



ITCO

TG04 ITCO GUIDANCE FOR WORKING ON TOP OF A TANK CONTAINER

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This Guidance document is intended for qualified industry professionals, persons who are appropriately trained in risk assessment and health and safety training.

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ITCO GUIDANCE FOR WORKING ON TOP OF A TANK CONTAINER

INTRODUCTION

This document provides guidance for ITCO member companies which engage in activities that require personnel to work on the top of a tank container.

The guidance assists in the risk assessment process and the selection of equipment and safe working, prior to accessing the top of a tank container.

This guidance is focused **only** on the safety provisions relating to working at height.

Refer to other sources for safety requirements and legislation concerning the many tasks that are undertaken from the top of the tank (such as filling and discharge, maintenance, tank entry and inspection).

Where possible, working on the top of the tank should be minimised – and, if possible, eliminated altogether.

Procedures should be reviewed to determine if a process change could be introduced that would allow tasks to be undertaken at ground level.

Nevertheless, personnel may need to gain access to the top of tank for various reasons.

Appropriate safety standards and procedures should be in place, in order to minimise the risk of a fall.

Personnel should be trained and qualified in safety and the functions that they are required to undertake. Training records should be maintained.

National Health and Safety (H&S) legislative requirements for working at height apply. Always comply with H&S legislation.

Tank containers are primarily designed for filling and discharge at a shipper's terminal facility, which is equipped with permanent top access gantries.

The tank container is fitted with a ladder and a top walkway as a secondary provision, recognising that personnel may need to gain access to the top of tank for various other reasons. Safety requires:

- Consistent approach to properly developed safety procedures
- Understanding by participants of the required best practice
- Understanding by participants of their roles and responsibilities

This guidance document includes three areas of activity:

- **Design and Manufacture** of access equipment
- **Operations** – terminal
- **Service providers** - inspection and maintenance

National and appropriate international legislation governs safe working at height and take precedence over these guidelines.

Always comply with applicable legislation.

This document refers only to tank containers (which are also commonly referred to as "Iso-tanks"). Most tank containers comply with the provisions of the "UN Portable Tank", this being the correct regulatory terminology. However, for ease of reading this document, the text uses the abbreviated term "tank"

The Guidelines are intended for the use of tank container industry professionals; qualified persons who have completed appropriate training, including training in risk assessment and health and safety requirements.

1. DESIGN & MANUFACTURE

The specification and design of the equipment fitted to the tank container is important to the ongoing safe access to the top of the tank.

The design engineer should consider, in consultation with the client, the proposed operational use of the tank. Tank containers are primarily designed for filling and discharge at a terminal facility that is equipped with permanent top access gantries.

Tank containers are fitted with a ladder and a top walk-way as a secondary provision, recognising that personnel may need to gain access to the top of tank for various reasons including inspection and maintenance.

The shipper's personnel at filling and discharge facilities should access the tank via permanent site gantries fitted with guard rails.

However, if the tank is to be filled and discharged without a terminal site gantry, the design may need to incorporate provisions such as for the walk-way to cover a wider area of the tank top surface to effectively form a platform and be provided with guard rails.

ISO 1496.3 provides guidance. Refer also to other applicable regulations.

1.1 Ladder

The ladder should be designed for the use of personnel wearing protective boots and gloves.

Two stiles (vertical members) are required to enable hand gripping from both sides i.e. the corner post should not form any part of the ladder.

The width of the ladder should be at least 30cm.

Rungs should be uniformly spaced between 28cm to 30cm apart and the top surface of the rung designed to be non-slip.

The ladder should be positioned to allow for the distance between the rungs and the tank to provide sufficient clearance for a safe footing i.e. allow for the booted foot to extend over the rungs.

The tank insulation and cladding behind the ladder may need to be modified to provide the necessary rung and foot clearance.

The ladder is required to be designed to withstand a minimum load of 200 kg on any rung.

The ladder is usually fixed in a vertical position.

An optional provision is for the ladder to be designed to be hinged at the top allowing the ladder to be extended out from the bottom. This allows for a suitable inclined ascent to the tank top. When the tank is in transit, the ladder must be securely fixed with a suitable brace to within ISO dimensions.

The ladder should be positioned on the tank to align with the configuration of the walkway which is usually fitted on the right-hand longitudinal side of the tank. This allows for the maximum walk-way surface area when transitioning from ladder to walk-way.

