8.2.4 Collision protection

A tank vehicle filling facility shall be protected against damage from vehicles and forklift trucks by a guard rail, traffic bollards or other physical barriers.

8.2.5 Vehicle access

The direction of entry of vehicles into a tank vehicle filling area shall be clearly marked.

The design of a tank vehicle loading facility shall be such that vehicles are positioned so that in an emergency, they can be driven or towed out without recourse to reversing (see also Clause 9.18.4).

8.2.6 Spillage control

8.2.6.1 *General requirements*

The tank vehicle filling area shall have a system for collecting any spilt liquid and draining it to a containment tank or compound. The following requirements apply:

(a) The vehicle standing area shall be graded so that any spillage will drain away to dedicated tank or compound and not spread to other loading areas.

(b) The surfaces of the system shall be impervious to any liquid that might be spilt.

NOTE: Concrete is a suitable material.

(c) The tank or compound in which spillage is retained shall be constructed and located in a similar manner as that described in Clause 5.8.

(d) A spill response kit shall be positioned within 15 m of the tank fill point.

Alternatively, a system based on a documented risk assessment and providing an equivalent level of protection may be used.

8.2.6.2 *Capacity of spillage control system*

The capacity of the spillage control system shall be the greater of—

(a) the capacity of the largest compartment of any tank vehicle using the facility or 9000 L, whichever is less; or

(b) the maximum volume of liquid that can be discharged from the two filling points having the greatest flow over 2 minutes.

The capacity shall be increased where necessary to provide for rain, clean-up or output from fire protection systems.

8.2.6.3 *Drainage*

Drainage of spilt liquid from the tank vehicle filling area shall be provided. One of the following methods shall be used:

(a) Use of an isolating valve.

The isolating valve shall be kept closed at all times except when liquid is being drained.

NOTE: Drainage should be through a separator pit under controlled conditions, unless the system is designed to operate with the valve continuously open.

(b) Drainage directly to a separator pit.

The pit shall be designed for the expected flow.

(c) Drainage directly to a remote compound, tank or pump-out pit.

NOTE: Subsequent treatment should be through a separator pit.

(d) A combination of the above.

Where an isolating valve is used, it shall be clearly marked with the words:

TANK VEHICLE FILLING AREA DRAIN VALVE—NORMALLY CLOSED

and shall be marked to indicate the open and closed positions.

Separator pits shall be capable of dealing with the flow rate from the drainage system, in accordance with regulatory requirements.

8.2.7 Flow rates

The flow velocity into the compartment of a tank vehicle shall be controlled to less than 1 m per second until a minimum level of 150 mm has been reached. Maximum flow velocity thereafter shall not exceed 7 m per second until filling is nearly completed, when the flow velocity shall again be reduced to minimize hydraulic shock when filling stops.

8.2.8 Emergency shut-down

Any transfer pump shall be provided with an emergency shut-down device located in a prominent position at least 10 m but not more than 30 m from any tank vehicle filling point. It shall be clearly marked EMERGENCY PUMP STOP.

8.2.9 Earthing and bonding

Static electricity shall be dissipated during tank vehicle filling, in accordance with AS/NZS 1020 or IEC 60079-32-2.

8.2.10 Bond wire connection

The bond between the vehicle tank being filled and the filling facility shall be made with a flexible sheathed cable meeting the requirements of AS/NZS 60079.14 for bond cables. It shall be securely attached to the filling facility at one end and provided with a robust spring clip, G clamp, plug and socket or equivalent at the other end.

NOTES:

1 The size of the flexible sheathed cable above is unrelated to its resistance but is necessary to provide a robust flexible connection suitable for field use.

2 A flexible cable used in a system to prevent overfilling of the tank vehicle and containing a dedicated bond wire connected by a special plug and socket is an acceptable alternative.

3 The sheathing on a bond cable should be resistant to the product.

8.2.11 Monitored cable connection

A monitored cable connection using a plug and socket may be either—

(a) part of an integrated tanker overfill controls system; or

(b) provided with visual indication of bond integrity.

