

## **SECTION 14550 VERTICAL RECIPROCATING CONVEYOR**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

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

#### **B. Related Sections**

- A. Section 03300: Cast in place concrete.
- B. Sections of Division 16: Electrical as applicable.

#### **1.03 REFERENCES**

- A. ANSI – American National Standards Institute (ANSI B20.1).
- B. AWS – American Welding Society.
- C. NEMA – National Electrical Manufacturer’s Association

#### **1.04 SUBMITTALS**

- A. Product Data: Submit latest edition of VRC data sheet and outline drawing with the proposal.
- B. Shop Drawings:
  - 1. Submit General Arrangement Drawing for approval within 3 weeks of receipt of an order, including plans, elevations, sections of the VRC, base plate and lateral loading values, and recommended pit dimensions if applicable.
  - 2. Submit VRC Specification Sheet for approval within three weeks of receipt of an order, including scope of work, operating and control voltages, lift speed, type of paint, and any special project notes.
- 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 D.1.1.
- 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. Pflow components – one (1) year parts and labor.
  - 2. Purchased components – one (1) year parts, ninety (90) days labor.

## PART 2 – PRODUCTS

### 2.01 MANUFACTURER

- A. Series 21 VRC manufactured by Pflow Industries, Inc., 6720 N. Teutonia Ave, Milwaukee, WI 53209  
Phone (414) 352-9000 Fax (414) 352-9002 e-mail [pflow@pflow.com](mailto:pflow@pflow.com) website: www.pflow.com

### 2.02 VRC MECHANICAL SPECIFICATION

- A. Capacity: The VRC shall be rated at a live load capacity of \_\_\_\_\_ lbs.
- A. Speed: The VRC shall have a lifting speed of 24 feet per minute when loaded to capacity.
- B. Vertical Travel: The VRC shall have a maximum lift height of \_\_\_\_\_ with a total of 2 operating levels.
- C. Lift Platform: The VRC platform shall be a minimum of \_\_\_\_\_ inches wide x \_\_\_\_\_ inches long x 84" load height with a steel deck plate and minimum 48" high welded handrails and kickplates on non-operating ends and dropbars with safety chains on operating ends.
- D. Support Columns: The VRC shall have a minimum of two (2) 6" wide support columns.
- E. Deflection Under Load: When loaded to rated capacity, no portion of the VRC shall exhibit permanent deformations.

F. 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.

G. Lifting Means:

1. Raising and lowering of the carriage shall be provided by two (2) cylinders suitably mounted on the unit. Transmission of the lifting force is achieved via steel roller chain attached to the cylinders and the lift platform. The cylinders are linked together by a heavy torsion bar to insure that the lift platform remains level despite off-center loads.
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.
3. Safety cams shall be mounted on the platform and connected to the lifting chains. The cams are designed to prevent the lift platform from falling more than six (6) inches if tension is lost in the chains.

H. Safety Enclosure: Guarding on all non-operating sides of the VRC shall be by shaftway walls or safety enclosures a minimum of 8' high consisting of material which will reject a ball 1/2" in diameter.

I. Floor Level Gates: Gates by Pflow/others or doors by others are required on all operating sides of the VRC at each level of operation.

1. The gates/doors shall be (vertical acting) (swing) (slide) type.
2. Each gate/door must be equipped with an electro-mechanical interlock to prevent opening of the gate/door unless the carriage is present, and to prevent operation of the VRC unless all gates/doors are closed.

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

L. Approach Ramp: If a pit is not specified, the manufacturer shall supply or option a steel fabricated approach ramp to be installed within 1" of the VRC platform at the ground level.

## 2.03 VRC ELECTRICAL SPECIFICATION

A. Motor:

1. Motor horsepower shall be sized for the rated live load and specified speed.

2. All motors are 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.
2. An internally pre-wired main control panel shall be provided with step-down transformer and field wiring terminal block.
3. The motor/pump unit shall be pre-wired to the main control panel.
4. Provide quick-connect type cables and connectors for field connection of push button control stations and gate interlocks to the main control panel.

- C. Power Source: Owner 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 – color Pflow Blue.
- 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 architect in writing of conditions detrimental to the proper and timely completion of the work.

### 3.02 INSTALLATION

- A. Install the VRC, 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 owner will provide a \_\_\_\_\_ pound test load and load the VRC at the ground level. The loaded VRC platform shall be conveyed to the upper 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 the 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 ANSI/ASME B20.1

**END OF SECTION**