



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Compactor College

Compactor Basics & Applications





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Welcome!

Compactor College

Compactor Basics & Applications

- The Benefits of Compactors
- Types of Compactors
- How they Work – Components & Systems
- Compactor Performance Features
- Optional Equipment for Compactors
- Conducting Site Surveys
- Sources of Technical Information
- General Compactor Safety
- ANSI Standards



CRAM-A-LOT®
J.V. Manufacturing, Inc.

The Benefits of Compactors



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Benefits of Compactors

SAVES

MONEY!



- Cost Reduction – They save money by reducing number of pickups
- Loss Prevention – They keep stolen product out of the waste stream
- Cleanliness – They prevent waste overflow and retain liquids
- Save Space – One container takes the place of several
- Discourage Scavenging – They keep “dumpster divers” out
- Prevent Unauthorized Dumping – They keep dumpers out
- Reduce Rodent, Insect, and Odor Problems



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Types of Compactors

- Various Compactor Types
- Stationary Compactors
- Self Contained Compactors
- Vertical Compactors
- X-press Packs
- Pre-Crushers

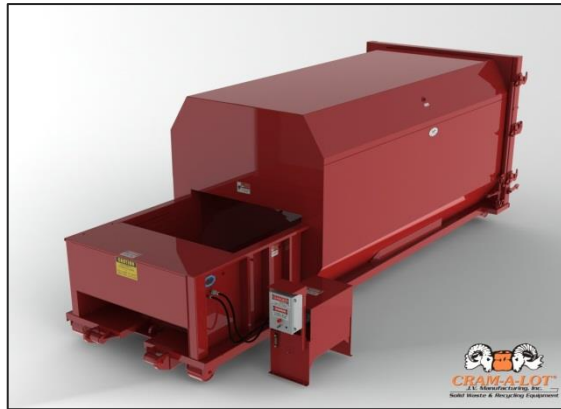


CRAM-A-LOT®
J.V. Manufacturing, Inc.

Types of Compactors

Various Compactor Types Exist to Meet Specific Needs

- Wet Waste, Dry Waste, Bulky Waste, Roll Off Service, Front Load Service -

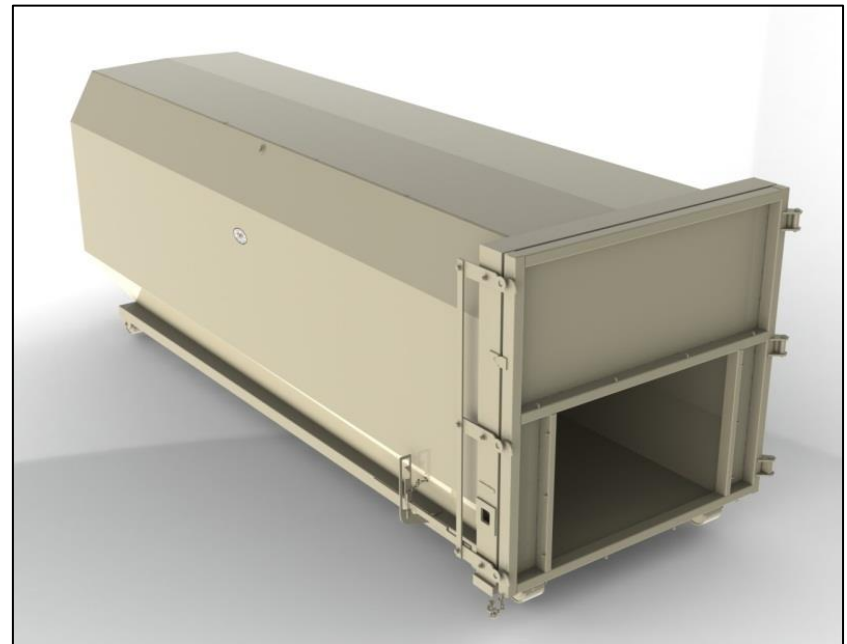


Stationary Compactors



CRAM-A-LOT®
J.V. Manufacturing, Inc.

- Suitable for dry waste or cardboard – not liquid tight
- Available in 1 yard to 15 yard charge chamber capacity
- Can utilize a 40 yard or 30 yard container
- Compactor is anchored and remains on site
- Detachable container is hauled to landfill with roll off truck
- Compactor can be fed through the wall or with open or enclosed hopper

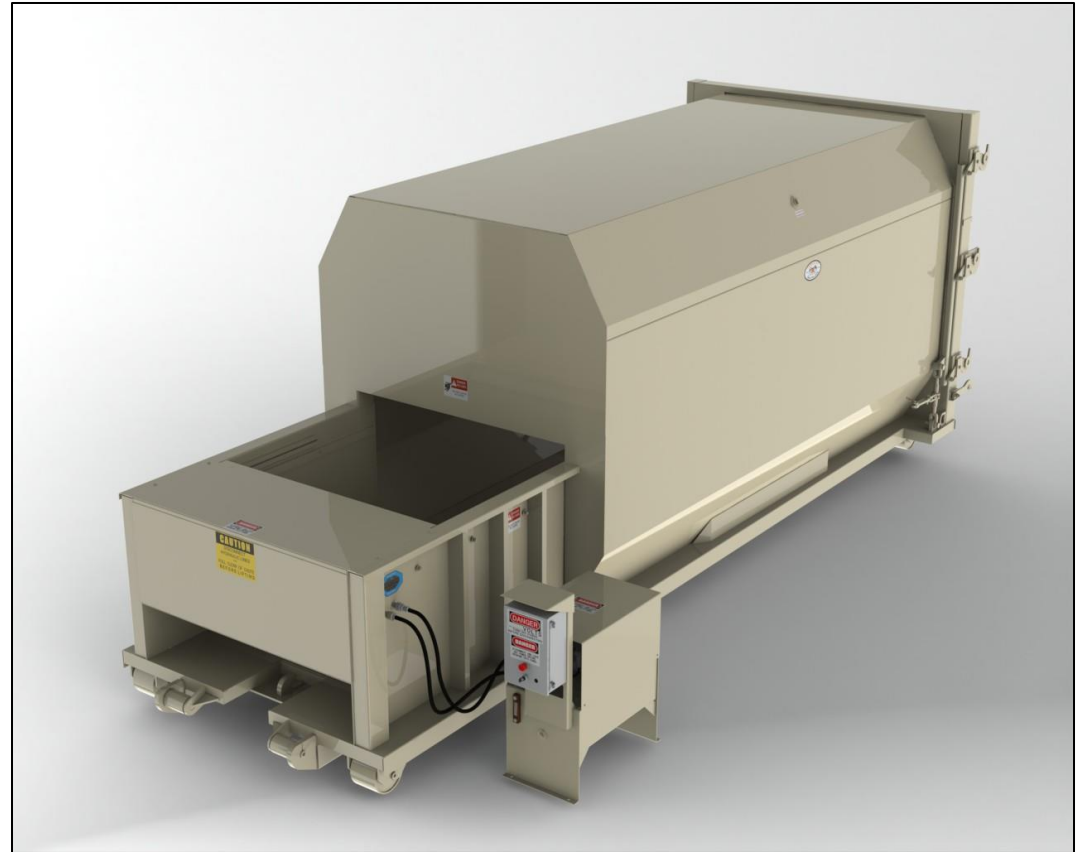




CRAM-A-LOT®
J.V. Manufacturing, Inc.

Self Contained Compactors

- Suitable for wet waste.
Liquid tight up to feed opening
- Charge chamber available in 1 or 2 yard capacity, with single or twin cylinders
- Available in 10 yard to 34 yard container capacity
- Compactor and container are integrated and are hauled to landfill with roll off truck
- Power unit is anchored and stays on site.