8.3 TOP-FILLING INSTALLATIONS

8.3.1 Access to vehicle tank

A platform with an anti-slip surface and an elevated grating or walkway shall be provided for each tank vehicle position and shall be provided with fall protection. Any platform over 6 m long shall have a means of egress at each end.

If handrails are suspended from the roof structure, they shall be provided on the opposite side of the vehicle tank to the access platform.

NOTE: AS 1657 provides requirements and guidance on the design, construction and installation of platforms, walkways, stairways and ladders.

8.3.2 Open-hatch filling

An open-hatch filling facility shall comply with the following:

(a) Flammable liquid transfer shall be through rigid piping extending to and in contact with the bottom of the vehicle tank compartment during the entire transfer operation. A hose shall not be used inside a vehicle compartment.

(b) Where the liquid transfer operation is controlled by a pre-set measuring device, an overriding 'stop' mechanism shall be provided.

(c) Where a liquid transfer operation involving flammable or C1 liquids is controlled manually, it shall incorporate a valve which is manually held open, closes upon release and cannot be locked or fixed open. Where such a valve is not of fire-safe construction and is used for loading flammable liquids, a fire-safe isolation valve shall be installed within 15 m of the fill point.

NOTES:

1 Where the products being transferred are viscous, e.g. bitumen, and there are operational problems in complying with Clause 8.3.2(a), the requirements of this Clause (Clause 8.3.2) need not apply. In such situations, operational safety should not be compromised.

2 A procedural alternative to Items (b) and (c), such as two-person filling, where one person controls the flow whilst the other is dedicated to fill monitoring, and both can intervene to stop the flow if necessary, may be used, but a physical means of control is preferred.

8.3.3 Tight-connection filling

Liquid transfer into a tank vehicle employing a fixed internal filling tube with leak-proof connections within the coaming area of the vehicle tank shall comply with the following:

(a) Final connection of pipework to the vehicle tank shall be rigid metal piping or a flexible hose complying with AS 2683.

(b) The requirements of Clause 8.3.2(b) and 8.3.2(c) shall apply.

8.4 BOTTOM-LOADING FACILITIES

8.4.1 System design

A bottom-loading facility shall incorporate the following:

(a) A preset meter incorporating automatic slow-start and slow-finish controls.

NOTE: Aviation refuellers are excluded from this requirement.

(b) A dry-break coupling between the loading arm or hose and the vehicle tank.

(c) Automatic overfill protection for each vehicle tank compartment.

(d) An integrated bond cable between the pipework in the filling facility and the vehicle tank.

(e) Provision for vapour relief, accessible from ground level, which includes a means of safely discharging the vapours to atmosphere or to a vapour recovery system.

(f) Interlocks to—

(i) prevent the tank vehicle from moving whilst hoses are connected;

(ii) prevent liquid transfer if the bond wire and vapour collecting hose are not properly connected; and

(iii) prevent the liquid transfer if any one of the overfill protection devices has been tripped.

NOTE: The above Clause is not intended to apply to bottom loading of bitumen, as the nature of the product makes such loading impractical. API RP 2023 provides guidance on the loading of bitumen.

8.4.2 Compliance with API Code

Where appropriate, a bottom-loading facility should comply with API RP 1004 where not otherwise dealt with in this Standard.

8.4.3 Design pressure

All components which are subject to pump shut-off pressure shall be designed to withstand a pressure not less than 1.5 times the maximum shut-off pressure of the transfer pump.

8.4.4 Flow rates

The liquid transfer into the vehicle tank shall be controlled within the limits specified in Clause 8.2.7, and shall reduce the flow rate towards the end of filling to minimize hydraulic shock.

8.4.5 Overfill protection

Means shall be provided to ensure the overfill protection devices are active and to prevent liquid transfer into any compartment under fault conditions. Any faults shall be indicated by a clear visible signal.

8.4.6 Internal valve and vent control

A pneumatic system for opening and closing the internal valves and vents of each compartment shall be interconnected with the tank vehicle braking system. This is to prevent the tank vehicle being driven or moved while the internal valves and vents are open, or while any liquid transfer hose is connected to the tank vehicle.

