

American National Standard



ENVIRONMENTAL INDUSTRY
A S S O C I A T I O N S

*for Equipment Technology and
Operations for Wastes and
Recyclable Materials -
Stationary Compactors -
Safety Requirements for Installation,
Maintenance and Operation*



WASTE EQUIPMENT TECHNOLOGY ASSOCIATION
A PART OF THE
ENVIRONMENTAL INDUSTRY ASSOCIATIONS

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American National Standard
for Equipment Technology and Operations
for Wastes and Recyclable Materials

**Stationary Compactors —
Safety Requirements for
Installation, Maintenance and Operation**

Secretariat
Environmental Industry Associations

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American National Standards Institute, Inc.

American National Standard

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Table of Contents

	Page
Foreword (informative).....	iii
0 Introduction (informative).....	1
1 Scope	2
2 Normative references	2
3 Definitions	2
4 Installation requirements	
4.1 General requirements	13
4.2 Power disconnect.....	13
4.3 Emergency controls	13
5 Safeguards and features	
5.1 Access Covers	13
5.2 Service openings.....	13
5.3 Compactor-container attaching mechanism	13
5.4 Controls.....	13
5.5 Operating switches and sensors.....	13
5.6 Security switch	14
5.7 Emergency controls	14
5.8 Interlocks	14
5.9 Guarding	14
5.10 Compactor containers.....	15
5.11 Container/cart lifting systems.....	16
5.12 Continuously operating and unattended stationary compactors with automatic startup – additional safety features	17
5.13 Caution, warning and danger markings	18
6 Reconstruction and modification	21
7 Owner/operator requirements	
7.1 Owner/Employer responsibilities for stationary compactors.....	21
7.2 Operator/employee responsibilities for stationary compactors.....	23
7.3 Procedures for the control of hazardous energy sources (lockout/tagout).....	24
7.4 Procedures for work in confined spaces	25
8 Safety and training program	
8.1 General	26
8.2 Safety program.....	26
8.3 General Training	26
8.4 Training requirements	27
Annex	
A Bibliography (informative).....	28

Figures

1	Apartment stationary compactor).....	9
2	Commercial/industrial stationary compactor.....	10
3	Self-contained compactor-container	11
4	Continuously operating stationary compactor (as used in typical waste processing facility operations)	12
5	Typical transport equipment for compactor-containers.....	12
6	Guard or loading hopper – minimum loading height for stationary compactor.....	15

FOREWORD (This foreword is not part of American National Standard Z245.2 -2008)

This American National Standard is applicable to the reconstruction, modification, maintenance, repair, operation, and use of commercial stationary compacting equipment used in apartment, institutional, commercial and industrial locations, including transfer stations and recycling facilities. A companion standard, ANSI Z245.21–2008 establishes safety requirements for the design and construction of commercial stationary compacting equipment. Both these standards taken together revise and replace ANSI Z245.2-1997. This American National Standard does not apply to compactors commonly referred to as domestic or household compactor appliances. Stationary compactors also have been addressed previously in ANSI Z245.2-1992 and ANSI Z245.1 (1978 and 1984 editions), *Mobile Refuse Collection and Compaction Equipment, Safety Requirements*. For mobile collecting and compacting equipment, refer to ANSI Z245.1.

The effective date of all requirements of this standard shall be 12 months after the approval date of this standard by the American National Standards Institute, Inc. For all stationary compacting equipment manufactured prior to 12 months after the approval date of this standard, please refer to the previous editions of the ANSI Z245.2 standard.

Inquiries, requests for interpretation and suggestions for the improvement of this standard should be directed to the Secretary, Accredited Standards Committee Z245, c/o Environmental Industry Associations, 4301 Connecticut Ave., NW, Suite 300, Washington, D.C. 20008.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Z245 on Equipment, Technology and Operations for Wastes and Recyclable Materials. Committee approval of this standard does not necessarily imply that all members of the committee voted for its approval. At the time it approved this standard, the Z245 Committee had the following members:
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American National Standard
for Equipment Technology and Operations
for Wastes and Recyclable Materials —

Stationary Compactors — Safety Requirements for Installation, Maintenance and Operation

0 Introduction

This standard was developed by American National Standards Institute Accredited Standards Committee Z245 Subcommittee 2 on Stationary Compactors and approved by Accredited Standards Committee Z245.

This standard revises the stationary compactor equipment safety requirements found in ANSI Z245.2-1997 by providing specific requirements for installation, maintenance, repair and operation necessary to ensure the safe operation of the stationary compactor.

This standard complements ANSI Z245.21-2008 which details the safety requirements for design and construction of stationary compactors.

The requirements contained in this standard pertain to new stationary compactors as produced by the manufacturer. New requirements and revisions are not intended to be retroactive for stationary compactors manufactured to comply with earlier revisions of this standard. Refer to the approved edition of ANSI Z245.2 in effect at the time of manufacture for those requirements.

The requirements contained in this standard are not intended to apply to other components of end-use applications where a stationary compactor is part of a designed compacting system.

Exceptions and notes contained in the standard apply to the clause or sub-clause in which they are contained or to which they reference. Exceptions pertain to normative requirements. Notes are informative and provide guidance for the evaluation of a normative requirement.

The units of distance measurement used in this standard are in the inch-pound system. When a value for measurement is followed by a value in other units in parentheses, the second value is only approximate. The first value is the requirement.

1 Scope

This standard revises safety requirements with respect to the installation, operation, maintenance, service, repair, modification, and reconstruction (where applicable) of stationary compacting equipment covered by ANSI Z245.2 - 1997, *Stationary Compactors – Safety Requirements*.

The requirements of this standard apply to stationary compactors rated at 600 volts or less, for outdoor or indoor use, and are employed in accordance with the manufacturer's installation, operation, and maintenance instructions and procedures.

This standard does not apply to compactors intended for use in private homes.

This standard does not apply to mobile landfill compactors and compactor-type equipment that is operational when mounted on trucks or other vehicles.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI A1264.1-1995 (R2002), *Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems*.

ANSI Z245.21-2008, *Stationary Compactors — Safety Requirements*

The following regulations contain provisions which, through reference in this text, constitute provisions of this American National Standard.

OSHA 29 CFR Part 1910.146, *Permit Required Confined Spaces*¹

OSHA 29 CFR Part 1910.147, *Lockout/Tagout of Energy Sources*²

3 Definitions

For the purposes of this American National Standard, the definitions below apply to terms used throughout this standard, unless the context clearly indicates otherwise.

3.1 access cover or door: A panel covering an opening that is designed to permit access to the interior of the stationary compactor.

3.2 access gate: A moveable barrier/guard that swings on hinges or moves in/on a track and is distinguished from a door by having openwork.

3.3 affected employee: An employee whose job functions place them in proximity to potential hazards related to work being performed by authorized employees.

3.4 authorized employee: A person who, on the basis of their specific experience and training, is permitted to perform certain designated duties.

¹ Available online at <http://www.gpo.gov/nara/cfr/index.html>.

² Available online at <http://www.gpo.gov/nara/cfr/index.html>.

3.5 automatic start/cycling control: A control that uses an automatic actuator or sensor to initiate the operation of the stationary compactor on demand, when refuse is loaded into the loading chamber.

3.6 cart: A wheeled container that receives, holds and stores loose refuse. Carts are generally classified by their size and application as either residential or commercial/industrial, in the following manner:

- a) **residential:** A two-wheeled container that receives, holds and stores loose refuse. It is typically used in collection of residential, commercial and industrial waste that utilizes mechanical lift systems for unloading. Residential carts typically range in size from 45 to 100-gallon capacity.
- b) **commercial/industrial:** A three- or four-wheeled container that receives, holds and stores loose refuse. It is typically used for the collection of commercial and industrial waste that utilizes manual lifting or mechanized lift systems for unloading. Commercial/industrial carts typically range in size from one-half (1/2) cubic yard to four (4) cubic yards in capacity.

3.7 chute: An enclosure connected to the stationary compactor and to an adjacent structure that funnels material into the loading chamber. (See figure 4.)

3.8 commercial waste: Waste produced by stores, offices, restaurants, warehouses, and other non-manufacturing operations.

3.9 compactor: See stationary compactor.

3.10 compactor-container: A container specially designed to be compatible with the compactor to which it is attached. It is used to receive, contain, store, and transport the compacted material.

3.11 compactor-container attaching mechanism: A compatible system that couples and secures the compactor-container to the compactor.