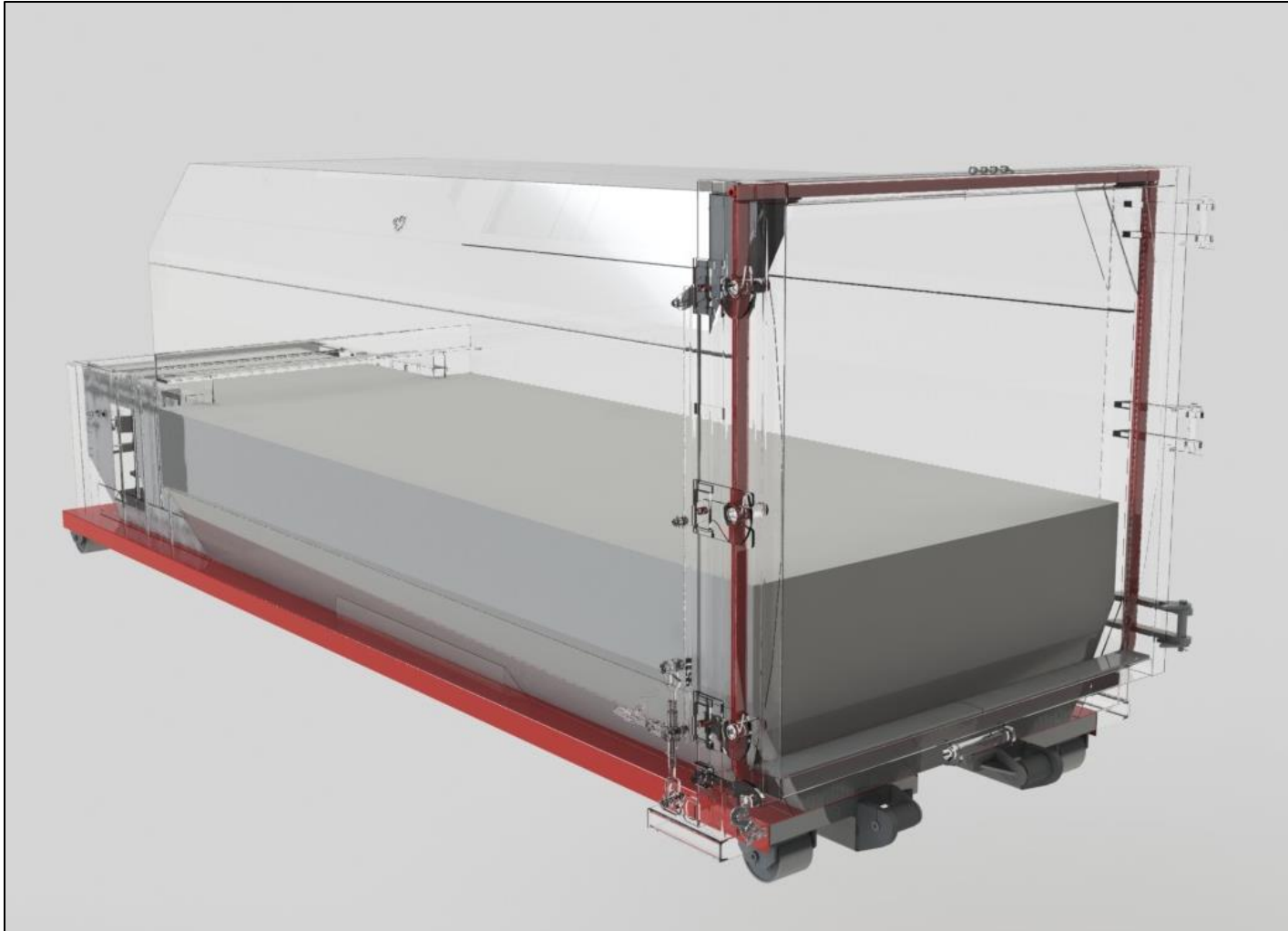


SC-T2-30



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Self Contained Compactors



Self-Contained Water Retention Level



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Self Contained Compactors

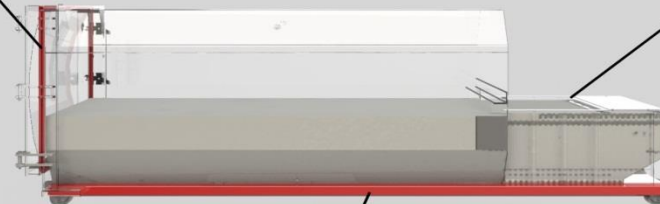
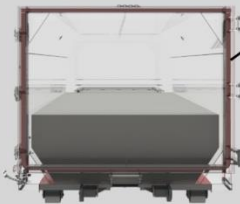
Water Retention Table



Single piece full height door seal



Welded seams in chassis and connecting components increase the water retention potential to chassis top



Single piece solid welded floor to reduce leak potential



CRAM-A-LOT®
J.V. Manufacturing, Inc.
Solid Waste & Recycling Equipment



VCH Series

Downstroke Vertical Compactors



CV Series

Sweeping Blade Vertical Compactors



CRAM-A-LOT®
J.V. Manufacturing, Inc.

CV Series Vertical Compactors

- For lower volume waste producers
- For front load and rear load service
- Front feed or rear feed only
- Available in 3 to 8yd container capacity
- Provide continuous service, container does not go to landfill.
- Hauler does not need to leave truck, no hoses or electrical connections to unhook.





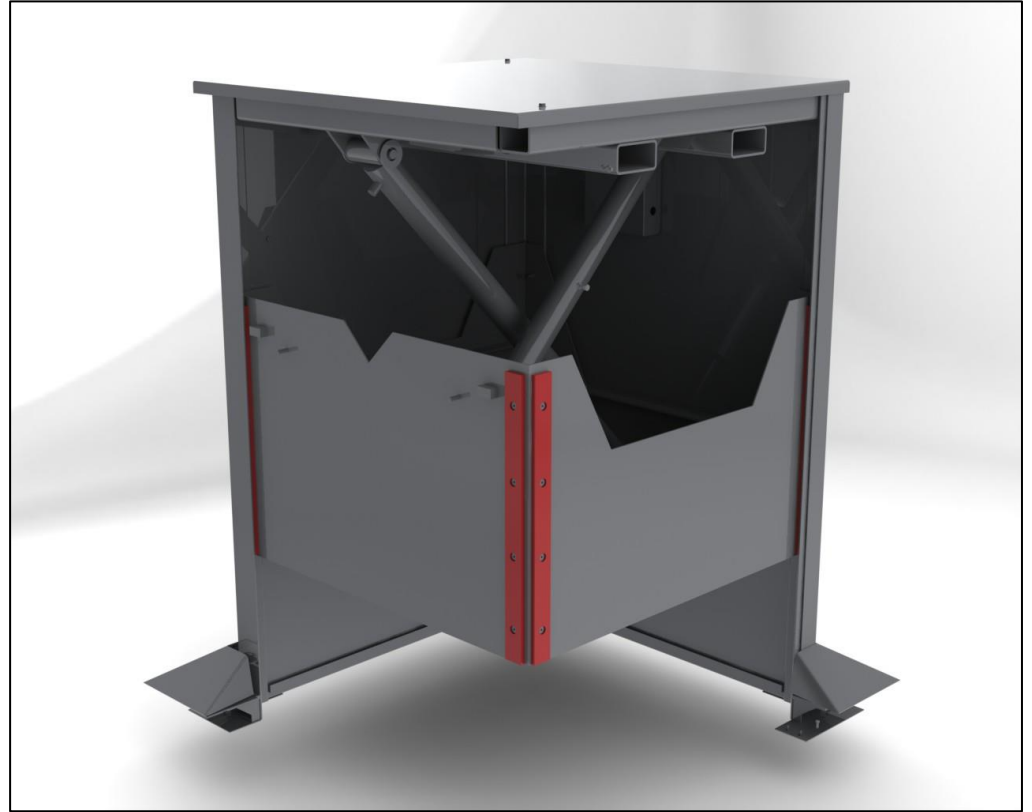
CRAM-A-LOT®
J.V. Manufacturing, Inc.

VCH Series Vertical Compactors



VCH Series

Downstroke Vertical Compactors



Twin Cylinder Downstroke Design



CRAM-A-LOT®
J.V. Manufacturing, Inc.