8.4.7 Data collection

A data collection device, which incorporates some or all of the control devices required by this Section, may be provided within the bottom-loading facility provided it complies with all relevant Standards.

8.4.8 Atmospheric venting

Where vapours are discharged to atmosphere during transfer, the discharge shall be in a vertical direction from a point at least 2 m above the highest point of the roof of the filling facility or, if not roofed, 8 m above the floor of the filling facility. The separation distances given in Clause 8.2.2.2(b) and 8.2.2.2(c) shall apply to the vent outlet. The vent shall be provided with flashback protection at its outer extremity.

SECTION 9 OPERATIONAL AND PERSONNEL SAFETY

9.1 SCOPE OF SECTION

This Section sets out requirements and recommendations on matters relating to operational and personnel safety. It applies to all storage other than minor storage, but the principles stated may be applied to achieve a greater measure of safety in such storage.

NOTE: Section 10 should also be consulted.

9.2 GENERAL PRECAUTIONS

9.2.1 Control of entry

In order to prevent unauthorized personnel from gaining access to the installation, a member of the occupier's staff should accompany those visitors, contractors' personnel and other persons whose duties require their entry into a restricted area. Where this cannot be done, such persons shall, before their entry into the restricted area, be given a written list of the hazards present and the appropriate precautions to be taken or undergo induction training. Any contractors working on-site shall be suitably trained (see Clause 9.10.3).

It is recognized that compliance with the above requirement is not possible where emergency services personnel have to enter unattended premises to attend an emergency. A safety information board is sufficient for such purposes.

Any restricted area shall be locked whenever it is unattended.

9.2.2 Clear access

The means of entry into and access from any area, room or building, in which flammable or combustible liquids are stored or handled shall be kept clear at all times.

At all times, access shall be available to—

(a) firefighting equipment;

(b) personal protective equipment;

(c) clean-up materials and equipment; and

(d) the place where the manifest is kept.

9.2.3 Vehicular access in restricted areas

The following requirements apply:

(a) Vehicular access to, and movement within, a restricted area shall be controlled.

(b) Vehicles shall be confined to a designated safe area unless they are suitable for use in hazardous areas.

(c) Speed limits shall be imposed where appropriate, and shall be indicated by signs.

(d) Vehicles shall be parked in designated parking places and comply with any operating and emergency procedures.

9.2.4 Vehicular access into a compound

Any vehicular access over a bund and into a tank's compound shall be kept barricaded and locked when not in use.

A notice bearing the words NO VEHICLE ACCESS WITHOUT WRITTEN PERMIT, in clearly legible red lettering, 100 mm high on a white background, shall be displayed at the access point.

9.2.5 Access by locomotives

A work permit shall be issued to control the entry of any locomotives into a hazardous area.

9.2.6 Lighting

The following requirements and recommendations apply to lighting that is provided:

(a) During the hours of operation, sufficient lighting shall be provided in work areas so as to enable a person to easily read all markings on packages, signs, instruments and other necessary items. Interior lighting should be of at least the luminance specified in AS/NZS 1680.1.

(b) Sufficient lighting shall be available on any of the installation's internal roads when personnel on the premises might use them.

(c) Reference should be made to the appropriate part of AS/NZS 60079.10.1.

9.2.7 Control of ignition sources

9.2.7.1 *Introduction of ignition sources*

A work permit shall be obtained before introducing any active or potential ignition source into a restricted area.

Conditions for work permits are given in Clause 9.8.3.

9.2.7.2 *Portable electrical equipment*

Portable electrical devices shall not be taken into a hazardous area unless certified for use in such an area or authorized by a work permit.

NOTE: For guidance, refer to AS/NZS 60079.14.

This is to control ignition sources such as torches, rechargeable power tools, pagers, phones and cameras, but not low-energy devices such as hearing aids or completely enclosed objects such as battery-powered watches.

9.2.7.3 *Smoking*

Smoking or the carrying of matches or cigarette lighters shall be prohibited in any hazardous area as defined by AS/NZS 60079.10.1 and within any restricted area.

