

SECTION 14 55 00
VERTICAL RECIPROCATING CONVEYOR

PART 1 GENERAL**1.01 DESCRIPTION**

- A. Design, fabrication, and installation of one (1) vertical reciprocating conveyor (VRC) including drive unit, controls and devices, gates and motorized gates, enclosures, pit, and bracing as shown on project drawings and as specified herein.
- B. Contractor shall provide all work and materials required for a complete and functional unit.

1.02 RELATED WORK

- A. Section 01 00 00, General Requirements
- B. Section 01 45 23, Testing Laboratory Services
- C. Section 02 41 00, Demolition.
- D. Section 03 30 00, Cast-in-Place Concrete.
- E. Section 26 05 11, Requirements for Electrical Installations
- F. Section 26 05 21, Low Voltage Electrical Power Conductors and Cables
- G. Section 26 05 26, Grounding and Bonding for Electrical Systems
- H. Section 26 05 33, Raceway and Boxes for Electrical Systems

1.03 APPLICABLE PUBLICATIONS

- A. The applicable publications from the organization listed below form a part of this specification. Installation shall meet the requirements of the latest editions published and adopted by the United States Department of Veterans Affairs on the date contract is signed.
- B. ANSI - American National Standards Institute (ANSI B20.1)
- C. AWS - American Welding Society
- D. NEMA - National Electrical Manufacturer's Association
- E. International Building Code (IBC)
- F. ASME - American Society of Mechanical Engineers
- G. IEEE - Institute of Electrical and Electronic Engineers
- H. UL - Underwriter's Laboratories

1.04 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 manufacturers must be done by welders Certified to AWS D.1.1.1.
- 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 code compliance.
- D. Approval by the Contracting Officer is required for products or services of proposed manufacturers, suppliers and installers and shall be contingent upon submission by Contractor of a certificate stating the following:
 - 1. Contractor (for installation) is currently and regularly engaged in the installation of VRC equipment as one of his principal products.
 - 2. Contractor shall have three years of successful experience, trained supervisory personnel, and facilities to install VRC equipment specified herein.
 - 3. The installers shall have the approval of the VRC manufacturer.
- E. Approval of VRC Contractor's equipment will be contingent upon their identifying a VRC maintenance service provider that shall render services within four hours of receipt of notification, together with certification that the quantity and quality of replacement parts stock is sufficient to warranty continued operation of the VRC installation.
- F. Approval will not be given to VRC contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record for unsatisfactory VRC installation, have failed to complete awarded contracts within the contract period, and does not have the requisite record of satisfactorily performing VRC installations of similar type and magnitude.
- G. The Contractor shall provide and install safety devices.
- H. Electrical work shall be performed by Licensed Electricians as requirements by NEC. Certificates shall be submitted for all workers employed in this capacity.
- I. Contractor shall take field measurements to verify and document existing conditions before producing shop drawings and ordering equipment. It is the contractor's responsibility to ensure that the VRC will properly fit within the space allotted.

J. Overall Standard: Structural engineering design documents stamped by a structural engineer registered to practice in New York State.

1.05 WARRANTY

- A. Submit all labor and materials furnished in connection with VRC system and installation to terms of "Warranty of Construction" articles of FAR clause 52.246-21. The One Year Warranty shall commence after final inspection, completion of performance test, and upon full acceptance of the installation and shall concur with the guarantee period of service.
- B. During warranty period if a device is not functioning properly or in accordance with specification requirements, or if in the opinion of the COR, excessive maintenance and attention must be employed to keep device operational, device shall be removed and a new device meeting all requirements shall be installed as part of work until satisfactory operation of installation is obtained. Period of warranty shall start a new for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

1.06 SUBMITTALS

- A. Submit in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Before execution of work, furnish information to evidence full compliance with contract requirements for proposed items. Such information shall include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, Data (size, capacity, and rating). All submitted drawings and related material shall be forwarded to the COR.
- C. Product Data:
 - 1. Submit latest edition of VRC data sheet and outline drawing(s).
 - 2. Submit VRC Specification, including operating and control voltages, lift speed, type of paint, and any special project notes.
- D. Shop Drawings:
 - 1. Submit complete scaled and dimensioned layout drawings, including plans, elevations, sections of the VRC, base plate and lateral load values, and pit dimensions.
- E. Structural Calculations:
 - 1. Submit complete structural design calculations stamped by NYS PE.
 - 2. Provide reactions as required for verification of pit and/or foundation design by a registered professional engineer.