1.2 Hand-hold, ladder to frame

The tank frame poses a difficult manoeuvre for personnel when moving from the vertical ladder to the horizontal tank top.

This is especially the case when personnel are wearing protective clothing.

Designers should ensure a hand-hold is fitted adjacent to the top of the ladder, to allow for the transition from ladder to walk-way and vice-versa.

The hand-hold should be of suitable dimension to allow for the protective gloved hand.

For smaller diameter tanks, where the top rail is higher than the tank walk-way, additional provision is required to provide a safe hand-hold and transition from ladder to the tank walk-way.



1.2 Tank ladder hand hold

1.3 Walk-way (top surface platform)

The walk-way should be of adequate dimensions and with no tripping hazards and constructed of a slip resistant surface.

Walk-ways manufactured of pressed aluminium with upward raised perforations which provide for slip resistance are widely used.

The width should be at least 46cm wide and extend to give safe access to the required locations.

A greater walk-way width should be considered as an enhanced safety provision. It is unsafe to stand or walk on the tank top and a greater walkway provision discourages improper access.

Many tanks are fitted with an "E" configuration walk-way to give access to all four corners, the man-way and top openings.

To facilitate a person transitioning from the ladder the positioning of the walk-way should align with the ladder and there should be sufficient walkway area to provide a safe landing when stepping from the ladder.

If the tank is intended to be used without a terminal site gantry, the walk-way should be designed to cover a greater surface area of the tank top and effectively form a platform. Guard rails may be required.

Tanks of a small diameter - where the top of the tank and the walk-way are below the frame - should be designed to allow access from the ladder and over the rear top rail to the stepped-down walk-way.

1.4 Collapsible guard rail

Permanently fitted collapsible guard rails are not recommended as an alternative to terminal installed on-site fall protection systems.

When fitted, the guard rail should be designed and tested to applicable provisions of ISO1496.3 where reference is made to EN 13374 temporary edge protection systems. EN 13374 specifies a minimum guard rail height of at least 100cm. National regulations may also apply and require 110cm.

Guard rails should be designed to provide effective fall protection to the work area.

Some tanks are fitted with a longitudinal light-weight collapsible guard rail that is designed to act primarily as a steadying device rather than to retain the full weight of a falling person. Such rails should be used together with other fall prevention procedures.

The procedure to safely erect the top guard-rail should be risk assessed to determine appropriate requirements.

Guard rail operation and use instructions should be displayed on the tank.

The guard rail, when not in use, is required to be designed to be stored and adequately secured for transport, within the ISO frame dimensions. A fail-safe automatic security safety catch is recommended.

Should the guard rail inadvertently lift in transit, a severe incident might result. This is especially a consideration for spring-assisted erection rails.

1.5 Bottom filling and discharge - top airline vapour valve

The process of filling and discharge of the tank via the bottom openings can be used to minimise the need to access the top of the tank and thereby reduce the risk the risk of a fall.

Filling and discharge procedures include a requirement to open the top closure i.e. "airline" valve for the purpose of venting the tank.

Devices are available that enable remote ground level operation of top closure valves and fittings.

The airline can be piped to ground level to facilitate use but for regulated substances, the top closure valve is required to be closed during transport.



1.5 Bottom control of the top closure airline valve and airline extended to the bottom side rail

Table 1. Summary of minimum design requirements

Item	Dimension	Remarks
Ladder	30cm width minimum Rungs 28-30cm apart	2 stiles Slip resistant rungs 200kg test load
Hand-hold		Adjacent to the top of the ladder
Walk-way platform	46cm width minimum	Access to all fittings Slip resistant perforated surface 3kN test load over an area 600x300cm
Guard rail	110cm height	Provisions of ISO1496.3 and EN 13374

2. SHIPPER'S AND RECEIVER'S TERMINAL

Shippers (consignor) and receivers (consignee) or companies acting on their behalf should undertake all tank operations, such as filling, that are carried out on their terminal site.

The terminal management are required by health and safety legislation to ensure that measures are taken to ensure safe working for personnel, including the prevention of falls by persons working on top of the tank.

The shipper's terminal filling and or discharge facilities should be equipped with appropriate gantries to safely access the top of the tank.

Note:

In the context of the filling and discharge terminal facility, the personnel engaged by the terminal to fill or discharge the tank might be potentially confusingly referred to as "operators"

There is an important difference between the role of the "tank container operator" and the shipper's terminal operator or operations.

The tank container Industry uses the term "tank container operator" to describe the supplier of the tank and logistics services.

