



GUIDELINE FOR SAFE HANDLING OF LIQUID CONTAINERS ON WHEEL BASES

AIGA 108/20

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GUIDELINE FOR SAFE HANDLING OF LIQUID CONTAINERS ON WHEEL BASES

As part of a program of harmonization of industry standards, the Asia Industrial Gases Association (AIGA) has published AIGA 108, *Guideline for the Safe Handling of Liquid Containers on Wheel Bases*, jointly produced by members of the International Harmonization Council and originally published as P-84 by Compressed Gases Association (CGA) as *Guideline for the Safe Handling of Liquid Containers on Wheel Bases*.

This publication is intended as an international harmonized standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), and Japan Industrial and Medical Gases Association (JIMGA). Each association's technical content is identical, except for regional regulatory requirements and minor changes in formatting and spelling.

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Contents	Page
1 Scope and purpose	1
2 Definitions.....	1
3 General handling guidelines.....	2
4 Safe handling guidelines	3
4.1 Offloading a container from a truck	4
4.2 Loading a container onto a truck	4
5 Training	5
6 Personal protective equipment (PPE)	5
7 References	5

Figures

Figure 1—Examples of typical liquid containers on permanently attached wheel bases	1
Figure 2—Examples of a tread/brake pedal (left) and a hand-operated friction brake (right)	3

1 Scope and purpose

This guideline details the safe practices related to the movement and handling of liquid containers on wheel bases during transportation and delivery. These include guidelines on general container handling safety and liquid container movement.

The containers addressed in this guideline have been manufactured with permanently attached wheel bases. See Figure 1 for examples of typical liquid containers on these types of wheel bases.

This guideline does not address liquid containers that have been temporarily affixed onto a wheeled cart for movement, nor does it address the movement of liquid containers on temporarily attached wheel bases.



Container with a round base



Container with a square base

Figure 1—Examples of typical liquid containers on permanently attached wheel bases

2 Definitions

For the purpose of this publication, the following definitions apply.

2.1 Publication terminology

2.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

2.1.2 Should

Indicates that a procedure is recommended.

2.1.3 May

Indicates that the procedure is optional.

2.1.4 Will

Is used only to indicate the future, not a degree of requirement.

2.1.5 Can

Indicates a possibility or ability.

3 General handling guidelines

Containers on permanently attached wheel bases pose safety hazards, which can present a risk to personnel handling them when they are moved. These units are very heavy; for example, a 240 L container can weigh approximately 400 lb (180 kg) empty and 900 lb (400 kg) when filled with oxygen. If they fall or tip during movement, there is a risk of serious injury or fatality.

In addition to the hazards encountered by a tipping or falling container, the mass of these containers presents potential ergonomic hazards when moving them. Pushing, pulling, and turning these containers incorrectly can lead to musculoskeletal injuries to many body parts, including the back, arms, shoulders, legs, and more. Handlers should ensure that best practices regarding stretching, body positioning, and personal limitations are followed. See CGA P-61, *Ergonomic Guidelines for the Industrial and Medical Gas Industry*, for additional guidance on safely moving these containers [1].¹

WARNING: *If a container is falling or off balance, move out of its way and let it fall.*

Personnel shall use caution while moving these units (empty or full) and adhere to the safe handling procedures in this publication.

When possible, move these containers over surfaces that are smooth and even. Plan the path of movement before moving the container. When or where the situation requires it, ask for assistance. When leaving a container unattended, ensure that the surface where the container is left will not cause it to roll or move on its own.

Be aware that, when pushing the container, the forward view could be obstructed. Tools, equipment, or other objects should not be placed on the container during movement. Placing objects on the container can affect its center of gravity and, therefore, its tipping point and handling.

When moving these containers, the handler should avoid placing themselves between the container and a structure or other object. Also, handlers should be aware of open edges on elevated surfaces. The container's momentum and weight could cause the:

- handler to become caught or crushed between the container and a structure or other object;
- container to fall from a height; or
- container to fall on the handlers or others.

The potential for these risks increases when moving containers on surfaces that are sloped.

Do not store or transport a full or empty container on its side.

A power lift gate, an inclined ramp of less than an 8-degree grade, or an alternate method such as a truck-mounted crane shall be used if the truck bed and shipping or delivery point are not at the same height. For ramps equal to or greater than an 8-degree grade, perform a risk assessment that includes considerations of the:

- Length of the ramp. Ensure that the ramp is not the same length as the wheel base so that the wheels of the container do not hit both edges of the ramp at the same time;
- Angle height of the ramp;
- Need for assistance to move the container;
- Surface type, to avoid water and ice buildup;
- Weight capacity of the receiving ramp; and
- Weight of any mobile ramps such as dock plates or transition ramps.

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.

Do not attempt to move these containers onto a tailgate or vehicle that is not designed to handle the weight of a full container.

These containers may be lifted using the manufacturer's designated lifting points and methods. When lifting a container that is equipped with a handle as shown in Figure 1, ensure the handle is secured to the container to avoid becoming damaged or creating an additional hazard.

Use only appropriate load-rated straps to secure these containers to the delivery vehicle.

4 Safe handling guidelines

When pushing a wheeled liquid container up an incline, it is recommended that the incline be no greater than 8 degrees. Ensure that you have an exit path to get out of the way if the container starts to roll towards you.

