

**SECTION 14 50 00  
VERTICAL RECIPROCATING CONVEYOR**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Design, fabrication, and installation of one (1) vertical reciprocating conveyor (VRC) including drive unit, controls, gates, and enclosures as shown on project drawings and as specified herein.

**1.03 CODES:**

- A. The equipment design and installation shall meeting the following codes.
  - 1. ASME B20.1 - Safety Standard for Conveyors and Related Equipment.
  - 2. National Electrical Code (NEC- 2020), or NFPA 70
  - 3. AWS – American Welding Society Codes
  - 4. NEMA – National Electrical Manufacturer’s Association Codes

**1.04 SUBMITTALS**

- A. Product Data: Submit latest edition of VRC data sheet and outline drawing with the proposal.
- B. Submittal:
  - 1. Submit VRC Submittal for approval before purchasing VRC.
  - 2. Contractor shall confirm the selected VFC will fit within the existing enclosure before ordering VRC.
- C. Closeout Submittals provided with equipment:
  - 1. Electrical Schematic Drawing including control panel layout and Bill of Materials reflecting original manufactured part numbers.
  - 2. Installation Manual and Electrical Installation Guide.
  - 3. Owner’s Manual including spare parts list, exploded parts drawings, operating instructions, maintenance schedule, service and troubleshooting guidelines.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer must have a minimum of five (5) years experience in the manufacture of vertical reciprocating conveyors.
- B. All structural welding performed by manufacturer must be done by welders certified to AWS D1.1.
- C. Manufacturer must guarantee compliance with ASME B20.1 Safety Standard for Conveyors and Related Equipment. Manufacturer further guarantees to repurchase the equipment at full purchase

price in the event that Owner is unable to use the equipment due to lack of elevator code compliance.

- D. Installer shall have the approval of the manufacturer and have a minimum of five (5) years experience in the installation of vertical reciprocating conveyors.

## 1.06 WARRANTY

- A. The manufacturer shall warrant the VRC free of manufacturing defects beginning (30) days after shipment with the following minimums:
1. Structure – lifetime parts and labor
  2. Manufactured components – one (1) year parts and labor.
  3. Purchased components – one (1) year parts, ninety (90) days labor.

## PART 2 – PRODUCTS

**2.01 MANUFACTURERS:** Approved Manufacturers and their products are listed below and other manufacturers may be submitted if approved by the Owner representative.

- A. PFlow Industries, Inc., 6720 N. Teutonia Ave, Milwaukee, WI 53209, Phone (414) 352-9000, e-mail [info@pflow.com](mailto:info@pflow.com), [www.pflow.com](http://www.pflow.com); Similar to Model D
- B. Advance Lifts, 701 S. Kirk Road • St. Charles, IL 60174 • Toll Free 1-800-843-3625, [www.advancelifts.com](http://www.advancelifts.com); Similar to Model VCHI-1.5
- C. AUTOQUIP, 1058 W Industrial Rd, Guthrie, OK 73044, 877-360-6777, [sales@autoquip.com](mailto:sales@autoquip.com), Similar to Model FLT-120-0015

## 2.02 VRC MECHANICAL SPECIFICATION

- A. Capacity: The VRC shall be rated at a live load capacity of 1000 lbs.
- B. Speed: The VRC shall have a lifting speed of 16 to 20 feet per minute when loaded to capacity.
- C. Vertical Travel: The VRC shall have a maximum lift height of 10 feet with a total of 2 operating levels.
- D. Lift Platform: The VRC platform shall be 4 foot wide x 4 foot deep x 84" load height with a steel deck plate and minimum 48" high welded handrails on non-operating ends and upper and lower snap chains on the loading and unloading sides.
- E. Lift Platform Load Patterns:
1. A method to describe the direction a load can be moved on and off a carriage.
  2. Assembly Z- Carriage configuration allowing a load/unload opening on opposite sides of the lift platform. See drawing ME-1 plan detail 2-ME1 for loading and unloading directions.
  3. Assembly L- 90 degree load pattern- Carriage configuration allowing a load/unload opening at right angles on the lift platform. See drawing ME-2 plan details 2-ME2 for loading and unloading directions.

- F. Support Columns: The VRC shall have a minimum of two (2) 6" wide, roll formed or wide flange support columns.
- G. Deflection Under Load: When loaded to rated capacity, no portion of the VRC shall exhibit permanent deformations.
- H. Hydraulic Power Unit:
1. A pressure compensated flow control valve shall be included to provide for safe lowering of the load.
  2. A velocity sensing check valve is required to prevent uncontrolled carriage descent in case of a failure in the hydraulic pressure line.
  3. A pressure relief valve shall be provided to protect the hydraulic system from excessive pressure due to overloading or jam situations.
  4. Direct drive pump and motor TEFC shall be provided.
  5. Hydraulic oil reservoir shall be included with motor, pump, oil filter and valves mounted on a top plate fastened to the top of the reservoir.
- I. Hydraulic Oil Type:
1. Hydraulic oil type to be manufactured for use in food-processing and preparation areas. This oil to be NSF registered H1 or meets FDA 21 CFR 178.3570 for incidental food contact.
- J. Lifting Means:
1. Raising and lowering of the carriage shall be provided by a dual ram direct-acting hydraulic cylinders. Sheaves, wire ropes, or chains are not to be incorporated in the lifting means.
  2. An adjustable mechanical stop and pressure switch act to limit the upward travel of the lift platform to a height flush and level with the upper floor. The pressure switch shall be designed and set to allow full build up of hydraulic pressure to secure the lift platform in place and prevent bounce during loading or unloading.
- K. Safety Enclosure: Guarding on all non-operating sides of the VRC shall be by safety enclosures a minimum of 8' high consisting of material which will reject a ball 1/2" in diameter.
1. The existing Safety Enclosure shall be reused and meets the above requirements in Section (I).
- L. Floor Level Gates: Gates are required on all operating sides of the VRC at each level of operation.
1. The gates shall be swing type.
  2. Each gate must be equipped with an electro-mechanical interlock to prevent opening of the gate unless the carriage is present, and to prevent operation of the VRC unless all gates are closed.

