

# **LOAD TRAINING**



## **Workbook**

Load training  
workbook for inland  
storage and  
distribution facilities

## DISCLAIMER

The Safe Load Program Load Training™ course has been produced on the understanding that Safe Load Program™, the authors and the producers (or any of them) will not be responsible for the results of any act done or omitted to be done on the basis of information contained in the Load Training™ course, nor for any errors or omissions in the said information. Safe Load Program™, the authors and the producers expressly disclaim all and any liability for any loss or damage (including without limitation, personal injury, property damage, third party claims and financial loss) which may be suffered by any person who makes use of this Load Training course or any other person arising out of or as a result of or in connection with any act done or omitted to be done by the person using the Load Training course in reliance, whether whole or partial, upon the whole or any part of the contents of this Load Training (LT) course whether that loss or damage is caused by any fault or negligence on the part of Safe Load Program™, the authors and the producers (or any of them) or not. All material in this workbook is copyright and may not be reproduced in whole or in part without written permission from Safe Load Program™.

## INTRODUCTION

The Load Training™ (LT) course has been especially prepared by Safe Load Program™ to provide generic introduction training for Fuel Loaders entering SLP participating terminals and depots. The generic material in this course is common to all SLP participating terminals and depots throughout Australia.

## PROGRAMME AIM

The material covered is intended to ensure safety of personnel and the protection of SLP participating terminals and depot facilities throughout Australia.

## TARGET AUDIENCE

The course is primarily aimed at petroleum transport industry drivers and contractors.

## DRIVER IDENTIFICATION CARD (ID)

Successful completion of the course and course assessment will be acknowledged with the issuing of an “SLP Identification Card” (SLP ID card), recognisable across the industry (but not replacing any existing licences or permits required by law). The ID card is valid for a period of two years, after which further competency testing (and further training, if required) will be necessary to ensure continued understanding of and compliance with safe procedures within SLP participating terminals and depots. The ID card will contain the trainee’s photo identification, an SLP identification number and the ID card expiration date.

## COURSE CONTENT

The Load Training course consists of several modules that may be undertaken at individual sessions or presented in sequence over one training session. The resource material comprises electronic media and a participant workbook, plus module guides for licensed course facilitators. This training is not meant to replace individual transport company and product specific training that will need to be undertaken for drivers carrying product on behalf of member companies.

## TRAINEE ASSESSMENT

Trainee assessment consists of an online exercise, where sufficient achievement is required for verification of competency.

As a majority of the training course is related to safety of personnel and property, the pass rate demanded is high. Individual Terminals or Depots or companies may request proof of training and competency in the course presented in this program at any stage and will reserve the right to retest if deemed necessary.

## COMPETENCIES

This course aims to train participants in the following four competencies that are considered necessary in operating with dangerous goods within an oil industry inland storage and distribution facility.

The following competencies are addressed in this programme:

- A1** Identify and classify dangerous goods
- A2** Load dangerous goods
- B1** Apply occupational health and safety guidelines
- C1** Control ignition sources

The competencies are written in a format that complies with national accreditation requirements. Within this framework, there are three 'fields' considered pertinent:

- A** Dangerous Goods handling
- B** Occupational Health, Safety and the Environment
- C** Fire Risk Management

The competencies listed above are categorised within these fields.

## TERMINOLOGY

The following descriptions are given to explain (where necessary) the various headings within the printed competencies:

### Related existing standards

Certain other industries have registered (or drafted) competencies, which are similar or relate to the Oil Industry standards but possibly differ in that they refer to e.g. explosives and not Classes 2.1 and 3 dangerous goods. The known related units are listed here.

### Element

Competencies are further broken down into "elements" of competence for ease of treatment.

### Performance criteria

Each 'element' of competence has its own 'performance criteria' that are the things which **must** be done to achieve competency in that element.

## **Range of variables**

This area recognises the range of variables, which could occur including differences in legislation between states/territories etc.

## **Evidence guide**

This section is particularly pertinent in the assessment of competence. It sets out what evidence should be sought in the testing process and the method of testing. As competency; is knowing what to do, how to do it and actually doing it correctly, it refers to some underpinning knowledge and skills that are necessary for a completely competent performance.

Unit	A1 Identify and classify dangerous goods
Field	<ul style="list-style-type: none"> <li>Class 3 dangerous goods and combustible liquids handling</li> </ul>
Description	<ul style="list-style-type: none"> <li>Basic knowledge and skills to recognise the characteristics of class 3 dangerous goods and combustible liquids, and to safely handle them during loading</li> </ul>
Related existing standards	<ul style="list-style-type: none"> <li>Australian Dangerous Goods Code ADGC</li> <li>Dangerous goods driver (92-002) Unit 1</li> <li>Driver for Road Transport—Unit C5—Load and unload dangerous goods (draft)</li> </ul>

Element	Performance criteria
1 Assess dangerous goods	<ul style="list-style-type: none"> <li>Dangerous goods are identified and classified in accordance with Australian Dangerous Goods Code (ADGC) and government regulations</li> </ul>

Range of Variables	Scope
Type of load	<ul style="list-style-type: none"> <li>May include flammable, combustible and composite loads</li> </ul>
Level of instruction	<ul style="list-style-type: none"> <li>May be limited or minimum</li> </ul>
OH&S standards	<ul style="list-style-type: none"> <li>As for company and statutory requirements</li> </ul>
Regulations/legislation	<ul style="list-style-type: none"> <li>Australian Dangerous Goods (ADG Code), Australian Standards</li> </ul>
Documentation and reporting systems	<ul style="list-style-type: none"> <li>As for company and statutory requirements</li> <li>Material Safety Data Sheets</li> </ul>
Procedures	<ul style="list-style-type: none"> <li>Are those prescribed by the relevant statutory authority, facilities and employing company</li> </ul>

## Evidence Guide

Critical aspects of evidence	<ul style="list-style-type: none"> <li>Assessment must confirm ability to classify petroleum products in accordance with ADGC requirements.</li> </ul>
Interdependent assessment of units	<ul style="list-style-type: none"> <li>Could be assessed selectively but normally in conjunction with relevant units from the field Dangerous Goods Handling</li> </ul>
Underpinning knowledge	<ul style="list-style-type: none"> <li>Australian Dangerous Goods Code and local Dangerous Goods regulations</li> <li>Storage and handling regulations</li> <li>Road and rail transport regulations</li> <li>Characteristics of and hazards associated with different classes of petroleum products</li> <li>Handling procedures for and precautions to be taken with different classes of petroleum products</li> </ul>
Underpinning skills	<ul style="list-style-type: none"> <li>Interpretation of ADGC</li> <li>Interpretation of Material Safety Data Sheets</li> </ul>
Resources	<ul style="list-style-type: none"> <li>Suitable training room / location with training materials and amenities</li> </ul>
Consistency	<ul style="list-style-type: none"> <li>Competence in this unit should be assessed for consistency of performance in a range of contexts</li> </ul>
Context	<ul style="list-style-type: none"> <li>Competence must be demonstrated by identifying and classifying relevant loads in a petroleum distribution environment</li> <li>Assessment will usually include knowledge of work processes and procedures; oral and/or written questioning on underpinning knowledge and skills and consideration of evidence of required attitudes</li> </ul>

<b>Unit</b>	A2 Load and unload Class 3 dangerous goods (theory only)
<b>Field</b>	Dangerous goods handling
<b>Description</b>	Basic knowledge and skills to identify critical characteristics of dangerous goods so as to safely load a vehicle in accordance with the relevant statutory regulations, ADG Code, facility and company procedures
<b>Related existing standards</b>	<ul style="list-style-type: none"> <li>Australian Dangerous Goods Code (ADGC)</li> <li>Dangerous goods driver (92-002) Unit 1</li> <li>Driver for Road Transport—Unit C5—Load and unload dangerous goods (draft)</li> </ul>

Element	Performance criteria
<b>1 Load and unload vehicle</b>	<ul style="list-style-type: none"> <li>Class 3 dangerous goods are identified and their characteristics used to determine ullage, appropriate handling and loading procedures</li> <li>Vehicle is loaded in compliance with regulations, ADG Code, facility and company procedures</li> <li>Personal protective equipment is worn during loading operations in compliance with ADG Code and company procedures</li> </ul>

Range of variables	Scope
<b>Type of load</b>	May include flammable, combustible and composite loads, and include top and bottom loading procedures
<b>Level of supervision</b>	May be limited or minimum
<b>OH&amp;S standards</b>	As for company and statutory requirements
<b>Regulations/legislation</b>	<ul style="list-style-type: none"> <li>National, state and territory road transport regulatory authorities</li> <li>Truck loading code</li> <li>The Australian Truck Drivers manual</li> <li>ADG Code</li> <li>Storage and Handling regulations</li> <li>Road Transport regulations</li> </ul>
<b>Conditions</b>	Not applicable
<b>Documentation and reporting systems</b>	As for company requirements
<b>Procedures</b>	Are those prescribed by the relevant traffic authority and company

Evidence guide	
<b>Critical aspects of evidence</b>	Assessment must confirm ability to identify switch loads and know the required precautions in line with facility procedures
<b>Interdependent assessment of units</b>	May be assessed in conjunction with relevant units from the field Dangerous Goods Handling
<b>Underpinning knowledge</b>	<ul style="list-style-type: none"> <li>ADG code, Storage and Handling and Road Transport regulations</li> <li>Compatibility of different types of dangerous goods</li> <li>Characteristics of and hazards associated with handling different classes of goods</li> <li>Company handling procedures for and precautions to be taken with different classes of goods</li> <li>Relevant government regulations concerning the transport of petroleum products</li> </ul>
<b>Underpinning skills</b>	<ul style="list-style-type: none"> <li>Ability to calculate ullage</li> <li>Identification of dangerous goods</li> <li>Interpretation of ADG Code</li> <li>Knowledge of liquid loading facility equipment</li> </ul>
<b>Resources</b>	Assessment of this unit will require training material for appropriate loads and loading environments, relevant vehicles and appropriate loading equipment
<b>Context</b>	<ul style="list-style-type: none"> <li>Assessment will usually include; oral and/or written questioning on underpinning knowledge and skills and consideration of evidence of required attitudes</li> </ul>