3.12 compactor frame: The structural assembly of a stationary compactor that encloses the loading chamber and ram components. (See figure 2.)

3.13 component: A part or assembly which complies with specified requirements and is used in the construction of the stationary compactor.

3.14 confined space: An area within the stationary compactor that has adequate size or configuration for personnel entry, has limited means of access or egress, and is not designed for continuous employee occupancy.

3.15 container: A receptacle (also referred to as a bin) that receives, holds and stores loose or compacted refuse for lifting, unloading and/or transportation by mechanical means. Containers are specially designed for use with certain types of equipment. Containers used with rear-loading compacting equipment will incorporate features that differ from containers used with front-loading compacting equipment. Containers used in conjunction with tilt-frame, roll-off, hook-lift and hoist-type equipment will incorporate features that differ between types of compatible lifting mechanisms utilized, and are designed to be picked up, transported, unloaded, and set off by that equipment. Containers typically range in size from one (1) cubic yard to seventy (70) cubic yards in capacity.

3.16 container/cart-lifting systems: Component mechanisms, such as (but not limited to) lifting arms, forks, and hydraulic cylinders, cables, winches and reeving cylinders mounted to a foundation or stationary equipment that are used to complete a lift and dump cycle of containers and/or carts into the loading chamber of the stationary compactor.

- a) **mobile type:** Hoist-type equipment or hoist equipment (see 3.32) and tilt frame or roll-off equipment (see 3.79). (See figure 5.)
- b) **stationary type:** Component mechanisms, such as (but not limited to) lifting arms, forks, buckets, hydraulic cylinders, cables, chains, winches, and reeving cylinders mounted to a foundation or stationary equipment that are used to complete a lift or dump cycle of carts and/or containers into the loading chamber of the stationary compactor.

3.17 continuously operating stationary compactor: Stationary compactor where the main motor remains in continuous operation, or can start automatically while unattended.

3.18 contract laborer: An employee of a person or company that provides labor (work) for a specified fee to another employer. A contract laborer may be used to supplement the employer's regular workforce and usually performs the same or similar duties as regular full-time employees.

3.19 contractor: A person (or company) who contracts to supply certain materials or provide a specific service (work) for a stipulated fee and/or a specified period such compactor equipment maintenance services. The work or service provided may be outside the scope of materials supplied or services provided by the employer or operator's workforce.

3.20 control of hazardous energy sources (lockout/tagout): A program which utilizes procedures for affixing appropriate lockout or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energizing, start-up, or release of stored energy in order to prevent injury to persons in or near the machines.

3.21 conveyor: A horizontal, incline, or vertical device for moving or transporting material in a path predetermined by the design of the device, and having fixed or selective points of loading and discharge.

3.22 cycle: The operation of a mechanism to perform one complete operation having a definite beginning and end.

3.23 dock ramp: A structural platform for walking on or driving a vehicle on that provides access from an adjacent structure or area to the stationary compactor.

3.24 electrical enclosure: That portion of a product that renders inaccessible any part that presents a risk of electrical shock.

3.25 electrical power disconnect: A device that breaks the circuit supplying all electrical power to the stationary compactor, and can be locked in the off position.

3.26 emergency stop (E-stop): A stop arising from a sudden and unexpected need, and not as a part of normal operation. The device that can be actuated in an emergency situation to stop a machine's process or cycle.

3.27 employee: An individual hired by an employer to work for compensation.

3.28 employer: A person, company, or entity who hires one or more individuals, companies or entities to work for compensation.

3.29 energy sources: Sources of energy that include, but are not limited to, electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other potential sources of energy (e.g., gravity, kinetic, etc.).

3.30 guarding: The use of a device or mechanism designed and constructed to prevent the operator of a stationary compactor and others from coming into physical contact with the point of operation or a hazard.

3.31 hazard: A condition of such a nature that it may precipitate an accident or injury.

3.32 hoist-type equipment or hoist equipment: The hoist arms, chains, and frames used to elevate, support, transport, dump, and unload compatible containers or equipment. Hoist-type equipment is utilized with an engine-powered cab and chassis (see figure 5).

3.33 industrial waste: Waste produced as a result of manufacturing, industrial processes, or demolition operations.

3.34 informative: Refers to the portions of this standard provided only for purposes of clarification, illustration and general information. The portions of this standard considered informative do not contain mandatory requirements. The Foreword, Notes and Annexes are considered informative.

3.35 installer: A company or person responsible for putting a stationary compactor in place, activating it, and performing initial checks.

3.36 integrated power unit: Power unit that is contained within the body/framework of the stationary compactor.

3.37 interlock: A device or mechanism used to connect individual components together so that the action of one part of the stationary compactor is constrained by, or dependent upon, another.

3.38 loader: An individual, 16 years old or older, who is trained and authorized by the employer to place materials into the loading chamber of a stationary compactor, but who is not authorized to operate the stationary compactor.

3.39 loading chamber: The opening within the structural configuration of the stationary compactor in which the material is loaded prior to compression by the ram.

3.40 loading height: The vertical distance between loading sill and working surface.

3.41 loading hopper: An enclosure mounted on the stationary compactor that serves to direct the flow of material into the loading chamber.

3.42 loading sill: The ledge over which material is deposited into the stationary compactor.

3.43 lockable device: A device that, once locked, will prevent opening or removal of the access door or cover it is protecting, and requires a key-like device to unlock.

3.44 main control panel: The panel that contains the motor starting controls and relays.

3.45 maintenance personnel: Employees who are trained and authorized by the employer to service, inspect, clean, repair, or maintain stationary compactors.

3.46 maintenance testing: Functional and operational checks that may be performed on stationary compactors and systems by authorized employees before, during, or after maintenance and before placing the stationary compactor back in regular service.

3.47 manufacturer: The term manufacturer includes any intermediate or final-stage manufacturer prior to the compactor being offered for sale.

3.48 maximum system pressure: The maximum operating pressure in the hydraulic system corresponding to the pressure relief valve setting for the system.

3.49 mechanical enclosure: A portion of the product that prevents unintentional contact with internal mechanical parts that involve risk of injury.

3.50 modification: Any change, alteration, addition to or removal from the original equipment or component, made in such a manner that the changed or altered portions or function of the equipment or component are different than the manufacturer's original design, specification, or use.

3.51 normative: Refers to the portions of this standard containing the mandatory requirements (shall). The body of this standard is considered normative.

3.52 operating controls: The controls for operating the stationary compactor. They can be mounted on the main control panel, the stationary compactor frame or located remotely at a control station.

3.53 operator: An individual, 18 years old or older, who is trained and authorized by the employer to operate a stationary compactor.

3.54 owner: An individual, corporation, partnership, legal entity, employer, or business that holds legal ownership papers, title, or lien, on or to, the stationary compactor equipment, unit, or system.

3.55 permit required confined space: A confined space within the stationary compactor that contains or has the potential to contain a hazardous atmosphere, material which may engulf a worker, converging walls or other configurations which could trap a worker, or has any serious safety or health hazards.

3.56 person: An individual, corporation, partnership, legal entity, or business.

3.57 pinch point: A point at which it is possible for a person to be caught between moving parts, or between moving and stationary parts, of the stationary compactor.

3.58 pit: A cavity in the ground, floor, or a sunken or depressed area that is adjacent to a floor area. A pit may be used to store materials to be fed into the stationary compactor.

3.59 point of operation: The area of the equipment where work is performed upon the material.

3.60 ram: The powered component of a stationary compactor that moves the refuse from the loading chamber to the compactor-container where it is compacted. (See figure 2.)

3.61 rated component pressure: The rated working pressure as provided by the component manufacturer.

3.62 reconstruction: The disassembly and re-assembly of equipment, beyond normal repair and servicing, generally for the purpose of placing the equipment back into full operation and substantially extending the service life contemplated at the time of original manufacture.

3.63 recyclable materials: Materials that because of their physical properties, characteristics or other intrinsic value can be reused, reprocessed, or converted for other uses or products after their original design use has been completed, and which have been diverted, removed or recovered from commercial, industrial, or residential wastes.

3.64 recycling: A series of operations or processes by which wastes or other materials are collected, separated, processed and returned to use as other products.

3.65 refuse: Any type of solid waste (except human wastes), including garbage, rubbish, ashes, incinerator residues, street cleanings, plant trimmings, and residential, commercial, and industrial solid wastes, including recyclable materials.

