AUSTRALIAN MADE

DURO TANK™

1300 829 802

BUILT TOUGH, PROVEN TOUGH

OPERATING AND MAINTENANCE GUIDELINES

www.durotank.com.au

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SECTION 1
OVERVIEW

Introduction

Congratulations on purchasing Australia's most up to date and versatile fuel storage system. In order to obtain the most from your purchase please read this manual thoroughly before installing or using your DURO Tank. For warranty details, see Appendix A3.

The design of the DURO Tank includes 'self-bunding' and the tank can be situated onsite, within nominated separation distances, without the need for an external bund to be constructed. This feature also allows a DURO Tank to be readily relocated if required, without the need to construct any additional bunding.

Standards

DURO Tanks are designed to meet the following standards. These standards should continue to be used in the ongoing operation, maintenance and any changes or additions:

It should be noted that the testing process is a continual ongoing requirement to retain approval to this standard.

AS1692 Steel tanks for flammable and combustible liquids

AS1692 covers the design requirements for tanks used for the storage of flammable and combustible liquids. DURO Tanks are designed to meet or exceed these requirements.

AS1940 The storage and handling of flammable and combustible liquids

AS1940 is the Australian Standard covering the design, operation and maintenance of flammable and combustible liquid storages. DURO Tank equipment is designed to meet the requirements of AS1940, if correctly installed.

An up-to-date copy of AS1940 should be kept on-site at all times and referred to regularly in addition to any recommendations in this manual.

Several other Australian Standards are referenced in AS1940. Summary of related Australian Standards is listed below:

- AS1020 The control of undesirable static electricity
- AS1692 Tanks for flammable and combustible liquids
- AS1851 Maintenance of fire protection equipment
- AS2865 Safe working in a confined space.
- AS2683 Hoses and hose assemblies for petroleum products
- AS3000 SAA Wiring Rules

Australian Standards are available from Standards Australia - www.saiglobal.com

SECTION 2
HEALTH, SAFETY and ENVIRONMENT

Legislation

Each State and Territory Government has enacted legislation aimed at protecting the health and safety of employees in the workplace. The Acts and Regulations effectively require an employer to provide employees with a safe place of work.

The legislation imposes obligations on both employer and employee. The information in this section of the Operating & Maintenance Manual is aimed at assisting Management and their staff to meet their Occupational Health and Safety obligations, but it is not exhaustive and compliance with the requirements set out here cannot ensure compliance with the law.

The administrative requirements of the Acts and Regulations vary significantly across the jurisdictions and management must be aware of, and comply with local requirements.

Employer Obligations

Essentially, an employer of staff is obliged to:

- Provide a safe place of work for employees
- Identify hazards, assess risks, decide on and implement control measures and monitor the effectiveness of these control measures
- Train employees in the operations that they are required to perform in the execution of their duties
- Provide safety equipment appropriate to the performance of the task
- Take into account the employees training and ability when allocating tasks
- Put in place procedures to ensure all tasks are undertaken in a manner which does not place an employee's safety at risk
- Maintain records that demonstrate these obligations have been met

Employee Obligations

- Correctly use and maintain the safety equipment provided
- Abide by published work procedures and practices
- Report to the employer any hazards identified in the course of their duties
- Comply with statutory regulations, such as Road Traffic Regulations and the Dangerous Goods Regulations

Safety, Health and Environment Policy

Most sites have written Health, Safety and Environment policies in place, which are to be followed at all times. In the absence of any site policy, as a minimum, legislative requirements should be followed at all times.

TRAINING

Bulk Storage Facilities Training

Each employee shall be trained in such duties as have been individually assigned to that person. The training of employees shall include the following as appropriate:

a) Layout and Operation of the facilities
b) Maintenance procedures
c) Procedures to be followed in the event of an incident (spillage, accident or fire)
d) Location of firefighting equipment
e) Basic principles of fire-fighting, and the use of fire extinguishers and fire-fighting equipment
f) Statutory regulations relevant to employees' tasks
g) Awareness of the properties, characteristics and hazards of any materials kept or handled and materials to be brought on-site
h) Correct use of any personnel protective equipment provided
    i. Area housekeeping
    ii. Safety rules of the installation, including any restrictions on movement, access or activities

Training - Emergency Response Personnel

Persons having been assigned emergency duties shall be given specific training in those duties. Such duties may include, among other things:

a) Fire-fighting
b) Spillage control, clean-up and decontamination
c) Evacuation control, and
d) First aid

Drills should be conducted at regular intervals to ensure that assigned persons have adequate opportunity to become familiar with their tasks. Local emergency services should be involved in joint exercises wherever possible.

Unsafe Plant and Equipment

Unsafe or faulty plant and equipment is to be withdrawn from operation immediately the situation is identified in such a way that inadvertent operation is not possible. Such withdrawal from operation may be by way of electrical isolation of the driving motor by locking off and tagging the relevant circuit breaker, by closing, locking and tagging isolating valves, or by providing a physical barrier to prevent access.

Whichever method is used, it must be positive and require a number of definite, considered actions to bypass the isolation. Isolation of faulty plant or equipment may be withdrawn only when the fault

has been rectified and the item of plant or equipment accepted as safe by the operational supervisor of the relevant area. Nobody shall be directed or expected to operate unsafe plant or equipment.

