



KELLY SYSTEMS AUTOVAC PNEUMATIC TUBE SYSTEM

Division 14 - Conveying Systems
Pneumatic Tube Systems - Section 14580

PART 1 - GENERAL

1.1 SUMMARY

- A. This section of the specification includes the design, furnishing and installation of a complete Autovac Pneumatic Tube System(s) as specified herein and shown on the drawings including supervision of field wiring associated with the work of this section.
- B. The System(s) specified herein shall be complete and shall not require any additional support equipment or utilities other than electrical.
- C. All work of this section shall be performed in accordance with the contract documents.

1.2 SYSTEM DESCRIPTION

- A. The Autovac Pneumatic Tube System(s) shall be 2.25", 3", 4", 6", 8" and 4"x 7" oval (as required). Single tube vacuum/pressure as manufactured by Kelly Systems, Inc. with dedicated service between designated stations. Stations shall be located in the following areas as shown on the drawings with service as follows:
- B. Carrier transmission is accomplished by central power unit(s) which switch between vacuum and pressure modes. All central power units shall be free-standing pedestal type which can be located remote from station terminals, or installed integral with station terminals as called for herein.
- C. The System(s) are designed for operation only while carriers are in transit between stations, controlled by a time cycle based on the length of carrier travel between stations. The Systems are designed to transport one carrier per operating cycle at an average speed of 25 feet per second.
- D. Send/receive terminals shall remain closed and latched at all times. Carriers may be sent only when station "in use" signals are inactive. To dispatch a carrier from a sub station, depress the pushbutton, open the station door, place a carrier in the tubeline. Vacuum will then propel the carrier to the power station and will then automatically time off. To dispatch a carrier from the power station, place a carrier up in the carrier retainer unit and depress the pushbutton. There shall be an individual pushbutton for each sub station in a circuit. The blower will dispatch a carrier to the sub station and will then automatically time off.

E. All station terminals shall be recessed down delivery full-access type, complete with wall flange, reinforced acrylic door, door lock and recessed pushbuttons and indicator lights. If called for herein, station terminals can be wall mounted, but must maintain a clean appearance throughout.

F. The Systems shall be fully expandable with the addition of either or both diverters and tandem send/receive terminals without the need to modify or replace existing equipment.

1.3 MATERIALS AND INSTALLATION

A. Tubing and bends shall be heavy-duty, chemically washed 1.4", 2.25", 3", 4", 6", 8" and 4"x 7" oval (as required) 16 gauge electric resistance welded galvanized steel, manufactured to ASTM-A787 Standard, flash controlled to .010 maximum, and shall be specially manufactured for pneumatic carrier transmission. The System Contractor shall furnish to the owner a certificate stating that the tubing has been manufactured in accordance with the above standards.

ALTERNATE: Tubing and bends shall be heavy-duty, chemically washed 1.4", 2.25", 3", 4", 6", 8" and 4"x 7" oval (as required) 16 gauge continuous welded aluminum, manufactured to ASTM-B313 and ANSI H35.1 standards, H-26 tempered for maximum resistance to oxidation and corrosion, and shall be specially manufactured for pneumatic carrier transmission. The System Contractor shall furnish to the owner a certificate stating that the tubing has been manufactured in accordance with the above standards.

B. Each full straight length of tubing shall have one expanded end for pressure-fit joints. Lines shall be securely held in place, and shall be braced against any motion caused by the passage of carriers. Bends shall be formed on the centerline to a 48" radius commensurate with carrier type and shall be of a true circular cross section throughout, free from wrinkles or distortions.

C. Field cut tubing and bends shall be joined with galvanized electric welded steel pressure fit couplings of proper dimensions to produce an air tight connection. When bends are cut in the field for offsets and small angle turns, the ends shall be cut square and straightened out by mandrilling to make a good connection to the adjoining piece. All indoor joints shall be completely free of external hardware.

D. All indoor joints shall be sealed with a high strength, medium viscosity aluminum colored, synthetic rubber based industrial metal sealant to insure airtight connections throughout. All outside joints shall be made with an A6354C two-piece flanged joint coupling. Each end of the tubing to be joined shall be flared and a rubber "O" ring shall be placed on each end of the tube between the flange and the flare to allow for expansion and contraction. The flange shall be bolted with a minimum of (5) 1/4" x 2-1/4" bolts.

E. Fittings shall be fabricated steel with the inside milled to fit snugly on the tubing. Provide necessary elbows, tees, coupling sleeves, and other fittings required for proper installation of the system.