The tank operator provides a logistics service, arranges the delivery of the tank to and from the shipper's terminal.

When located at the shipper's or receiver's terminal the tank should be "operated" by the terminal personnel who should undertake the filling and discharge process.

However, in some countries it is recognised that trucking company personnel might be requested to carryout tasks at the shipper's terminal in which case there should be a risk assessment and appropriate function specific training.

2.1 Terminal personnel

The filling and discharge terminal personnel should undertake all activities relating to the filling, discharge, taking of samples and operation of the tank etc.

The personnel should be fully trained and qualified in the requirements of safe working and working on top of the tank.

The tank logistics operator's personnel, including any contracted personnel such as the truck driver, should wait at a designated safe place until the site personnel have completed their tasks.

2.2 Tank logistics operator's personnel

The tank logistics operator's personnel, including any contracted personnel such as a truck driver, should not be involved in the filling and discharge of the tank on the shipper's terminal.

This includes erecting guard rails in preparation for the terminal site personnel.

In the event that such activity is contemplated, the tank logistics operator and its contracted truck company should be aware of their potential liability of working on the terminal site.

A risk assessment along with appropriate safety and function training should be undertaken before any activity takes place.

A contract should be in place between the terminal and the tank logistics operator detailing the terms and conditions that apply to any activity required by the terminal and agreed by the tank logistics operator.

Similarly, contracts should be in place between the tank logistics operator and the trucking supplier.



2.2 Terminal gantry tank filling

The tank logistics operator should not instruct the contracted or independent truck driver to undertake operational tasks on the terminal site to which they are not fully trained and qualified.

Tank container truck drivers are required to be trained for their prime role but because they are engaged to transport a wide range of substances and different tank types to often unfamiliar terminal facilities, safety and function specific training is complex.

By comparison, road tank vehicle drivers who might frequently visit the shipper's terminal, are trained and qualified to function-specific activities and are usually familiar with the road tank vehicle equipment, type of substances transported.

All personnel should be trained and qualified in the specific tasks to be performed including all safety requirements.

2.3 Bottom filling and discharge

For some operations, bottom filling and discharge processes can be designed to prevent the need for top access.

When bottom filling and discharging, the top airline valve needs to be vented (opened) and closed on completion.

The airline can be piped to ground level.

Alternatively, a device can be designed to remotely open the valve from the ground level.

There are often technical reasons to access the top of the tank.

For some designated substances transported, the regulations require openings to be above the liquid level requiring all valves and fittings to be on the top of the tank.

Access to the bottom valve when the tank is mounted on an extended wheel-base chassis, may also require working from a height of 1m or more. Appropriate safety provisions are required.



2.3 Bottom tank filling



2.3b Bottom access safety access

2.4 Access gantry

The shipper's terminal is required to provide an access gantry which allows for the tank to be positioned beneath the gantry and for the shipper's operative to access the top of the tank.

The gantry should be equipped with stair-way access and guard rails.



2.4 Terminal gantry top access

2.5 Tank fitted with guard rails

If the filling and discharge terminal fails to provide adequate gantries it might be appropriate for the tank operator to equip the tank with guard rails.

Guard rails should only be erected on site by the terminal personnel when it is safe to do so.

If the guard rail is designed only to be erected from the top of the tank, the person erecting the guard rails should wear a safety harness to prevent a fall and should be attended by another person to act as an emergency responder.

Consideration should be given to the height of guard rails above the tank obstructing overhead structures.

It has been reported that terminals have requested that guard rails are erected by the truck driver alone on the roadside prior to the tank entering the terminal. Such practice is unsafe.

2.6 Terminals without gantries

If the terminal is not properly equipped with an access gantry a temporary platform and guard rails could be fitted by a nearby service provider.

A top frame including guard rails may be stored at a service providers premises and temporarily installed on the tank for the required period of use.

Usually, the installation takes place at the service providers premises. The tank, complete with the lift-on/ lift-off platform is then delivered by truck to the terminal. The system is not suitable for intermodal transport. Only for local transport by truck.

Terminal personnel erect the collapsed hand rails when the tank arrives at the terminal



2.5 Temporary platform for top access

2.7 Fall arrest system - body harness

These systems include the use of a body harness attached to a higher rail, track or cable via an inertia arresting block. The systems are better suited to a workshop setting where the rail is suspended from a roof structure.

Sites should have a rescue plan in the event that a person should fall from the tank top and is suspended in a safety harness. Self-lowering fall arrest systems can significantly reduce the risk of suspension trauma as well as support site rescue team.