Personal Safety

Petroleum products i.e.: solvents, petrol, diesel etc. should not be used for cleaning hands or any part of the body. If splashed with product, wash thoroughly with soap and warm water (if available) or use hose on site to wash body. Before removing product soaked clothing, drench clothing thoroughly by using hose on site. Never wear fuel soaked clothing in a building or vehicle. Always stand clear of vents or hatches during tank filling operations to avoid inhaling fumes. Staff must wear the appropriate PPE i.e.: protective footwear, safety glasses, hard-hat and gloves where appropriate.

Only trained staff operating with a Work Permit and Confined Space Entry Permit with specific operating conditions may enter a confined space.

Personal Protective Equipment

As a minimum, staff working within the Restricted Area of a bulk fuel or lubricants storage facility should wear protective footwear and appropriate anti-static clothing.

When handling bulk or packed product, suitable gloves and eye protection should be worn. Gloves, which may absorb spilled hydrocarbon product into the material of the gloves, are not suitable. Staff working outdoors should be provided with, and wear, hats and sunscreen where appropriate for sun protection. When handling bulk product into or out of vehicles or filling drums, protective safety glasses or a face shield must be worn to protect against product splashes. Personal Protective Equipment must comply with the relevant Australian Standard and be maintained in good condition.

All vehicles carrying Dangerous Goods are to be equipped with personal protective equipment specified by the ADG Code.

The following standards should apply to personal protective equipment:

a) Protective clothing complying with AS 2919, AS 3765.1 or AS 3765.2, and suitable for use with the specific liquids being handled.
b) Eye protection, selected in accordance with AS/NZS 1337.
c) Protective gloves complying with the relevant parts of the AS/NZS 2161 series of Standards.
d) Safety helmets complying with AS/NZS 1801 and selected in accordance with AS/NZS 1800.
e) Safety footwear complying with AS/NZS 2210 (series).
f) Respirators having appropriate filters, and self-contained breathing apparatus (SCBA) complying with AS/NZS 1716 and selected, used and maintained in accordance with AS/NZS 1715.

NOTE: MSDS may provide further information on suitable personal protective equipment.

First Aid

At least one person in each installation should be qualified in Workplace First Aid in accordance with legal requirements, irrespective of the number of staff set as a legal threshold. A First Aid kit to meet the legal requirements should also be available.

Incident/Accident Reporting

All accidents and incident should be reported. Product spillage (Loss of Containment) in excess of 5 litres should also be reported, even if contained within spill containment areas.

Refer Site Procedures.

Preparation of work site

The relevant site area and plant shall be prepared in a way that reduces the potential for fire, explosion, or exposure of persons to a hazardous substance.

Precautionary measures shall include the following, as appropriate:

a) Identification of both the equipment to be worked on and other affected equipment.
b) Depressurisation and disconnection of such equipment.
c) Isolation and locking-off of the equipment from other equipment.
d) Purging of the equipment.
e) Where the work to be carried out may impact upon hazardous substances, the removal of those substances from the immediate vicinity.
f) Sealing-off of sewers.
g) Provision of appropriate fire-protection equipment.
h) Testing of the work environment for flammable or hazardous vapours and oxygen content.

Confined Space Entry

The DURO Tank equipment includes manholes for internal inspection and cleaning as/when required. The space inside the tanks is a confined space.

Only trained staff operating with a Work Permit and Confined Space Entry Permit with specific operating conditions may enter a confined space. The requirements of AS2865 should also be applied.

SECTION 3
GENERAL PRODUCT HANDLING

Classification of Petroleum Products

Petroleum products are classified by their flashpoint as follows:

Flammable Liquids

- PG II Flashpoint < 23°C e.g.: petrol, avgas, solvents
- PG III Flashpoint 23-61°C e.g.: kerosene, jet fuel

Combustible Liquids

- Class C1 Flashpoint 61-150°C e.g. diesel, most fuel oils
- Class C2 Flashpoint >150°C e.g. most lubricating oils

AS1940, the main standard governing fuel and lubricant installations has more stringent requirements for flammable liquids than combustible liquids. Under the ADG Code, Flammable liquids are classified as ***"Dangerous Goods"*** while combustible liquids are not.

Diesel and lubricating oils are classified as combustible liquids.

Flashpoint

Flashpoint is the temperature at which the product will produce vapour in sufficient quantities to be ignited by an ignition source – see typical product classifications above. It should not be confused with the auto-ignition temperature.

Auto-ignition Temperature

Auto-ignition temperature is the temperature at which the product will auto-ignite given suitable levels of oxygen (without the need for a separate source of ignition). Typically the auto-ignition temperature for petroleum products is 220°C or greater.

Product Handling Hazards

In handling of petroleum products, staff may be exposed to a number of potential hazards such as:

Fire: Inevitably, some flammable vapour is generated in day-to-day depot operations and can be a fuel source for a fire.

Exposure to Product Vapour: As well as providing a fuel source for a fire, high exposures to product vapour may have an adverse effect on human health.