3.66 repair: Any replacement, substitution, or overhaul of the original stationary compactor or components made in such a manner that the stationary compactor and functions of the repaired portions retain minimum design specifications established by the original manufacture (not a modification).

3.67 residential waste: Waste produced by single and multi-family residences.

3.68 safety signs: Signs meeting the Occupational Safety & Health Administration (OSHA) requirements used to depict three levels of hazards:

- a) "DANGER" — indicates an imminently hazardous situation, which if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations;
- b) "WARNING" — indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury, and
- c) "CAUTION" — indicates a potentially hazardous situation, which if not avoided, may result in minor to moderate injury. It may also be used to alert against unsafe practices.

3.69 self-contained compactor-container: A powered press or auger machine that remains stationary during operation and is designed to compact refuse into an integral container. The entire unit is moved for placement and unloading waste or recyclable materials (see figure 3).

3.70 service opening: A protected opening into the interior of the stationary compactor that is designed to permit access to the interior for the purpose of service, repair, or maintenance, but not of a size to permit a person to pass through.

3.71 shall: Use of this word in this standard denotes a mandatory requirement.

3.72 should: Use of this word in this standard denotes a recommendation that is a sound safety practice; it does not denote a mandatory requirement.

3.73 start-up alarm: An audible and visible alarm distinctive and recognizable as a signal to provide warning that the stationary compactor will begin to operate.

3.74 stationary compactor: A powered press or auger that remains stationary and is designed to compact waste or recyclable materials into either a detachable or integral container or into a transfer vehicle. Apartment stationary compactors are stationary compactors used in apartment complexes or institutions (see figure 1). Commercial/industrial stationary compactors are stationary compactors used in commercial businesses, industrial plants, or waste processing, disposal, transfer and recycling facilities (see figures 2, 3 and 4).

3.75 sustained manual pressure control: A control that requires continuous pressure by the operator to allow the stationary compactor to operate.

3.76 system: The combined use of several technologies, normally stand-alone, in an integrated fashion for the simultaneous or sequential processing of materials (such as, shredders, trommels, conveyors, etc).

3.77 system pressure: The range of operating pressures ranging between normal and maximum operating pressure in the hydraulic system as stated by the manufacturer.

3.78 tailgate: The hinged gate or door(s) that closes the rear of the compactor container.

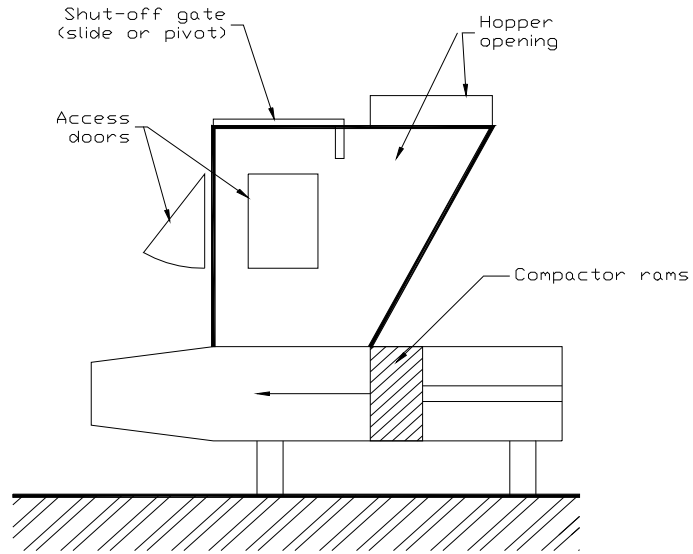
3.79 tilt-frame or roll-off equipment: The tilt-frame, tilt-frame support equipment, hoisting devices, tilt cylinders, and controls for operating the tilt-frame and hoisting devices for loading, dumping, and unloading

containers or stationary compactors (see figure 5). Tilt-frame equipment can be mounted on an engine-cab and chassis or on a trailer chassis.

3.80 unattended stationary compactor with automatic startup: Stationary compactor where the main motor will start and the compactor will cycle automatically while unattended when activated by a signal from a sensor or a sequencing program or device.

3.81 waste: Any type of solid wastes (except human wastes) such as garbage, trash, rubbish, ashes, incineration residue, street cleanings, plant trimmings, solids, semi-solids, liquids or gases, or the like which are generated and discarded by commercial, industrial, and residential activities. Excluded are solid or dissolved materials such as domestic sewage and solid or dissolved materials in irrigation return flows or industrial discharges. This definition does include material diverted from the waste stream for the purpose of recycling.

3.82 working surface: Any surface on which employees perform job duties or upon which employees are required to work while performing assigned tasks.



(a) Horizontal

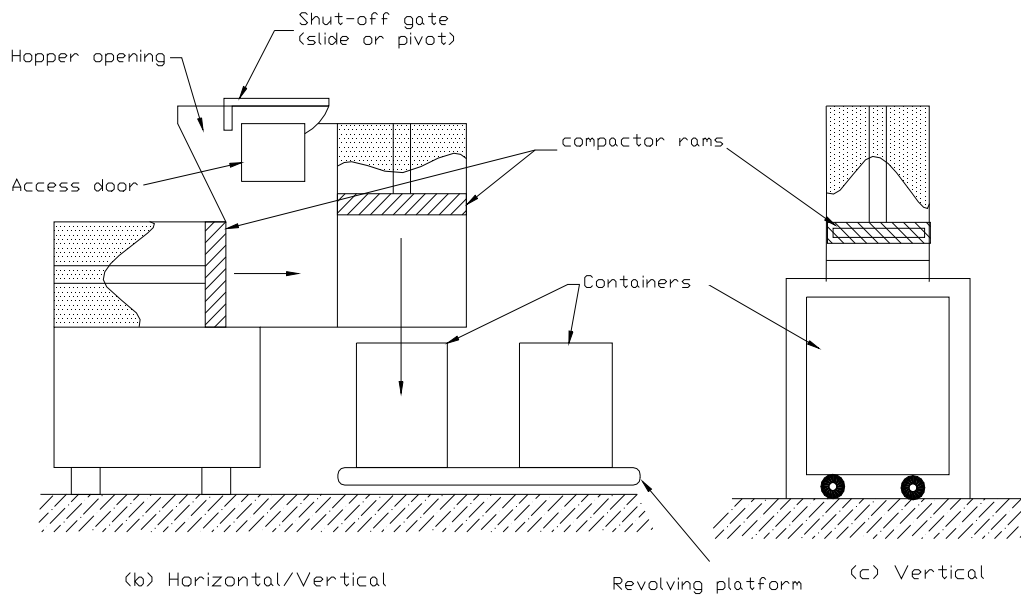
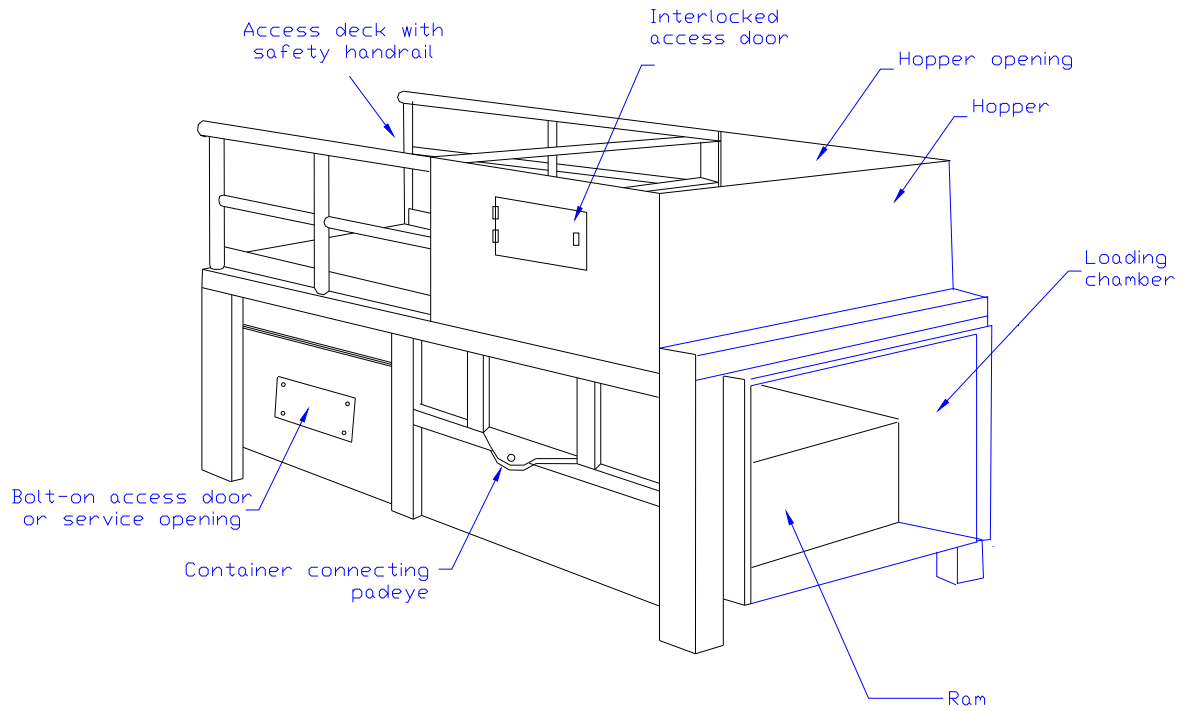
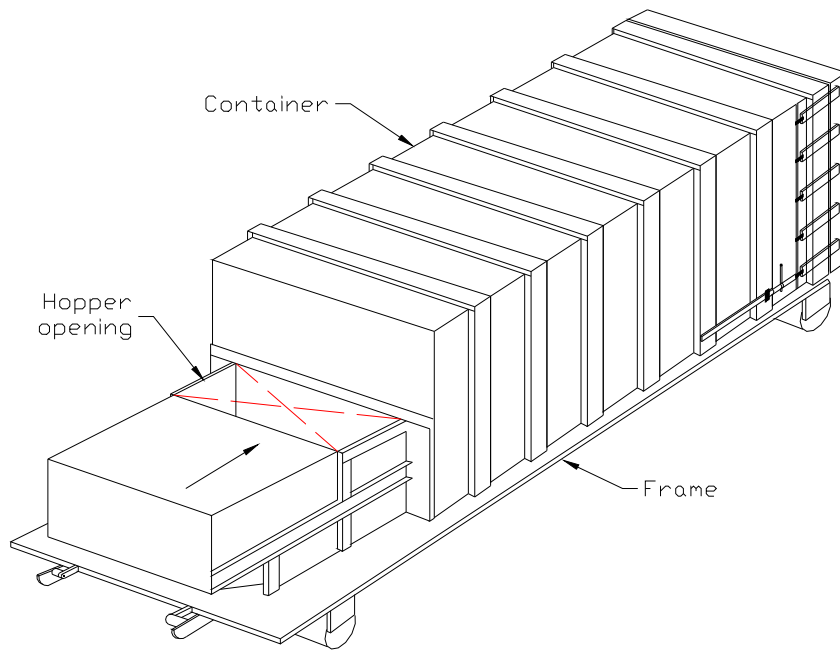