Table 2. Summary of filling and discharge requirements

Obligation shipper	Remarks
Minimise the need to work at height	Review processes
Personnel trained in working at height	
Operations at the terminal to be undertaken by terminal personnel	Contractual terms and conditions
Provide access gantries for terminal personnel to carry-out the required tasks	
Obligation tank logistics operator	
Personnel trained in working at height	
Personnel qualified in the required tasks	Including contracted personnel e.g. truck driver

3. TANK SERVICE PROVIDERS - DEPOTS

The requirement for maintenance and inspection requires that personnel access the top of the tank.

- Inspection – This might sometimes take place in the yard where fall protection harness is employed.
- Repairs – This usually takes place in the workshop area where working at height gantries can be provided.

Both the service providers employees and external personnel present on the premises, are required to be protected.

All personnel should receive safety training as required by health and safety legislation.

The service provider should verify the training of external personnel and provide additional training and instruction specific to the service providers premises.

Service provider / client contracts should include safety obligations of each party.

3.1 Clients

When clients (employees or their appointed surveyors and contractors) visit the depot, they should comply with all the required safety procedures. Clients should ensure that personnel:

- Are appropriately trained in safety requirements for functions of activity.
- Have completed a risk assessment.
- Adhere to company, depot and statutory safety requirements.
- Are equipped with the necessary protective clothing and equipment.
- Are aware of moving vehicles/containers and are conspicuous at all times.
- Provide notice of the visit to the depot to enable preparations to be arranged.

3.2 Inspection

Inspectors require access to all parts of the tank.

Inspectors might be:

- Service provider employees
- Independent inspectors contracted to the service provider
- Independent inspectors contracted to the client
- Client employed inspectors

The service provider has a responsibility for on-site safe working practices, part of which includes ensuring appropriate training and qualification has been provided to persons working on the service providers premises and the provision of equipment to facilitate safe working procedures.

The service providers risk assessment should assess the safety requirements, consider the contractual liabilities and determine a safe working process.

External personnel should verify their safety training qualification to the service provider. Specific safety requirements of the service providers site should be confirmed and include the emergency plan and safe assembly point.

Inspection gantries

Inspection from a gantry complete with guard-rails is the preferred means of access to the top of the tank.



3.2a Inspection gantry for top access to tank

Tanks undergoing inspection and test should be positioned alongside a gantry but might require the inspector to access the tank using the tank walk-way.

A fall arrest harness is required if guard-rails are not fitted.

Recognising that inspection might not be feasible to undertake alongside a permanent gantry, an alternative safe means of access should be provided.

A fall arrest harness may be appropriate.

Alternatively, the service provider may equip the tank with a lift-on/lift-off mobile platform complete with guard rails



3.3b Temporary platform top access



3.2c Fall arrest harness

Inspection ladders

Ladders may be required for accessing both the external and internal parts of the tank.

Internal tank access

Access to the inside of the tank is through a 50 cm diameter man-way.

The ladder should include:

- Means to secure (to the tank man-way neck-ring) to prevent slippage
- Rubber feet to reduce slippage risk
- Length to suit the tank diameter
- Width to provide sufficient space within the 50 cm man-way for the inspector's access
- Lightweight

The ladder, being frequently moved in and out of tanks is vulnerable to damage. The ladder condition should be checked before use and maintained fit for purpose.

Fall arrest body harness

These systems include the use of a body harness attached to an upper rail, track or cable via an inertia arresting block.

Sites should have a rescue plan for situations where the operator falls from the tank top and is suspended in a safety harness. Self-lowering fall arrest systems can significantly reduce the risk of suspension trauma as well as support site rescue team.

3.3 Repairs and maintenance

Repairs and maintenance require access to all parts of the tank, interior and exterior.

The repair-shop provides, gantries, platforms, ladders and fall arrest equipment to enable safe working

Where possible, top working should be eliminated. Operations should be reviewed to determine if process changes could be introduced that would allow operations to be undertaken at ground level.

Ladders and walkway platforms fitted to the tank might be damaged and unsafe to use.

Rotating equipment

Rotators are designed to enable the tank to be orientated to a position where works can be carried out at ground level.

In addition to facilitating safe working, the equipment also provides repair efficiency with resulting economic benefits



3.3a Rotator rig

There is a balance to be made when considering the time taken to fit the tank into a rotator and the estimated time to make the repair.