Unit	B1 Apply occupational health and safety guidelines
Field	Occupational Health and Safety and the Environment
Description	Core skills to ensure that OH&S is maintained in the work environment
Related existing standards	<ul style="list-style-type: none"> <li>Warehousing and Distribution—Unit 1.4.3, WS 3.4.3</li> <li>Metal and Engineering—Unit 1.2F, 13A</li> <li>Driver Road Transport—Unit D1, D2</li> </ul>

Element	Performance criteria
1. Apply OH&S guidelines at work	<ul style="list-style-type: none"> <li>Work is completed in accordance with occupational health and safety guidelines as laid down by employing company and statutory requirements</li> <li>Appropriate personal protective equipment and clothing is used as required by statutory and company regulations</li> <li>Workplace occupational health and safety information and guidelines are readily available, accessed and applied and suggestions to improve safety are offered</li> </ul>
2. Provide first aid	<ul style="list-style-type: none"> <li>Basic assessment is made of patient's needs</li> <li>Injuries and minor disorders are correctly managed until medical assistance is available</li> </ul>

Range of variables	Scope
Physical and environmental hazards	May include combustibility, flammability and toxicity of products, climate, condition of equipment, electrical, ignition sources, obstacles, vapour areas, ventilation
Factors affecting safe work practices	May include substance abuse, long hours of work and other stressors
Level of supervision	May be limited or minimum supervision
OH&S standards	Legislated requirements and company policy
Documentation and reporting systems	As for company and statutory requirements
Procedures	Are those prescribed by government legislation and employer policies

Evidence guide	
Critical aspects of evidence	Assessment must confirm knowledge of occupational health and safety requirements, personal protective clothing and equipment requirements and basic first aid procedures.
Interdependent assessment of units	This unit could be assessed in conjunction with any units in which occupational health and safety is required
Underpinning knowledge	<ul style="list-style-type: none"> <li>Personal protective clothing and equipment requirements</li> <li>Safety hazards in the petroleum industry environment</li> <li>Sources of information on OH&amp;S requirements</li> </ul>
Underpinning skills	<ul style="list-style-type: none"> <li>Recognition of hazards in the work environment</li> <li>Use relevant protective clothing and equipment correctly</li> <li>Basic relevant first aid</li> <li>Interpretation of Material Safety Data sheets</li> </ul>
Resources	Assessment of this competency will require applicable terminal, facility and/or carrier loading procedures and related documents
Context	<ul style="list-style-type: none"> <li>Competence must be demonstrable for the relevant work environment, by day or night and in varied weather conditions in real or simulated situations.</li> <li>Assessment of this unit will usually include observation of real or simulated work processes and procedures; oral and/or written questioning on underpinning knowledge and skills and consideration of evidence of required attitudes</li> </ul>

Unit	C1 Control Ignition Sources
Field	C Fire Risk Management
Description	Basic knowledge and skills to recognise potential ignition sources and control them in hazardous and restricted areas in petroleum distribution environments
Related existing standards	<ul style="list-style-type: none"> <li>• Metal and Engineering—Unit 11.9A—Handle/move fluids/gases</li> <li>• Driver Road Transport—Unit D6 (draft)</li> </ul>

Element	Performance criteria
1. Identify fire hazards	<ul style="list-style-type: none"> <li>• Items of equipment and materials which have the potential to be ignition sources are correctly identified</li> <li>• Hazardous areas are correctly identified in accordance with relevant legislation, codes and company requirements</li> <li>• Switch loading charts and procedures as required by company policy are strictly observed for relevant loads</li> </ul>
2. Apply safety guidelines and codes	<ul style="list-style-type: none"> <li>• Safety distances from ignition sources as specified in relevant legislation and codes are observed</li> <li>• Work permits are issued an appropriately authorised person in accordance with company policy and conditions for conduct of work are strictly monitored</li> <li>• Proper precautions are taken against static electrical discharge in accordance with company requirements</li> </ul>

Range of variables	Scope
Types of risk	Fire risks associated with flammable and combustible products, ignition sources in hazardous areas
Level of supervision	May be limited or minimum
OH&S standards	As for company and statutory requirements
Regulations/legislation	Australian Dangerous Goods Code, relevant Australian Standards and legislation
Documentation and reporting systems	As for company requirements
Procedures	Includes petroleum facility and vehicle safety and emergency procedures

Evidence guide	
Critical aspects of evidence	<ul style="list-style-type: none"> <li>• Assessment must confirm sufficient knowledge of the fire triangle, static electricity, definitions of restricted and hazardous areas and safety and emergency procedures</li> <li>• Assessment must confirm the ability to apply this knowledge in a real or simulated environment</li> </ul>
Interdependent assessment of units	May be assessed with units from the fields A or B
Underpinning knowledge	<ul style="list-style-type: none"> <li>• Relevant Australian Standards and legislation</li> <li>• Australian Dangerous Goods Code</li> <li>• Fire theory</li> <li>• Safety distances from hazardous areas</li> <li>• Company policy on prohibited items in petroleum depots</li> </ul>
Underpinning skills	<ul style="list-style-type: none"> <li>• Recognition of fire hazards in the work environment</li> <li>• Ability to follow company documented procedures</li> </ul>
Resources	Assessment of this competency will require applicable terminal, facility and/or carrier loading procedures and related documents
Context	<ul style="list-style-type: none"> <li>• Competency may be demonstrable in a simulated petroleum distribution work task.</li> <li>• Assessment will usually include observation of work procedures; oral and/or written questioning on underpinning knowledge and skills and consideration of evidence of required attitudes</li> </ul>



## LEGEND

Disclaimer .....	2
Introduction .....	2
Programme aim .....	2
Target audience.....	2
Driver IDENTIFICATION CARD (ID) .....	2
Course content .....	2
TRAINEE ASSESSMENT .....	3
Competencies.....	3
Terminology .....	3
MODULE 1: HEALTH AND SAFETY.....	12
1.1 Why safe handling of products is important .....	13
1.2 Segregation .....	14
1.3 static electricity .....	15
1.4 switch loading .....	18
1.5 risks in handling products.....	18
1.6 First Aid .....	19
1.7 personal protective equipment .....	20
1.8 risk assessment.....	22
END .....	23
MODULE 2: PRODUCT PROPERTIES.....	24
2.1 Volatility.....	24
Flashpoint .....	25
2.2 flammable range.....	27
2.3 combustible and flammable products .....	28
2.4 auto ignition .....	29
2.5 density .....	29
2.6 colour identification and appearance.....	30
END .....	30
MODULE 3: tanker loading .....	31
3.1 Inspecting and preparing for loading.....	32

3.2 loading vehicle position .....	33
3.3 vehicle set up.....	33
3.4 loading product .....	34
3.5 vehicle disconnection.....	35
3.6 documentation and terminal exit .....	36
END .....	36
MODULE 4: vehicle and gantry knowledge .....	37
4.1 non essential electrical.....	38
4.2 terminal driving rules .....	38
4.3 vehicle parking .....	38
4.4 automatic gearbox vehicles .....	38
4.5 working at height.....	39
4.6 dip and fill cap security .....	39
4.7 gantry entry.....	39
4.8 return to service .....	39
4.9 hose dust plugs and dust caps .....	39
4.10 clean loading valves .....	39
4.11 check that your compartment is empty.....	40
4.12 loading arm and tanker compartment selection .....	40
4.13 tanker compartment loading order.....	40
4.14 loading can affect your vehicles road safety .....	41
4.15 drive away protection gate.....	41
4.16 overfill protection system.....	41
4.17 static electricity .....	41
4.18 connecting a static clip .....	41
4.19 internal valve activation .....	42
4.20 ramp up and ramp down .....	42
4.21 product draining containers.....	42
4.22 bio fuel slops .....	42

4.23 loading arm manual handling .....	42
4.24 vapour removal and recovery .....	42
4.25 checking for leaks.....	43
4.26 other work.....	43
END .....	43
SLP Pass-2-load .....	44
Pass-2-Load.....	44

## MODULE 1: HEALTH AND SAFETY

MODULE 1: HEALTH AND SAFETY.....	12
1.1 Why safe handling of products is important.....	13
1.2 Segregation .....	14
1.3 static electricity .....	15
1.4 switch loading .....	18
1.5 risks in handling products.....	18
1.6 First Aid .....	19
1.7 personal protective equipment .....	20
1.8 risk assessment.....	22
END .....	23

### DURATION:

The estimate time to completed this section is 40 minutes

### LEARNING OUTCOMES

As a result of satisfactorily completing this training module, participants will be able to:

- 1.1 - 1.8 Apply basic workplace occupational health
- 1.2 Demonstrate a basic understanding of how to control and prevent product contamination.
- 1.3 Exhibit a basic knowledge of the cause of static electricity.
- 1.3 Take proper precautions against static electrical discharge.
- 1.4 Demonstrate basic knowledge of switch loading charts and procedures.
- 1.5 Apply basic safety guidelines when handling petroleum products.
- 1.6 Apply basic first aid procedures in the event of contact with petroleum products.
- 1.7 Identify the correct personal protective equipment for fuels loading.
- 1.7 Identify equipment to be worn during all operations in compliance with the ADG Code, and government regulations and guidelines.
- 1.8 Apply the essentials of either 'Take 5' or 'Safe Performance Self-Assessment' risk assessment tools before commencing work.