3. VRC manufacturer should provide all concurrent load information on their submittal drawings for the responsible foundation designer.
- F. 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.
- G. Furnish certificates as required under: Paragraph "QUALITY ASSURANCE" above.

1.07 ADDITIONAL EQUIPMENT

- A. Additional equipment required to operate the specified equipment manufactured and supplied for this installation shall be furnished and installed by the contractor. The cost of the equipment shall be included in the base bid.
- B. Special equipment not required by specification, which would improve the operation, may be installed in conjunction with the specified equipment by the contractor at his option at no additional cost to the Government, provided prior approval is obtained from the COR.

PART 2 - PRODUCTS

2.1 MANUFACTURED PRODUCTS

- A. Materials, devices and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but meet technical specifications which can be established through reliable test reports or physical examination of representative samples will be considered.
- B. When two or more devices of the same class of materials or equipment are required these devices shall be products of one manufacturer.
- C. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit.
1. Individual components of assembled units shall be products of the same manufacturers.
 2. Parts which are alike shall be the product of a single manufacturer.
 3. Components shall be compatible with each other and with the total assembly for the intended service.

- D. Motor nameplates shall state manufacturers' name, rated horsepower, speed, volts, amperes and other characteristics required by NEMA Standards and shall be securely attached to the item of equipment in a conspicuous location.
- E. The VRC equipment, including controllers, and supervisory system shall be the product of manufacturers of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure a first class, safe and smooth operating system. Mixing of manufactures related to a single system or group of components shall be identified in the submittals.

2.2 VERTICAL RECIPROCATING CONVEYOR

A. Series F Mechanical Vertical Lift

Pflow Industries, Inc.

6720 N. Teutonia Ave, Milwaukee, WI 53209

Ph: (414) 352-9000 X322 Fax: (414) 352-9002 www.pflow.com

Contact: Fred Volkman fredv@pflow.com 518-361-0967

B. Or approved equal.

2.3 VRC MECHANICAL REQUIREMENTS

- A. Capacity: The VRC shall be rated at a live load capacity of 12,000 lbs.
- B. Speed: The VRC shall have a lifting speed of 18 to 30 feet per minute when loaded to capacity.
- C. Vertical Travel: The VRC shall have a maximum lift height of 125 inches (to be field verified and adjusted as required) with a total of 2 stops/operating levels.
- D. Load Configuration: The VRC shall be front and rear loading.
- E. Lift Platform: The VRC platform shall have a usable carriage of a minimum of 74 inches wide x 144 inches long x 96 inches load height with a steel smooth deck plate and 96 inch high sheet steel sides on non-operating ends and snap chain on operating ends.
- F. Support Columns: The VRC shall have a minimum of four (4) 6" wide support columns.
- G. Mounting: The VRC shall be pit mounted.
- H. Deflection Under Load: When loaded to rated capacity, no portion of the VRC shall exhibit permanent deformations.
- I. Lifting Means: Raising and lowering of the carriage shall be provided by a chain (heavy-duty) over sprocket with common drive

shaft connected to an efficient helical gear reducer assembly. The lifting chains shall be in a guidance assembly.

- J. Safety Cams: Safety cams shall be mounted on the platform and connected directly to the lifting chains. The cams shall prevent the platform from falling more than 6" if tension is lost in the chains.
- 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.
- L. Floor Level Gates: Gates are required on all operating sides of the VRC at each level of operation.
 - 1. The gates shall be motorized vertical acting gates. Gates shall be bi-vertical where required for clearances.
 - 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.
- M. Signs: "NO RIDER" signs shall be provided. Lettering shall be a minimum of 2" high for visibility.