VCH Series Vertical Compactors

- For lower volume waste producers
- For front load and rear load service
- Front feed, rear feed, or left / right side feed.
- Available in 3 to 8yd container capacity
- Provide continuous service, container does not go to landfill.
- Downstroke design permits through the wall installation with 40x40" door and ring.





CRAM-A-LOT®
J.V. Manufacturing, Inc.

X-Press Pack Compactors

- For lower volume waste producers
- Available in 3 to 6yd container capacity
- Provides continuous service, container does not go to landfill.
- Maintains a cleaner corral than a vertical compactor.
- Hauler must disconnect hydraulic hoses and electrical connector.





CRAM-A-LOT®
J.V. Manufacturing, Inc.

X-Press Pack Compactors

- Available for front load or rear load service
- Rear Feed configuration only.
- Controls usually specified in main control panel.
- Optional guide islands can be installed to ensure consistent placement and protect nearby corral or building.





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Pre-Crusher Compactors

- For bulky waste and product destruction
- Ideal for pallets, furniture, white goods, and drums
- Available in 3 to 7yd charge chamber sizes
- Ram crushes waste against guillotine gate for maximum volume reduction
- For use with RO-40-HD heavy duty container





CRAM-A-LOT®
J.V. Manufacturing, Inc.

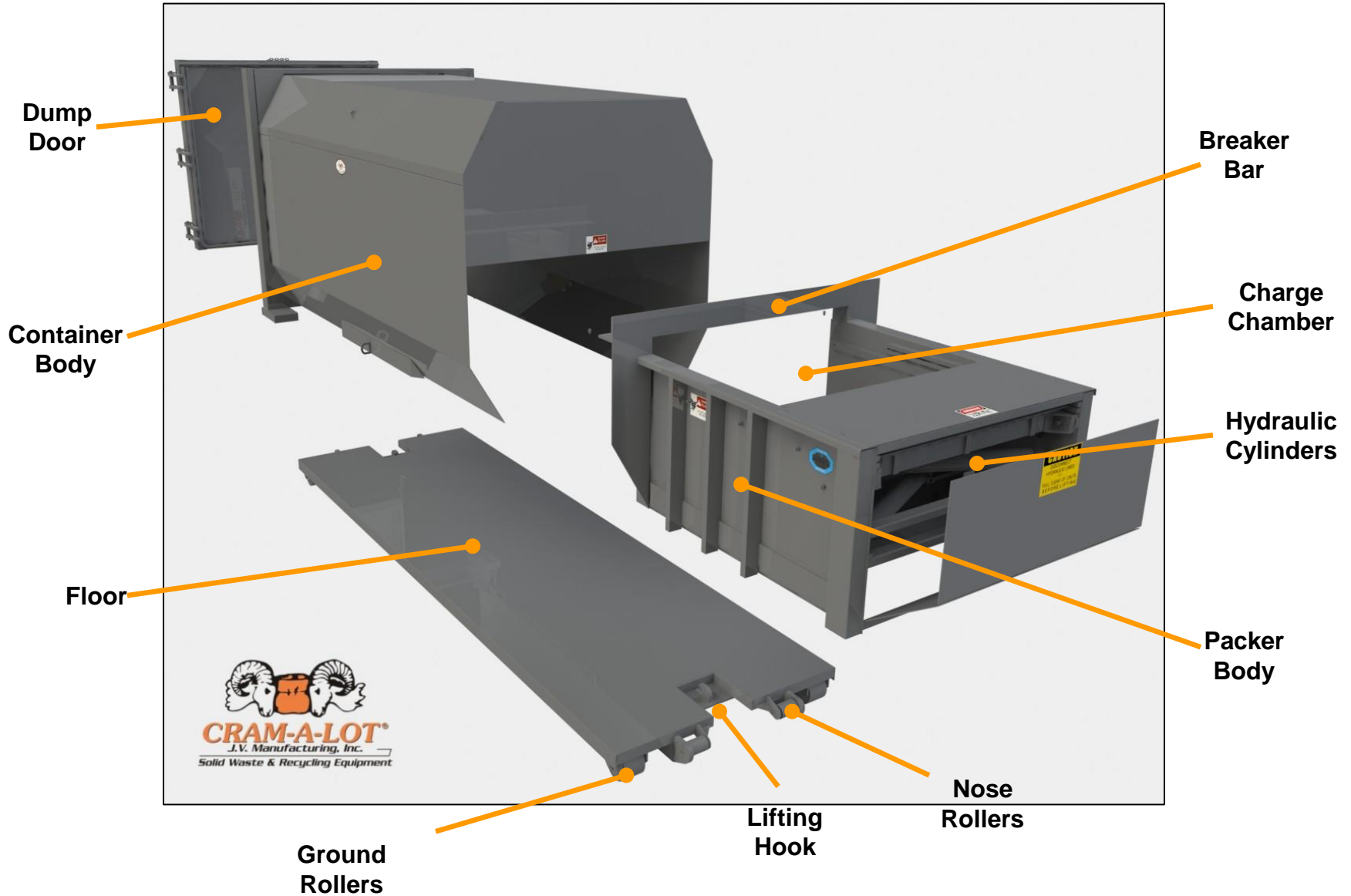
Parts of a Compactor

- Self Contained Compactor Exploded View
- Hydraulic Power Unit Exploded View



CRAM-A-LOT®
J.V. Manufacturing, Inc.