## 1.1 WHY SAFE HANDLING OF PRODUCTS IS IMPORTANT

### Step 1 P.E.A.R. principal

- Your ability to safely load your vehicle is critical in the protection of people, the environment, assets and reputation.
- These four categories form the **PEAR** principal:
  - **PEOPLE**
  - **ENVIRONMENT**
  - **ASSETS**
  - **REPUTATION**
- Protection of **PEOPLE** is ALWAYS our first priority.

### Step 2 Hazardous Zones

- Hazardous areas within a terminal are hazardous due to the possible presence of fuel vapours. These areas are known as hazardous zones.
- Fuel vapours in a hazardous zone can be found:
  - in a tank or compartment that contains or has contained product;
  - near your tanker's loading valves;
  - when a tanker is loading in a loading gantry;
  - around your tanker's vents and vapour return hose;
  - near a storage tank containing product that is venting; and
  - around pumps used for loading products.

### Step 3 Control of Ignition Sources

- Control of ignition sources is an important safety measure in hazardous zones and restricted areas.
- The following items are all potential ignition sources that you need to be aware of:
  - Static electricity
  - Mobile phones
  - Portable radios
  - Cameras
  - Two-way radios
  - Personal use portable electronic devices like computers, tablets, iPads, iPods, MP3 and DVD players.
  - Pagers
  - All electrical tools and equipment that is not hazardous zone approved.
  - Faulty electrical items. For example, exposed electrical wiring or damaged electrical lighting or components.
  - Cigarettes
  - Lighters; and
  - Matches
- It's your responsibility to ensure these items are not taken into a terminal.

### Step 4 Terminal Entry

- To prevent ignition sources from entering terminals, a number of controls are in place:
  - Entry of all personnel is controlled.
  - Anyone entering a terminal must undergo safety training or be supervised by terminal staff at all times.
  - All works in terminals is strictly controlled; and
  - There is absolutely NO ENTRY or USE of unauthorised or unapproved equipment in the terminal.
- If controls are not strictly followed, consequences such as injury, death, environmental impact, fire, or explosion are all likely to occur.

## Step 5 Incidents and Responsibilities

- Loading a tanker in a fuel gantry comes with many risks.
- You have a responsibility to yourself, those working around you and your family, to work safely, and to reduce risks when and wherever possible.
- It is vitally important that you:
  - Follow the terminal procedures.
  - Know where the terminal emergency alarms and assembly areas are located
  - Know what the emergency alarms sound like and what to do when they are activated
  - Wear the correct Personal Protective Equipment
  - Only engage in approved work
  - Use only authorised equipment and use it in approved areas only.
  - Report all near misses, incidents or accidents immediately.
  - Complete all required training and assessments; and
  - If you are not sure - STOP and ask questions
- The majority of incidents in loading gantries are caused when a person:
  - does not follow procedures;
  - Takes a short cut;
  - Fails to wear personal protective equipment;
  - does work that is not approved;
  - uses unauthorised equipment;
  - uses equipment in an unauthorised area;
  - Fails to use correct manual handling techniques;
  - fails to report a near miss, incident or accident; or
  - has not received training or been assessed in their work.

## 1.2 SEGREGATION

### Step 1 Prevention of Contamination

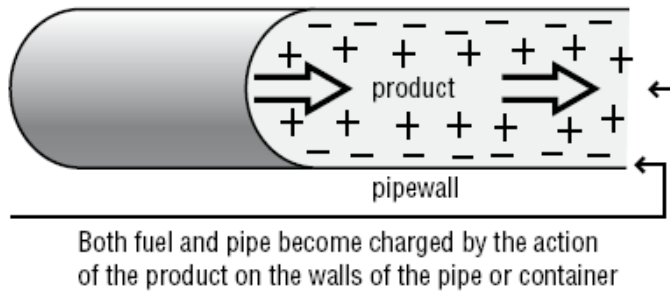
- Product contamination not only affects product quality but is also critical to product safety. Contaminating diesel with just a small amount of petrol can place your life and the product consumer's life at risk. Understanding how to control and prevent product contamination is very important.
- Preventing product contamination is easy and just requires you to follow some simple rules:
  - **Identify** your product – use product labelling, and ensure your load plans are correct.
  - **Switch Loading** – drain your compartments dry when switching product
  - **Segregation** – your tanker must not leak between compartments.
  - **Composite or combined loading** – at times a tanker is loaded with different products in each compartment. Be aware that some products are prohibited from being loaded in a compartment alongside other products or even in the same tanker.
  - **Buffer load** – you may be required to load one type of product in your tanker before you can load another product; this is called a buffer load.

A buffer load removes the chance of the previous product contaminating the next product to be loaded. For example before you load heating oil you may be required to load and deliver a full load of diesel, this will ensure there are no traces of petrol remaining that might contaminate the heating oil, placing the customers lives in danger.
  - **Correct Product loading** – connect the correct loading arm to the correct compartment

## 1.3 STATIC ELECTRICITY

### Step 1 Generating Static

- The leading cause of incidents in terminals involving a fire or explosion is Static Electricity.
- Static can be created in many ways, but in the fuel industry it is most commonly created by the movement or friction produced between the product on the walls of a pipeline, a container or a tanker compartment.



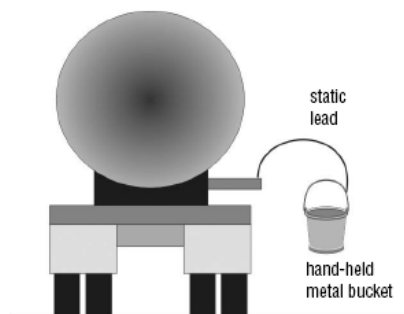
- Static occurs in our every day operations like when you are:
  - loading product into a tanker;
  - draining product into a bucket;
  - pouring product into a drainings tank;
  - when removing clothing or simply wearing polyester or nylon clothing; and
  - static can also be generated from a moving vehicle.

### Step 2 Potential

- The way static electricity transfers or flows from one object to another, is important to understand.
- When two objects have an uneven static electrical charge, it's known as an electrical potential difference between the two objects.
- When a connection is made between the two objects, the electrical charge will flow from one object to the other until the charge on each object is equal.

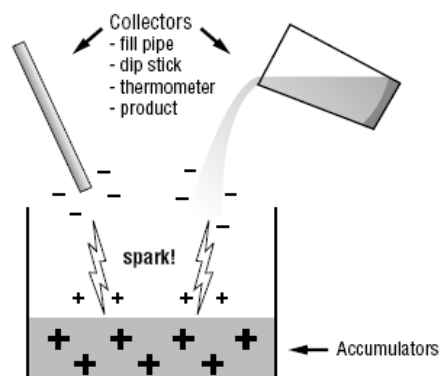
## Step 3 Conductors

- Static electricity is generated at increased levels when:
  - products that are poor conductors of static electricity are loaded;
  - When filters are used in a pipeline they generate higher levels of turbulence and this creates higher friction leading to a high build up of static electricity;
  - When faster loading rates are used it increases the friction between the product and pipeline, creating a higher build up of static electricity;
  - If the product is contaminated or mixed with other materials or other products, these materials or products also create friction when they mix together during loading and increase the build up of static electricity;
  - If you splash fill product into a tanker compartment or a drainings container the increased turbulence creates static electricity at a higher rate; or
  - filling a container that's not connected with a static bond cable to a tanker or gantry will insulate the container and its product, not allowing the static electrical charge to equalise with the tanker or gantry.
- Plastic containers must never be used for draining tanker compartments. Plastic is an insulator and if used will build up a static charge and will retain that static electrical charge for a long period of time. Plastic containers are also likely to absorb the fuel they come in contact with and become soft or brittle and fail, causing a spill.
- Draining containers must be fitted with a static cable and the cable connected to the tanker when draining tanker compartments. If a static cable is not connected between the container and the tanker, the container may build up a high static charge and retain that static charge for a long period of time.



## Step 4 Collectors

- Whenever static electricity is generated in a product or object, the static electricity will be attracted to any object that has a different electrical potential that is brought close to the static charge. Any object that attracts static is called, a 'Collector'.





## Step 5 Poor Conductors

- While all products produce static, some products are poor conductors of static electricity and produce more static electricity than others.
- Diesel, Kerosene, Jet Fuel, many chemicals and solvents do not allow static to disperse quickly, so static electricity builds up in these products more than products like unleaded and premium unleaded petrol's.

## Step 6 Overfill Protection System

- Connecting the gantry overfill protection system to your tanker creates an electrical bond between your tanker and the gantry allowing static electricity to equalise between the gantry and your tanker.
- The overfill protection system is a self-checking system and will only generate a green light to load if an electrical bond between your tanker and the gantry has been made.
- Static or bonding cables on containers require regular checking to ensure they are effective – every time you use one, check for loose connections and faulty clips.

## Step 7 Static Bond

- It is essential to ensure that all parts of the system (the tanker, the gantry, loading arms and containers for draining) are static bonded at all times to minimise the build-up of static electricity and to assist with dispersing static electricity.
- Keeping all parts of the system bonded using static bonding cables ensures that they remain at the same electrical potential so that a spark cannot occur.

## Step 8 Pumping speed

- Product pumping speed influences the amount of static electricity generated due to friction in pipes, splash and turbulence in tanker compartments.
- When a tanker compartment is first being filled in a gantry, the pumping speed is kept low to ensure the product enters the compartment smoothly without splash. This ensures static generation is low.
- When product reaches a level in the compartment where it can no longer create a splash the gantry system will increase the pumping rate to its full speed.  
Normal full speed loading rate is limited to no more than 2,500 litres per minute.