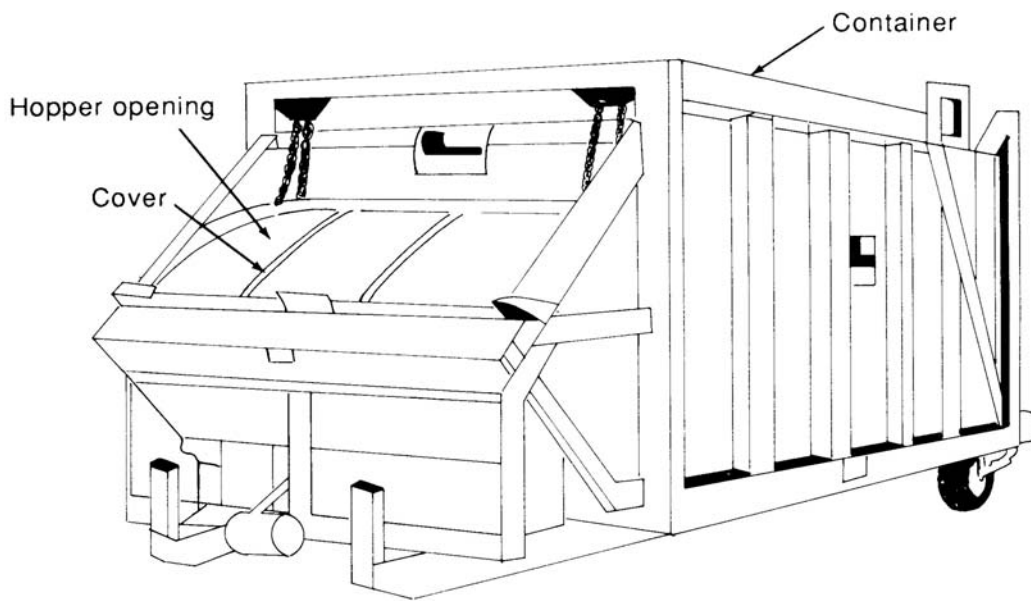
Figure 1 — Apartment stationary compactor