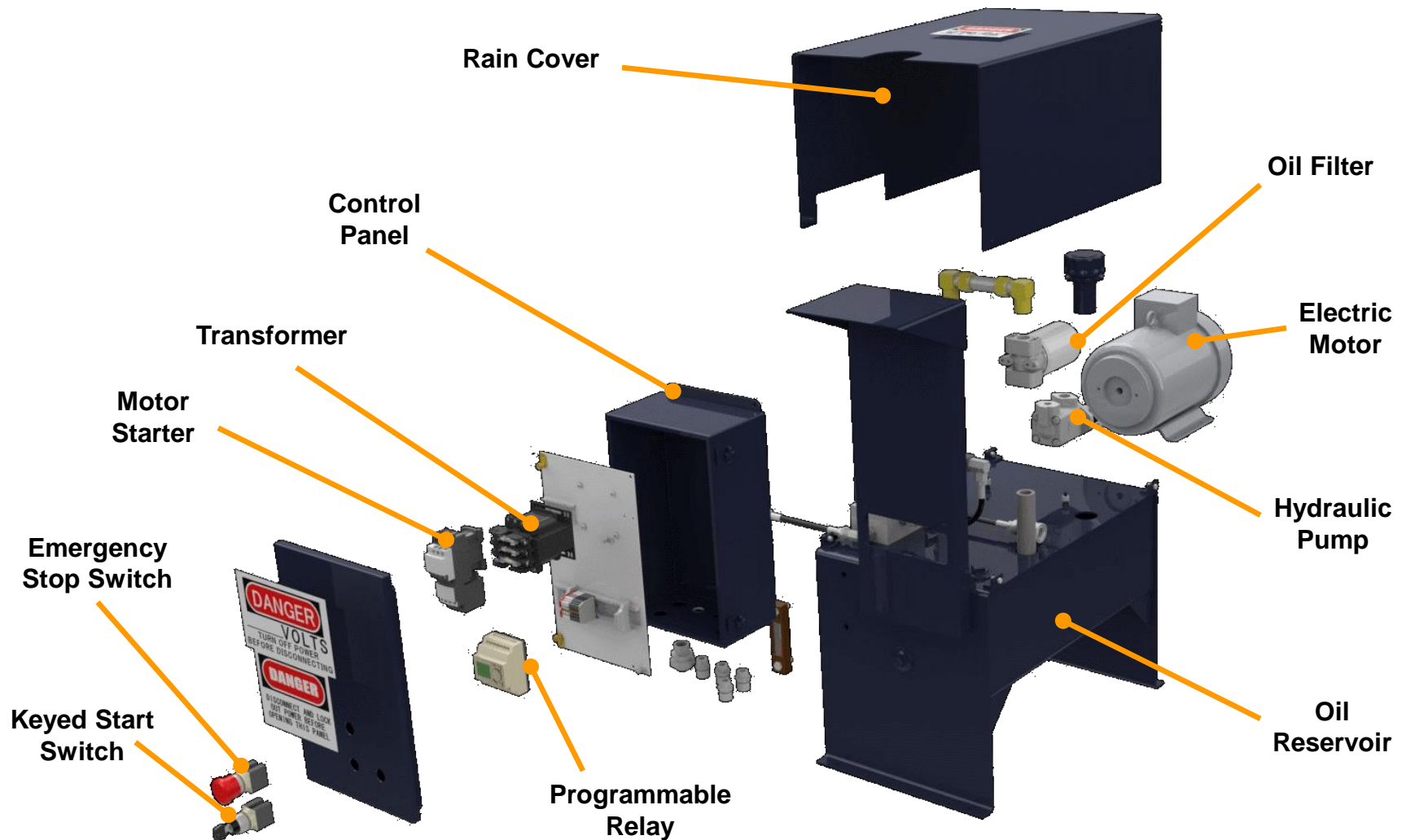
SC Compactor - Exploded





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Power Unit - Exploded





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Compactor Performance

- Compaction Ratio
- Ram Face Pressure
- Penetration & Cycle Time
- Cylinders
- Pumps
- Motors
- Types of Compactor Operation



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Compaction Ratio



=



4 Trips Loose

160 cu yds Loose

20,000 lbs Loose

(@125 lbs / cu yd)

=

1 Trip Compacted

40 cu yds Compacted

20,000 lbs Compacted

(@500 lbs /cu yd)



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Ram Face Pressure

Compactors are designed to compress loose waste. In order to do this they must generate force and pressure on the material.

- **Ram Face Pressure** is probably the most important performance measure of a compactor.
- As a user / buyer – Ram Face Pressure is the best comparative point to compare compaction performance.
- Higher Ram Face Pressure results in better compaction and higher compaction ratio.
- Ram Face Pressure is calculated by taking the cylinder force divided by the area of the ram face (HxW).



Ram Face



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Penetration & Cycle Time

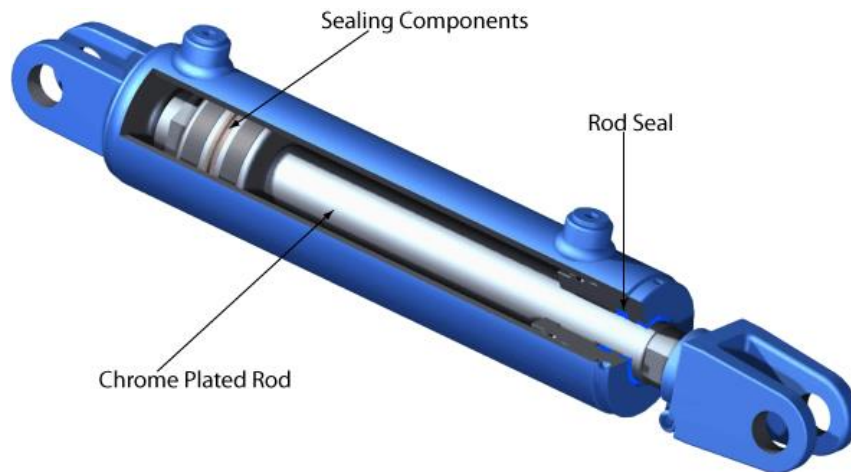
Compactors must also effectively move the waste from the compactor charge chamber into the container area.

- **Penetration** is the distance that the ram protrudes into the container.
- Penetration can improve compaction ratios by keeping material from falling back into charge chamber.
- Penetration helps maintain a clear charge chamber.
- **Cycle Time** is the time that it takes the presshead to fully extend and retract. The extend and retract times are not equal. The retract cycle is faster than the extend cycle because there is less cylinder volume to fill with hydraulic fluid during retract. The cylinder rod takes up considerable volume in the barrel of the cylinder.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Cylinders



- Cylinders are sized by Bore, Stroke, & Rod Size
- **Bore** is the inside diameter of the barrel.
- **Stroke** is the travel distance of the cylinder.
- **Rod Size** is the outside diameter of the chrome plated rod. If the rod diameter is too small, the cylinder could buckle under pressure.
- Bore area (sq in) x System Pressure (psi) = **Force** (lbs / force)
- Twin cylinder compactors have bypass valve / poppit valve. This increases the life of the cylinder by softening the shift.

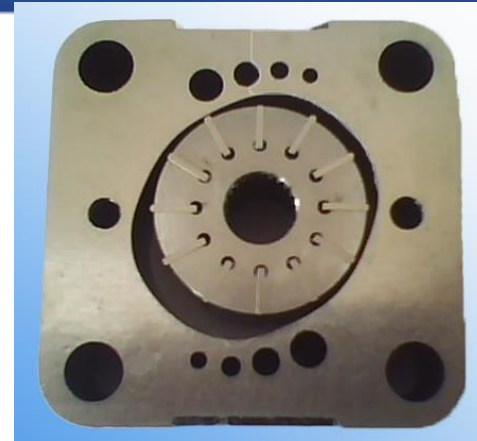


CRAM-A-LOT®
J.V. Manufacturing, Inc.

Pumps



Vickers Vane Pump



Cross Section of Vane Pump

- Pump Size is determined by the gallons per minute (gpm) that the pump flows.
- Vane pump vs Gear pump – vane pumps are quieter and do not lose pressure over time. They offer more consistent performance.
- The pump does not regulate system pressure, it just flows fluid.
- All else equal (bore, rod, stroke size) a higher GPM pump decreases cycle time (makes machine faster).
- Motor horsepower, system pressure, & flow must all be considered for efficient system design.
- $HP = (\text{pressure (psi)} \times \text{flow (gpm)}) / 1714$



CRAM-A-LOT®
J.V. Manufacturing, Inc.



Baldor 10hp Motor



- TEFC – Totally Enclosed Fan Cooled – this is an indoor / outdoor design found on all Cram-A-Lot compactors. The motor internals are sealed from the elements.
- ODP – Open Drip Proof – for indoor use only. Cram-A-Lot compactors do not use these.
- **Is 15hp better than 10hp?** Not necessarily. The motor must be sized to match pump & system pressure. A larger motor does not necessarily make the machine faster or build more pressure.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Types of Operation

- **Key Start** – machine starts when key is turned - like a car's ignition
- **Dead Man** – machine only compacts while key is held in start position
- **Start on Door Close** – When key is in “On” position, compactor starts after hopper door is closed. Can be programmed to start after door is closed 2,3,4 times, etc. Visual & audible pre-start alarm are required per ANSI Z245.2 – 2013.
- **Photo Eye Start** – compactor starts when trash breaks a photocell beam that is positioned across the charge chamber. Occurs after required 20 second initialization with visual & audible pre-start alarm.
- **Auto Start** – compactor starts automatically based on a timer (i.e. every 15 minutes) Occurs after 20 second initialization with visual & audible pre-start alarm.
- **Multi Cycle** – compactor runs 2 or more continuous cycles every time it is started. Can be configured with any of the above start methods. (except dead man)