## Step 9 Time

- One method of minimising static is simply to allow time after loading is complete for any static charge to disperse.
- Once loading is completed there is no requirement to open any part of the tanker, this will reduce the opportunity of introducing a static collector and creating a static charged spark.

## 1.4 SWITCH LOADING

### Step 1 Switch Load

- The expression 'Switch Loading' is used to describe when you load a product in a compartment that is different from the product that was carried in the compartment on your last load.
- For example, let's say your tanker was previously loaded with unleaded petrol and your new load is diesel, this is called a switch load.
- It's very important you follow the switch loading rules to ensure product-loading hazards are kept as low as possible. Incorrect switch loading can produce dangerously high levels of static electricity and possibly contaminate the product putting your life, the customer's life and the end users lives in danger.
- The Switch loading table shows what must be done when changing from one product to another.

The chart is a grid with 'Previous Load' on the vertical axis and 'Current Load' on the horizontal axis. It categorizes loads into 'Flammable Liquid', 'Flammable Solid', 'Oxidizing Liquid', 'Oxidizing Solid', 'Corrosive Liquid', 'Corrosive Solid', 'Inert Liquid', and 'Inert Solid'. The cells are color-coded: Green for 'No Action', Yellow for 'Pre-Flush', Orange for 'Post-Flush', and Red for 'Pre-Flush and Post-Flush'. A yellow arrow points from 'Flammable Liquid' to 'Flammable Liquid'.

**EXAMPLE ONLY**

## 1.5 RISKS IN HANDLING PRODUCTS

### Step 1 MSDS or Bulletin

- Products handled during loading are potentially harmful, so it's essential to know how to take the necessary precautions; to find relevant information; and to administer First Aid if required
- All products have a detailed Material Safety Data Sheets known as either a bulletin or a Material Safety Data Sheet. These are available from all terminals.
- Material Safety Data Sheets contain information such as:
  - A description of the product;
  - Hazard classification;
  - Handling requirements and the Personal Protective Equipment required;
  - Physical and chemical hazards of the product;
  - Health hazards;
  - First Aid measures;
  - Fire fighting measures and requirements;
  - Measures for accidental release; and
  - Disposal requirements.

## Step 2 Vapour

- Take care and avoid inhaling product vapours when draining compartments or switch loading. One way of avoiding vapour is not to stand with your face directly over the draining bucket and if possible stand up-wind during product draining.
- Keeping draining containers empty and preventing product spills or drips in the gantry will all help to reduce product vapours in your work area.

## Step 3 Exposure

- Avoid contact with products at all times by wearing petroleum resistant gloves and by changing any clothing that is accidentally contaminated with product.
- Products are easily absorbed through the skin and into your body.
- Note that removing contaminated clothing requires caution and should be soaked or showered in cold water before and while removing the contaminated clothing.

## 1.6 FIRST AID

### Step 1 Basic Steps

- While you are working in the terminal you need to know the basic steps to take, in the event that you or someone else is injured and requires First Aid.
- If you were to accidentally swallow product:
  - seek medical help at once;
  - drink milk; and
  - do not induce vomiting.
- If a liquid, powder or vapour comes in contact with your eyes:
  - wash the eye for at least 15 minutes with fresh water; and
  - seek medical help immediately.
- If your clothing is splashed with product or product comes in contact with your skin:
  - move to a safe area;
  - keep ignition sources away;
  - shower in cold water before and while removing any product soaked clothing;
  - wash your skin thoroughly with soap and cold water; and
  - seek medical advice.
- If poisoned by gas or vapour:
  - remove the patient to fresh air;
  - keep the airway clear and loosen clothing;
  - seek medical help;
  - keep the patient warm and calm; and
  - apply artificial respiration if breathing stops. You will need to use a non-return valve to ensure that you don't breathe in the vapour yourself and to protect yourself from other infections.

## 1.7 PERSONAL PROTECTIVE EQUIPMENT

### Step 1 Safeguards

- Personal protective equipment is used to safeguard you against contact or exposure with petroleum products or physical hazards.
- Please note that the following items are the minimum required personal protective equipment at all SLP terminals.



### Step 2 Clothing and Shoes

- Your clothing, like shirts, trousers or overalls, must fully cover your body, arms and legs from neck to toe to wrist; this is often also described as being collar to cuff.
- Your clothing must be made from 100% cotton material, but the garments worn under your shirt, trousers or overalls are not required to be 100% cotton.
- Hi-visibility clothing made from 100% cotton material that meets Australian Standards for day and night time use must be worn in all SLP terminals.
- Standard daytime Hi-Visibility clothing is non-reflective and is worn during daylight hours only. During night hours Hi-Visibility “reflective” clothing must be worn in the terminal.

**Note:** Hi-Visibility “reflective” clothing is not required inside a vehicle during night hours.

**Safety Hint:** If the terminal lights are on then Hi-Visibility night-time “reflective” clothing must be worn.

- Safety shoes or boots with steel or protective toe caps, leather or a non-porous chemical-resistant upper, complete with oil and chemical resistant soles that meet Australian Standards must be worn at all times.



## Step 3 Glasses and Gloves

- Safety glasses are required to meet Australian Standards and must be suitable for use in all lighting conditions. That means dark lens glasses are not acceptable for use in low lighting conditions, so as a minimum requirement, a pair of clear lens glasses must be readily available to you at all times.
- Gloves made from petrol resistant synthetic materials, like PVC and Nitrile must be worn whenever you are handling tanker and loading gantry equipment (excluding the bay controller control panel).
- Please note that gloves must be worn when;
  - connecting the overfill protection system;
  - when draining or switch loading tanker compartments;
  - when connecting the vapour recovery hose; and
  - connecting the gantry loading arms.

**Safety Hint:** To remove confusion you can simply choose to wear a hard hat in all terminals at all times.

## 1.8 RISK ASSESSMENT

### Step 1 Take5 and S.P.S.A

- Risk assessment tools like 'Take 5' or 'Safe Performance Self-Assessment' are used before commencing any work to manage and reduce risk.
- The steps in the Take 5 process are very simple:
  - Stop, step back, and observe your work area and what is around you.
  - Walk through your task and think through every step you are about to take.
  - Identify hazards by asking yourself "what are the dangers I am likely to encounter at each step?"
  - Control each hazard you find and communicate these controls to others, and
  - Finally, you need to safely carry out your work.
- Safe Performance Self Assessment is a very similar process that has only 3 steps
  - **Step one;** is to 'assess' to consider your risks, by locating hazards and asking yourself what could go wrong?
  - **Step two;** is to 'analyse' to work out how to reduce your risks and identify safeguards to control the hazards.
  - **Step three;** is to 'act' to carry your task correctly while controlling your hazards and using the safeguards provided.

### Step 2 Other Hazards

- There are many other things that can create hazards and increase your risk when loading a tanker.
- Hazards outside of your control can increase your risk, such as:
  - Bad weather;
  - Vehicles moving about the terminal;
  - Trip hazards; and
  - Loss of electrical power.
- Personal factors can also increase your risk, personal hazards such as:
  - Working when you are tired or fatigued
  - Working when you are not mentally alert, when your mind is not on the task; and
  - Using poor manual handling techniques such as bending your back instead of your legs.

### Step 3 Fatigue

- It is important that you understand that things like:
  - tiredness due to poor or interrupted sleep;
  - some medications;
  - a poor diet;
  - alcohol;
  - stress; and
  - physical exhaustion, can make you **UNFIT** for work.
- You can form good habits to ensure a good diet and good health by:
  - Keeping regular meal times;
  - Take your time when eating;
  - Drink plenty of water;
  - Eat lots of fruit and vegetables;
  - Avoid fatty and sugary foods;
  - Get regular good sleep and avoid heavy meals before sleeping;
  - Plan for relaxation; and
  - Avoid heavy drinking.

## Step 4 Noise

- Wherever possible, you should reduce your exposure to noise during loading. If your contact with excessive noise is unavoidable, then you must wear hearing protection.

## Step 5 Injury

- When it comes to being injured in a terminal, did you know that you are more likely to be injured while lifting or moving equipment, being hit by a moving vehicle or you could simply trip or fall on level ground? You must use the correct manual handling techniques and be aware of your surroundings at all times.

## Step 6 Accidents

- Research into tanker accidents has revealed the most common causes of vehicle accidents, which include:
  - Vehicle or mechanical failure;
  - Not enough space to manoeuvre a vehicle;
  - Not enough time;
  - Driver fitness or illness;
  - Mistakes caused by others;
  - Failure to adjust to road conditions; and
  - Reversing, in which reversing accounts for 50 per cent of all tanker collisions.

## Step 7 Reporting

- You must immediately report all incidents or near misses to terminal staff including the following:
  - Fire;
  - Spill;
  - Overfilling of a compartment or compartments, even when there is no spill;
  - Injury;
  - Near loss or near miss;
  - Product mix;
  - Equipment fault or leak; and
  - Missing, faulty or damaged emergency equipment or signs.