F. Materials furnished shall be free of static electricity. For security, health and safety reasons, absolutely no PVC materials shall be used, except for underground or buried portions of the system.

G. Tubing and bends shall be installed and secured with zinc plated clamps constructed of 1" x 1/8" cold rolled flat bar steel held together by (2) 3/8" diameter threaded, zinc plated hanger rods. Clamps shall be spaced on not greater than 12-1/2 foot centers, and shall not have scoring or break joints to weaken their cross sectional area. Clamps shall be two-piece, each formed in a semicircular shape to fit snugly above and below the tubing respectively. Each piece shall make firm contact with the outside wall of the tubing.

1.4 STATION TERMINALS

A. All station terminals shall be send/receive type constructed of heavy-duty 12 gauge furniture steel with a beige wear resistant powder coat protective finish. The dimensions shall allow for the use of at least three (3) carriers. A Burtek 328F sling shall be built into each terminal to cushion the carrier's delivery.

B. The doors shall be impact resistant of transparent acrylic material and shall be 1/4" thick minimum. The transparent doors shall visually indicate the arrival of incoming carriers. All doors shall be equipped with a heavy-duty chrome plated steel frame, positive cam action pull-tight latch, and spring loaded hinge.

C. All station terminals shall be specifically designed and manufactured for recessed in-wall mounting. Heavy gauge steel wall flanges shall be welded to the top, bottom and sides of the terminals and shall be spaced back from the leading edge of the terminals an appropriate distance to insure that the face of the terminals are flush mounted with the finished wall. Shadow boxing or enlarged wall openings extending beyond the outer edges of the terminals are prohibited.

ALTERNATE: Station terminals shall be specifically designed and manufactured for surface mounting on the face of walls or on desks or similar counter-top arrangements, and shall be free of sharp edges.

D. Air diodes shall be provided at each station terminal location to insure an air-cushioned soft delivery of carriers. The air diodes shall be designed to open when sending a carrier to allow for free flow of air, and close when receiving a carrier to block air flow.

E. All station terminals shall be provided with low voltage Class 2 control wiring meeting NEC Article 725 standards. 24 volt "Send" and "In-Use" illuminated pushbuttons shall be provided which are depressed to send a carrier, and which illuminate whenever a carrier is in transit. An optional second illuminated push button shall also be provided at owner's request, at each station terminal that shall illuminate to indicate the arrival of a carrier. When the button is depressed, the light will extinguish. All pushbuttons shall be recessed mounted in the face of the station terminals and shall be fully accessible for ease of maintenance.

1.5 CENTRAL POWER UNIT

A. All central power units shall be free standing pedestal type which can be located remote from station terminals or installed integral with station terminals. The central power units shall be constructed of heavy-duty furniture steel with the same finish as the station terminals. The central power units shall be lined with acoustical material for sound absorption and shall contain one blower pack, air shifting mechanism and control panel. Central power units shall be full access type having two (2) secured removable access panels that provide access to the top and front of the units.

B. One blower pack shall be contained in the control power units and shall operate on 120 volt AC 60 Hz single phase power for increased efficiency and economy and shall consist of a maximum of two (2) blowers that will operate simultaneously (in the same mode) when the system is in operation. Blowers shall be in the off mode except when System is in use. Blower packs shall be capable of providing the specified carrier speed under loaded conditions. Blower packs shall have a heavy-duty, air-tight, double chamber, steel enclosure and be provided with a secured removable access panel. Blower packs shall be fully enclosed within the central power units complete with vibration isolators. The blowers within the blower packs shall always run in the same direction and never reverse.

C. The air shifting mechanisms shall consist of a heavy gauge cast aluminum 4-port valve complete with diode gate and rotary motor. Air shifting mechanisms shall alternate between two (2) positions to allow for vacuum or pressure throughout the system, as appropriate, to propel the carrier to its proper destination. When the diode gate is in position 1, the system will operate on pressure and when in position 2, the system will operate on vacuum, without reversing the direction of the blowers. The air shifting mechanisms shall be electrically controlled via the station terminal push buttons, and shall automatically adjust to the proper position.

D. The control panel shall consist of appropriate plug-in type modular relays, timers, etc. mounted on an enclosed printed circuit board for ease of maintenance. The plug-in relays and timers shall be capable of individual removal and replacement, without the need to replace an entire printed circuit board or substrate. The timer shall be adjustable to allow for appropriate timing cycles.