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Compactor Options

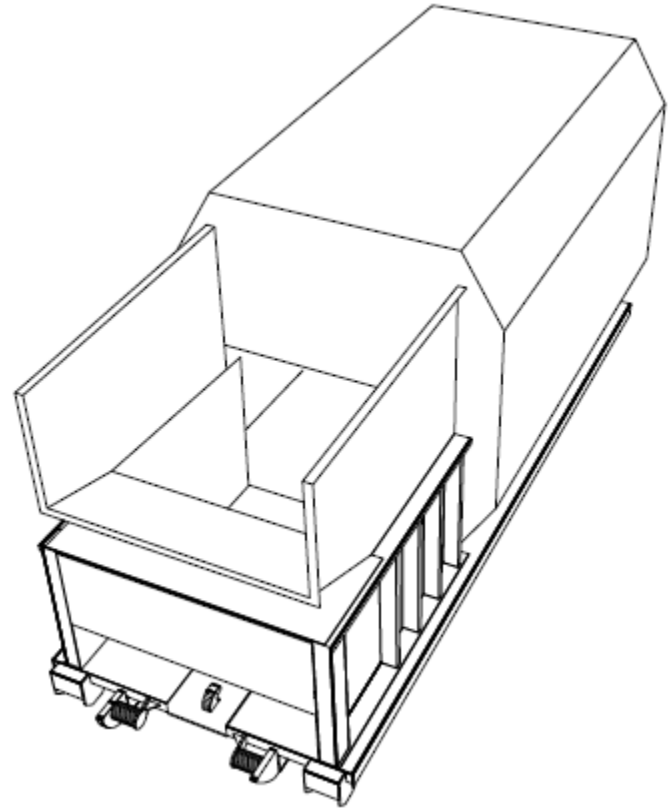
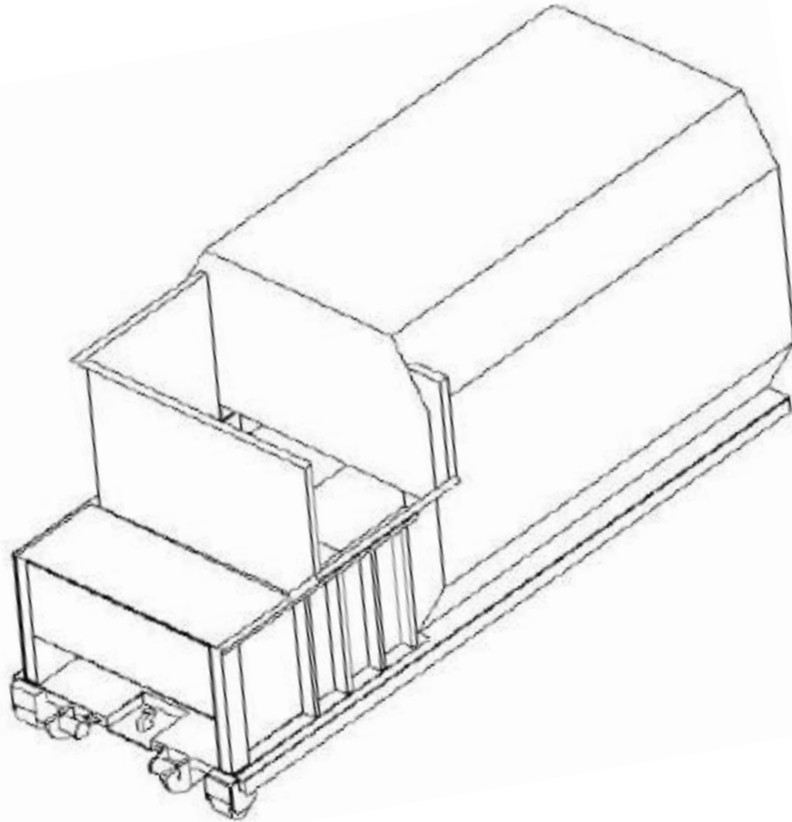
- Fabricated Steel Options
- Electrical Options
- Hydraulic Options



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Fabricated Steel Options

Open Top Hoppers

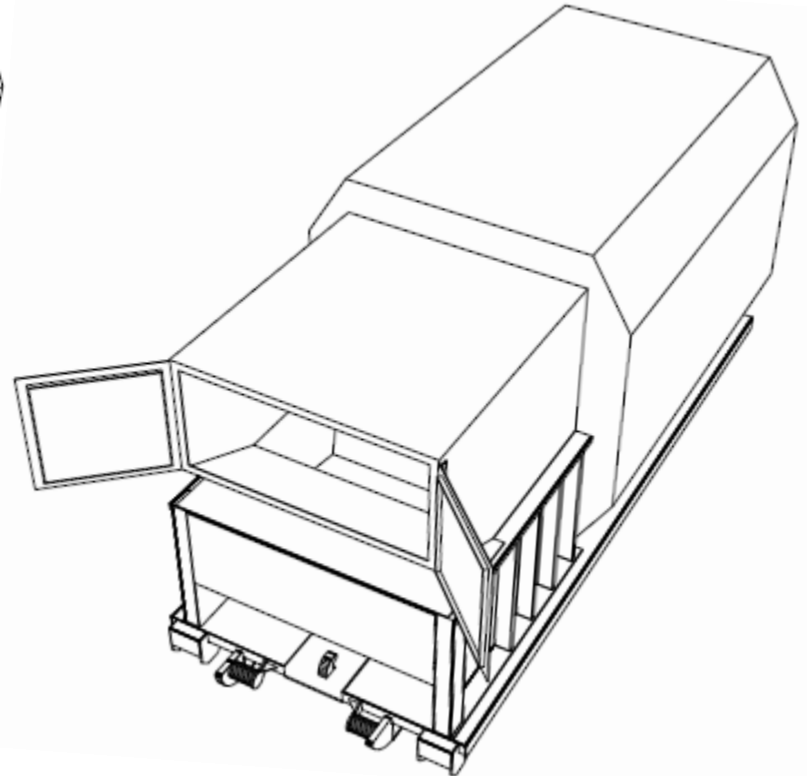
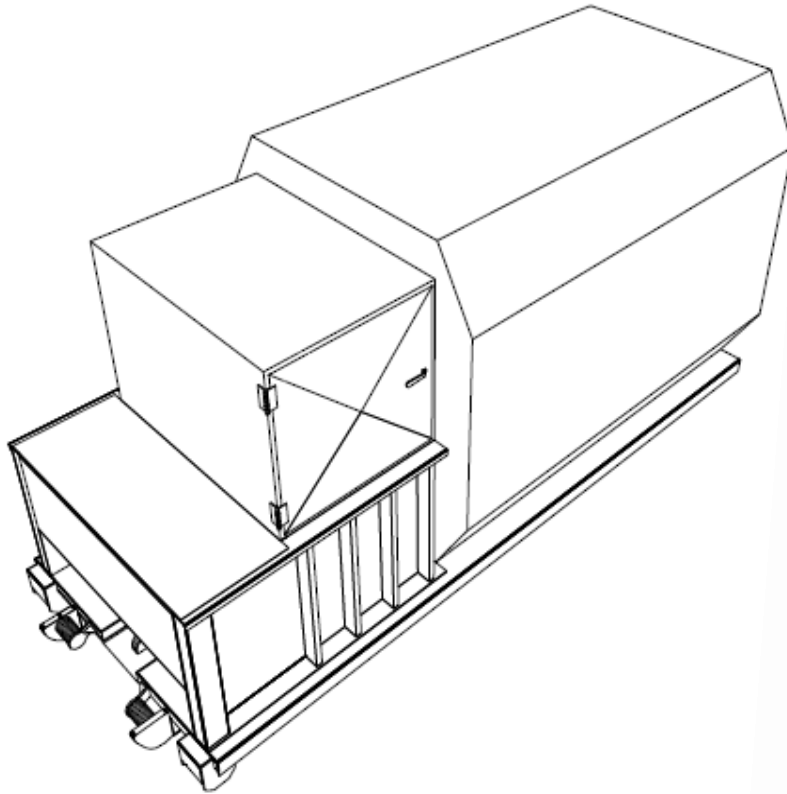




CRAM-A-LOT®
J.V. Manufacturing, Inc.