This time equation should also consider the safety of personnel: accidents can occur during both small and large jobs.

Workshop mobile stairs and access platforms

Access to the top or side of the tank is better made from gantries or mobile platforms.



3.3b Platform top side access

Working on top of the tank

Positioning the tank under a gantry allows for safe access. The gantry should be fitted with guard rails

The photograph displays a workshop where the tanks are on secure trestles (to facilitate underside works) and the rear end of the tank is positioned to a gantry that runs the length of the workshop.

Personnel gain access to the top of the tank from the gantry.



3.3c Top access workshop gantry

Workshop ladders

Ladders might be used for access to the sides of the tank and access to the interior.

Exterior ladders

Ladders for exterior works are not recommended in place of platforms.

However, when used the top of the ladder should be firmly secured to the tank to prevent slippage.

Interior access

Access to the inside of the tank is via the 50 cm man-way and a ladder placed inside the tank.

A safe ladder requires:

- Means to secure the ladder at the top to prevent slippage
- Rubber feet to reduce slippage risk
- Length to suit the tank diameter
- Narrow width to provide sufficient space within the 50 cm man-way for the inspector's access
- Lightweight

Ladders, being frequently moved in and out of tanks, are vulnerable to damage.

The ladder condition should be checked before use and maintained fit for purpose.

Note:

Tank entry procedures require the issuance of a tank entry permit.

Do not enter a tank without a safety permit.

Fall arrest body harness

Personnel should be protected from falls by working from tank gantries and platforms fitted with guard-rails.

However, where this is not practical fall arrest body harness is an alternative safe measure. These systems include the use of a body harness attached to a rail, track or cable via an inertia arresting block



3.3d Fall-arrest harness

Sites should have a rescue plan for situations where the operator falls from the tank top and is suspended in a safety harness. Self-lowering fall arrest systems can significantly reduce the risk of suspension trauma.

Repair yard repairs

Repairs should be undertaken in the workshop area where safety facilities should be easily accessible.

However, it might be necessary to undertake works in the repair yard.

These repairs might be small “last minute” repairs but safety procedures must nevertheless be implemented in full.



3.3e Mobile access



3.3f Mobile access

3.4 Tank cleaning

Tank cleaning is usually carried out by equipment fitted to the tank man-way and requires operatives to access the top of the tank.

Tank cleaning facilities might be designed as:

- Drive-through facility where the tank remains on a truck and is positioned under a gantry
- Tanks positioned at ground level

Drive-through cleaning

The tank remains mounted on the tank chassis and the facilities utilise a gantry for top access.

A draw-bridge fitted with guard-rails, is required to allow the operator to step from the gantry to the tank walk-way.

The gantry should be fitted with guard-rails around the work area.

Alternatively, a fall arrest body harness should be provided



3.4a Tank cleaning top gantry

Ground level cleaning

End access gantries can be installed to reach the top of the tank.

There should be a safe means for the operator to step from the gantry to the tank walk-way.

Provision should be made for guard-rails where practical or a fall arrest body harness should be provided



3.4b Tank cleaning top access

Tanks on semi-trailers

Access to the bottom valves might involve climbing onto a trailer that extends beyond the rear of the tank. Although a lower height, precautions against fall remain important part of the work procedure.

It may also be necessary to access the sides and ends of the tank to remove placards.

Platforms are required for safe working.

Tank service providers obligations

Health and safety legislation places obligations to employees and external personnel present on the service providers premises.

Table 3 Summary of service providers obligations

Obligation	Remark
Risk assessment	Undertake a risk assessment and determine put appropriate measures
Personnel trained and qualified in safety appropriate to their tasks	Maintain training record
External personnel visiting the site verify safety training and informed of depot safety and working at height requirements.	Safety training should be undertaken by their employer and a record of the training provided to the service provider on request.
Site awareness and emergency procedures	Personnel informed of safety policy and actions in the event of an emergency
Provide safe access for personnel to carry-out the required tasks	

4. RISK ASSESSMENT

Risk assessment should be carried out to assess hazards and the necessary measures to control risk.

Risk assessment should be obtained the appointed safety advisor or other qualified person.

Risks to consider include:

- Height of the working position
- Frequency of access
- The task
- Equipment to be handled
- Personal Protective Equipment to be worn
- Location and exposure to weather conditions
- Level of supervision
- Operating procedures
- Maintenance procedures
- Training and qualification of personnel

end

PHOTOGRAPH ACKNOWLEDGMENTS

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