Exposure to Liquid Product: Liquid Hydrocarbons can adversely affect skin by its drying action, which can also lead to dermatitis. Product splashed into the eyes can cause damage if not flushed immediately.

Static Electricity: can be a source of ignition for flammable vapours with resultant fires. (It is unlikely that sufficient static electricity is generated in product movement for it to be a direct hazard to human health as the result of an electrical discharge through the body).

The first three of these hazards are minimised by storing and handling the product in sealed systems as far as practically possible, and, where the product is exposed to the atmosphere in normal operations, by taking appropriate precautions. Fire prevention principles and precautions are detailed in Section 6 of this Manual, while precautions to minimise the risks of exposure to vapour or liquid, and information on static electricity, follow in this section.

Accidental spillage of product can present unusual exposure to these hazards, and spillage prevention is covered separately.

Vapour Exposure

Every effort should be made to minimise exposure to hydrocarbon product vapour by taking a few sensible precautions:

- Don't stand near tank vents while tanks are being filled
- When dipping a tank, stand back from the dip point
- Never use petrol to clean parts or equipment

Exposure to Liquid Product

As with vapour exposure, exposure to liquid hydrocarbon product can be minimised by taking common sense precautions:

- Always wear protective PVC gloves when handling product in bulk or in packages
- Don't use gloves made from absorbent material, which can hold product in contact with the skin
- Always wear safety glasses, with side protection, or a full-face shield when handling bulk product, e.g. when dipping a tank
- Make sure hoses are in good condition, with no leaks and the seals are in place before using them.
- Take every precaution to avoid product spillage
- Clean up product spillage immediately and wear appropriate protective clothing, gloves, etc. while doing so
- Check equipment for leaks on a regular basis, report any found and tag the faulty equipment out of service immediately
- Do not leave product in open containers such as buckets or pails

STATIC ELECTRICITY

Control of Static Electricity

Static electricity is the cause of a significant number of fires/explosions where petroleum products are handled incorrectly.

Static electricity is generated whenever two dissimilar materials move against each other, including when petroleum products flow through pipe work and hoses.

Static charges accumulate on both the moving liquid and on the pipe or container. The magnitude of the charge depends on the electrical conductivity of the product and the container, and the ability to dissipate the charge to the earth. If the product is relatively conductive and the earthing system can dissipate the static charge as fast or faster than it can be generated, insufficient charge will accumulate to provide an ignition source.

All product lines and tanks are provided with electrical bonding and connections to earth stakes to dissipate electrical charges.

Some hydrocarbon fuels handled, such as Petrol, are sufficiently conductive that a static charge does not accumulate, ***while Diesel and others in the middle distillate range readily accumulate static charges in their natural condition.***

The conductivity of the middle distillates can be improved by the addition of certain additives and thus overcome the static accumulation problem. While most products will have been treated in this manner, it is impossible to guarantee all product has been treated and the effectiveness of treatment decays over time.

It is also much reduced by contaminants such as dirt/water. Hence, all fuels must be treated as though they will generate and accumulate static electrical charges when transferred.

For an electrical charge to flow or tend to flow between two objects, the two objects must be at different electrical potentials, i.e. they hold different charges or, in simple terms, they are at different voltages.

If the two objects are at the same potential, no charge will flow and no spark can occur between the two objects even if they are at very high potential or voltage.

This simple principle is used in the petroleum industry to prevent static electricity causing unwanted sparks in areas where flammable vapours may be present. When all the metallic parts of a system are electrically bonded, or connected, together they will all be at the same potential so no spark can occur between them.

The whole bonded system is then connected to earth to dissipate any charge that accumulates, so that if an unconnected body, such as a driver, approaches the system, no spark will jump from the bonded system to the unconnected body.

Product flowing through filters, pumps, and valves or around bends in the pipeline will generate larger static charges than when it is flowing through a straight pipe. Similarly, where there are more dissimilar materials in the flow, as when water or dirt contaminates the product, higher charges will be generated. In this latter situation, the product flow rate must be reduced to equate to a product velocity through the pipe of less than 1m/s.

In addition to the static electricity generated by product movement, static generated by friction between any two dissimilar materials may be encountered and can accumulate enough to cause a spark capable of igniting a flammable vapour mixture.

- Never remove clothing in the Restricted Area. Different fabrics rubbing together can cause sparks. Always thoroughly wet any contaminated clothing before removal.
- Always connect static bonding cables with bare hands to ensure your body is at the same potential as the cable, vehicle, pipeline, etc.
- Never load product when an electrical storm is in the area. Lightning is a natural discharge of static electricity.

Continuity Testing

Continuity tests shall be carried out at intervals not exceeding 6 months to ensure that earthing and bonding is effective and that the resistance does not exceed 1M ohm.

Valve Operation

A number of different types of valves will be found in product handling facilities, all of which have different characteristics needing a variety of operating techniques.

Gate Valves: Usually the most common type of valve found as an isolating valve in both main and branch product lines and on tank connections. When opening a gate valve, turn the hand-wheel anti-clockwise until it stops, then turn it back clockwise one quarter of a turn to leave the valve "free". To close a gate valve, turn the hand-wheel clockwise until it stops and leave it in that position to leave the valve "firm". When closing a gate valve, do not turn the hand-wheel back to leave the valve "free". The open or closed status of a gate valve, as used in the petroleum industry, is indicated by the position of the valve stem. If the valve stem is protruding from the centre of the hand-wheel, the valve is open, and if it is flush or almost flush with the boss of the hand-wheel, the valve is closed.