Fabricated Steel Options

Enclosed Hoppers

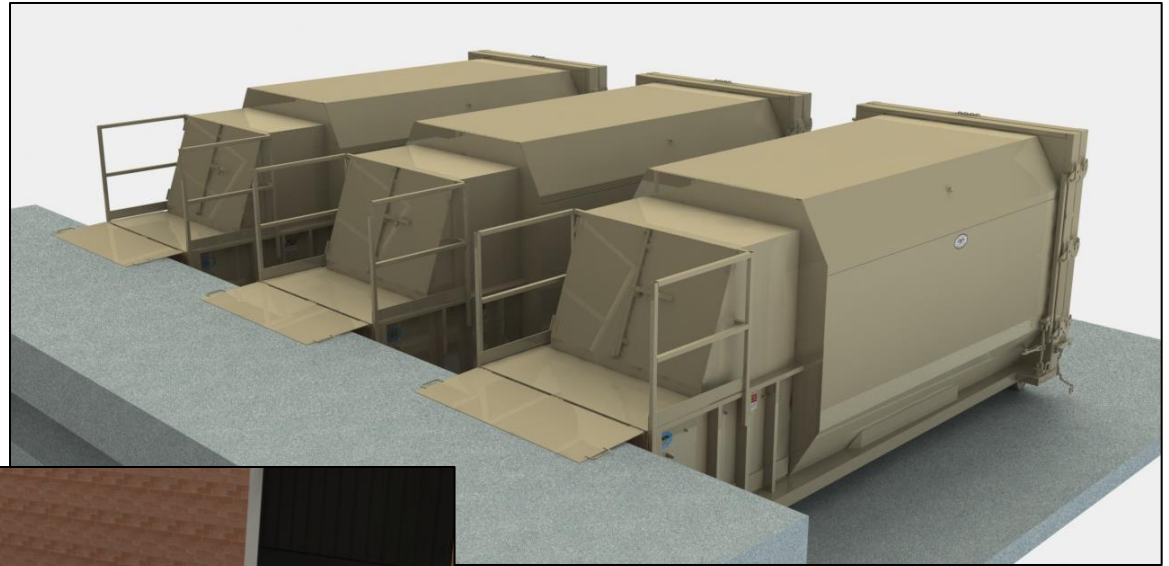




CRAM-A-LOT®
J.V. Manufacturing, Inc.

Fabricated Steel Options

Dock Mount Systems

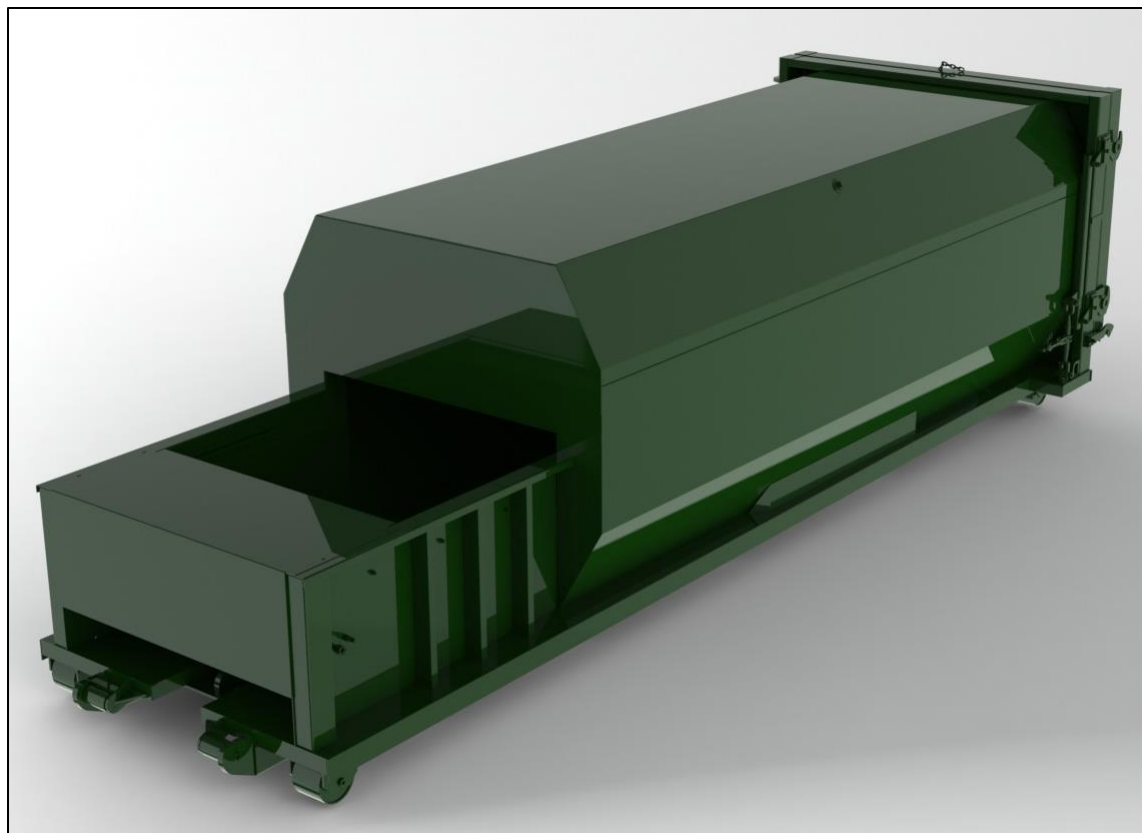




CRAM-A-LOT®
J.V. Manufacturing, Inc.

Fabricated Steel Options

Custom Sizes



SC-T2 with Cut Down Height



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Fabricated Steel Options

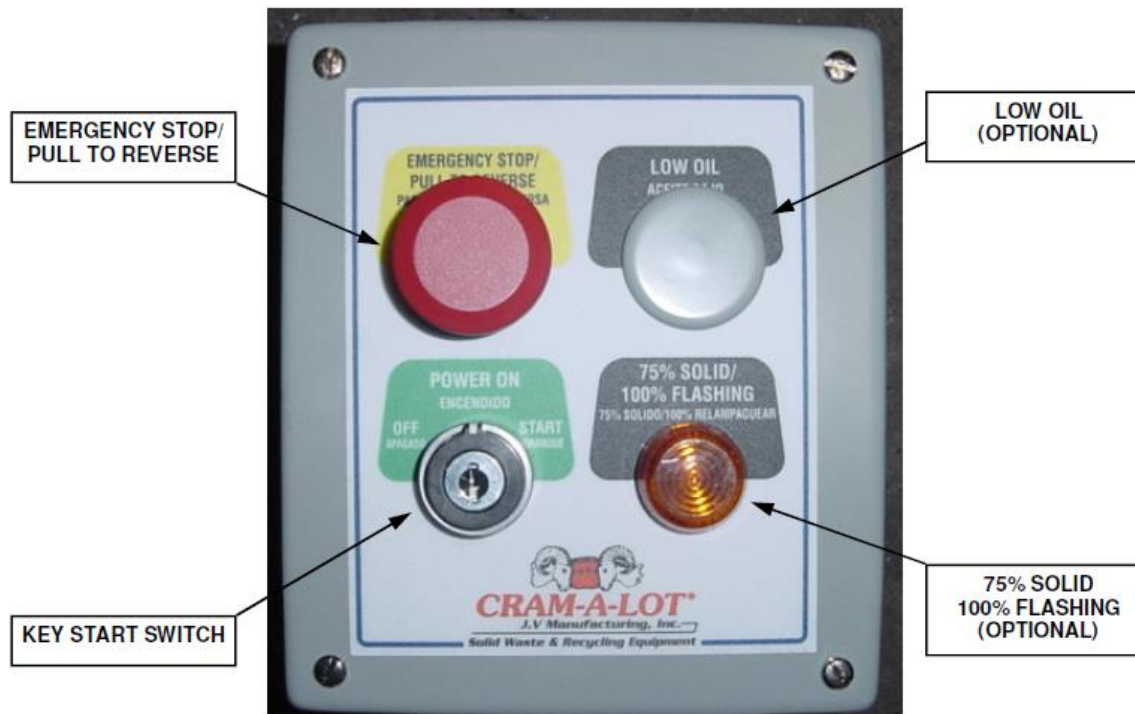
- Guide Islands – Angle iron assemblies that guide compactor into place using the rail assembly under the compactor floor.
- Guide Channels – Channel steel that guides compactor into place using the ground rollers.
- Drip Pan Under Disconnects – Captures residual hydraulic fluid when removing the hydraulic disconnects and dispenses it into the self-contained compactor.
- Drain Systems – Ball valve drain systems that reduce load weight by allowing excessive liquid to be routed out of a self-contained compactor and into a sanitary sewer.
- Fixed Breaker Bar Teeth – Keeps waste from migrating from container back into charge chamber. Positioned above ram.
- Hinged Breaker Bar Teeth – Keeps waste from migrating back into charge chamber. Hinged teeth protrude below ram and hinge onto top of ram as it extends.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Electrical Options

- **Remote Controls** – places controls at point of use in a small pendant style enclosure.
- **Fullness Indicator Light** – solid at 75% flashes at 100%





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Electrical Options

- **Motor Upgrade** – could extend life of motor by “oversizing” motor for required duty
- **Sonozaire Odor Control System** – Covers waste in a blanket of ozone which keeps odor from becoming airborne.