Within a restricted area, any specifically designated place where smoking is permitted shall be clearly identified by SMOKING PERMITTED signs.

9.2.7.4 *Earthing and bonding*

Static electricity shall be controlled in accordance with AS/NZS 1020. Lightning protection shall comply with the requirements of AS/NZS 1768. Earthing shall comply with AS/NZS 3000.

NOTES:

1 Bonding and earthing are often confused with each other.

2 Bonding connects all items where static electricity might build up. For example, a tank, pump, filling nozzle and receiving container could be connected with each other through pipes with bridged flanges, conducting transfer hoses and bonding wires and clips.

3 Earthing discharges dangerous currents into the ground. It is not intended to provide the continuous circuit required for bonding and should not be used to control static electricity.

9.2.8 Heated storage

Any combustible liquid that is heated and kept above its flash point shall be stored and handled in the same manner as a PG III flammable liquid.

If liquids are to be heated, controls shall be provided to prevent their heating to a temperature that could jeopardize the safety of the container or its contents.

Where liquids are heated during storage, operating procedures shall take account of the following:

(a) Where the temperature of the liquid could approach that at which cracking, decomposition, polymerization or ignition could occur, the vapour space in the container could be within flammability limits.

(b) Any water present in the container could flash to steam and cause a boilover as the boiling point is approached. Any procedures for water removal shall be followed closely.

(c) Sufficient ullage shall be allowed for thermal expansion.

(d) Vapours shall be controlled to ensure that they do not create a hazard.

NOTE: Appendix J provides a table of characteristics of common flammable liquids.

9.2.9 Site upkeep

The area within any compound or in and around any store shall be maintained in a safe condition. The following requirements apply:

(a) The area shall be kept clear of all extraneous materials.

(b) Specified clearance distances shall be maintained at all times.

(c) Packages shall not be placed where they could jeopardize entry and exit.

(d) Vegetation that could become a fire hazard shall be kept short.

(e) Any weed killer that is known to be a potential source of fire danger shall be used only with due care and precautions.

(f) Any compound drain valve shall be kept closed and locked except during supervised drainage. A notice with the following words shall be displayed:

COMPOUND DRAIN VALVE—TO BE KEPT CLOSED AND LOCKED

(g) The walkway of any tanker loading gantry shall be kept clear of extraneous materials.

(h) Spills shall be cleaned up as soon as possible (see also Section 11).

9.2.10 Bunds and compounds

Bunds and compounds shall be maintained so as to retain their designated capacity and in a condition which will prevent the escape of liquid from the compound.

All bunds and compounds shall be kept free from extraneous combustible material, e.g. packagings, pallets, tree branches, leaves.

For earthen bunds, original height markers shall be checked regularly and the bund height maintained to those levels.

9.2.11 Doors and doorways

The following requirements apply:

(a) Any self-closing door to a store or cabinet shall not be propped open.

(b) Doorways shall be kept clear so as not to impede the closing of fire doors in an emergency.

(c) The area to be kept clear around a fire door shall be clearly marked.

9.2.12 Commissioning of new, modified or repaired equipment

No equipment or installation shall be put into service unless a hazard identification and risk assessment has been undertaken to ensure that appropriate controls are in place. In addition, appropriate operating and emergency procedures shall be available and personnel shall have been trained in the operation of the equipment, recognition of fault conditions and actions to be taken if fault conditions occur.

9.2.13 Safety information

Material safety data sheets (MSDS/SDS), describing the properties of the liquids being kept or handled in the installation and the appropriate first aid measures for them, shall be readily accessible.

9.3 OPERATING PROCEDURES

9.3.1 General requirements

Safe systems of work, including procedures commensurate with the quantity and nature of the liquids being kept, shall be developed, documented and implemented.

Written procedures shall be appropriate to the installation and shall include the following:

(a) A site plan (or plans) indicating tanks, plant, main pipework, switchboards or substations, emergency stop valves or actuating devices, fire protection systems and drainage.

(b) Operating procedures, covering all aspects of the day-to-day operation of the installation.