**Figure 2 — Commercial/industrial stationary compactor
(shown with optional accessories)**

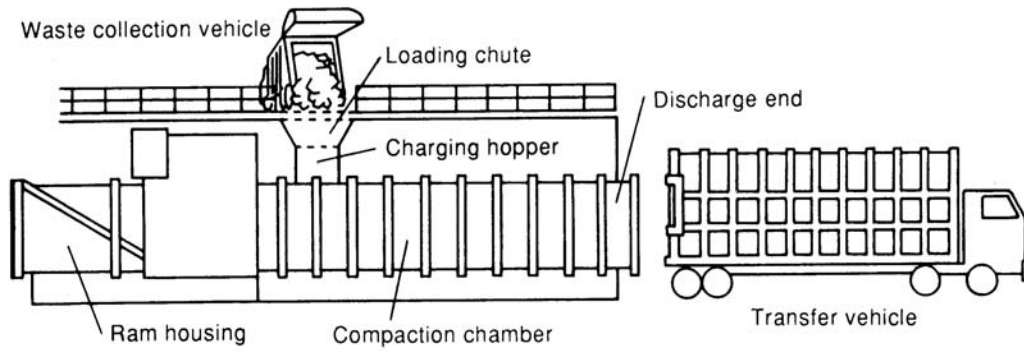


(a) Integral horizontal Compactor-container



(b) Pivoting ram compactor-container

Figure 3 — Self-contained compactor-container



**Figure 4 — Continuously operating stationary compactor
(as used in typical waste processing facility operations)**

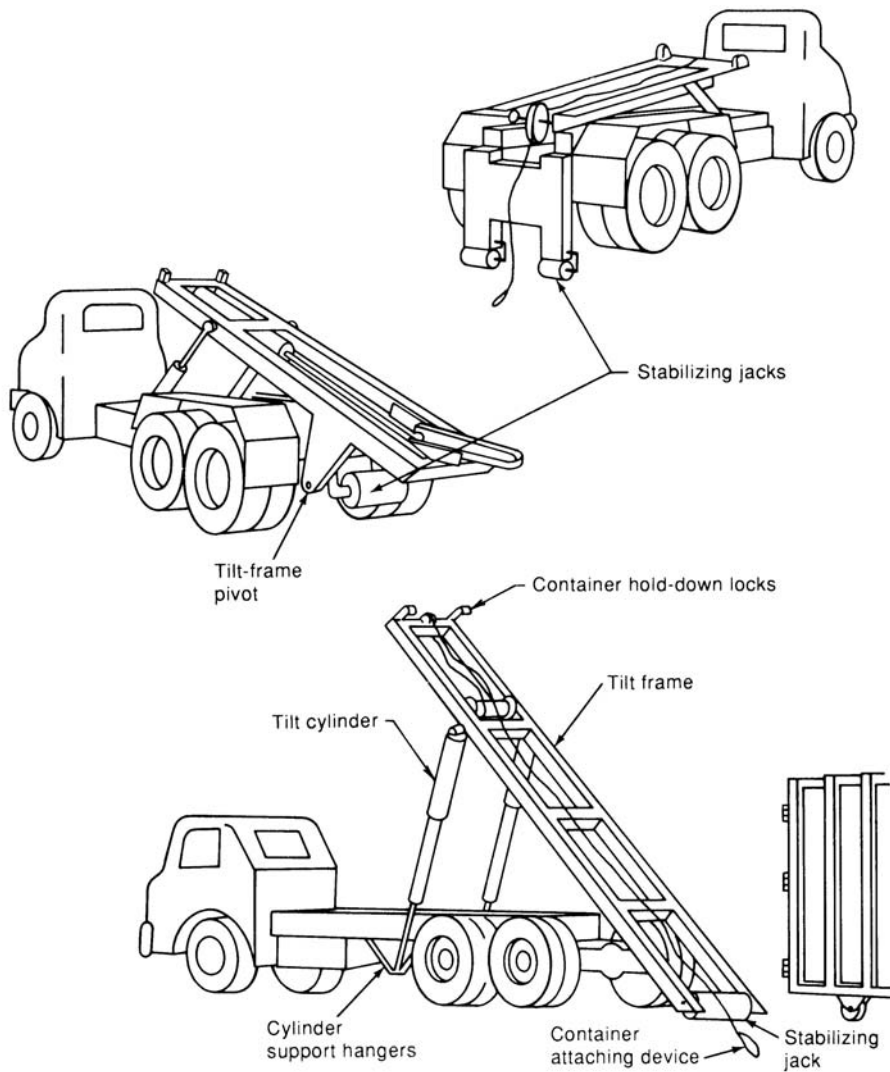


Figure 5 — Typical transport equipment for compactor-containers

4 Installation requirements

4.1 General requirements

4.1.1 The installer of stationary compactors shall do so in accordance with the appropriate sections of this American National Standard and ANSI Z245.21, applicable codes, local ordinances and the manufacturer's recommendations, and shall affix to such equipment the date of installation, installer's name and a statement attesting to compliance with this standard.

4.2 Power disconnect

4.2.1 Installation shall include a power disconnecting means that can be locked in the "off" position.

4.3 Emergency controls

4.3.1 Emergency stop controls shall be readily accessible to the operator or shall be located within 3 ft (91.4 cm) of the point of operation, the material feed area, or if chute fed, within 3 ft (91.4 cm) of the access door.

4.3.2 An electrical power disconnect shall be located within sight of, and no more than 50 ft (15 m) away from the main control panel.

5 Safeguards and features

5.1 Access covers

5.1.1 Access covers shall be interlocked, secured by a lockable device, or be removable by the use of hand tools only.

5.2 Service openings

5.2.1 Removable covers shall protect service openings that expose pinch points. The covers shall be interlocked, secured by a lockable device or removable by the use of hand tools only.

5.3 Compactor-container attaching mechanism

5.3.1 The compactor-container attaching mechanism shall be capable of withstanding more than manufacturer's specified maximum ram force exerted on the refuse in the container.

5.4 Controls

5.4.1 Each control shall be clearly and conspicuously labeled as to its function.

5.4.2 Operating controls, such as start buttons, shall be designed and located to prevent unintentional activation.

5.4.3 Stop buttons, including emergency stop buttons, shall be red, distinguishable from all other controls by size and color, and shall not be recessed.

5.5 Operating switches and sensors

5.5.1 When the unintentional operation of a switch results in a risk of injury to persons, the actuator of the switch shall be located or guarded so that unintended operation is unlikely.

5.5.2 When guarding is utilized for the actuator of the switch, it shall be by recessing, ribs, barriers, or the like.

5.5.3 The actuator of an interlock switch shall be located so that unintentional operation is unlikely.

5.5.4 A device that automatically starts a stationary compactor, such as a timer, an automatically reset overload-protective device, or the like, shall not be employed unless it utilizes a startup alarm.

5.6 Security switch

5.6.1 A key-lock on-off switch, or similarly functioning security switch, shall be maintained by the user/operator as a means to disconnect power to the operating controls and lock these controls in the "off" position.

5.7 Emergency controls

5.7.1 For emergencies, a safety retract feature shall be provided such that whenever the unit is shut off and started again, the ram will always retract to its rear position, or a means of stopping and controlling the movement of the ram at any point shall be provided.

5.7.2 Emergency stop controls shall be readily accessible to the operator or shall be located within 3 ft (91.4 cm) of the point of operation, the material feed area, or if chute fed, within 3 ft (91.4 cm) of the access door.

5.7.3 An electrical power disconnect shall be located within sight of, and no more than 50 ft (15 m) away from the main control panel.

5.8 Interlocks

5.8.1 Access door(s) of loading chambers shall have an interlock system that prevents cycling motion while the access door(s) is open.

5.8.2 An interlock shall not be readily defeated without intentional purpose, such as by:

- a) Damaging of the interlock;
- b) Making wiring connections or alterations; or
- c) The use of tools or other materials (such as magnets and wedging devices)

5.8.3 An interlock shall not be capable of being defeated by materials such as wood, metal chips or debris that could accumulate in normal use.

5.8.4 When movement of a guard actuates an interlock, the arrangement shall be such that the guard is in place when the interlock is in the position that permits operation of the parts being guarded.

5.9 Guarding

5.9.1 Protection for personnel from contacting moving parts at the point of operation shall be provided by one of the following methods or by other means as effective as the following means:

- a) The installation of a guard or loading hopper with a minimum loading height above the working surface of 42 inches (106.7 cm) (dimension "Y"), and the sum of dimensions "X" and "Y"

equaling 84 inches (213.4 cm) or greater (see figure 6), that shall prevent any person from contacting moving parts at the point of operation; or

- b) The installation of an access gate or door that is interlocked in such a manner as to prevent the movement of parts at the point of operation when the said gate or door is open; or
- c) Sustained-manual-pressure controls located in such a way that the operator cannot reach the point of operation and within an area fully visible to the operator of the complete point-of-operation area when a guard is not used.

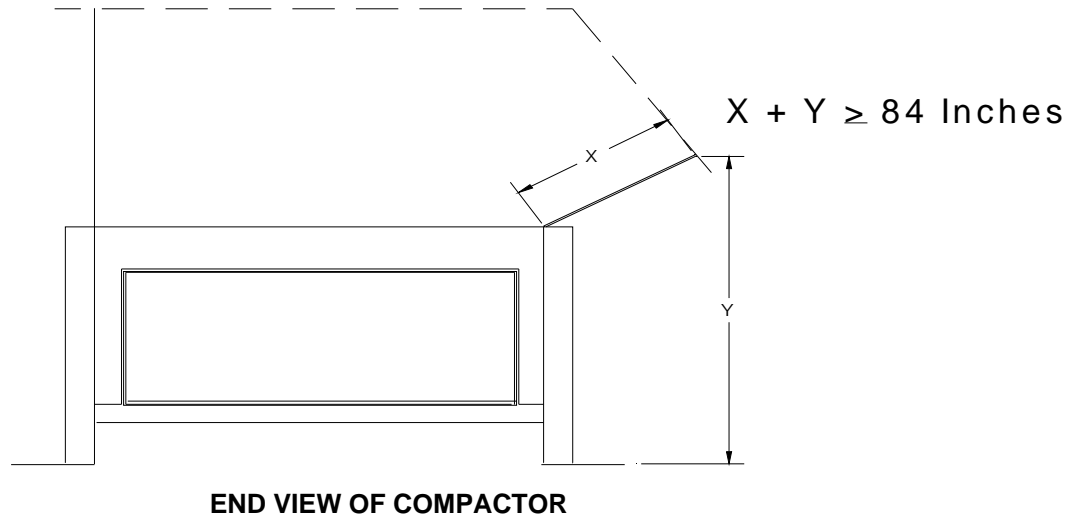


Figure 6 - Guard or loading hopper - minimum loading height

5.10 Compactor containers

5.10.1 Compatibility

5.10.1.1 Stationary compactors with detachable containers must be compatible. Compatibility is achieved when the container completely covers the discharge opening of the compactor, is securely fastened by a locking mechanism that mates with securing devices on the compactor, and when the locking mechanism and the entire unit is capable of withstanding more than the maximum design forces exerted by the compactor ram upon the refuse.

5.10.2 Tailgate latching and locking devices

5.10.2.1 The tailgate locking mechanism used to secure the tailgate to the container body shall be capable of withstanding the maximum design forces for this area and shall be designed to prevent sudden outward motion of the tailgate when the locking or latching mechanism is actuated.

5.10.2.2 On containers equipped with side-hinged tailgates, latching devices shall be provided to hold the tailgate(s) open when refuse is being unloaded.

5.10.2.3 A safety hook and chain, or similar device, shall be provided which prevents a side-hinged tailgate from swinging open if the door latching mechanism should fail.

5.10.3 Firefighting

5.10.3.1 Compactor containers shall have a 2-1/2 in (64 mm) fire port or an access door.

5.11 Container/cart lifting systems

5.11.1 General

5.11.1.1 Container/cart lifting systems for stationary compactors shall be installed in accordance with the manufacturer's instructions.