Containers on a non-square wheeled base can be less stable.

Some containers are taller than others. Be aware that taller containers can be less stable and not all containers are equipped with brakes.

Prior to moving the container:

- Inspect the wheels for signs of excessive wear and damage. If present, remove the container from service until repaired; and
- Confirm that the wheel brakes, if equipped, are functional. One type of brake is tread brake/pedal type; another is hand-operated friction brake. See Figure 2 for examples of these two types of brakes.



Figure 2—Examples of a tread/brake pedal (left) and a hand-operated friction brake (right)

Moving containers with a forklift is prohibited unless they are:

- secured on a pallet with appropriate load-rated straps; or
- designed to be moved with a forklift.

When moving containers:

- Ensure that the wheel brakes, if equipped, are released;
- Full and empty containers are generally pushed;
- For containers with round bases:
 - On flat surfaces, use the handling ring to guide the container, especially over uneven ground or when there is a change of elevation. This will help to prevent the container from tipping over;

- For containers with square bases:
 - On flat surfaces, use the handle in conjunction with the handling ring to guide the container, especially over uneven ground or when there is a change of elevation. This will help to prevent the container from tipping over;
- On a downward-sloped surface, personnel should stand behind the container and guide it down the slope. Handlers shall follow their company procedures for moving containers on sloped surfaces; and
- Use either the handling ring or the handle to turn a container to position the wheels in the direction of travel. Do not try to turn and pull the container at the same time.

4.1 Offloading a container from a truck

The following steps shall be performed when offloading a container, whether full or empty, from a truck:

- a) Evaluate the transition between the truck bed and the power lift gate to ensure that the container can be safely maneuvered onto the lift gate;
- b) If a gap between the delivery dock and the lift gate is excessive, use a transition plate to bridge the gap;
- c) Secure the folding ramp in place prior to lowering or raising the power lift gate;
- d) Lower the power lift gate as low as possible to minimize the incline of the ramp to the lift gate. It may be necessary to relocate the truck to achieve a safe delivery;
- e) Remove the container from the pallet, if applicable;
- f) Position the container onto the power lift gate;
- g) Position a container with a square base on a power lift gate so that the container or its handle does not interfere with the movement of the lift gate;
- h) Engage the container's brake, if equipped, while lowering the container. If not equipped with a brake, the container should be secured to prevent movement while being lowered;
- i) Do not set more than two containers on the power lift gate at a time to allow sufficient room for the handler to maneuver and to prevent overloading of the power lift gate;
- j) Identify or prepare an area that is clear of snow or debris so that the power lift gate can be lowered for safe use. Lower the gate and ensure that it is on the ground;
- k) Ensure that the ramp is fully extended and stable. Minimize the incline as much as possible. Pay attention to the condition of the ground at the bottom of the ramp to avoid conditions such as ruts, large stones, or uneven surface that could affect the safe use of the power lift gate and ramp;
- l) Ensure that the wheels located on the front of a container with a square base don't swivel and get stuck (for example, on a threshold or crack) and cause a tipping risk; and
- m) Remove the container from the power lift gate using proper ergonomic techniques.

4.2 Loading a container onto a truck

The following steps shall be performed when loading a container, whether full or empty, onto a truck:

- a) Empty containers may be pushed or pulled onto the power lift gate ramp, whichever minimizes tipping and ergonomic hazards;
- b) Engage the brake, if present, or secure the container from shifting when the power lift gate is raised;
- c) Ensure the ramp is locked in place prior to raising the power lift gate;
- d) Raise the power lift gate; and

- e) Maneuver the container onto the truck and secure it in accordance with country specific regulatory requirements. In case of absence of country specific regulations follow guidelines as per DOT or TC requirements [2, 3].

5 Training

Handlers of containers on permanently attached wheel bases shall be trained in their safe movement and handling.

6 Personal protective equipment (PPE)

The employer shall conduct a risk assessment to determine the PPE that is required for handlers of containers on permanently attached wheel bases.

The following PPE is recommended when handling these containers:

- safety footwear with protective toes and metatarsal guards;
- safety glasses with side shields or safety goggles; and
- leather wrist gloves or fabric gloves with leather palms.

For additional information on PPE, see AIGA 066, *Selection of Personal Protective Equipment* [4].

7 References

Unless otherwise specified, the latest edition shall apply.

[1] CGA P-61, *Ergonomic Guidelines for the Industrial and Medical Gas Industry*, Compressed Gas Association. www.cganet.com

[2] *Code of Federal Regulations*, Title 49 (Transportation) Parts 100-180, U.S. Government Printing Office. www.gpo.gov

[3] *Transportation of Dangerous Goods Regulations*, Transport Canada. www.tc.gc.ca

[4] AIGA 066, *Selection of Personal Protective Equipment*, Asia Industrial Gases Association www.asiaiga.org

NOTE—This publication is part of an international program for industry standards. The technical content of each regional document is identical, except for regional regulatory requirements. See the referenced document preface for a list of harmonized regional references.

[5] AIGA TP 11, *Safe Handling and Use Portable Liquid Containers (PLCs)*, Asia Industrial Gases Association www.asiaiga.org