Sonozaire installed on Stationary Compactor



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Electrical Options

- **Keypad Access Control** – Allows authorized users to enter a PIN code and operate the machine
- **Bio-Start** – Allows authorized users to start the compactor using their fingerprint – no PIN number means no sharing of codes

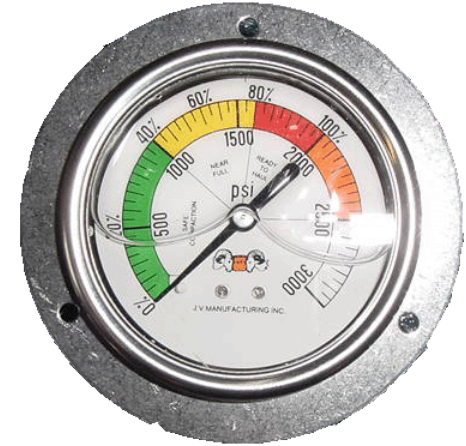




CRAM-A-LOT®
J.V. Manufacturing, Inc.

Hydraulic Options

- **Pressure Gauge** – Color coded pressure gauge tells operator when compactor is near full
- **Hydraulic Plumbing Relocation** – disconnects can be run to middle of container or end of container
- **Lockable Relief Valve** – prevents tampering with relief valve to adjust system pressures down. (Usually by a hauler who wants lighter loads & more pulls)
- **Oil Heater** – Heating element located in hydraulic tank that keeps oil viscous in cold temperatures. Recommended for compactors installed North of Mason/Dixon line.
- **Low Temperature Oil** – blends ATF automatic transmission fluid with standard hydraulic oil. Lowers pour point, keeps fluid viscous in hoses and cylinder during winter, quieter operation in winter.





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Hydraulic Options

- **Biodegradable Oil** – environmental friendly. Specs are available.
- **Oil Level Shutdown** – Float located in hydraulic tank that notifies user if oil level is low. Prevents cavitation of pump.
- **Oil Temperature Shutdown** – Thermostat is located in hydraulic tank and shuts down compactor when oil temperature exceeds 190 degrees Fahrenheit.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Site Surveys

- Questions to Ask
- Space Assessment
- Pad Requirements
- Electrical Requirements



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Conducting a Site Survey

It is important to conduct a thorough site survey to ensure all of the customer's needs can be met through the proper selection and installation of the compactor. The following questions should be asked during the site survey to ensure all necessary information is collected:

- **What type of refuse?** Dry, Wet, MSW, industrial waste, recyclables?
- **What size of refuse?** Bulky, bagged, loose debris?
- **What volume of refuse?** How many cubic yards are generated per week?
- **What is the peak demand?** Periods of peak demand can determine required compactor size.
- **What method of material handling?** Will refuse be carried or brought in carts?
- **How much available space?** Seems like there is never enough space!
- **What type of pickup service?** Rolloff, front load, or rear load?
- **Is there a pad?** Is a sufficient concrete pad available?
- **Is there electricity?** A properly sized disconnect is required.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

Space Assessment

- Space – enough space must exist for the users to bring refuse to the machine, for the machine and container to be adequately serviced and accessed, and for the rolloff truck to maneuver into position to pick up the container.
- A minimum of 2 feet must be allowed between the compactor / container and any building or wall to permit accessibility of operators, haulers, and service technicians.
- Rolloff truck must have a “clear approach” of 45 to 60 feet – depending on the type of truck being used.
- Rolloff truck must have 24’ of overhead clearance to pick up container.

Space Assessment



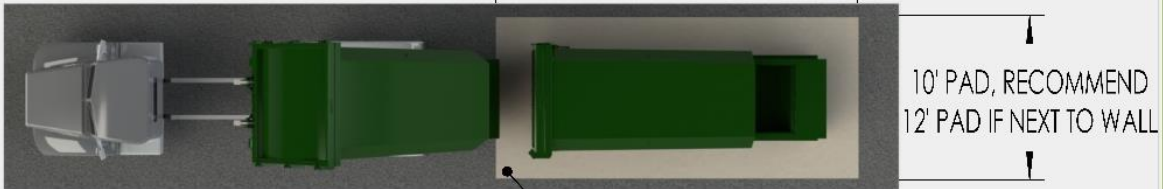
CRAM-A-LOT®
J.V. Manufacturing, Inc.



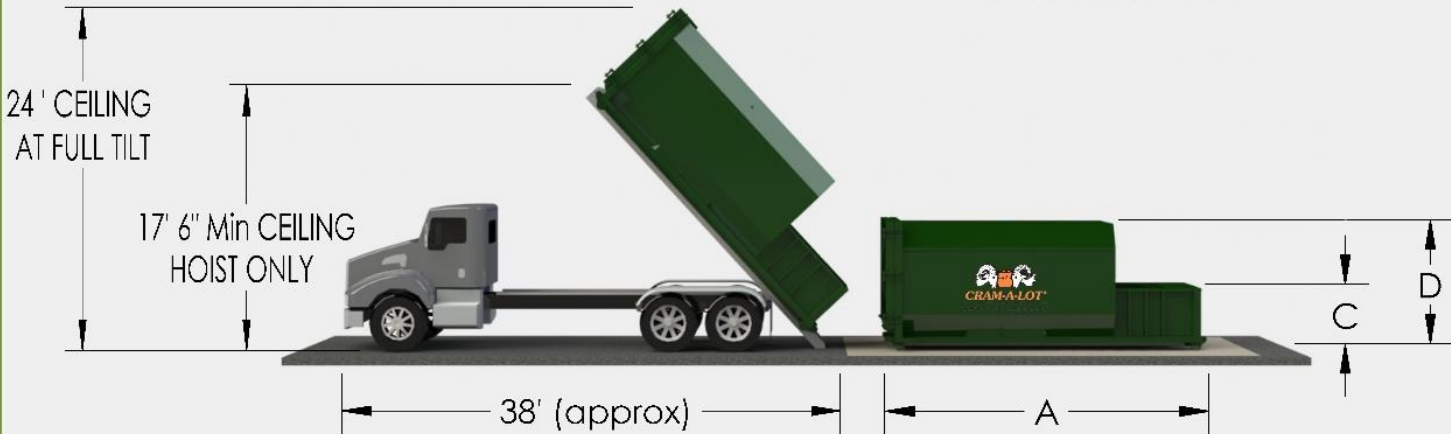
Self-Contained Model	A	C	D
SC-T2-20	17' 4"	49"	102 ½"
SC-T2-25	19' 11"	49"	102 ½"
SC-T2-30	22' 1"	49"	102 ½"
SC-T2-34	23' 9"	49"	102 ½"
SC-T2-38	25' 10"	49"	102 ½"

Self-Contained Model	A	C	D
SC-02-20	19'	49"	102 ½"
SC-02-25	21' 7"	49"	102 ½"
SC-02-30	23' 9"	49"	102 ½"
SC-02-34	25' 5"	49"	102 ½"

