Understanding the Benefits of Compaction

WASTEQUIP

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Understanding Compactors

How a Compactor Works

A stationary compactor consists of five (5) basic parts:
BODY, RAM, CYLINDER, POWER UNIT, and ELECTRICAL PANEL BOX.

1. The **BODY** is a steel structure which houses all the other parts. It has an area where material is compiled or 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.

2. The **RAM** is a specially designed steel structure with heavy face plate. It moves horizontally through the charge box forcing the refuse into the compaction container.

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

4. The **POWER UNIT** 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.

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

Compaction Advantages

+ Discourages Scavengers.
Keeps scavengers out of your container.

+ Saves Labor.
No need to break up boxes or carry trash outside to container.

+ Reduces Collection Costs.
Reduces the cost of transporting refuse to the disposal site. A compactor can eliminate 3 out of 4 trips.

+ Reduces Insect/Rodent Problems.
No need to call an exterminator.

+ Prevents Wind Blown Trash.
No need to sweep parking lots.

+ Reduces Fire Hazards.
Saves on insurance costs.

+ Controls Odor.
A sealed compaction system reduces odor.

+ Saves Inside Storage 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 eliminates merchandise from being taken out the back door.

+ Prevents Unauthorized Access To Waste.
A sealed container keeps others from viewing any confidential data.

+ Avoids Unauthorized Disposal.
Prevents others from using your container for disposal of their trash or hazardous waste.

+ Improves Employee Safety.
Enclosed or chute fed compactor eliminates need for employees to take material outside.

TERMINOLOGY

Compaction—Reducing the size and volume of material by compressing and crushing.

Stationary Compactor—A machine that compacts refuse into a detachable container at the site of generation.

Pre-Crusher Dry Waste Compactor—A machine that pre-crushes large bulky items such as steel drums and pallets prior to being compacted into the container.

Compaction Container—A steel reinforced container into which a stationary compactor compacts refuse.

Self-Contained Compactor—A unit in which the compactor is integrated structurally 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 *(L x W x H)*.

ClearTop Opening—The length and width of the opening above the charge box.

TYPES OF COMPACTORS

1. Stationary
   a. Waste type: Dry-mixed paper, corrugated, wood, plastic, etc. (Dry Waste)
   b. Application: Retail/department store, industrial, warehouse.
   c. 2, 3, 4 cu. yd stationary works in cooperation with 40 cu. yd. container.
2. Self-Contained
   a. Waste type: Wet-waste, food processing, medical, etc.
   b. Application: Supermarket (produce/meat waste), restaurant, mall, hospital.
   c. Examples: 20, 30, 35 cu. yd. self-contained.
3. Accu-Pak or Packman
   a. Waste type: Primarily wet waste and food waste with a few dry applications.
   b. Application: Fast food, nursing home, small grocery store.
   c. Examples: 3, 4, 6 and 8 cu. yd. units.

HISTORY

Stationary compactors were first built in the early 1960's. They were developed to increase the 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. They were used primarily by large industrial plants. However, 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.

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. Wet waste is best handled by a self-contained, liquid-tight compactor.

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 material 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 thru-the-wall chute, a doghouse, or a dock-fed hopper? Is the compactor adaptable to these types of installations?

SAFETY STANDARDS
Does the installation comply with recommended ANSI and OSHA standards? Are there interlock switches on the hopper access gate or chute/doghouse doors? Is a “Hold to Run” button required?

COMPACTION RATIO
How much will a compactor reduce the volume of solid waste? There are several factors that determine compaction ratio: TYPE OF REFUSE, TOTAL FORCE OF COMPACTION RAM, and TYPE OF COMPACTION CONTAINER.

At the risk of over-simplification, it might be stated that the average compaction ratio for compactible, 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 mainly of 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). Consider ALL variables before estimating the compaction ratio for a specific application.

WHO NEEDS A COMPACTOR?
Not all generators of solid waste can justify compaction equipment. A convenience store with one 6 cubic yard container emptied once a week may 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. 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.

COMPACTOR INSTALLATION
1. Concrete Pad Installation - Preferred dimensions of pad are 10’ wide and a length of 5’ greater than the combined length of the compactor and container (Not Enclosed).

EXAMPLES:
- Pad: 10’ wide x 40’ long — For 2 cu. yd. Stationary and Container (see page 3)
- Pad: 10’ wide x 35’ long — For 35 cu. yd. Self Contained
- Pad: 10’ wide x 12’ long — For vertical compactor

The pad should be a minimum of 3000 p.s.i. concrete, wire mesh reinforced and 6” thick.

