

## SECTION 14700 - PNEUMATIC TUBE SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. General provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Drawings, apply to this Section.

#### 1.2 SUMMARY

- A. Work included:

1. Furnish and install a new Pneumatic Tube System (PTS) as indicated on the Drawings, and as scheduled in this Section, complete with all required Work.
2. All general contract work.
3. All electrical wiring and connections.
4. All coordination with related Work and Contractors.

- B. Related Work specified elsewhere:

1. Section 01045: Cutting and Patching.
2. Section 02070: Selective Demolition:
3. Section 03310: Concrete.
4. Section 09250: Gypsum Drywall.
5. Section 09511: Acoustical Ceilings:
6. Section 09900: Painting.
7. Mechanical: Division 15.
8. Electrical: Division 16.

#### 1.3 SYSTEM DESCRIPTION

- A. The Pneumatic Tube System (PTS) Contractor shall design, furnish and install all components required to provide a new tube system with associated stations to the new hospital at locations indicated on the drawings, through the routing indicated on the vendor provided drawings. It is anticipated that the system will be comprised of six (6) stations, with a blower provided as recommended by the vendor, per station or by zone. These stations will be a combination of surface mounted units (3), and recessed units (3)
- B. The PTS system should be designed to be expandable to the north end on the building by up to 20 stations in phase 2 of the hospital construction.
  1. PTS Contractor will provide all system, mechanical and electrical drawings.

- C. PTS includes new components to provide new zones and tube stations, each connected to the system zones through transfer units. The PTS Contractor shall verify that the addition of the new stations/zones in the future will require add on equipment only with the need to replace existing equipment only if it is non-functional and cannot be repaired.
- D. Provide a maximum capacity of (6) six stations in this phase. Future additions will require add-on equipment only.
- E. Modular construction of the system components shall permit changes and addition to stations as Owner requirements change.

#### 1.4 SUBMITTALS

- A. The Pneumatic Tube System Contractor shall submit to the Architect and Construction Manager through the General Contractor, Shop Drawings which include:
  - 1. Manufacturer's specification data sheets, properly edited, representing all standard and specially fabricated equipment and components specific to this Project.
  - 2. Drawings showing the routing of all tubes; the control center, the locations of all stations, transfer units, blowers; the space required for all tubing, switches, valves and blowers, transfer units; the location, capacity, horsepower and space requirements of all blower units, the location of floor slab openings, a riser diagram of tube routing and electrical diagram; all of the above fully coordinated with general construction, mechanical work, electrical work and the work of all other applicable trades.
  - 3. Complete description of the operational performance of the proposed system.
  - 4. A letter from the manufacturer stating that they have visited the site, reviewed the Drawings and Specifications, and that all proposed materials and procedures are compatible with that of the surrounding construction.
- B. Following installation and preceding final acceptance, furnish Owner complete maintenance manuals containing Record Drawings of equipment with wiring diagrams, parts lists, operating and maintenance instructions, addresses and telephone numbers where 24-hour service is available, and recommended type and quantities of parts on hand, as specified in Division 1.
- C. Submit signed copies of warranty documents.
- D. Submit sample policies and procedures documents to the Owner for review and assist the Owner in developing their policies and procedures for safe and efficient use of the system.

#### 1.5 QUALITY ASSURANCE

- A. Installation of the PTS shall be performed by manufacturer or his authorized representative under direct supervision of the manufacturer.
- B. The PTS Contractor shall regularly and currently manufacture the PTS materials required for the system.

- C. All Work shall conform to the National Electric Code and National Electrical Manufacturers Association and all codes.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. The PTS Contractor shall deliver and store materials to prevent damage.
  - 1. Coordinate storage with the Construction Manager.

#### 1.7 PROJECT CONDITIONS

- A. All designs, clearances, construction, workmanship, and materials shall conform to all applicable codes.
- B. PTS Contractor shall Obtain and pay for necessary local inspections and permits, if any. Make such tests as required in the presence of governing authorities, Owner, Architect and Construction Manager.
- C. Schedule and coordinate the work of this Section with the Construction Manager and work of all other trades involved. Verify delivery and installation of all equipment with approved schedule for the Project. Furnish and install all required items for a complete installation, so as to cause no delay in the work of the Project.
- D. Prior to commencing installation, carefully inspect the installed work of other trades and verify that all such work is complete to the extent that pneumatic tube system work may commence.
- E. In the event that a discrepancy or incompleteness in the work of other trades becomes apparent, notify the Construction Manager. Do not proceed or continue pneumatic tube system work until such discrepancies have been fully resolved and corrected.

