

**ARCHITECTURE**

**SECTION 14550**

**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, manual controls, gates, and enclosures as shown on project drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 03300: Cast in place concrete. Provide recess in slab for pit.
- 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

Product Data: Submit latest edition of VRC data sheet and outline drawing with the proposal.

A. Shop Drawings:

- 1. Submit General Arrangement Drawing for approval, 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, including scope of work, operating and control voltages, lift speed, type of paint, and any special project notes.

B. 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. Vertical reciprocating conveyors (VRC) are covered by ANSI/ASME B20.1 Safety Code for Conveyors and Related Equipment (current edition), National Electric Code, OSHA codes, and State & Local Codes where applicable. Manufacturer to ensure elevator code (National and Local) compliance.

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- 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 date of building substantial completion with the following minimums:
1. Manufacturers components – one (1) year parts and labor.
  2. Purchased components – one (1) year parts, ninety (90) days labor.

### PART 2 – PRODUCTS

#### 2.01 MANUFACTURER: Provide VRC by one of the following manufacturers:

- A. Model FLHC manufactured by Autoquip Corporation, P.O.Box 1058, Guthrie, OK 73044  
Phone (888) 811-9876 fax 405-282-8105.
- B. Model RJS manufactured by Giant Lift Equipment Manufacturing Company, 185 Lafayette Road, North Hampton, NH 03862 Phone (800) 52-GIANT fax 603-964-9263.
- C. Series D VRC manufactured by Pflow Industries, Inc., 5045 N. 35<sup>th</sup> Street, Milwaukee, WI 53209 Phone (414) 462-8810 Fax (414) 462-2673.
- D. Delta 2200 manufactured by WilLift, a division of Wildeck, Inc., 405 Commercial Street, Waukesha, WI 53186 Phone 800-325-6939 fax 262-549-3466.
- E. Architect approved equal.

#### 2.02 VRC MECHANICAL SPECIFICATION

- A. Capacity: The VRC shall be rated at a live load capacity of 2,200 lbs. minimum.
- B. Speed: The VRC shall have a lifting speed of at least 15 feet per minute when loaded to capacity.
- C. Vertical Travel: The VRC shall have a maximum lift height of 6'-6" +/- (to be verified in field) with a total of 2 operating levels.
- D. Lift Platform: The VRC platform shall be a minimum of 48" inches wide x 48" inches long x 84" load height with a steel deck plate and minimum 42" high welded handrails and kickplates on non-operating ends and safety chains with snaphooks on operating ends.
- E. Support Columns: The VRC shall have a minimum of two (2) 6" wide flange support columns.
- F. Deflection Under Load: When loaded to rated capacity, no portion of the VRC shall exhibit permanent deformations.
- G. 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.

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### H. Lifting Means:

1. Raising and lowering of the carriage shall be provided by single or dual 2" 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.
- I. Safety Enclosure: Guarding on all non-operating sides of the VRC shall be by safety enclosures a minimum of 7' high consisting of material which will reject a ball 1/2" in diameter.
- J. 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 at both the upper and lower levels.
  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.
- K. Signs: "NO RIDER" signs shall be provided. Lettering shall be a minimum of 2" high in red letters on a yellow background for visibility. It is the Owners responsibility to maintain proper signage throughout the life of the equipment.
- 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.

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 to be selected by Architect from manufacturers standard color line.
- 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.

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**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 1500 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 ANSI/ASME B20.1.
- D. Maintenance: Maintenance safety checklist is to be supplied by a qualified installer at the time of completed installation.
- E. Training: Only trained personnel shall be permitted to operate the conveyor. Installer shall provide one, brief but comprehensive training session for the Owner and/or the owners representatives. It is the responsibility of the Owner to provide similar training to any potential operators of the equipment.

**END OF SECTION**