2. Electrical Installation - A lockable fused disconnect box (customer furnished) must be within sight of the compactor, and should not exceed 10’ from compactor.

This equipment conforms to all applicable ANSI Z245.2/.21 Safety Standards.

COMPACTION CONTAINERS
A. SIZE: 20 cu. yd. to 40 cu. yd.

B. STYLE: Octagonal and Rectangular

TYPES OF REFUSE
Refuse can be wet or dry, bulky or non-bulky, and compactible or non-compactible.

Wet—Food waste, produce, meat waste and soiled waste.

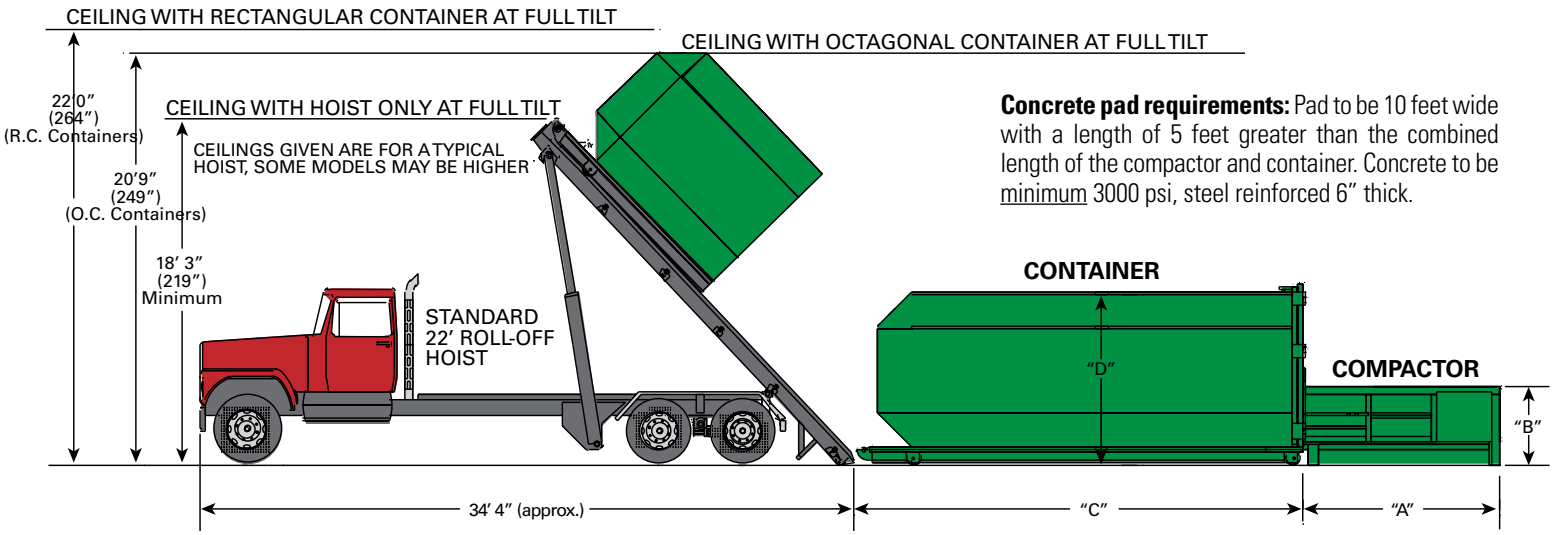
Dry—Paper, corrugated boxes.

Bulky—Wooden crates, pallets, drums, “white goods” (appliances, metal cabinets), furniture.

Non-compactible—Stacked newspaper, bundled computer paper, phone books.