5.11.1.2 Controls for container/cart lifting systems, except for those stated in 5.11.3, shall be of the sustained-manual-pressure type, and located outside the area of operation of the lifting system and container, such that the operator is in direct line of sight of the lifting operation and can not activate the controls while standing under a raised container.

5.11.1.3 Safety check valves in the hydraulic system or mechanical lock systems shall be provided to hold the lift in its position should a failure occur with a lifting system hydraulic hose.

5.11.2 Container/cart lifters

5.11.2.1 Lifters for containers or carts provided with stationary compactors, or marketed separately and recommended by the manufacturer for use with the stationary compactor, shall conform to the following requirements:

- a) The lifter must be compatible with the type(s) of container/carts it is to cycle;

NOTE: If an operator attempts to use a lifter to cycle containers/carts for which it was not designed, this may result in an unsafe condition or damage to the container/cart.

- b) A minimum cycle time for the lifter shall be specified and the lifter cycle time shall be capable of being adjusted only by the use of a tool;
- c) Upon release of pressure on the operating device by the operator, the lifter shall stop and hold at its current position in the cycle;
- d) The control shall be capable of reversing the direction of motion of the lifter at any point in the cycle;
- e) Controls shall be located so as to prevent inadvertent operation of the lifter.

NOTE: There may be more than one set of controls.

- f) The normal position for an operator using the controls shall not place the operator underneath a raised container or cart;
- g) Control levers shall be marked to indicate function. Vertically positioned controls shall be designed such that they are pulled to raise, and pushed to lower;
- h) Push button controls shall be arranged with the "raise" button higher than the "lower" button and shall be marked to indicate function; and
- i) The lifter shall be equipped with a device to secure the container/cart to the lifter during the lifting cycle.

5.11.3 Automatic container/cart lifting systems

5.11.3.1 Automatic container/cart lifting systems shall have the point of operation and area through which the container moves completely enclosed by guards, a cage, or other similar devices with interlocked access that prevent entry, or operation when not in place.

5.11.3.2 Automatic container/cart lifting systems shall have an emergency stop control. (see 5.7.2 regarding location of the emergency stop control.)

5.12 Continuously operating and unattended stationary compactors with automatic startup — additional safety features

5.12.1 Start-up alarm

5.12.1.1 Continuously operating stationary compactors and unattended stationary compactors with automatic startup shall have a start-up alarm that is audible and visible for at least 5 seconds beginning with activation of the switch controlling the automatic starting control circuit (such as a “Manual/Off/Auto” function control) to the starting of the compactor.

5.12.1.2 The audible alarm shall be a pulsing or intermittent signal, and it shall be adjustable to at least 10 dBA above the ambient noise level. An automatically adjustable audible signal shall be capable of producing at least 10 dBA above the ambient noise level.

5.12.1.3 The visible alarm shall be a flashing or pulsating light.

5.12.2 Start-up time delay

5.12.2.1 Continuously operating stationary compactors and unattended stationary compactors with automatic startup shall have a minimum time delay of 20 seconds from the time of activating the switch controlling the automatic starting control (such as a “Manual/Off/Auto” function control) until the automatic starting control circuit is energized and the compactor cycles.

5.12.2.2 For continuously operating stationary compactors, the switch shall be held in the actuating position for the entire 20-second delay in order to energize the automatic starting control circuit. If the switch controlling the automatic starting control circuit is released before the end of the 20-second delay period, the automatic starting control shall not be energized.

5.12.3 Warning alarm

5.12.3.1 Continuously operating stationary compactors and unattended stationary compactors with automatic startup shall have a visible warning alarm that is activated as long as the automatic starting control system is energized or the main motor is running.

NOTE: The warning alarm may be the same alarm used for the start-up alarm in 5.12.1

5.12.4 Emergency stop controls, interlock interrupts and automatic starting control circuits

5.12.4.1 When actuated, emergency stop controls shall stop the compactor motor and disable any automatic starting control circuit. (See 5.12.5)

5.12.4.2 For stationary compactors with automatic starting control circuits, the stationary compactor shall not automatically restart when the emergency stop control is reset. The compactor shall not restart until the automatic starting control circuit has been manually reset (energized) to initiate a normal startup sequence with startup alarm and startup time delay.

5.12.4.3 For stationary compactors with automatic starting control circuits, the stationary compactor shall not automatically restart when the access door or gate is closed (interlock re-engaged). The compactor shall not restart until the automatic starting control circuit has been manually reset (energized) to initiate a normal startup sequence with startup alarm and startup time delay.

5.12.5 Automatic starting control circuit

5.12.5.1 The automatic control circuit shall be de-energized when power is removed from the stationary compactor.

5.12.5.2 For stationary compactors with automatic starting control circuits, the stationary compactor shall not restart automatically when electrical power is reapplied. The compactor shall not restart until the automatic starting control circuit has been reset (energized) to initiate a normal startup sequence with startup alarm and startup time delay. (See 5.12.2)

5.12.6 Discharge lockout device for continuously operating stationary compactors

5.12.6.1 A key lock switch shall be provided within sight of the discharge end of a continuously operating stationary compactor to prevent the inadvertent activation of the compaction cycle when the discharge end is not visible from the operator station.

5.13 Caution, warning and danger markings

5.13.1 Stationary compactors or a separately packaged attachment having a hidden or unexpected risk of injury to persons shall be marked to inform the user of the risk.

5.13.2 All cautionary, warning, danger, and operator markings shall be located on or immediately adjacent to each automatic sensing device and at the point of operation.

5.13.3 A caution, warning, or danger marking shall be permanent and legible and shall be located on a permanent part of the stationary compactor.

5.13.4 A cautionary marking intended to instruct the operator shall be legible and visible from the position normally assumed by the operator when starting the stationary compactor or from the position normally assumed for the specific operation involved. Other such markings for servicing or making settings and adjustments shall be legible and visible to the individual when such work is being accomplished.

5.13.5 A marking intended to inform the user of a risk of injury to persons shall be prefixed by a signal word "CAUTION," "WARNING," or "DANGER." The marking shall be in letters not less than 0.672 inches (17.07 mm) high. The signal word shall be more prominent than any other required marking on the stationary compactor.

5.13.6 Markings shall be color coded as follows:

"DANGER" - Red, or predominantly red, with lettering or symbols in a contrasting color.

"WARNING" - Orange, or predominantly orange, with lettering or symbols in a contrasting color.

"CAUTION" - Yellow, or predominantly yellow, with lettering or symbols in a contrasting color.

NOTE: Additional guidance for markings can be found in ANSI Z535.4-2002.

5.13.7 A stationary compactor having a part of an enclosure that is removable without the use of a tool (to attach, to make an operating adjustment, or for other reasons) shall be marked to indicate that such servicing is to be done with the equipment disconnected from the supply circuit.

5.13.8 A stationary compactor having provisions for two or more separate connections to a branch circuit or other power-supply source shall be permanently marked with the word "**CAUTION**" and the following or the equivalent: "**This stationary compactor has more than one connection to the source of supply. To reduce the risk of electrical shock, disconnect all such connections before servicing.**" The marking shall be located at each point of connection, and shall be readily visible after installation of the stationary compactor.

5.13.9 All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard.

5.13.10 A sign shall be located on or immediately next to each automatic sensing device, and at the point of operation, such as:

"WARNING — THIS COMPACTOR STARTS AUTOMATICALLY"

5.13.11 Where voltage exceeds 120 volts, a sign shall be located on each control panel and power unit, such as:

"DANGER — HIGH VOLTAGE" (or appropriate voltage)

5.13.12 A sign shall be located on each access cover, such as:

**"WARNING — DO NOT REMOVE ACCESS COVER EXCEPT FOR SERVICING;
FOLLOW LOCKOUT/TAGOUT PROCEDURES"**

5.13.13 A sign shall be located on each access gate that prohibits access to the loading chamber from a walk-on ramp, such as:

"WARNING — GATE MUST BE CLOSED BEFORE OPERATING COMPACTOR"

5.13.14 A sign shall be located on any inside face in the loading hopper, which is visible from a loading position, such as:

"DANGER — DO NOT ENTER"

5.13.15 A sign shall be located on each outside face of the loading hopper, such as:

"DANGER — DO NOT ENTER"

5.13.16 On commercial/industrial stationary compactors without a loading hopper, a sign shall be located at the loading sill(s) such as:

"DANGER — DO NOT ENTER"

This sign shall be visible from both sides of the compactor.