Ball Valves: Ball valves are a quick acting type of valve usually actuated by a lever handle which lies along the axis of the pipe to show the valve is open and across the pipe to indicate the valve is closed. Ball valves are used in similar locations to gate valves (see above). Ball valves must be opened and closed slowly (over 2 to 5 seconds) to avoid a sudden pressure build up, or "surge", which can damage equipment. Sudden closure of a ball valve causing this pressure build up may be accompanied by a dull "thump " or "bang" from the pipeline.

Thermal Pressure Relief Systems: Thermal pressure relief systems are provided in the product pipelines to prevent unacceptably high pressures occurring in the lines as a result of thermal expansion of the product.

Expressed simply, if a pipeline full of product, closed by valves at each end, is heated by the sun, the product will expand more than the pipe work and if there is nowhere for the extra volume to go, the pressure in the pipeline will rise to very high levels. The thermal pressure relief system allows the extra volume to bleed into a section of pipeline at lower pressure, preventing excessive pressure build up and avoiding possible equipment damage.

Product Sampling and Draining

From time to time it is necessary to draw samples, or drain tanks or pipelines. Always take samples or collect drainings in metal containers with a static bonding connection to the pipe or tank. The bonding connection is made before any product flows and must remain until after all flow ceases. When taking samples or collecting drainings:

- Never use plastic or plastic lined containers, or metal containers, which have been lacquered on the inside to prevent corrosion as these materials also prevent dissipation of static electricity charges.
- Do not use food containers, e.g. soft drink bottles, glass jars, etc. If a food container is reused after containing product, there is a risk of contamination of the food.

MANAGEMENT OF LEAKS AND SPILLS

General

Every endeavour should be made to prevent leaks or spills, and to control them if they do occur. Clean-up action should be taken immediately. Most product spillage in operations occurs while product is being transferred from one tank or container to another or during vehicle filling. To minimise the risk of spillage:

- Before starting to transfer product, check the receiving tank or container has sufficient free space (ullage) to take the volume of the proposed transfer. Dip the tank or read the tank gauging system where one is fitted and calculate the ullage.
- ***NEVER*** fill any tank above the Safe Fill Level.

When spills do occur, they should be cleaned up immediately.

The following are areas where spills may occur:

- Tank spill containment bund (front section of tank)
- Tanker Unloading Area
- Vehicle Filling Area

Samples or diesel from water draining should be poured directly into an oily waste collection container, NOT down an oily water drain.

Clean-up Materials and Equipment

In order to deal with leaks and spills, clean-up equipment and absorbent materials should readily available.

The following is a typical list of such materials and equipment:

a) Adequate quantities of absorbent material, e.g. sand, fuller's earth or suitable proprietary substances.
b) A sufficient number of resealable waste-recovery containers, e.g. drums, made of materials compatible with the substances being kept and appropriately marked as being for emergency use only.
c) Portable pumps and decanting equipment.
NOTE: Petrol-powered or non-flame proofed electric pumps are unsuitable for use with flammable liquids.
d) Shovels
e) Yard brooms
f) Drain covers

Cleaned-up material shall be disposed of in accordance with statutory requirements.

NOTE: It is unlikely that such wastes could be disposed of with general refuse destined for landfills.

Actions for dealing with Leaks and Spills

At every occurrence of a leak or spill, an immediate assessment needs to be made as to what action is to be taken.

If the spill is less than one litre, clean up the spill with absorbent material and/or hose down the area to an appropriate oily water drain/spill collection system (if installed)

DO NOT HOSE DOWN TO STORMWATER.

If the spill is more than one litre and depending on the size of the spill, consider implementation of the site emergency plan and notifying the emergency services.

Emergency services should be notified when:-

a) The liquids have spread, or have the potential to spread, beyond the boundary of the installation;
b) It is beyond the resources of the of the occupiers to clean up the spill or leak effectively and safely;
c) The protective equipment is inadequate for dealing with the situation;
d) Staff are not experienced in dealing with the situation; or
e) Staff and the public are, or could potentially be, placed at risk.

In any case:

1. Stop any activities and the operation of any pumps or motors. Press pump and/or emergency stop.
2. Warn all persons away from the area.
3. Advise site supervisor immediately.
4. Close all valves.
5. Place the fire extinguishers within easy reach, in case of fire.
6. Guard against product flowing outside the spill area and contain any product flow using a spill kit or any other means available (such as sand and earth). If within the tank equipment bund, ensure the bund drain valve is closed.
7. If the spill has spread towards the switchboard area, turn off the main power supply and evacuate the immediate area.
8. Ensure there are no naked flames, smoking or hazardous activity (e.g. welding) taking place in the vicinity. Take care not to spread the liquid even more.
9. Clean up spill.
10. Any contaminated clothing must be removed. Never remove clothing in the Restricted Area as different fabrics rubbing together can cause sparks. Always thoroughly wet any contaminated clothing before removal.