**END**

## MODULE 2: PRODUCT PROPERTIES

<b>2.1 Volatility.....</b>	<b>24</b>
Flashpoint .....	25
<b>2.2 Flammable Range .....</b>	<b>27</b>
<b>2.3 Combustible and Flammable Products .....</b>	<b>28</b>
<b>2.4 Auto Ignition .....</b>	<b>29</b>
<b>2.5 Density.....</b>	<b>29</b>
<b>2.6 Colour Identification and Appearance.....</b>	<b>30</b>
<b>END .....</b>	<b>30</b>

### *Duration*

The estimate time to completed this section is 40 minutes

### *Learning outcomes*

As a result of satisfactorily completing this training module, participants will be able to:

MODULE 2 Demonstrate basic knowledge and skills to recognise the characteristics of petroleum products

## **2.1 VOLATILITY**

### **Step 1 Vapour**

- Volatility refers to the products capacity to give off vapour. The more vapour emitted from a product, the more explosive it is.
- At normal or ambient temperature petrol gives off lots of vapour whereas diesel gives off almost no vapour at all. Therefore, petrol is more volatile than diesel.  
No matter how cold it gets in Australia, petrol will always give off enough vapour to ignite, whereas diesel will not ignite at low to medium temperatures.
- Jet fuel and kerosene gives off a little more vapour than diesel, but not as much as petrol.  
In hot weather, jet fuel and kerosene may give off enough vapour to ignite and in some very extreme hot weather and given the right conditions diesel may also produce enough vapour to ignite.



## Step 2 Vapour pressure

- One method used to measure product volatility is to test the products vapour pressure.
- Vapour pressure can be measured by placing a sample of product into a sealed container complete with a pressure gauge. The container is then placed in water that is heated to 40 degrees Centigrade and the container is occasionally shaken. Heat from the water converts some of the product into vapour this vapour creates pressure in the container, and this is called Vapour Pressure. The higher the vapour pressure the higher the volatility or potential for the product to cause an explosion.

## Step 3 Flashpoint testing

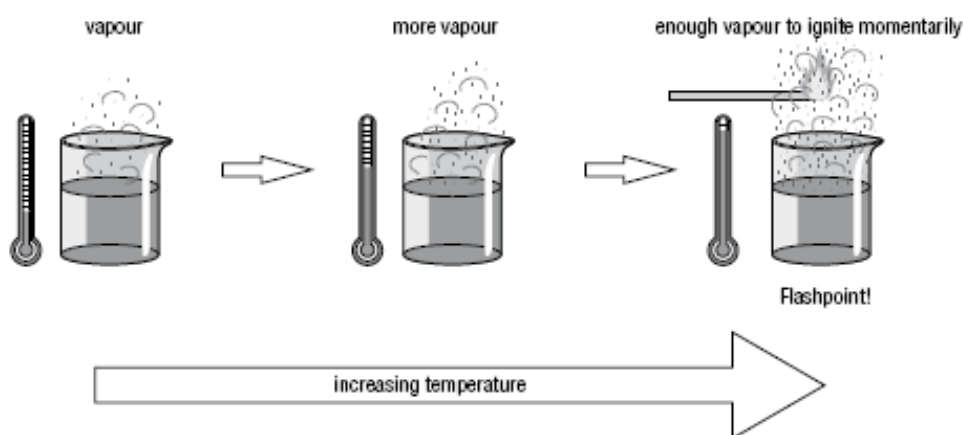
- Another method used to measure the volatility of products is called flashpoint testing.
- The flashpoint test is carried out by slowly heating a small amount of product in a container, and then passing a small flame over the product.

While the temperature of the product is below flashpoint, there is no explosion or ignition when the flame is passed over the product.

- But when the product reaches the temperature at which the fuel vapour produced briefly ignites when the flame is passed over the product, this is the flashpoint.

The flashpoint is the lowest temperature needed for the product create enough vapour to ignite momentarily, in other words creating a flash.

**FLASHPOINT** —lowest temperature at which it forms enough vapour with air to ignite momentarily

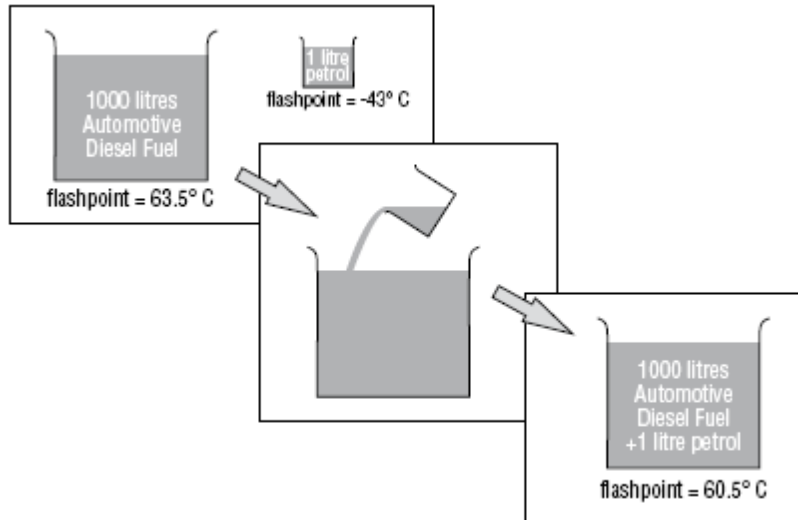


## Step 4 Flashpoint

- The Flashpoint of Petrol is minus 40 degrees centigrade so petrol will always produce enough vapour to explode or ignite no matter the weather conditions in Australia.
  - The Flashpoint of diesel is between 61 to 80 degrees centigrade; note that the minimum allowed by Australian regulations is 61 degrees Centigrade.
  - And the flashpoint for jet fuel and kerosene is 40 degrees Centigrade or higher.
- As the temperature of the product rises, so too does the amount of vapour produced.

## Step 5 Contaminated product

- If the product you are loading is contaminated with another product, the Flashpoint may be altered and the product may not meet specification.

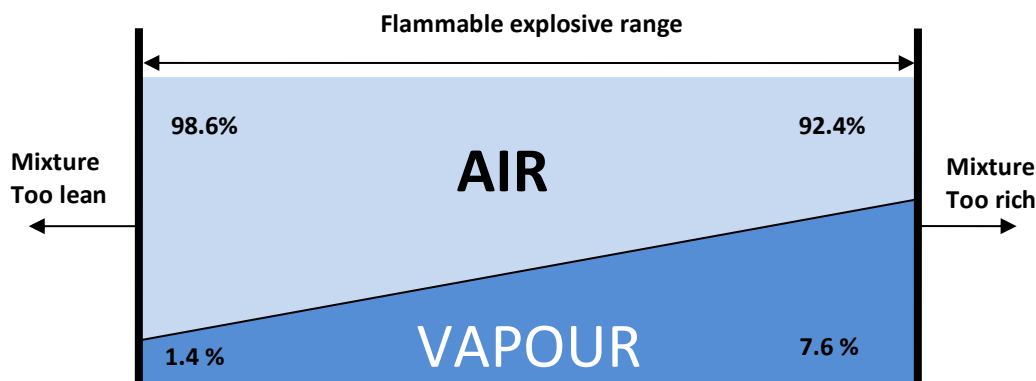


- For example 4000 litres of diesel is loaded into a tanker with a flashpoint of 64 degrees Centigrade. If that compartment still contained 20 litres of petrol from the previous load, then the diesel would be contaminated. The Flashpoint of the diesel would now be only 50 degrees Centigrade, which does not meet the minimum 61 degrees Centigrade.
- If instead of 20 litres of petrol, there were 200 litres left in the compartment, the Flashpoint of the diesel would possibly be only 20 degrees Centigrade.  
Transporting and delivering contaminated diesel with a low Flashpoint could be catastrophic for you, your customer and the end user.

## 2.2 FLAMMABLE RANGE

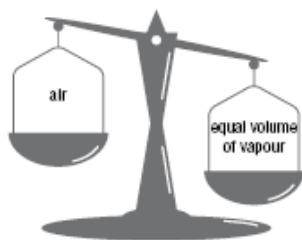
### Step 1 Vapour mixture

- When product vapour is mixed in the air it will only ignite or explode within narrow range, this range or the percentage of air and vapour mixture is referred to as the Flammable Range.
- At the low end of the flammable range there is not enough product vapour in the air to allow an ignition or explosion; this is described as the mix being “to lean”.  
At the high end of the flammable range there is too much product vapour in the air to allow an ignition or explosion; this is described as the mix being ‘to rich’



### Step 2 Flammable

- Without using specialised testing equipment you may never know if the air in your work area is mixed with a product vapour that falls within the flammable range?  
This is why we simply consider all product that you load, handle, smell or see to be dangerous and within its flammable range.
- Let's consider where we might have a mix of vapour in air that is within the flammable range;
  - Around any open hatch on a tanker that contains or has previously contained petrol;
  - Around any vent on a tanker that contains or has previously contained petrol;
  - Around any vapour recovery hose connection that contains or has previously contained petrol;
  - Around a hose that has been used for petrol delivery;
  - Around the dip point of a tank containing or has previously contained petrol;
  - In or around any container used for draining petrol while switch loading; and
  - Any petrol spills or product laying on the ground or in drip trays around your work area.



All petroleum product vapours are heavier than air

## Step 3 Weather conditions

- On a cold day with a small breeze, product vapour in air can remain within the flammable range for a very long time and can travel long distances in search of an ignition source.



## Step 4 Reduced opportunity

- You can reduce the opportunity of dangerous product vapours being created while loading your vehicle by following some of these simple tips,
  - If product is spilt in the gantry, then clean it up quickly
  - Don't allow product from your tanker or the loading arm to drip onto the ground during loading – collect these drips in a bonded container and dispose of as soon as you can.
  - Have only one tanker-loading valve open at a time during draining or switch loading.
  - Empty your draining container immediately after draining your compartments
  - Safely remove any clothing contaminated with product
  - Properly dispose of any rags or other materials contaminated with product.
  - Ensure all compartment hatches and dip and fill point caps are closed and secured.
  - Report product laying in drip trays or drains to the terminal supervisor
  - Cap your product delivery hoses.
  - Ensure your vapour recovery hose is properly connected to the gantry during loading.