RECOMMENDED 5' GREATER THAN COMPACTOR LENGTH



MINIMUM 3000 PSI CONCRETE STEEL REINFORCED, 6" THICK



Space Assessment

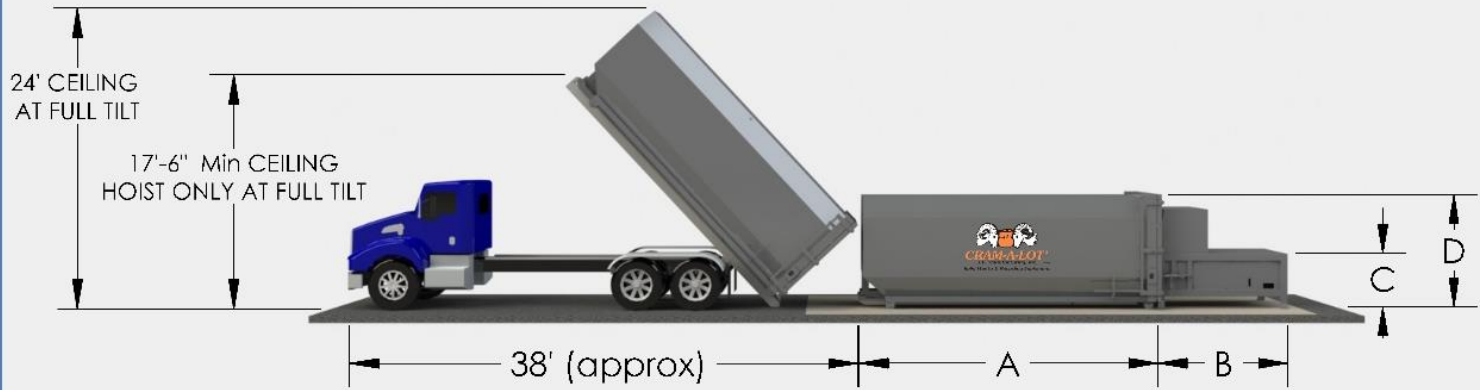
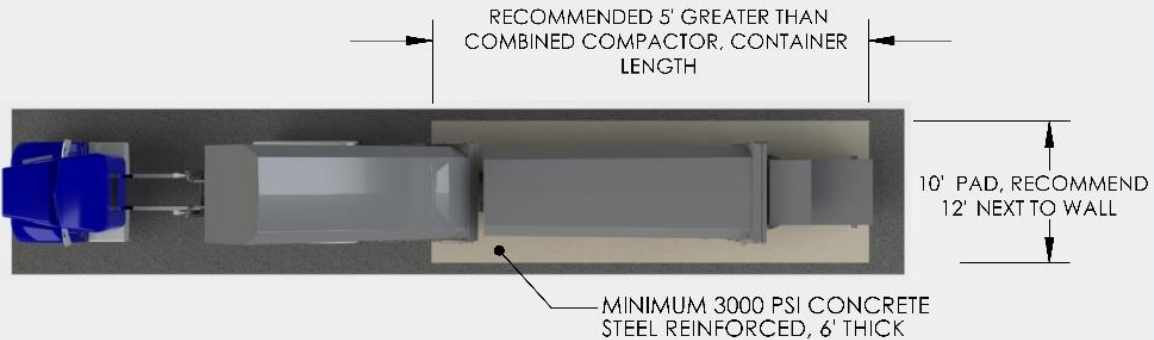


CRAM-A-LOT®
J.V. Manufacturing, Inc.

Compactor Model	B	C
CO-02/CC-02/CX-02	116 5/8"	49"
CO-03/CH-03/CX-03	162 1/2"	49 1/2"
CO-04/CH-04/CX-04	162 1/2"	55"
CO-05/CH-05/CX-05	245"	55"



Receiver Model	A	D
RO-30	223 1/2"	103"
RO-40/RO-40-10/RO-40-HD	271 1/2"	103"





CRAM-A-LOT®
J.V. Manufacturing, Inc.

Conducting a Site Survey

- Preferred dimensions for the concrete pad are 10ft wide by 36ft long.
- Pad should be level and preferably flush with the surrounding ground level.
- Concrete should be 3,000 psi reinforced concrete, 6 inches thick



Electrical Requirements

A lockable, fused disconnect must be installed within sight of the control panel. It cannot be placed greater than 50' away from the compactor.

A chart of electrical service requirements can be found in your handbook. Using this chart, the motor horsepower and site voltage, you can advise an electrician what size disconnect, fuses, and wire should be provided for the equipment.



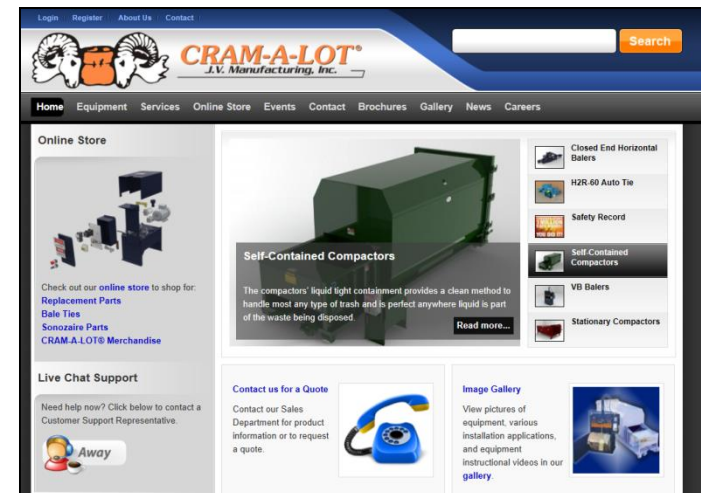
CRAM-A-LOT®
J.V. Manufacturing, Inc.

Sources of Technical Information

- Regional Sales Manager
- Owner's Manual
- Product Literature
- Product Specifications
- Electrical Service Requirements
- WASTEC Compactor Listing
- ANSI Compatibility Standards – Z245.6
- Cram-A-Lot Customer Support
- Cram-A-Lot Website



Waste Expo 2013



www.cram-a-lot.com



CRAM-A-LOT®
J.V. Manufacturing, Inc.

General Compactor Safety

- **NEVER** place hands or arms in the compactor while it is operating.
- **NEVER** allow anyone except qualified electrical or hydraulic repair persons to work on the equipment.
- **NEVER** disable any safety switch.
- **NEVER** overload the compaction chamber.
- **NEVER** place concrete, heavy steel plate or castings, explosive materials, liquids, nor hazardous waste in the compactor .
- **NEVER** climb in or on the compactor, nor perform any maintenance/repairs unless the power is disconnected and locked / tagged out.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

General Compactor Safety

Safety Terminology

The accident prevention decals on your compactor meet or exceed standards set by ANSI and OSHA. It is important that you are familiar with the terminology used on the decals and the varying degrees of hazards that are associated with this terminology.

DANGER—Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations. The signal word Danger should not be used for property damage hazards unless personal injury risk appropriate to the level is also involved.

WARNING—Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. This signal word should not be used for property damage hazards unless personal injury risk appropriate to this level is also involved.

CAUTION—Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may also cause property damage.

NOTICE—Indicates a statement of company policy directly or indirectly related to the safety of personnel or protection of property. This signal word should not be associated directly with a hazard or hazardous situation.





CRAM-A-LOT®
J.V. Manufacturing, Inc.

ANSI Z245.21

- Manufacturer safety standards for design & construction

ANSI Z245.2

- **Installer** – must install equipment in accordance with ANSI, local codes & manufacturer's recommendations.
- **Owner / Employer** – must provide properly maintained equipment and regulatory compliant.
- **Operator / Employee** – must use safety features, receive training, use according to manufacturer's instructions.



CRAM-A-LOT®
J.V. Manufacturing, Inc.

The following OSHA regulations may apply to the operation of refuse compactors:

29 CFR 1910.147 – Control of Hazardous Energy Sources (Lockout / Tagout)

29 CFR Part 1910.212 – Machine Guarding

29 CFR 1910.146 – Permit Required Entry into Confined Spaces