2.4 VRC ELECTRICAL REQUIREMENTS

- A. Electric Motor:
 - 1. Motor horsepower shall be sized for the rated live load and specified speed.
 - 2. All motors are three phase (208V) and shall be designed for continuous duty at ambient temperatures from 32° to 120° Fahrenheit.
 - 3. The motor shall not automatically restart when the overload device is reset.
 - 4. The motor shall be equipped with a heavy-duty, fast-acting, fail-safe industrial brake to ensure the brake will hold in case of power failure.
- B. Controls:
 - 1. Each operating floor level shall be equipped with a momentary contact push button control station (NEMA 12 rated) with call, send, and mushroom style E-stop operators for manual control of lift operation.
 - 2. An internally pre-wired, NEMA 12 rated main control panel shall be provided with step-down transformer, reversing motor starter, overload relay, instantaneous current sensing jam relay, inrush

bypass timer, field wiring terminal block, and positive acting brake contacts. Main control panel shall include diagnostic lights on door to assist in troubleshooting.

3. Travel Limit Switch: The VRC shall be equipped with a floor level, upper level, and over travel limit switch to control positioning of the VRC platform.
4. Chain Tension Safety Device: Monitors each chain and shuts off motor while engaging brake in the event of a slack, taut, or broken chain.
- C. Power Source: Owner shall terminate high voltage operating power within 10' of the location designated for installation of the VRC.

2.5 FINISHES

- A. All carbon steel surfaces shall be coated with an industrial enamel finish over primer:
 1. Carriage and main structural components: Color - Blue
 2. Non-access side enclosures and gates on access sides at each level: Color - Safety Yellow
- 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 PREPARATION

- 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 COR in writing of conditions detrimental to the proper and timely completion of the work.
- B. Before fabrication, take necessary job site measurements, and verify where work is governed by other trades. Check measurement of space for equipment, and means of access for installation and operation. Obtain dimensions from site for preparation of shop drawings.
- C. Ensure the following preparatory work, provided under other sections of the specification has been provided. If the VRC Contractor requires changes in size or location to accomplish their work, he must make arrangements, subject to approval of the Contracting Officer and include additional cost in their bid. Where applicable, locate controller near and visible to its respective VRC unit.
- D. Work required prior to the completion of the lift installation:
 1. Demolition and infill (openings).
 2. Piping, conduit, raceway, and equipment relocation.

3. Relocation of the Shaft 3 door.
 4. Loading dock modifications.
 5. Determine bracing locations for operating dynamic loads.
 6. Verification of pit and/or foundation design.
 7. Any other items indicate on the drawings.
- E. Supply of electric feeder wires to the VRC as required, including circuit breaker.
- F. Furnish electric power for testing and adjusting VRC equipment.

3.02 SPACE CONDITIONS

- A. Provide adequate clearances for pedestrian access at the outside of VRC at the subbasement level. Provide at least 3-foot clearance between stairs and VRC equipment. Notify COR if any clearance issues exist.

3.03 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.
- C. Finished work shall be straight, level and plumb, with true, smooth surfaces and lines. All machinery and equipment shall be protected against dirt, water, and mechanical injury. At final completion all work shall be thoroughly cleaned and delivered in perfect unblemished condition.
- D. Exposed gears, sprockets, and sheaves shall be guarded from accidental contact in accordance with ASME A17.1 Section 2.10.

3.04 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 12,000 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.
4. Full-Load Run Test: VRC shall be tested for a period of one hour continuous run with full contract load. The test run shall consist of the lift stopping at all floors, in either direction of travel, for not less than five or more than ten seconds per floor.
5. Safety Devices Tests: Test all safety devices for proper functionality.
6. Overload Devices: Test all overload current protection devices in the system.

3.05 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. Clean equipment.

3.6 INSTRUCTION OF VA PERSONNEL

- A. Provide competent instruction to VA personnel regarding the operation of equipment and accessories installed under this contract, for a period equal to one eight hour day. Instruction shall commence after completion of all work and at the time and place directed by the COR.

- B. In addition to oral instruction, written instructions in triplicate relative to VRC, adjustments and operation of all equipment and accessories shall be furnished and delivered to the COR in independently bound folders. DVD recordings will also be acceptable. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electrical apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts list with descriptive literature, and identification and diagrammatic cuts of equipment and parts. Information shall also include electrical operation characteristics of all circuits, fields, relays, timers, regulators and electronic devices, as well as R.P.M. values and related characteristics for all rotating equipment.
- C. Provide supplementary instruction for any new equipment that may become necessary because of changes, modifications or replacement of equipment or operation under requirements of paragraph entitled "Warranty ".

END OF SECTION