## 2.3 COMBUSTIBLE AND FLAMMABLE PRODUCTS

### Step 1 Classification

- Petroleum products are classified or grouped as either combustible or flammable products.
- In the combustible group, there are a further 2 sub groups either called "C1" which covers products with a Flashpoint between 60 and 150 degrees centigrade and the second group called "C2" which covers products with a Flashpoint over 150 degrees Centigrade.
- The flammable products group also has two sub groups, the first called Class 2 which covers gasses such as LP Gas. The second is called Class 3 which covers liquids such as petrol, kerosene and many solvents. The flammable products classification is also known as Dangerous Goods.

Low Initial boiling point	Low Flashpoint	Intermediate Flashpoint	High Flashpoint	
Packaging Group I (Great danger)	Packaging Group II (Medium danger)	Packaging Group III (Minor danger)	Combustible 1	Combustible 2
Initial Boiling Point 35°C Flash Point minus 23°C	Initial Boiling Point 35°C Flash Point minus 23°C	Initial Boiling Point 35°C Flash point 23°C to 60°C	Flash Point 60°C to 150°C	Flash Point 150°C plus
<b>Flammable</b>			<b>Combustible</b>	
<ul style="list-style-type: none"> <li>petrol</li> <li>ethanol</li> <li>hexane</li> <li>naphtha</li> <li>aviation gas</li> <li>racing fuels</li> </ul>			<ul style="list-style-type: none"> <li>heating oil</li> <li>auto diesel fuel</li> <li>fuel oil</li> </ul>	<ul style="list-style-type: none"> <li>most lube oils</li> <li>greases</li> </ul>

## 2.4 AUTO IGNITION

### Step 1 Spontaneous combustion

- Auto ignition is the lowest temperature at which a product will spontaneously ignite without the need for an external source of ignition such as a flame or a spark.
- Petroleum products have different Auto Ignition temperatures;
  - Petrol can automatically ignite at 280 degrees Centigrade;
  - Whereas Kerosene will automatically ignite at 295 degrees Centigrade; and
  - Diesel will automatically ignite at 335 degrees Centigrade.

## 2.5 DENSITY

### Step 1 Product weight

- Another important property to understand is Density, a measure of the products mass or weight.
- As an example 1 litre of water weighs 1 kilogram, so the density of water would be measured as "one" (1.0). Where as one litre of petrol with a density of (0.725) will weigh point seven two five of a kilogram or in other words seven hundred and twenty five (725) grams.
- We use density information to calculate the product weight when we are loading a vehicle.  
For example, if you are told to load 16 tonnes of product into a tanker, by using the product density you can calculate the volume or litres to be loaded:
  - By dividing 16,000 kilograms by the density of the product for example
  - A petrol density of (0.725) is calculated as 22,070 litres of product; and
  - A diesel density of (0.830) is worked out to be 19,277 litres.

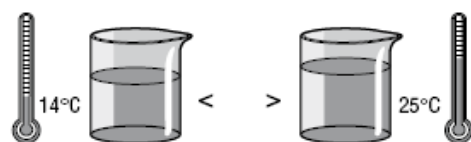
### Step 2 Contamination

- If your loaded product is contaminated or mixed with another product, then the product density will have changed.
- For example, if petrol is added to a load of diesel, then the density of the diesel is decreased. On the other hand, if diesel is added to petrol, then the density of the petrol is increased.
- Testing a products density is a way to detect whether a product is contaminated.

### Step 3 Temperature

- When the product temperature is raised or lowered the product density and volume will change.
- Here is an example; 20-litres of diesel at a temperature of 14 degrees has a density of 0.835. The diesel is then heated to 25 degrees, the volume has now increased to 20.2 litres and the density has decreased to 0.831.

Automotive Diesel Fuel



Volume = 20 litres  
Density = 0.835  
Weight = 16.7 kg

Volume = 20.2 litres  
Density = 0.831  
Weight = 16.7 kg

- This is why tanks and compartments are not filled above the safe fill level, always leaving space to allow for the possible increase in volume of product if the temperature rises. If a compartment of product loaded to 8000 litres is heated by about 10 degrees, the volume can increase to almost 8100 litres.

## 2.6 COLOUR IDENTIFICATION AND APPEARANCE

### Step 1 Colour

- An important property of our products is colour.
- Some products are coloured to help us identify what the product is.
  - Unleaded Petrol, Premium Unleaded Petrol and E10 from October 2015 will range from yellow to pale yellow in colour;
  - Aviation Gasoline or Avgas is coloured either green or blue;
  - Lighting Kerosene is coloured blue or clear;
  - Automotive Diesel can range from pale yellow to straw or even appear as a pale fluorescent green colour; and
  - The colour of Jet Fuel is identified as water white, this simply means it's transparent, and very clear and bright in appearance.
- Being able to identify a product through its colour is important when loading, but following procedures and ensuring you have the correct connection from the loading gantry to your tanker compartment is critical. If the product colour does not appear to match what you are loading then contact a terminal supervisor for assistance.

### Step 2 Appearance

- The appearance of the product is also very important and products are required to be clear and bright when sold to a customer.
- Visual inspection of the product can allow us to detect water, sediment or other contaminants. You should inspect the product through the sight glass and ensure that the product is:
  - Not cloudy or hazy (which can indicate the presence of water);
  - There should not be water separating out from the product; and
  - The product should not contain scum or sediment.
- If you notice anything unusual in the sight glass or you are just not sure, then contact the terminal supervisor for assistance.

**END**

## MODULE 3: TANKER LOADING

Duration: .....	31
Learning outcomes .....	31
3.1 Inspecting and Preparing for Loading .....	32
3.2 Loading Vehicle Position .....	33
3.3 Vehicle Set Up .....	33
3.4 Loading Product.....	34
3.5 Vehicle Disconnection .....	35
3.6 Documentation and Terminal Exit .....	36
END .....	36

### DURATION:

The estimate time to complete this section is 40 Minutes

### LEARNING OUTCOMES

As a result of satisfactorily completing this training module, participants will be able to

- 3.1 Demonstrate basic knowledge of how to inspect and prepare a vehicle for loading dangerous goods
- 3.2 Shows a basic knowledge of why a vehicle needs to be positioned correctly in the load bay.
- 3.3 Displays a basic knowledge of how set up a vehicle to load dangerous goods
- 3.4 Demonstrate basic knowledge of how to load dangerous goods
- 3.5 Exhibits an understanding of how to safely disconnect a vehicle after loading dangerous goods
- 3.6 Shows a basic knowledge of loading documentation requirements and safely exiting a terminal

## 3.1 INSPECTING AND PREPARING FOR LOADING

### Step 1 Non essential equipment

- Before driving your vehicle into the terminal, turn off all non-essential vehicle electrical components such as; radios, including CB and two way radios, mobile phones, GPS units, personal electrical devices, air conditioners, and ice packs.
  - Turn off vehicle lights only when safe to do so.
- Non-essential vehicle electrical equipment must remain off at all times while the vehicle is inside the terminal.

### Step 2 Observation

- Observe terminal speed limits and be aware of all structures, protective barriers, personnel and other vehicles.

### Step 3 Gantry exclusion

- Your vehicle must come to a complete STOP at the gantry exclusion zone, once your vehicle comes to a stop, check to ensure the loading bay is clear and safe to enter before continuing on and entering the loading bay.
- Before entering the loading bay turn off your vehicles headlights, taillights and clearance lights.

### Step 4 Designated waiting area

- If the loading bay you require is in use, then you must park your vehicle in the designated waiting area, turn off your engine, apply your park brake, place the gearbox in neutral and remain in the vehicle cabin or near to your vehicle.

### Step 5 Pre loading inspection

- Complete your vehicle pre loading inspection and check your vehicle for leaks or damage and ensure it is ready to load. Report all faults to a terminal supervisor and seek advice before attempting to load your vehicle.
- Pre loading inspection must include a check to ensure your tankers hatches and dip and fill caps; are locked, pinned or wired closed.

### Step 6 Return to service

- Tankers that are returning from routine service or repairs must be inspected using a 'Safe Load Program Return to Service tag or checklist'
- The checklist must be filled out, signed and handed in at the terminal before the tanker can be loaded.

### Step 7 Prepare to position the vehicle

- Now that your tanker has been checked, and the loading bay is clear you are ready to position the vehicle in the loading bay.



## 3.2 LOADING VEHICLE POSITION

### Step 1 Position the vehicle

- Position your vehicle in the loading bay so that the loading arms can easily reach your vehicles loading valves.

### Step 2 Vehicle preparation

- You must:
  - Stop your vehicle engine.
  - Apply your park brake.
  - Put your gearbox in neutral.
  - Close your cabin windows and doors.
  - Your vehicle must remain unlocked with the key in the ignition.
  - Your battery master switch must be left in the 'on' position

### Step 3 Exit vehicle

- Exit your vehicle safely, maintaining 3 points of contact.

## 3.3 VEHICLE SET UP

### Step 1 Drive away protection

- Unlock and raise your drive away protection bar.

### Step 2 First on

- Connect the gantry over fill protection system to your tanker, by connecting the loading bay plug to your tanker socket. Obtain a green light before proceeding to the next step

### Step 3 Static clip

- Ensure the static clip connected to your metal bucket is securely attached to your tanker and the metal bucket is placed directly below the loading valve outlet before removing your loading valve dust cap.
- Make sure the loading valves are clean.

### Step 4 Drain dry

- Open your tanker internal valves by operating the internal valve air control button and commence compartment draining.
- Your tankers compartments must be fully drained dry.