1.6 DIVERTERS

A. All required system diverters shall be one in, four (4) outlet type, wired to 120 volt single phase power. All diverters shall be housed in a heavy-duty enclosure, and be motor driven, airless operated units. The diverters shall be provided with full length secured access panels for ease of maintenance. Electrical relays contained in the diverter units shall be modular plug-in type for ease of maintenance. Tubing within the diverters shall be rigid throughout with no flexible portions.

B. Each diverter shall be provided with integral mounting flanges with appropriate holes to properly accept 3/8" diameter threaded, zinc plated hanger rods, for direct support and

security. Trapeze type hanging arrangements shall not be allowed unless the diverter is directly bolted to the trapeze.

1.7 CARRIERS

A. Provide a minimum of three (3) carriers per station terminal. Carriers shall be bi-directional and shall be available in multiple inside lengths ranging from 8" to 14". Carriers shall have expanded glider sections on each end with protective ribs to protect the gliders.

1.8 SUBMITTALS

A. Submit complete shop drawings for the design of the system. Include complete data on the equipment including physical dimensions, location of all components of the system and their relationship to all architectural, structural, security equipment, mechanical, electrical, fireproofing, fire protection, piping or other components adjacent to the proposed system location, performance capabilities and limitations, and schedules indicating locations when more than one type of an item is to be used. Indicate all bends, radii, clearances and other conditions that might interfere with the work of other trades or require special coordination by the General Contractor. Show how all components of the terminals are to be recessed from view.

B. Submit manufacturer's product data and installation instructions for each component of the system. Highlight specific areas in the product literature that demonstrate conformance of the proposed products with the System Description.

C. Submit operation and maintenance manual data for the entire system.
(6) sets of instruction manuals shall be furnished to the owner's representative with each set to include the following:

1. Manufacturer's Parts List identified with the make, model and serial number of the equipment furnished.
2. Control and wiring diagrams.
3. Installation, operation, and maintenance instructions.
4. Manufacturer's recommended spare parts list.

1.9 QUALITY ASSURANCE

A. Provide products of a single manufacturer for the entire installation. Modifications of the tube systems shall be accomplished with Kelly Systems' standards and the approved modification procedures.

B. Manufacturer and installer shall have been engaged in the production and installation of similar type and size systems for at least ten (10) years with at least five (5)

installations of the same equipment specified, in correctional institutions. Submit a list of projects assuring this qualification with bid.

C. System Contractor shall regularly and presently manufacture and install pneumatic tube systems as its principal business.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials to the job site in original, new and unopened packages bearing the manufacturer's name, label, product number, etc.

1.11 WARRANTY

A. Provide a written warranty, signed by the manufacturer, agreeing to repair or replace all work that exhibits defects in material or workmanship. Normal wear and tear are excluded.

1.12 EXAMINATION

A. Prior to the installation of system components, inspect conditions at the site to assure that installation may proceed without interference of the work of other trades. Bring any conflicts to the attention of the General Contractor for resolution. Beginning of installation implies acceptance of conditions.

1.13 CLEANING AND ADJUSTING

A. Remove all installation debris from the site. Clean all surfaces to be finished by others. Touch up all primers and finishes that have become scratched or blemished during installation.

B. Adjust pneumatic tube system to assure smooth operation.

1.14 ELECTRICAL

A. Electrical equipment specified herein shall be provided complete with motors, control panels, pushbuttons, and 24 v.a.c. interstation wiring. Plug-in type modular components shall be supplied with printed circuit boards for easy replacement.

B. Electrical power supply to the central power units and diverters shall be 115 v.a.c. with 20 amp dedicated service and will be supplied by others. 24 volt interstation wiring of the system shall also be performed by others in compliance with the local governing electric code.

1.15 STRUCTURAL WORK

A. Alterations to building components, machinery and equipment, cutting and repair of floors, walls, ceiling and roof openings, access panels, and the removal and replacement of the ceiling shall be provided by others.

1.16 AS-BUILT DRAWINGS

A. A record shall be kept of all deviations in location or elevation of any concealed installations from that shown on the contract drawings. Records shall also be kept of any significant changes in installations from approved shop drawings or contract drawings. Records shall consist of marked shop, or contract drawings and shall be submitted to the owner's representative at any time upon request during or after completion of construction. No such deviation from the contract drawings or approved shop drawings shall be made without prior approval by the owner's representative.

1.17 TESTING, INSTRUCTION, TRAINING

A. The system shall be operated at a maximum design capacity for the duration of time as needed and repeated as necessary to prove to the owner's representative that the system meets design conditions and is acceptable for full operation. Allow four hours for on-site training and demonstration.