5.13.17 Apartment stationary compactors

A sign shall be located on each loading hopper access door or access cover, such as:

**"WARNING — BEFORE OPENING DOOR (or COVER, as appropriate),
TURN CONTROL PANEL KEY SWITCH TO OFF POSITION,
REMOVE KEY, AND BLOCK OFF TRASH CHUTE
FOLLOW LOCKOUT/TAGOUT PROCEDURES"**

5.13.18 Compactors equipped with discharge end lockout devices (see 5.12.6)

A sign shall be located near the device, such as:

**"WARNING — WHEN CHANGING CONTAINERS OR REPOSITIONING TRANSFER VEHICLES,
TURN KEY SWITCH TO OFF POSITION AND REMOVE KEY
FOLLOW LOCKOUT/TAGOUT PROCEDURES "**

5.13.19 Compactor containers and self-contained compactors equipped with tailgates

A sign shall be located on the sides of the body at the rear of all compactor containers and self-contained compactors equipped with tailgates, such as:

**"WARNING — STAND CLEAR WHEN TAILGATE OR CONTAINER IS
IN MOTION AND DURING LOADING AND UNLOADING"**

5.13.20 Container/cart lifting systems

5.13.20.1 A sign shall be located in the vicinity of the lifting system controls, such as:

"WARNING — BEFORE OPERATING LIFTER, CLEAR AREA OF ALL INDIVIDUALS"

A sign shall be located in clear view of the dumper system and container, such as:

"DANGER — STAY CLEAR OF LIFTER AND LIFTING AREA"

5.13.21 Compactors containing one or more confined spaces meeting the criteria of " confined space"

5.13.21.1 A sign shall be located at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as:

"WARNING – FOLLOW LOCKOUT/TAGOUT PROCEDURES BEFORE ENTERING"

5.13.21.2 A sign shall be located at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as:

"DANGER — CONFINED SPACE"

6 Reconstruction and modification

6.1 Reconstruction or modification of any stationary compactor (including power units and controls) shall be in accordance with requirements of ANSI Z245.21.

6.2 Reconstructed or modified stationary compactors shall be permanently identified with the name of the manufacturer or person conducting the reconstruction or modification and the date of reconstruction or modification.

6.3 Reconstructed or modified stationary compactors evaluated and determined to conform to the requirements of ANSI Z245.21 shall be identified on the stationary compactor by a statement attesting to compliance with this standard or shall have an approved listing mark.

7 Operational requirements

7.1 Owner/employer responsibilities for stationary compactors. The owner/employer shall provide properly maintained stationary compactors that meet all applicable regulatory safety requirements and the requirements of this standard, and shall be responsible for all of the following:

- a) Ensuring that the installation of the stationary compactor conforms to local codes, ordinances, and manufacturer's recommendations. If installing into a system, examine prevailing safety standards of associated equipment;
- b) Providing to employees instruction and training in safe work methods before assigning them to operate, clean, service, maintain, modify, or repair the stationary compactor. Such instruction and training shall include procedures provided by the manufacturer. The employer will maintain records as to the names of employees and the dates of training;
- c) Providing instructions for addressing abnormal situations (e.g., bridging of the loading chamber or feeding chute, jam of materials);
- d) Assigning only trained employees to work on (which includes operating, loading, cleaning, servicing, maintaining, or repairing) the stationary compactor;
- e) Monitoring the employee's operation of the stationary compactor and taking appropriate action to ensure proper use, including adherence to safe practices and the employee requirements of this standard and monitoring the employee's operation of stationary compactors and taking appropriate action to ensure proper use of equipment, including adherence to safe practice;
- f) Repairing, prior to placing the stationary compactor into service, any mechanical malfunctions or breakdowns that affect the safe operations of the stationary compactor;
- g) Establishing and following a program of periodic and regular inspections of all stationary compactors to ensure that all parts, component equipment, and safeguards are in safe operating condition, and adjusted, in accordance with the manufacturer's recommended procedures. This shall include keeping all malfunction reports and records of inspections and maintenance work performed;
- h) Implementing a program for the maintenance of the stationary compactor which will incorporate the following elements:
 - 1) Requirements for trained, competent maintenance employees or contractors to perform inspection and repair work;

- 2) Providing for the cleaning, inspection and repair of the stationary compactor in accordance with the manufacturer's recommendations, including periodic maintenance;
 - 3) Ensuring that all required safety features are operational and functioning, and repairing, prior to placing into service, any reported malfunction or defect that affects the safe operation of the stationary compactor; and
 - 4) Ensuring that all caution, warning and danger markings required by 5.13 are installed and legible, or are replaced if damaged, defaced or missing.
- i) Utilizing the manufacturer's recommended procedures for the control of hazardous energy sources (lockout/tagout) in a program complying with Part 1910.147 of Title 29 of the *Code of Federal Regulations* (OSHA) (see 7.3);
 - j) Utilizing the manufacturer's recommended procedures for access control for permit-required confined spaces as part of the employer's program (see 7.4);
 - k) Repairing, prior to placing the stationary compactor into service, any mechanical malfunctions or breakdowns that affect the safe operations of the stationary compactor;
 - l) Protecting any person by one of the methods in 5.9.1, or by other means as effective as those means of protection.
 - m) For stationary compactors fed by means of a loading pit conveyor, reciprocating floor, or push pit that is flush with or below the facility floor, providing:
 - 1) Protection for employees by means of:
 - i) Limiting access within 6 feet (183 cm) of the edge of the pit to authorized employees;
 - ii) Training authorized employees to recognize and avoid the hazards associated with the pit area;
 - iii) Requiring that others whose employees use the pit area provide assurance of such training; and
 - iv) Limiting access by unauthorized persons by installing signs, such as:

"RESTRICTED AREA — AUTHORIZED EMPLOYEES ONLY"

- 2) Providing a device to the extent practicable, which prevents trucks or other motor vehicles that unload directly into the loading pit from rolling into the pit;
- n) When stationary compactors equipped with automatic start/cycling controls are provided, allowing their use only in locations where a startup alarm is utilized or it is demonstrated that automatic starting does not result in a risk of injury to persons;
 - o) Providing guard railings for dock ramps that meet U.S. Occupational Safety and Health Administration requirements. These shall be located around the loading chamber opening if walk-on ramps are used to deposit refuse into the loading chamber. Guard railings and toe boards shall be provided on the sides of docks and ramps;

- p) Providing for an adequate work area around the stationary compactor for safe maintenance, servicing, and cleaning procedures;
- q) Keeping all surrounding walking areas and floors free from obstructions, and accumulations of waste matter, grease, oil, and water;
- r) Maintaining records or employee reports of malfunctions;
- s) Specifically inspecting safety interlocks, switches, and other protective devices to ensure that these devices are not disabled or bypassed, and not to permit the stationary compactor to be operated unless these devices are fully functional. These inspections shall be in accordance with g);
- t) Ensuring that containers supplied are capable of withstanding the maximum forces generated by the compacting system;
- u) Ensuring that loaders are aware of hazards and safety requirements;
- v) Ensuring that only authorized employees (18 years old or older) operate, inspect, or maintain stationary compactors;
- w) Ensuring that only authorized employees (16 years old or older) load, but do not operate stationary compactors; and
- x) Incorporating stationary compactors into the employer's safety program (see Section 8).

7.2 Operator and employee responsibilities. Operators who work on and around the stationary compactor shall be responsible for the items listed below:

- a) Using all applicable safety features provided on the stationary compactor;
- b) Using the stationary compactor only after receiving instruction;
- c) Reporting any damage to, or malfunction of, the stationary compactor by submitting a report to the employer or responsible authority when the damage or malfunction occurs;
- d) Ensuring that access doors and service opening covers are in place, secure, and/or locked before operations begin;
- e) Ensuring that the area of operation around container/cart lifting systems and the container will be clear of persons during all phases of the lifting operation prior to energizing the dumping system;
- f) Ensuring that all persons are clear of the stationary compactor point of operation before actuating any compaction cycle controls or container/cart lifting system controls and being prepared to stop the compaction cycle or container dumping operation if necessary;
- g) Ensuring that all persons are clear of the tailgate (on compactor-container combinations so equipped) before the tailgate is opened or shut. The operator shall warn all persons not to cross behind or under an open tailgate;
- h) Using the stationary compactor in accordance the manufacturer's instructions, including ensuring the proper position of all locks, doors, guards, etc.;

- i) Ensuring that no one disables or bypasses safety interlocks, switches, or other protective devices and that the stationary compactor is not operated unless these devices are fully functional;
- j) Locking out the unit when inspecting malfunctions, jams, or other problems arising from daily operations; servicing; or performing maintenance (except maintenance testing). The affected employee shall identify the type and magnitude of the energy that the stationary compactor uses, shall understand the hazards, and know the methods to control the energy (see 7.3);
- k) Coupling and securing a compatible container to a compactor frame as specified by the compactor and container manufacturer(s);
- l) Operating, inspecting, and maintaining the stationary compactor only if 18 years old or older and after being properly instructed and trained; and
- m) Loading, but not operating, the stationary compactor only if 16 years old or older.

