

A Guide to Compaction & Compaction Equipment

History

Stationary compactors were first built in the early 1960s. They were developed to increase efficiency of waste disposal by reducing the number of trips to the landfill by the waste transporter. These first compactors were very large, heavy and expensive and used primarily by large, industrial plants.

With the introduction of the various sizes, compaction became available to all types and sizes of commercial, retail and industrial businesses: supermarkets, department stores, hospitals, nursing homes, restaurants, hotels and shopping malls.

Terminology

COMPACTION - Reducing the bulk of solid waste by compressing, crushing or tamping.

STATIONARY COMPACTOR - A machine that compacts refuse into a detachable container at the site of generation.

COMPACTION CONTAINER - A steel-reinforced container into which a stationary compactor compacts refuse.

SELF-CONTAINED COMPACTOR - A unit in which the compactor is welded to the compaction container and the entire machine is taken to the disposal site.

CHARGE BOX - The area, measured in cubic yards, in front of a compactor ram, into which refuse is placed.

CLEAR TOP OPENING - The length and width of the opening above the charge box.

How A Compactor Works

A stationary compactor consists of five (5) basic parts: Body, Ram, Cylinder, Power Pack and Electrical Panel Box.

The **BODY** is a steel structure that houses all the other parts. It has a charge box with heavily reinforced sides to withstand the forces of compaction. **A BREAKER BAR**, made of a heavy steel angle, is located across the front of the charge box. This bar causes oversized objects like wood or pallets to be broken before entering the compaction container.

The **RAM** is a specially designed steel structure with heavy faceplate. It moves horizontally in the charge box, forcing the refuse into the compaction container.

The **CYLINDER** is attached behind the ram and moves it forward and backward. Inside the cylinder is a piston and rod, which operate hydraulically. The cylinders vary in size - the large ones are used in heavy-duty compactors with big charge boxes. Cylinders are sized by bore and rod diameters.

The **POWER PACK** consists of a hydraulic oil tank, pump, electric motor and directional control valve. The oil, under high pressure, forces the piston in the cylinder to move forward and backward.

The **ELECTRICAL PANEL BOX** contains the transformer, motor starter, relays, fuses and switches that operate the compactor. Most panel boxes incorporate printed circuit boards and programmable controllers for added reliability. All are UL rated.

Types of Refuse

Refuse can be wet or dry, bulky or non-bulky, and compactable or non-compactable. Examples of refuse are:

WET - Food waste, produce and meat waste.

DRY - Paper, corrugated boxes

BULKY - Wooden crates, pallets, drums, white goods (appliances metal cabinets), and furniture.

NONCOMPACTABLE - Stacked newspaper, bundled computer paper, phone books.

The type of refuse determines (among other variables, discussed later) the type of compactor best suited to compact and contain the refuse.

The type of refuse also determines payload, or total tonnage in a compaction container. Refuse with a high moisture content (produce, food waste) will weigh more than drier waste (paper, boxes). A full 40 cubic yard compaction container from a produce market might weigh 15,000 to 20,000 lbs. whereas the same size container with only compacted corrugated cardboard boxes might weigh 8,000 to 10,000 lbs.

Types of Compactors

Horizontal Stationary Compactor (Break-Away)

Waste Type - Dry - mixed paper, corrugated, wood, plastic, etc.

Application - Retail and Department stores, industrial, warehouse

Examples - 2, 3, 4 cu. yd. stationary, 40 cu. yd. container

Self-Contained Compactor

Waste Type - Wet - garbage, food processing, and medical.

Application - Supermarket (produce/meat waste), restaurant, mall, hospital

Examples - 20, 30, 35 cu. yd. self contained

Frontload/Rearload Compactor

Waste Type - Primarily wet, garbage, food waste

Application - Fast food, nursing home, small grocery store

Examples - Vertical/pivot rams

Types of Containers

All containers are sized by cubic yard capacity

Compaction Containers

Size: 20 cu. yd. to 40 cu. yd.

Style: Rectangular or Octagon

Compaction Ratio

How much does a compactor reduce the size of solid waste?

There are several factors that determine compaction ratio:

- Type of refuse
- Total force of compactor ram
- Type of compaction container

At the risk of oversimplification, it might be stated that the average compaction ratio for compactable, mixed waste is 4 to 1. For example, you could expect to compact 160 loose cubic yards of mixed waste into one 40 cubic yard container. In general, 4 to 1 could be used as a rule-of-thumb for most applications, but there are **many exceptions**. For instance, industrial waste consisting of mainly pallets and heavy boxes might yield only a 2 to 1 compaction ratio. Even climate affects compaction ratio (frozen garbage is more difficult to compact than wet garbage). Also, the smooth sides and beveled shape of the octagon-style container tends to **improve** compaction ratio as does the high ram forces of heavy-duty compactors.

Consider all variables before estimating the compaction ratio for a specific application.

Who Needs a Compactor?

Not all generators of waste can justify compaction equipment. A convenience store with one 6 cubic yard container, emptied once a week would not need a compactor. Larger volume waste generators are more likely prospects. A generator of 30 to 40 cubic yards of refuse weekly might justify a vertical compactor. One that generates 60 to 150 cubic yards weekly could use a stationary compactor with a detachable container or a self-contained liquid-tight compactor.

Benefits of Compaction

Discourages Scavengers

Keeps scavengers out of your container

Saves Labor

No need to break up boxes or carry trash outside to a container.

Reduces Collection Costs

Reduces the cost of transporting refuse to the disposal site. A compactor eliminates 3 out of 4 trips.

Reduces Insect/Rodent Problems

No need to call exterminator

Prevents Windblown Trash

No need to sweep parking lots, chase debris.

Reduces Fire Hazard

Saves on insurance costs

Controls Odor

A sealed compaction system reduces odor.

Saves Inside Store Space

No need to use valuable storeroom space for refuse.

Saves Outside Parking Space

Fewer containers outside means more customer parking spaces.

Extends Pavement Life

Reduces wear and tear on parking surfaces by heavy collection vehicles.

Stops Pilferage

A steel security chute keeps employees from taking merchandise out the back door.

Prevents Unauthorized Access to Waste

A sealed container keeps others from viewing confidential data in trash.

Avoids Unauthorized Disposal

Prevents others from using your container for disposal of their trash or hazardous waste.

Choosing a Compactor - Questions to Ask**Volume of Waste Generated**

Will the compactor be adequate to handle the volume generated?

Size of Waste

What are the dimensions of the largest box, bag, etc? Is the clear top opening large enough to accommodate these objects without bridging?

Type of Waste

Dry waste is efficiently compacted by a stationary compactor. A self-contained, liquid-tight compactor best handles wet waste.

Location

Is one central point adequate, or should several locations be considered?

Available Space

Is there space for the compactor and collection truck to service the compactor? Are overhead clearances adequate?

Suitable Voltage?

Is adequate power available? Three-phase? Single-phase?

Peak Loads

Is the compactor adequate to handle the volume of refuse generated at peak loading times?

Ease of Use

Is the compactor conveniently located? What is the loading height? Does it save steps and labor? Is it easy to feed?

Collection Equipment Compatibility

Is the compactor compatible with local waste collection equipment?

Installation

Does installation require a through-the-wall chute, a doghouse, or dock-fed hopper? Is the compactor adaptable to these types of installation?

Safety Standards

Does the installation comply with recommended ANSI standards? Is there a 42" high barrier between the user and the charge box? Is there an access interlock switch on the chute or hopper doors and gates? Is a dead-man button required?