SECTION 4
FIRE PREVENTION / FIRE PROTECTION

Fire Prevention Policy

It is preferable to expend resources in taking precautions to minimise the risk of a fire, than to risk people and assets in attempting to combat an established outbreak. Consequently, maximum effort should be focused on fire prevention.

Fire Theory

Fire occurs when three conditions occur at the same time and place. The situation is often represented by a triangle with the three sides depicting the three essential conditions.

The three conditions are:

- **Fuel:** Sufficient fuel must be present in the correct mixture with air (oxygen) to form a flammable mixture.
- **Air (Oxygen):** Sufficient air must be available to form a flammable mixture with the fuel
- **Heat:** Heat or an ignition source with sufficient energy to ignite the flammable mixture

Fire will occur if all the above three conditions occur at the same time, for example, if a flammable vapour mixture is exposed to a spark or flame. The avoidance of at least one of the 3 factors occurring at the same time and place is the basic principle of **Fire Prevention**

If a fire is burning and one of the above factors is removed, the fire will go out, as when a gas fire is extinguished by turning off the valve to remove the fuel supply.

This is the principle applied to **Fire Protection**. The chemical reaction to the fuel burning becomes a fourth factor in the continuation of a fire, so that interruption of the chemical reaction can also result in extinguishment.

Fire Prevention Practice

The aim of fire prevention is to prevent flammable vapour, heat and air occurring in the same place at the same time by controlling the three factors.

The control of **Air (Oxygen)** is usually impractical in the context of operations as it is only possible to reduce the oxygen content below the level at which combustion is supported in a confined space. Unfortunately, if the oxygen content is reduced to this level in a confined space, it is also insufficient to support life. The presence of air in these circumstances has to be accepted and every effort focused on controlling the other factors.

The Fuel source is controlled by storing and handling the product in sealed containers, pipes and hoses to prevent, as far as practically possible, the exposure of a liquid product surface to the atmosphere and the consequent emission of vapour. Where it is not practical to avoid emission of vapour from a liquid surface, such as when loading bulk product into vehicles, every effort is made to separate the vapour from possible ignition sources.

Control of Heat or Ignition sources is achieved by restricting the use of heat (spark) producing equipment or activities within the premises or near possible vapour sources. Restricting the access of people, vehicles and equipment controls the entry of possible ignition sources into the facility.

This is the principle applied to Fire Protection. The chemical reaction to the fuel burning becomes a fourth factor in the continuation of a fire, so that interruption of the chemical reaction can also result in extinguishment.

Ignition Sources

To prevent fires, it is necessary to control ignition sources within the fuel facility or near a flammable vapour source.

Matches cigarette lighters or other means of ignition must not be taken into the facility or used within 8 metres of a vapour source in another area.

No electrical equipment, such as torches, radios, cameras, calculators, mobile phones, pagers, or similar items shall be taken into a Restricted Area unless approved by the Site Manager as acceptably safe for the area.

Hot Work, i.e. Use of any equipment or activity which may produce an ignition source, is not permitted within a Restricted Area, unless the appropriate Safe Work Permits and Work Clearances have been issued by qualified Officers.

Some examples of Hot Work are:

- Welding, either electric or gas
- Grinding of metal or other material
- Drilling
- Gas cutting
- Use of electrical equipment (including battery operated equipment) not approved for use in a Restricted Area
- Cutting or drilling of concrete
- Smoking

Other potential sources of ignition include static electricity, vehicles, vehicle air conditioning systems, two way radios, mobile telephones, friction sparks from dropping steel tools on concrete, and sparks from aluminium striking rusty steel or iron.

The following precautions should be taken to control possible ignition sources.

Static Electricity

- Always bond to bare metal
- Always use bonding wires where fitted
- When sampling or water draining, use metal containers with earthing wire attached

Vehicles

- ALWAYS switch off engines before refuelling
- Switch off all auxiliary equipment, e.g. radios, CB, wipers, air conditioning, indicator lights, lights etc.

Pumps & Motors

- Check bearings, motor bearings and seals to ensure they are not overheating
- Check seals for leaks
- Do not over-grease bearings
- Check electrical cables and terminal box to ensure that all screws are fully engaged and cables are not loose

Electrical Equipment

- Prevent water ingress into switches, junction boxes, etc. by ensuring that seals and glands are complete
- Check all covers and ensure that all screws are fully engaged, fitted correctly and that there are no illegal entries

Motor Driven Equipment

- Do not allow auxiliary motors, e.g. motor mowers, generators, pumps, to be used inside the facility unless their use is authorised and approved

Sundry

- Remove all accumulated rubbish, oily rags etc., which can be a source of spontaneous ignition
- Battery operated drills and non-approved torches are ignition sources

Vapour Sources

Flammable vapour is emitted from the surface of a flammable liquid exposed to the atmosphere or from a container that contains vapour from previous use and is then refilled.

Regular sources of vapour include:

- Tank vents, particularly when the tank is being filled or on above ground tanks when the tank is heated under the influence of the sun.
- Any open container of product, including an open interceptor pit.
- A tanker discharge point when the hose is being connected or disconnected.
- Any product leak or spillage from a pipeline, tank or other container.
- Oily water drainage system collection or junction pits.