(c) Maintenance procedures, covering regular testing, inspection and monitoring of the equipment.

(d) Emergency procedures, covering actions to be taken in the event of fire, spillage, accident, equipment failure or other abnormalities or emergencies (see also Section 10).

(e) Construction and maintenance procedures, covering new facilities and repairs to and modification of existing plant.

NOTE: Many states have occupational health and safety legislation that provides for consultative mechanisms at workplaces, enabling management and workers to be jointly involved in the development of procedures and work practices.

Procedures shall be documented in notices, manuals or other recorded instructions as appropriate to the particular installation. They shall be either on view or readily available on site.

All personnel shall be trained in appropriate procedures (see also Clause 9.10).

All personnel shall comply with the procedures established for the installation. An audit system should be established to ensure compliance.

Procedures shall be regularly reviewed and modified as necessary, particularly following any equipment or organizational changes.

9.3.2 Operating procedures

Operating procedures shall include, but not be limited to, the following as appropriate:

(a) Initial commissioning procedures.

(b) Normal handling procedures.

(c) Liquid transfer procedures.

(d) Monitoring of essential functions and components.

(e) Control of hazards, including ignition sources.

(f) Manufacturer’s operating instructions for equipment.

(g) Earthing and bonding.

(h) Fault conditions.

(i) Housekeeping and site upkeep.

(j) Isolation, deactivation and identification of equipment not in use.

(k) Maintenance of clear spaces for access.

(l) Management of leakage, spillage and clean-up.

(m) Personnel safety and protective equipment.

(n) Environmental monitoring.

(o) Operation of utilities.

(p) Fire protection systems.

(q) Control of access, movement and activities.

9.3.3 Construction and maintenance procedures

These procedures shall include the following, as appropriate:

(a) Work authorization, including the issuing of work permits.

(b) Work in confined spaces.

(c) Testing of instrumentation, protective devices, alarms and monitors.

(d) Isolation and tagging of equipment.

(e) Control of contractors.

(f) Firefighting equipment.

(g) Pipework.

(h) Storage tanks.

(i) Drainage systems and any separators.

(j) Bunds.

(k) Electrical equipment.

(l) Ventilation systems.

(m) Fences and security.

(n) Lighting.

(o) Signs and notices.

(p) Plant components, e.g. pumps, fans, package filling equipment.

9.3.4 Emergency procedures

Documented emergency procedures and first aid procedures shall be prepared in accordance with Section 10 and Clause 9.13.

9.4 MANAGEMENT OF ABOVE-GROUND LEAKS AND SPILLS

9.4.1 General

Every endeavour shall be made to prevent leaks or spills, and to control them if they do occur. Clean-up action shall be initiated immediately. Leaked or spilled liquids shall be kept and disposed of in accordance with Section 12.

9.4.2 Clean-up materials and equipment

In order to deal with leaks and spills, a spill response kit shall be readily available where flammable or combustible liquids are stored, dispensed or in transit storage in order to prevent spills from reaching ignition sources, stores of other chemicals, or combustible materials (e.g. timber and paper), or flow into drains or onto neighbouring land, or enter any creek, pond or waterway.

A simple spill response kit should consist of some or all of absorbent pads, booms, loose absorbent and contaminated waste bags that are packed in a readily identifiable weather resistant container and are compatible with the liquids stored.

A spill response kit should also contain all personal protective equipment, as advised by the Safety Data Sheet of the liquids stored, broom and shovel.

Additional absorbent materials should be available, if required, to clean up the contents of the largest container kept, or the largest likely spill.

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

(a) Adequate quantities of absorbent material, e.g. absorbent pads, loose absorbent 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) Booms (on-ground and floating).

(g) Drain covers and drain plugs.

Any absorbent material containing flammable liquids are normally regarded as wastes but might still be classified as dangerous goods. In such cases they shall be disposed of in accordance with Section 12 and in compliance with local and State or Territory law.

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

9.4.3 Actions for dealing with leaks and spills

At every occurrence of a leak or spill, the emergency plan should be implemented and consideration should be given to 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 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.