Approach Specifications

Stationary Compactor

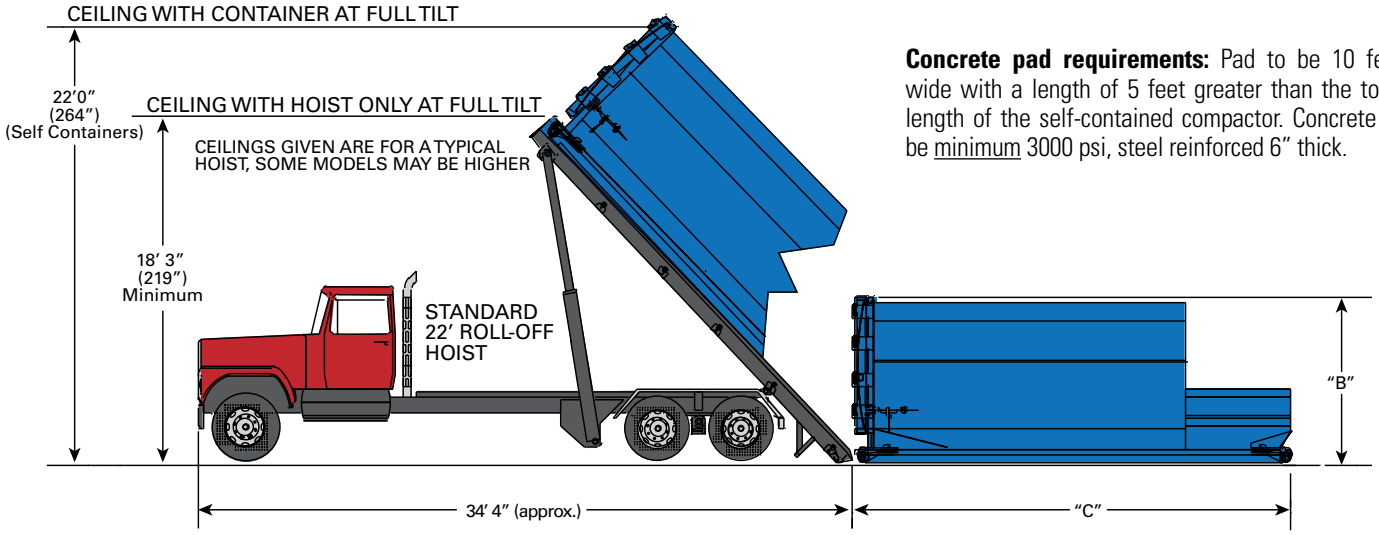


Concrete pad requirements: Pad to be 10 feet wide with a length of 5 feet greater than the combined length of the compactor and container. Concrete to be minimum 3000 psi, steel reinforced 6″ thick.

Stationary Container	Length Overall (C)	Height Overall (D)
25 cu. yds.	171½″	105″
27 cu. yds.	189½″	105″
30 cu. yds.	207½″	105″
35 cu. yds.	237½″	105″
40 cu. yds.	270½″	105″

Stationary Compactor	Length Overall (A)	Height Overall (B)
245	126″	48⅛″
345	143″	48⅛″
350	187″	48⅛″
445	187″	48⅛″
450	235″	48⅛″
545	219″	48⅛″
645	259″	48⅛″

Self-contained Compactor/Container



Concrete pad requirements: Pad to be 10 feet wide with a length of 5 feet greater than the total length of the self-contained compactor. Concrete to be minimum 3000 psi, steel reinforced 6″ thick.

Model 255HD Self contained	Length Overall (C)	Height Overall (B)
15 cu. yds.	186″	90″
20 cu. yds.	220″	90″
25 cu. yds.	234″	104″
30 cu. yds.	264″	104″
34 cu. yds.	290″	104″

Model 265X Self contained	Length Overall (C)	Height Overall (B)
15 cu. yds.	160″	90″
20 cu. yds.	200″	90″
25 cu. yds.	215″	104″
30 cu. yds.	245″	104″
35 cu. yds.	275″	104″
39 cu. yds.	296″	104″