Restricted Area

A Restricted Area is one where the general public or employees are not permitted free, unsupervised access. In this facility, the tank farm area should be considered a Restricted Area. The facility operator is required to control and supervise access to the Restricted Area by employees, contractors and visitors.

Hazardous Area

A Hazardous Area is defined as one in which a flammable atmosphere may occur or may be expected to occur under either normal or abnormal operating conditions. AS2430.3.3 "Classification of Hazardous Areas" describes the various criteria governing Hazardous Areas.

As diesel is a combustible product as distinct from a flammable product, diesel storage and handling areas are not classified as hazardous areas under AS2430.3.3 "Classification of Hazardous Areas". However, common sense indicates that diesel storage and handling facilities should still be treated with caution and respect.

Fire Protection

The intent is for facility staff to have sufficient firefighting equipment and training in the use of that equipment to extinguish an initial outbreak of fire. Facility staff is not expected to operate as fire fighters. At no time should facility staff place themselves at any personal risk in attempting to combat a fire within the facility operation, or in attempting to save life or property in such a situation.

Fire Protection Practice

As outlined in the section on Fire Theory, the principle of Fire Protection is to separate the three essential factors required for combustion, i.e. Fuel, Air or Oxygen and Heat.

The most common fire control medium, water, extinguishes a fire by cooling the fuel below the temperature at which combustion is supported. However, water alone is generally ineffective on petroleum fires.

The most effective extinguishers for flammable and combustible liquid fires are foam and dry chemical powder, both of which extinguish fires by separating the fuel from the oxygen (air) supply. Foam, being mainly water (more than 94% by mass), has the added advantage of cooling the fire environment, which could prevent re-ignition as the foam dissipates with time. Dry chemical powder provides rapid knockdown, but, as it does not cool the fire environment, re-ignition can occur.

SECTION 5
INSTALLATION REQUIREMENTS

General Information

DURO Tank equipment is of a double walled, self-bunded construction (so do not require a separate spill containment bund), designed in accordance with the ISO dimensional requirements for shipping containers for easy transport and handling. Portability is the key design feature of DURO Tank equipment.

The main features are:

- Tanks are designed and manufactured in compliance with UL142 / ULC142 Steel Above Ground Tanks for Flammable and Combustible Liquids, AS 1692 Tanks for Flammable and Combustible Liquids and AS 1940 The Storage and Handling of Flammable and Combustible Liquids.
- The tanks are made up of an internal fuel storage tank (rectangular design), this internal tank is surrounded by an external tank (or skin) providing the "self bunded" functionality of the design.
- The tanks are designed to be used only in outdoors applications.
- Venting is fitted to the inner tank (50mm dia) in accordance with the requirements of UL142 / ULC142 and AS 1940.

Installation Requirements

Environmental Protection Authority Requirements

Some states the Environmental Protection Authority may require licensing and/or approval of bulk fuel or lubricants storages, and may require the installation of water runoff protection devices. Check with your individual state EPA office for specific requirements.

Compliance to AS1940

AS1940– the storage and handling of flammable and combustible liquids is the Australian standard covering the design, operation and maintenance of flammable and combustible liquid storages. Any installation must conform to state/local government requirements which take precedence. However, where state/local government requirements are lacking or unclear, AS1940 should be used to define installation requirements.

Note in particular separation and clearance requirements contained in sections 5.7.6 and tables 5.3 and 5.4 of AS1940-2004.

An up-to-date copy of AS1940 should be kept on-site at all times and referred to regularly in addition to any recommendations in this manual.

Several other Australian Standards are referenced in AS1940 and are applicable for bulk fuel/lubricants installations. A summary of related Australian standards is listed below:

- AS1020 The control of undesirable static electricity
- AS1692 Tanks for flammable and combustible liquids
- AS1851 Maintenance of fire protection equipment
- AS2865 Safe working in a confined space.
- AS2683 Hoses and hose assemblies for petroleum products
- AS3000 SAA Wiring Rules

Australian Standards are available from Standards Australia *www.saiglobal.com*

Lifting and Unloading

Tanks are supplied with crane lifting lugs located at the top of the unit.

IMPORTANT NOTES:

- The tank lifting attachments are only designed to be used when the tank is EMPTY.
- Only competent persons with suitable lifting equipment should be used to carry out any tank unloading or lifting.

Siting of the Tank

All fuel and lubricant storage installations are required to be located and installed in accordance with local regulations and should comply with the requirements of AS1940 "The storage and handling of flammable and combustible liquids."

The tanks must be installed on a flat level area. The site must have adequate bearing capacity for the weight of the tanks and associated equipment.

Tank Foundation Slab

It is important that the tank be placed on a level, stable base.

Tank Protection

The installed tank must be protected from vehicular collision by adequate barriers or bollards.

Electrical

The tank should be connected to the site electrical system (when required) by a suitably qualified electrician using only adequately rating components to individual State requirement and in accordance with AS3000 and AS1940. If the product receipt or load out is planned to occur at night, a suitable lighting system should be installed.

SECTION 6
FUEL DISPENSING

General

The following requirements apply to the whole of the fuel facility.