### Step 5 Empty draining's bucket

- Once you have drained your compartments, immediately secure the bucket static clip to the gantry product returns tank, before emptying the contents of your bucket.

### Step 6 Product labels

- Ensure the product labels on the tanker loading valves are correctly set to match the product to be loaded.

## Step 7 Vapour hose

- Disconnect your vapour recovery hose from your tanker, and connect the hose to the loading bay vapour connection.

## Step 8 Loading arm selection

- Select the loading arm for the compartment to be loaded.

## Step 9 Product labels match

- Check to ensure the loading arm product label and the tanker loading valve product label match

## Step 10 Connect loading arm

- Connect the loading arm to the tanker-loading valve.
- Ensure the loading arm coupling clicks into place.
- Hold the loading arm in place, and operate the loading arm tension handle.
- Ensure the tension handle is fully engaged

## Step 11 Ready to load

- Your tanker is now connected and ready to be loaded.

## 3.4 LOADING PRODUCT

### Step 1 Bay Controller

- Enter your loading information into the bay controller. Be aware that bay controller systems can operate differently at each terminal. Be sure to follow the on screen prompts.
- Remember that you should not wear gloves when operating the bay controller.

### Step 2 Point of no return

- You are now at the point of no return in the loading process, so before pressing the start button check to ensure that you're loading information is correct, and that the loading arm is connected to the correct compartment.

### Step 3 Check connection

- Once pumping begins, check the connection between the loading arm and your tanker, looking for product leaks or drips.

### Step 4 Remain alert

- As pumping continues remain alert and continually monitor the loading arms and tanker for leaks, and listen for unusual sounds that may indicate a problem with venting that can lead to a loss of product.
- Should a problem occur;
  - **STOP** all pumping; and
  - consider if the emergency stop or alarm button should be activated.
  - **"Caution"** Your safety and the safety of others is your top priority!
  - Only when safe should you consider.
    1. Containing leaks in a bonded metal bucket; and
    2. Completely disconnecting the vehicle from the gantry
  - Finally you must contact a site supervisor for assistance.

## Step 5 Remove the loading arm

- Once the compartment is loaded it's time to disconnect the loading arm from your vehicle. It's very important to ensure that once each compartment is loaded and the loading arm has been removed, that the tanker loading valve dust caps are replaced immediately.

## 3.5 VEHICLE DISCONNECTION

### Step 1 Disconnection

- Disconnect the loading arm from your tanker and secure the arm away.  
Report any excess product in drip trays to a site supervisor.

### Step 2 Replace dust caps

- Ensure all dust caps are securely replaced.

### Step 3 Vapour hose

- Disconnect the vapour recovery hose from the gantry and reconnect it to your vehicle's storage point.

### Step 4 Last off

- Disconnect the overfill protection system plug from the tanker socket and store on the socket provided in the gantry.
- Remember – "First on – Last off".

### Step 5 Drive away protection

- Lower the drive away protection bar and lock it into position.

### Step 6 Check area

- It is important to check the area thoroughly before you move your vehicle. Check to ensure any draining buckets and other obstacles have been removed.

### Step 7 Walk around

- At this point you must complete a vehicle walk around before moving your vehicle.
- If you are loading additional trailers, then move your vehicle forward and repeat the procedure.

### Step 8 EIP

- After completing loading, set your vehicle's dangerous goods signage and emergency information panels to match the product being transported.

### Step 9 Documents

- Ensure the correct emergency guidance documents are available for the product loaded.
- You are now ready to complete your loading documentation.

## 3.6 DOCUMENTATION AND TERMINAL EXIT

### Step 1 Paperwork collection

- Ensure your vehicle is parked in a designated parking area before leaving your vehicle to collect the load paperwork and finalise your documentation.

### Step 2 Load volume

- Check to ensure your loaded volume is equal to the ordered or scheduled pre-set quantity.
- Contact a site supervisor if the volume loaded does not match the quantities expected.

### Step 3 DG paperwork placement

- Place the dangerous goods manifest with the delivery paperwork in the vehicle cabin.
- Refer to the local terminal and supplier requirements for documentation.

### Step 4 Walk around

- Ensure your vehicle is free from obstructions and can be safely driven from the terminal.
- When exiting the facility, use blind spot mirrors provided, ensure pathways are clear of pedestrians and roadways clear of vehicles.

**END**

## MODULE 4: VEHICLE AND GANTRY KNOWLEDGE

Duration .....	38
Learning outcomes .....	38
4.1 Non essential electrical .....	38
4.2 Terminal driving rules .....	38
4.3 Vehicle parking .....	38
4.4 Automatic gearbox vehicles .....	38
4.5 Working at height .....	39
4.6 Dip and fill cap security .....	39
4.7 Gantry entry .....	39
4.8 Return to service.....	39
4.9 Hose dust plugs and dust caps .....	39
4.10 Clean loading valves.....	39
4.11 Check that your compartment is empty .....	40
4.12 Loading arm and tanker compartment selection.....	40
4.13 Tanker compartment loading order .....	40
4.14 Loading can affect your vehicles road safety .....	41
4.15 Drive away protection gate .....	41
4.16 Overfill protection system .....	41
4.17 Static electricity .....	41
4.18 Connecting a static clip.....	41
4.19 Internal valve activation .....	42
4.20 Ramp up and ramp down .....	42
4.21 Product draining containers.....	42
4.22 Bio fuel slops .....	42
4.23 Loading arm manual handling.....	42
4.24 Vapour removal and recovery.....	42
4.25 Checking for leaks .....	43
4.26 Other work .....	43

## DURATION

The estimate time to completed this section is 40 minutes

## LEARNING OUTCOMES

As a result of satisfactorily completing this training module, participants will be able to: C1/1.2

Identify hazards in the loading of dangerous goods vehicles.

Identify items of equipment and materials that have the potential to be ignition sources

Demonstrate an awareness of the safety equipment used in the loading of dangerous goods vehicles.

### 4.1 NON ESSENTIAL ELECTRICAL

- Turning off all nonessential electrical equipment and having it remain off at all times while the vehicle is inside the terminal has two purposes; the first is reduce the number of electrical items that could create an ignition source, and secondly is to ensure the devices do not distract you from the important task of loading your vehicle.
- Some vehicles are fitted with a single switch known as a “non-essentials switch” where all or many of the hard-wired nonessential electrical items are turned off by activating this single switch. Ask your employer or vehicle owner what items are turned off when you activate the non-essentials switch.
- Turning off vehicle head lights, taillights and clearance lights before entering the loading bay also reduces the number of possible ignition sources.

### 4.2 TERMINAL DRIVING RULES

- You must comply with terminal driving rules, and know that all accidents are avoidable, so it is important that you observe terminal speed limits and be aware of all structures, protective barriers, personnel and other vehicles.
- A small accident in a fuel terminal can have a horrific outcome.

### 4.3 VEHICLE PARKING

- Before loading make sure your vehicle is parked in a designated waiting area and that you remain in or near your vehicle.
- If your vehicle is parked in the correct area then it will be at a safe distance from the gantry and staying close to your vehicle means you can quickly move your vehicle to a safe location if there is an emergency.

### 4.4 AUTOMATIC GEARBOX VEHICLES

- Our standard vehicle parking instructions ask you to place your vehicle gearbox in neutral, but if you are operating a truck fitted with an automatic gearbox then please refer to the vehicle operating instructions when parking your vehicle.
- Some manufactures require the auto gear lever be placed in the park where some manufacture request the gear lever be placed in neutral.

## 4.5 WORKING AT HEIGHT

- Vehicle preloading inspection requires that you to check to ensure your tankers emergency hatches and the dip and fill caps; are locked, pinned and or wired securely closed.
- In order to check these hatches you may be required to climb your tanker access ladder to a point only high enough that you can clearly see your hatches.

**At all times maintaining 3 points of contact.**

- Each terminals working at heights rules or the rules for climbing your tankers ladder may be different so first seek approval by the terminal supervisor before your feet leave the ground.

## 4.6 DIP AND FILL CAP SECURITY

- Compartment hatches are generally fitted with dip and fill point camlock caps, it is very important that these caps are in place; the levers or camlock ears must be closed, locked wired or pinned to prevent the ears or arms from coming undone.
- If a camlock cap is not securely fitted it can be easily blown off due to the high volume of product being forced into the compartment during loading.
- Compartment dip and fill tubes travel from the bottom of the compartment to the top hatch, so once a cap is removed any product entering the compartment during loading is forced up the tube and out through the dip or fill point.
- There are recorded cases where a compartment filled with less than two hundred litres of product during loading has forced product out through a fill tube when the cap has been blown off.

## 4.7 GANTRY ENTRY

- Occasionally a loading bay may not be available either due to maintenance; or a product may not be available. Terminal staff will restrict access with safety cones, signage and or safety barriers. If the bay you wish to use is closed, contact terminal staff for further information.

## 4.8 RETURN TO SERVICE

- If your tanker is returning from service work or repairs, then you must ensure a 'return to service' tag or checklist has been completed by the workshop or the repairer and has been checked and signed by you before being handed in to terminal staff before loading.

## 4.9 HOSE DUST PLUGS AND DUST CAPS

- When removing a dust plug from a fuel hose or vapour hose or when you are removing a dust cap from a tanker outlet valve, caution should always be used and you should slowly release one camlock ear at a time, checking for any sign of retained product or build up of pressure held in the hose dust plug or dust cap.
- People have suffered serious facial injuries from hose plugs that have been forced out under pressure.
- Failure to slowly release camlock caps checking for retained product can lead to spills.