7.3 Procedures for the control of hazardous energy sources (lockout/tagout)

7.3.1 The owner/employer shall have a hazardous energy control (lockout/tagout) procedure to follow when performing servicing and maintenance on stationary compactors where the unexpected energization or start up of equipment, or release of stored energy could cause injury to employees.

7.3.2 The owner/employer shall utilize the instructions provided by the manufacturer for the control of hazardous energy sources. The lockout/tagout procedure shall isolate and render safe all energy sources, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other potential sources of energy (e.g., gravity, kinetic, etc.). It shall be used to ensure that the compactor is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the compactor or release of stored energy could cause injury.

7.3.3 The lockout/tagout procedure shall include but is not limited to the following:

- a) Shutting down all power sources;
- b) Removing keys or other devices that enable the stationary compactor;
- c) Installing a tag on an appropriate location, using a non-reusable fastener, or installing a similar warning device;
- d) Placing operating components in such a position so as not to be subject to possible free fall and/or installation of additional blocking devices to prevent such free fall of any raised or elevated component; and
- e) Relieving stored hydraulic or pneumatic pressure, after blocking devices are installed, if maintenance is to be done to the hydraulic or pneumatic system.

7.3.4 The procedure shall address the following:

- a) Sequence of lockout for the compactor:
 - 1) Notify all affected employees that servicing or maintenance is required on a compactor and that the compactor must be shut down and locked out to perform the servicing or maintenance.

- 2) The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the compactor utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
- 3) If the compactor is operating, it must be shut down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).
- 4) De-activate the energy isolating device(s) so that compactor is isolated from the energy source(s).
- 5) Lock out the energy isolating device(s) with assigned individual lock(s).
- 6) Stored or residual energy must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
- 7) Ensure that the compactor is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

Caution: Return operating control(s) to neutral or "off" position only after verifying the isolation of the equipment.

NOTE: The machine or equipment is now locked out.

- b) Restoring the compactor to service. When the servicing or maintenance is completed and the compactor is ready to return to normal operating condition, the following steps shall be taken:
 - 1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
 - 2) Check the work area to ensure that all employees have been safely positioned or removed from the area.
 - 3) Verify that the controls are in neutral.
 - 4) Remove the lockout devices and reenergize the machine or equipment.

NOTE: The removal of some forms of blocking may require re-energizing of the machine before safe removal.

- 5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

7.4 Procedures for work in confined spaces

7.4.1 The owner/employer shall have a written procedure for work in confined spaces meeting the criteria of "permit required confined spaces," such as integrated power units. The procedure shall utilize the manufacturer's instructions for the hazardous energy control (lockout/ tagout) procedure which shall isolate and render safe energy sources, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other potential sources of energy (e.g., gravity, kinetic, etc.), which may create a hazard during entry into each of those confined spaces.

- a) These instructions shall include the requirement to affix a sign to the compactor, at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as, "**Warning — Follow lockout/tagout procedures.**"
- b) These instructions shall include the requirement to affix a sign to the stationary compactor, at or near the entrances to those confined spaces for which hazardous energy control procedures are provided, such as, "**Danger — Confined Space.**"

8 Safety and training program

8.1 General

8.1.1 Employers shall evaluate and manage safety issues related to the operation of stationary compaction equipment as part of their safety program.

8.2 Safety program

8.2.1 The employer's program shall include at a minimum the following elements:

- a) A hazard assessment in which the employer conducts a review of the various types of stationary compaction equipment that the employer utilizes and the hazards associated with them and, review and assess the capabilities, qualifications and training of any person who may potentially encounter these hazards.
- b) An evaluation of the means and methods of controlling the hazards identified in the hazard assessment, including information such as industry and regulatory requirements; instructions for the operation, inspection, and maintenance of stationary compactors, and other information appropriate to the hazards that are identified
- c) A written program, based upon the hazard assessment and evaluation, to include procedures for the operation, inspection, and maintenance of stationary compactors, prohibited practices, record keeping, training requirements, and normative references to documents, such as operating manuals, that are relied upon and may be required as part of that program;
- d) A program, conforming to 8.2, for the implementation of the written program; and
- e) Periodic review and program revisions as necessary to ensure the effectiveness of the safety program.

8.3 General training

8.3.1 Employers shall ensure all employees, including supervisors, contract laborers, and all other persons engaged in the operation, cleaning, maintenance, service or repair of stationary compacting equipment are properly trained appropriate for their assigned jobs and tasks. Contractors who may be engaged to operate or maintain the employer's stationary compactors shall be advised of the unique hazards related to the equipment that may affect the activities in which the contractor's employees will engage.

8.3.2 Training frequency

8.3.2.1 Training shall be provided upon initial assignment to a job or task, with periodic refresher training to maintain the required level of competence. Retraining shall be provided for employees whenever their job assignments change, or an equipment change occurs that presents a new hazard. Additional retraining shall

be provided whenever the employer has reason to believe, or periodic inspections reveal, that employee deviations from procedures have occurred, or inadequacies in the employee's knowledge of procedures become evident.

8.3.3 Instructional information

8.3.3.1 Employers are required to refer employees to, and have readily available, the manufacturer's instructions to ensure correct operating and maintenance procedures and work practices are understood and followed. Employers are required to ensure employees possess knowledge and skills to safely operate the stationary compactor.

8.3.4 Contract labor

8.3.4.1 Employers shall ensure for each job or task performed that training is provided either by the contract laborer's parent employer or by the employer.

8.3.5 Training records

8.3.5.1 Employers are required to maintain training records to include the date(s) of the training and the type of training received. Records are required to be maintained as required by applicable regulations. Contractors and contract laborers are required to provide the employer with appropriate training records upon demand.

8.3.6 Equipment-specific training

8.3.6.1 Training shall be tailored for individual operations and the type of equipment utilized including detailed, equipment-specific training for machine operators, as well as maintenance personnel and supervisors who must operate equipment as part of their job duties. Training shall include practical demonstration of equipment operation knowledge and skills by the employee, as appropriate to the requirements of the employee's job duties.

8.4 Training requirements

8.4.1 Training is required to include at a minimum:

- a) The necessary training as identified in the hazard assessment [see 8.2.1 a)];
- b) The training required by laws and regulations, such as those of federal and state Occupational Safety and Health Administrations, the Departments of Transportation, and other applicable regulatory agencies; and
- c) Operational instruction on each specific type of equipment used by the employee, including the instructions provided with the equipment.

Annex A
(informative)
Bibliography

A.1 American National Standards

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ANSI Z535.2-2002, *Environmental and Facility Safety Signs*

ANSI Z535.3-2002, *Criteria for Safety Symbols*

ANSI Z535.4-2002, *Product Safety Signs and Labels*

ANSI Z535.5-2002, *Accident Prevention Tags*

A.2 U.S. Government Health & Safety Regulations^{2,3}

OSHA 29 CFR Part 1910.23, *Guarding of Floor and Wall Openings and Holes*

OSHA 29 CFR Part 1910.132, *General Requirements for Personal Protection Equipment*

OSHA 29 CFR Part 1910.146, *Permit-Required Confined Spaces*

OSHA 29 CFR Part 1910.147, *Lockout/Tagout of Energy Sources*

OSHA 29 CFR Part 1910.212, *Machine Guarding*

A.3 Industry Standards

ASME B15.1-2000, *Mechanical Power Transmission Equipment*⁴

ASME B20.1-2000, *Conveyors and Related Equipment*

1 Available from Environmental Industry Associations

2 Available from U.S. Government Printing Office, Washington, DC

3 Available over the Internet from www.osha.gov

4 Available from American Society of Mechanical Engineers