- Only authorised people to use the facility.
- No Smoking – No ignition sources
- No cutting, burning or welding
- Only one vehicle to be refuelled at a time
- No vehicles to reverse

For Vehicle Refuelling Procedures, refer Appendix E

APPENDIX A1 –
DURO Tank Warranty Details

1.	DURO Tank Pty Ltd (hereinafter called DURO Tank) warrants that each new and unused item of equipment (hereinafter called the Product) is of good workmanship and is free from mechanical defects, provided that: • The Product is installed and operated in accordance with the printed instructions of DURO Tank. • The Product is used under normal operating conditions for which it is designed. • The Product is not subject to misuse, negligence or accident. • The Product receives proper care, lubrication, protection and maintenance under the supervision of suitably qualified personnel
2.	This warranty expires 36 months after shipment. This warranty is extended by DUROTank only to the purchaser of new Products from DUROTank or one of its authorised distributors. The products purchased under this warranty are intended for use exclusively by the buyer and its employees and by no other persons and, therefore, there shall be no third party beneficiary to this warranty.

3.	A claim of defects in any Product covered by this warranty must be in writing and is subject to DUROTank factory inspection and judgment. DUROTank's liability is limited to repair only. Replacement and exchange parts will be warranted for the remainder of the original warranty, or for a period of ninety days, whichever is the greater.
4.	Under no circumstances whatsoever shall DUROTank and its authorised distributors be liable for any special or consequential damages, whether based on goodwill, lost resale profits, work stoppage, impairment of other goods or otherwise, and whether arising out of breach of any express or implied warranty, breach of contract, negligence or otherwise, except only as may be required by applicable law.
5.	This warranty does not apply to: • Engines (Gasoline or Diesel) • Fuel Meters • Compressors • Storage Batteries • Generators • Alternators • Hose and Reels • Fluids • Filters • Fuses • Pumps • Any other major component having its own inherent warranty Many of the foregoing components are warranted directly by the manufacturer and are serviced by a worldwide network of distributors and others authorised to handle claims for component manufacturers. A first user's claim should be presented directly to such an authorised component service outlet. In the event any component manufacturer has warranted its component to DURO Tank and will not deal directly with a first user, then DURO Tank will cooperate with the first user in the presentation of a claim to such manufacturer. Under no circumstances does DUROTank assume any liability for any warranty claim against or warranty work done by, or on behalf, of any manufacturer of the foregoing components.

APPENDIX A1 –

DURO Tank Warranty Details continued...

6.	Continued use of Product (s) after discovery of a defect voids all warranties.
7.	Expect as authorised in writing, this warranty does not cover any equipment that has been altered by any party other than DURO Tank.
8.	There are no warranties which extend beyond the description of the face hereof. DURO Tank makes no warranties, express or implied, of merchant ability or fitness for a particular purpose.
9.	Expect as authorised in writing, this warranty does not cover any equipment that has been altered by any party other than DURO Tank.
10.	DURO Tank neither assumes nor authorises any person for DURO Tank any liability in connection with the Products sold, and there are no oral agreements or warranties collateral to of affecting this written warranty.

WARNING

At all times, safety must be considered an important factor in the installation, servicing and operation of the product. Skilled and technically qualified personnel should always be employed for such tasks.

APPENDIX B1 –
Tank Dipping Procedure

Tank dipping is essential for stock control and reconciliation, product transfers and loss control including early recognition of possible leakage.

Personal Protective Equipment for handling bulk product, i.e. safety footwear, eye protection and PVC gloves is to be worn while dipping tanks.

To obtain comparable dips for stock recording purposes, it is important the dips are taken using a consistent procedure.

Dipping Procedure:

- Open the dip cap from the upwind side and raise the dipstick to a height where the product level can be seen.
- Note the approximate level of the product.
- Wipe down the dipstick with an absorbent rag.
- Return the dipstick to the tank, lowering it rapidly to a point 50-100mm from the bottom and then slowly until the stick gently touches the bottom of the tank.
- Pause with the stick in contact with the bottom of the tank and raise it quickly to where the liquid level can be read.
- Record the reading.
- Repeat the above twice more, to obtain 3 readings.
- Take the average of the three readings as the dip for the tank.
- Return the dipstick to the tank.
- Refit or close the dip cap.

APPENDIX C1 –

Product Receipt Using DURO Tank Unloading Pump (where fitted)

Receiving Product ex Bulk Delivery Vehicle

Generally an oil company delivery vehicle will carry out bulk deliveries with an appropriately trained and qualified driver.

Normal traffic should keep clear of the tanker whilst it is unloading, allowing the tanker to exit in a forward direction in an emergency without obstruction.

The tank(s) contents must be manually "dipped" to confirm there is adequate ullage for the tanker to safely discharge into the facilities.

Discharge Procedure – Bulk Delivery Vehicle

While hoses are connected, the driver should not leave the vehicle unattended at any time.

The driver must remain in a position where he has full control over all hoses, valves & controls.

1. Park in such a position that product can be discharged without moving the vehicle. The engine should be stopped and the parking brake engaged.

2. Note the location of Emergency Stops and Fire Extinguishers.

3. Dip each of the planned receiving tank(s) to ensure sufficient ullage for the amount of product being delivered. Record the tank number and dips on the delivery media and formulate a written discharge plan to match tanker compartments with planned receiving tanks.