3. The existing Safety Gates shall be reused and they meet the above requirements in Section (J).

M. Lift Platform Railings:

1. Railings- One railing 48 inch high including 24 inch high mid-rail and 4 inch high kickplate shall be provided on all unloading sides of platform (two sides of platform).
2. Snap chains- Two snap chains shall be provided on each on/off loading side of the platform (two sides of platform). One chain to be located at the adjacent railing top and the other chain shall be located at the mid-rail of each railing. Steel corner post to be provided to support chains on L load pattern platforms.

N. Signs: "NO RIDER" signs shall be provided. Lettering shall be a minimum of 2" high for visibility.

O. Approach Ramp: The manufacturer shall supply a steel fabricated approach ramp to be installed within 1" of the VRC platform at the ground level.

1. Approach ramp shall be provided on the lower floor.
  - (a) Constructed of steel plate and 44 in wide X 12" long.
  - (b) Ramp shall be fastened to the floor with concrete anchors 1 inch from lower platform.

## 2.03 VRC ELECTRICAL SPECIFICATION

A. Motor:

1. Motor horsepower shall be sized for the rated live load and specified speed.
2. All motors to be three phase and shall be designed for continuous duty at ambient temperatures from 32° to 102° Fahrenheit.

B. Controls:

1. Each operating floor level shall be equipped with a momentary contact push button control station with call, send, and mushroom style E-stop operators for manual control of lift operation. These control stations should be mounted outside the Lift Platform enclosure near the gate at each floor and no control stations shall be installed within the Lift Platform enclosure.
2. Upper mechanical stop for upper level with a pressure switch to maintain platform level- See Section H-2.
3. Provided two interlock switches to lock out gate opening at lower and upper floors and if required by control system two limit switches to indicate position of platform in the up and lower position.
4. An internally pre-wired main control panel shall be provided with step-down transformer and field wiring terminal block.
5. The motor/pump unit shall be pre-wired to the main control panel.

- C. Power Source: Electrical subcontractor shall terminate high voltage operating power within 10' of the location designated for installation of the VRC.

## **2.04 FINISHES**

- A. All carbon steel surfaces shall be coated with an industrial enamel finish over primer – Paint color shall be the standard manufacturer color.
- B. Prior to painting, all dirt, mill scale, oil, and grease shall be removed from carbon steel surfaces by a combination of brushing, wiping, and use of solvents.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. Prior to commencing installation of the VRC, the installer shall visually examine the conditions under which the VRC is to be installed and notify the Owner in writing of conditions detrimental to the proper and timely completion of the work.

### **3.02 INSTALLATION**

- A. Install the VRC and reuse existing enclosures, and gates as indicated on the approved shop drawing.
- B. Comply with manufacturer's detailed installation instructions when installing the equipment.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspection: Upon completion of installation, the VRC shall be inspected to verify that it meets all requirements of PARTS 1, 2, and 3 of this Section.
- B. Tests:
  - 1. Operating Load Test: The contractor will provide a 1000 pound test load and load the VRC at the ground level. The loaded VRC platform shall be conveyed to an upper floor level and returned to the ground level to assure proper operation. If the VRC conveyor cannot lift or lower the load, the VRC shall fail the test.
  - 2. Performance Test: This Test is to be performed in conjunction with Test 1 above. During the demonstration of the lifting and lowering test, the owner shall measure the time required to lift and lower the capacity load. The owner will average times for lifting and lowering the load and calculate the average lifting and lowering speed. If the VRC does not lift the load within 10% of the specified speed, or if the lowering speed exceeds the lifting speed by more than 10%, the VRC shall fail the test.
  - 3. Stationary Load Test: This Test is to be performed in conjunction with Test 1 above. The loaded VRC platform shall remain stationary at an upper level for a minimum of one (1) hour. After the one (1) hour period, the VRC will be inspected for deflection of the components or drift of the platform. If deformation or downward drift is evident, the VRC shall fail the test.

### **3.04 ADJUSTING AND CLEANUP**

- A. Touch up all scratches, abrasions, and other defects in the pre-finished surfaces with the same material color as that used in the factory applied finish.
- B. Remove and dispose of all rubbish and debris caused by the work under this section.
- C. Verify that equipment is properly installed and guarded per ASME B20.1

**END OF SECTION**