## 4.10 CLEAN LOADING VALVES

- Ensure that you keep the surfaces of your loading valves as clean as possible, dirt and road grime can make its way to the loading valve surfaces and causes damage to the valve face and seals.

- Once the seals and valve face are damaged they start leaking or weeping during loading, damp or wet valves then attract more dirt and grime leading to more damage, and larger leaks.
- Every time you remove the dust cap check to ensure your valves are clean and free from grime.

## 4.11 CHECK THAT YOUR COMPARTMENT IS EMPTY

- One of the easiest ways to check if your tanker is empty is to simply tap your knuckles or slap your hand on the shell of your tanker; the sound an empty tanker makes is noticeably different to that of a full tanker.
- When draining your tanker compartments it's important that the tankers internal valves are open to ensure all remaining product is drained from the compartment before loading.
- With your tanker Internal valves open check to see if there is product in the outlet sight glasses, extra care should be taken when opening the tanker loading valve if the sight glass is full of product.
- A tanker outlet pipe that is not correctly drained could contain up to 20 litres of product.
- Emptying or discharging your tanker on anything other than flat level ground can result in product remaining in your tanker compartments.

## 4.12 LOADING ARM AND TANKER COMPARTMENT SELECTION

- It can be easy to select the wrong loading arm or connect to the wrong compartment if you don't remain focused. This can end in overfilling a compartment or putting the wrong product in a compartment.
- The best way to avoid confusion is to connect and start one loading arm at a time.
- The process is easy; Connect the loading arm to the compartment, (before continuing once again confirm your choice of loading arm and tanker compartment with your paperwork) only then should you start the loading pump, finally check the connection for leaks!
- This process can then be repeated for your second and third loading arm connections.
- By following these simple rules you can reduce confusion leading to you making mistakes.
- Some other safety points to note when connecting loading arms:
  - You must not cross loading arm hoses as this can lead to confusion and place extra tension on the arm, which can cause arm or valve coupling failure with disastrous consequences.
  - If the loading arm valve handle is stiff or difficult to move, do not continue to use the loading arm, please report the fault to a terminal supervisor who will tag the arm out for inspection and maintenance.

## 4.13 TANKER COMPARTMENT LOADING ORDER

- Before loading your tanker you must consider the order in which you will load and also unload your tanker.
- If you're preparing your tanker load plan then you also need to think about how your tanker will be unloaded, particularly if you are unloading product at more than one location.
- Driving a tanker with an unstable load is very dangerous and should be avoided.
- Keeping weight over the vehicle axles is usually seen as best practice when you are required to download a tanker.
- In a typical six compartment tanker loading should start with compartment one and six followed by two and five, finally finishing with compartments three and four.
- Note when unloading your tanker just reverse the order of loading four, three, five, two, six and finally compartment one.
- Please note that loading compartment one first, is dependent on the location of the vehicle turntable and the tanker king pin and skid plate.
- In some cases it can be safer for stability to load compartment two before loading compartment one due to the location of the connection between the tanker and the truck.



- Please discuss the loading order or your tanker with your supervisor.

## 4.14 LOADING CAN AFFECT YOUR VEHICLES ROAD SAFETY

- If your vehicle is not loaded correctly it can affect your vehicles ability to deal with normal road conditions, it can affect vehicle stability during braking, your vehicles cornering performance can be seriously reduced and your vehicles stability may be compromised when you require it the most during an emergency.
  - If you are downloading your vehicle ensure the majority of product and weight is loaded directly over the vehicle axles.
  - When operating a downloaded vehicle use caution when driving; be prepared for the unexpected; take time to understand how your vehicle responds when downloaded.
  - If you are concerned that your vehicle may be incorrectly loaded and unstable then seek advice from your supervisor or a terminal supervisor before leaving the terminal.

## 4.15 DRIVE AWAY PROTECTION GATE

- Tankers are fitted with a bar or gate that is positioned across the front of the tanker loading valves this gate is designed activate the trailer brakes when the gate is raised or opened.
- Gates are also designed to ensure that loading arms or the overfill protection system plug are not connected while the gate is closed ensuring that while any of these items are connected to the tanker the gate must be open and the trailer brakes are on.

## 4.16 OVERFILL PROTECTION SYSTEM

- The overfill protection system is designed to provide a number of safeguards one is to provide a means of equalising and dispersing static built up during the loading process via the electrical bonding connection made when the plug is connected to the tanker, and secondly to provide a final safeguard to overfilling tanker compartments.
- The overfill protection system will ensure that even if a mistake is made and the compartment is filled beyond its safe fill level, the overfill probe will activate the overfill protection system shutting down the pumps and closing valves in the gantry stopping the flow of product.
- It's very important that the tanker overfill protection system probes are set at the correct level. Incorrectly set probes may not allow the gantry system to close down quickly enough and product will fill beyond the maximum capacity of the compartment, spraying product from the emergency vents creating a spill the loading bay.
- For everyone's safety we need to keep the product on the inside of the tanker.

## 4.17 STATIC ELECTRICITY

- To ensure you and your tanker and the loading gantry are at the same electrical potential its advised that you place your bare hand on your tanker immediately after exiting your vehicle cabin, this will ensure you and your tanker are at the same static electrical potential.
- Operating the loading bay control panel with bare hands will also ensure you and the gantry are at the same electrical potential.

## 4.18 CONNECTING A STATIC CLIP

- One of the most important things you can do for your own safety is connecting a bonding clip before draining product into a bucket or container.

- It's most important to place the bonding clip in a location that provides the best possible bond, connect your static clip to a bare metal surface like the underrun protection rail or the loading valve panel, avoid connecting static clips to moving parts like the loading valve handles.

## 4.19 INTERNAL VALVE ACTIVATION

- Tanker manufactures have several different methods of opening the tanker internal valves, some are operated by pressing in an individual valve or button located above each tanker loading valve, or they may be operated by one single valve button located somewhere above the tanker loading valves, and some internal valves are opened automatically by raising the loading valve drive away protection gate.

## 4.20 RAMP UP AND RAMP DOWN

- The automatic loading gantries have a system of slow fill at the start of loading and again a slow fill rate at the end of loading.
- The slow loading rate is designed to reduce product splashing in the compartment that also reduces the generation of static electricity. Slow fill at the end of loading reduces product surge or wave action in the compartment as it gets close to the compartment safe fill level.

## 4.21 PRODUCT DRAINING CONTAINERS

- Draining your tanker compartments before loading is very important, but it is also very important to empty your draining container immediately after draining your tanker.
- Having an open container of product in the gantry can offer many hazards to your work area like, fuel vapours, a potential spill or trip hazard, these hazards can lead to the more serious risk of fire.
- Empty all draining containers immediately after draining.

## 4.22 BIO FUEL SLOPS

- Requirements for the disposal of Bio fuel slops can vary at each terminal you must ensure you are aware of each terminals specific requirement for the disposal of Bio fuels.

## 4.23 LOADING ARM MANUAL HANDLING

- When operating gantry loading arms you need to ensure you are physically prepared to move and locate the loading arm into position.
- Use your manual handling techniques; use your legs, move your feet when moving the loading arms, don't twist from the waist.
- Don't force a loading arm into position as this can put increased pressure on your lower back, if the loading arm appears to be stiff or hard to move then, STOP and don't use the arm, as soon as possible report the fault to terminal staff so the arm can be serviced or repaired.

## 4.24 VAPOUR REMOVAL AND RECOVERY

- Vapour recovery systems have a number of functions including supporting health, safety, environmental protection and cost reduction, whereas vapour removal systems support health and safety.
- Vapour recovery and removal systems remove high volumes of product vapours from the air in the loading bay during vehicle loading.
- Without vapour removal or recovery the loading bay would fill with fuel vapours exiting the tanker during loading.

- The loading bay would be filled with dangerous fuel vapours looking for an ignition source, and people working in the loading bays would be inhaling those fuel vapours.
- Vapour removal or recovery is very important in reducing the volume of dangerous vapours in the loading gantry during loading, so be sure your vapour recovery hose is in good condition and properly connected. Report any suspicious sounds from your tanker while loading that may be releasing fuel vapours in the loading bay.

## 4.25 CHECKING FOR LEAKS

- Before you start pumping you should have checked your vehicle for any sign of a leak and once pumping begins, you must continue to observe your tanker and the loading arm connection to your tanker for any leaks or drips.

## 4.26 OTHER WORK

- You must not perform any other work in the terminal or gantry such as mechanical repairs or cleaning while loading is underway.
- During pumping you must remain alert and continually monitor the loading arms and tanker for any leaks or problems with venting that may lead to a loss of product.
- Remember should you have a problem;
  - STOP all pumping.
  - Consider if the emergency stop or alarm should be raised.
  - Contain all leaks (only when it's safe to do so) in a bonded metal bucket.
  - If it's a minor leak, make the area safe. Completely disconnect the vehicle from the gantry if it's safe to do so, and contact a site supervisor for assistance.

**END**

## SLP PASS-2-LOAD

### PASS-2-LOAD

SAFE LOAD PROGRAM: PASS 2 LOAD

QR Code linked to the Pass Number

Vehicle Registration

Authorised Inspection Location

Date of Inspection

**PASS-2-LOAD**

**Equipment:** REGO

**Issued by:** AIL Name / Number

**Insp Date:** Pass Date

**Expiry** MONTH

**Month of Expiry**

**Pass Number** 0000000000

**SLP**

#### Objective

- to ensure vehicle entering terminals and depots to load petroleum products are safe to load
- to protect both drivers and terminal/depot while vehicle is on premises

#### Pass validity

- six months from month of inspection

#### Inspections

- prime mover and trailers (including dollies) must be compliant to SLP requirements, and passes issued for each individual vehicle