   If there are any concerns about delivery details, contact site supervisor before discharge begins.

4. Select the first receiving tank by opening the manual tank isolation valve at the selected tank. Close all other manual tank isolating valves at the other tanks.

5. Connect the bonding/earthing cable prior to any further activity.

6. Raise the locking bar over the vehicle tank outlet connections.

7. Connect the product discharge hose(s) to the correct vehicle outlet and the DURO Tank fill connection.

8. Open the vehicle internal valve. Open the tanker manifold valve and check the sight-glass to confirm that the product colour is correct.

9. Make sure there are no leaks from any connections.

10. Open the DURO Tank fill point isolation valve(s).

11. Start Pump, proceed to discharge.

12. Change receiving tanks in accordance with the discharge plan.

Post Discharge Procedure – Bulk Delivery

1. When the discharge is complete, clear and close the tanker manifold valves, close the DURO Tank hose isolation valve(s) and stop the truck pump. Visually check that the vehicle compartments are empty.

2. Ensure both internal and external valves on the vehicle are closed.

3. Disconnect product hose(s) from the facility and re-install camlock caps. Take care to avoid spillage.

4. Securely close all vehicle fill caps. Lower the locking bar over the vehicle tank outlet connections.

5. Complete paperwork for delivery.

Product Spill During Discharge

1. If product is spilled, discharging activities and the operation of pumps and motors must cease immediately. Press pump and/or emergency stop. Warn all persons away from the area.

2. Close all valves. If less than 1 litre, hose the area down before continuing the discharge. If more than 1 litre, proceed as below.

3. Advise site/facility supervisor immediately.

4. Place the fire extinguishers within easy reach, in case of fire.

5. Guard against product flowing outside the discharge area and contain any product flow using a spill kit or any other means available (such as sand and earth).

6. If the spill has spread towards the switchboard area, turn off the main power supply and evacuate.

Product Spill During Discharge cont'd

7. If a large amount of combustible product (e.g. Diesoline) has been spilt and no other hazard exists, the vehicle may be moved (if necessary) under its own power. Ensure there are no naked flames, smoking or hazardous activity (e.g. welding) taking place in the vicinity. Take care not to spread the liquid even more.

8. Clean up spill. Do not proceed with delivery until all potential hazards have been controlled or removed.

9. Any contaminated clothing must be removed.

Fire During Discharge

1. Immediately stop the flow of product. Press 'Emergency Stop'.

2. Raise the alarm.

3. If possible, close all valves, and disconnect from customer's tank.

4. If safe to do so, attempt to extinguish the fire using portable fire extinguishers.

5. Remove any other vehicles to a safe distance, away from the hazardous area.

6. If the vehicle is on fire do not attempt to move it.

7. If the fire grows beyond control, evacuate any persons in the vicinity to a distance of at least 50 metres from the vehicle.

APPENDIX D1 –
Light Vehicle Refuelling Procedure

General

The following requirements apply to the whole of the fuel facility.

- Only authorised people to use the facility.
- No Smoking – No ignition sources
- No cutting, burning or welding
- Only one vehicle to be refuelled at a time
- No vehicles to reverse

Light Vehicle Refuelling Procedure

To refuel at the light vehicle dispenser:

1. Stop engine, apply brakes
2. Note the location of the Emergency Stop and Fire Extinguishers
3. Lift nozzle and refuel vehicle
4. When finished, hang up nozzle
5. Record the amount of fuel taken.

To stop fuel flow in an Emergency, hang up the hose or press the Emergency Stop Button.

For problems or faults, contact site supervisor.

APPENDIX D2 –
Heavy Vehicle Refuelling Procedure

General

The following requirements apply to the whole of the fuel facility.

- Only authorised people to use the facility.
- No Smoking – No ignition sources
- No cutting, burning or welding
- Only one vehicle to be refuelled at a time
- No vehicles to reverse

NOTE: No heavy vehicle refuelling is to take place whilst a fuel delivery tanker is discharging fuel into the facility. Heavy vehicle refuelling utilises "Banlaw" dry break nozzle equipped refuelling hoses to permit heavy vehicles to be refuelled.

Mechanical meter is located at each discharge facility to record the amount of fuel dispensed

Heavy Vehicle Refuelling Procedure

1. Ensure engine is stopped and brakes applied.

2. Select appropriate Banlaw nozzle, open refuelling hose isolation valve.

3. Reset Meter to zero.

4. Connect Nozzle to Vehicle.

5. Rotate Nozzle Lever to ON position

6. Press Pump Start, slowly open the hose isolation valve and refuelling will commence and the nozzle will shut off when the vehicle fuel tank is full.

7. Press Pump Stop and close the hose isolation valve when refuelling is complete.

8. Disconnect Hose, hang up Nozzle.

9. Record fuel delivered.

OPERATORS RECORDS

Please fill in and retain for your own records:

COMPANY NAME

_____

DATE PURCHASED

_____

WARRANTY EXPIRY DATE

_____

MODEL

_____

SERIAL NUMBERS

_____

E & O.E
Specifications subject to change without notification

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