Required Electrical Power Information

Motor Horsepower Rating/Phase	Line Supply Voltage	Full Load Amps[1]	Locked Rotor Amps[2]	Maximum Dual Element Time Delay Fuse[3]	Maximum Inverse Time Circuit Breaker[3]	Minimum Disconnect Rating[4]	Min. Wire Size THHN CU 90°C / 194°F [6]			Recommended Wire Size		
							100′	200′	300′	100′	200′	300′
2HP/1Ø	115/60Hz	24	144	45	60	30	12	10	8	12	10	8
	208/60Hz	13.2	80	25	35	30	12	12	12	12	12	12
	230/60Hz	12	72	25	30	30	12	12	12	12	12	12
3HP/1Ø	115/60Hz	34	204	60	90	60	8	6	4	8	6	4
	208/60Hz	18.7	113	35	50	30	12	12	10	12	12	10
	230/60Hz	17	102	30	50	30	12	12	10	12	12	10
5HP/1Ø	230/60Hz	28	168	50	70	60	10	8	6	10	8	6
10HP/1Ø	230/60Hz	40-50	300	90	125	60	6	4	2	6	4	2
3HP/3Ø	208/60Hz	10.6	71	20	30	30	12	12	12	12	12	12
	230/60Hz	9.6	64	20	25	30	12	12	12	12	12	12
	460/60Hz	4.8	32	10	15	30	12	12	12	12	12	12
	575/60Hz	3.9	25.6	10	10	30	12	12	12	12	12	12
5HP/3Ø	208/60Hz	16.7	102	30	50	30	12	12	10	10	8	8
	230/60Hz	15.2	92	30	40	30	12	12	10	10	8	8
	460/60Hz	7.6	46	15	20	30	12	12	12	12	10	10
	575/60Hz	6.1	36.8	15	20	30	12	12	12	12	10	10
10HP/3Ø	200/60Hz	32.2	186.3	60	90	60	8	6	4	8	6	4
	208/60Hz	30.8	179	60	80	60	10	8	6	10	8	8
	230/60Hz	28	162	50	70	60	10	8	6	10	8	6
	460/60Hz	14	81	25	35	30	12	12	12	12	10	8
	575/60Hz	11	64.8	20	30	30	12	12	12	12	10	10
15HP/3Ø	200/60Hz	48.3	267	90	125	60	6	4	3	6	4	3
	208/60Hz	46.2	257	90	125	60	6	4	3	6	4	2
	230/60Hz	42	232	80	125	60	8	6	4	6	4	2
	460/60Hz	21	116	40	70	30	12	10	8	10	8	6
	575/60Hz	17	93	30	50	30	12	12	10	10	10	8
20HP/3Ø	200/60Hz	62.1	334	110	175	100	4	3	2	4	3	2
	208/60Hz	59.4	321	110	150	100	6	4	3	4	2	2
	230/60Hz	54	290	100	150	100	6	4	3	4	2	2
	460/60Hz	27	145	50	70	60	10	8	6	8	6	4
	575/60Hz	22	116	40	70	30	12	10	8	10	8	6
30HP/3Ø	200/60Hz	92	500	175	250	150	2	1	1/0	2	1	1/0
	230/60Hz	80	435	150	200	100	3	2	1	2	1/0	1/0
	460/60Hz	40	218	70	100	60	8	6	4	6	2	2
	575/60Hz	32	174	60	80	60	10	8	6	8	4	4
40HP/3Ø	200/60Hz	120	667	225	300	150	1	1/0	2/0	1	1/0	2/0
	230/60Hz	104	580	200	300	150	2	1	1/0	2	1	1/0
	460/60Hz	52	290	100	150	60	6	4	3	6	4	3
	575/60Hz	41	232	80	125	60	8	6	4	8	6	4

A separate branch circuit with a main disconnect device supplied by the owner is required to supply power to compactor and baler power plants. The installation of the main disconnect must be performed by a qualified electrician in compliance with all local and National Electrical Code regulations. ANSI standards require that the main "disconnect shall be located within sight of, and no more than 50 ft. away from the main control panel". The actual voltage must be within ± 5% of the nameplate rating on the motor when the unit is operating at the system relief pressure. The following table lists recommended fuse and wire sizes for the various motors used on compaction and baling equipment manufactured by Wastequip, Inc.

1. Values for single phase motors obtained from Table 430.248 of 2005 NEC. Values for three phase motors obtained from Table 430.251(A) of 2005 NEC.
2. Values for single phase motors obtained from Table 430.250 of 2005 NEC. Values for three phase motors obtained from Table 430.251(B) of 2005 NEC.
3. Maximum fuse values are based on full load current x 175% (300% for class CC) as determined from Table 430.152 of the 2005 NEC. Maximum inverse time circuit breaker values are based on full load current x 250% as determined from Table 430.152 of the 2005 NEC. The fuse/breaker and wire sizes must always meet or exceed any federal, state, or local electrical codes or ordinances.
4. Minimum disconnect rating is based on full load current x 115% as determined from Article 430.110 of the 2005 NEC. It is the owner's/installer's responsibility to verify disconnect rating for the correct horsepower motor at the supply voltage used.
5. Wire size based on motor full load current x 125% and ampacity of 90° THHN copper wire found in Table 310.16 of the 2005 NEC. Wire must not introduce more than a 5% voltage drop. Check federal, state, or local electrical codes or ordinances.

Caution
This equipment should be operated by properly trained personnel. Operators should become familiar with OSHA, ANSI and any other applicable standards or laws for using this equipment. Improper use, misuse, or lack of maintenance could cause injury to people and/or property. Photos used in the literature are illustrative only. We assume no liability or responsibility for proper training/operation of equipment not manufactured by Wastequip. We reserve the right to make changes at any time without notice. Information contained within this literature is intended to be the most accurate available at time of printing.

WASTEQUIP
Nationally known for personal service

Phone 877-468-9278
Email: sales@wastequip.com
www.wastequip.com