equipment without knowing the precise load limits.
4. Calculations are needed to determine the overall weight, dimensions and area of goods.
5. When estimating and calculating storage and transport requirements for loads, observe and consider load characteristics.
6. Estimation is a reasonable guess or an approximation, and is a critical skill when managing loads.

Topic 2 | What you need to do to estimate/calculate mass and area, and quantify dimensions

{ *To transport and store goods correctly, you must follow legislation and regulations.* }

In this topic you will learn how to:

2A Work according to legislation and regulations

**2B** Make calculations

2C Work with others

Height

The height of an object measures how tall it is, or the length from the top to the bottom. Height can be measured in millimetres, centimetres or metres.
For example, the height of the load is 2m (2 metres).

Area

Area is the length and width of a flat surface, such as the floor. Area can be measured in square metres, square centimetres or square kilometres. Square metres are written using the symbol m^2. A square metre is a square that has a length of 1 metre and a width of 1 metre.
For example, the storage floor area is $50m^2$ (50 square metres).

Volume
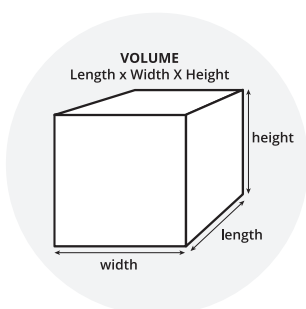
Volume is the length, width and height of a solid object. Volume is measured in cubic metres. Cubic metres are written using the symbol m^3. A cubic metre is a unit of volume that refers to an object or area whose length, depth and height are all 1 metre.
For example, the pallet load of bricks is $1m^3$ (1 cubic metre).

Weight or mass

Weight or mass refers to how heavy something is. The weight of a solid object can be measured in grams (g), kilograms (kg) or tonnes (t). The weight of liquid can be measured in millilitres (mL), litres (L) and kilolitres (kL).
For example, the weight of the load is 50kg (50 kilograms).

Quantity

Quantity is used to measure the number or amount of something. The quantity of items in a carton is measured using whole numbers.
For example, the quantity of items in the order is 100.

Volume

Volume is expressed in cubic metres (m³).

Volume is the total amount of space (length, width and height) the load will take up in the store room. Before you calculate the volume, you may need to convert measurements into metres.

Here is an example

What you need to know

To calculate cubic metres (m³) of a load, you need to know the length, width and height of the load. The load is 150cm long, 70cm wide and 120cm high.

Since the measurements are uneven, they must be converted into metres. When converted to metres, the measurements are:
length = 1.5m; width = 0.7m; height = 1.2m.

Calculate volume using multiplication

To find the volume of the load, you need to multiply the measurements of the length, width and height.

What it looks like

1.5m x 0.7m x 1.2m = 1.26m³

Estimations

Estimating the area and volume of goods with set length, width and height is easier than estimating goods with irregular sides and shapes.

Here are ways you can estimate space storage area

Stepping it out

Stepping it out is when you use the length of your stride to make the estimation. The average distance that a person covers in two steps is about 1.5m. To estimate the size of a storage area, walk the length of the area and count every second step. This method of estimation requires multiplication.

To work out the estimate you need to multiply the number of steps you counted by 1.5m. For example, 30 counted steps x 1.5m = 45m.

Rounding numbers

You may need to round numbers up or down to the nearest whole number.

If the first decimal point is 5 or more, the number is rounded up (for example, 1.5m is rounded up to 2m).

If the first decimal point is less than 5, the number is rounded down (for example, 10.4cm is rounded down to 10cm).

Educated guess

An educated guess is when you make an estimate based on what you already know or what you have done before. If you have transported or stored a similar load before, you can base the estimate on previous experience.