#### 1.8 WARRANTY

- A. Provide a full two year warranty and routine maintenance after acceptance by the Owner. Warranty period will begin on the date the facility opens for patient visits.
- B. Provide alternate pricing for extended warranty and routine maintenance for years three to five of system operation.

#### 1.9 MAINTENANCE

- A. Provide a start up and testing program with the Owner's personnel, at the Owner's convenience, to be scheduled within thirty (30) days after Substantial Completion of the system.
- B. Provide on-site training with the Owner's personnel, for as long as may be required.

- C. Provide one week of factory training for two persons, at the PTS Contractor's facility, at the Owner's option.
- D. Provide all maintenance manuals, instructions and as-built drawings, as required.
- E. The system manufacturer shall provide the number of sets of operating and maintenance manuals specified in Division 1. Manuals shall include:
  - 1. System components and part descriptions.
  - 2. Starting and stopping procedures.
  - 3. General operating instructions.
  - 4. Specific maintenance and troubleshooting instructions.
  - 5. Recommended service schedule for adjustment, lubrication and inspection.
  - 6. Recommended spare parts inventory.
  - 7. The system manufacturer shall provide disks of as-built drawings suitable for AutoCAD for instruction and future reference by the Owner.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with owner requirements, provide systems by the following:
  - 1. Swiss Log/Translogic Corporation.
  - 2. Pevco.

### 2.2 LINE MATERIAL

- A. Tubing and bends shall be cold-rolled steel, electric welded with flash removed, hot-dip galvanized to ASTM specifications A525-77 light commercial. Transmission tubing and bends will be 6" outside diameter, 16 gauge steel. Air supply tubing will be sized as required for proper system operation. Bends shall be nominal 50" centerline radius.
- B. Tubing joints shall have bell and chamfer ends and shall be airtight.
- C. Tubing hangers shall be galvanized clamps with zinc plated threaded rods to be attached to structure with suitable anchors. Horizontal tubing shall be supported on not more than 10 foot centers; vertical tubing shall be supported at each floor. Each diverter and each bend shall be supported at each end and sway braced at the centers. Structural channel, angle iron or preformed channel may be used to support groups of tubing close together and parallel.
- D. Each transfer unit shall be supported by independent hangers and sway braced.

- E. Hangers shall be plated, threaded rod screwed into the appropriate device attached to the building structure. Tube clamps fastened to the rod shall support the tubing. Clamps shall hold the tubing firmly in position without deforming the tube.
- F. Joints shall be sealed with sleeves cemented in place to give a rigid, airtight connection.
- G. Stations and other components shall be joined to the tubing with bolted couplings which can be slipped aside to facilitate equipment maintenance. The joints shall be wrapped with aluminum tape before installing the couplings.
- H. Line material:
  - 1. Tubing shall be 6 inch outside diameter, 16 gauge, cold rolled, electric welded steel, flash removed, degreased and hot dip galvanized.
  - 2. Bends shall be formed of same material on a center line radius of not less than 48 inches. The cross section shall be free from wrinkles and distortions. No expanded bends shall be allowed in the System.
  - 3. All cut ends shall be square, deburred and mandreled round.
  - 4. Solid steel slip sleeves or split steel gasketed bolted sleeves shall be used for tubing joints. Split sleeves shall be used at all connections of serviceable equipment. All sleeves shall be of the same gage as the tubing.
  - 5. Slip joints shall be sealed with a suitable airtight compound.
  - 6. Tubing shall be supported with suitable hangers and supports as follows:
    - a. Minimum every ten (10) feet of straight tubing,
    - b. At every floor of vertical runs,
    - c. At each end of each bend,
    - d. At equipment connections, and
    - e. At the center of the bend radius with sway bracing.
  - 7. Hangers shall be pre-threaded, zinc plated rod attached to the building structure. Tube clamps or channels fastened to the rod shall support the tubing.

### 2.3 TRANSFER UNITS

- A. Transfer units enable a transmission tube connection from one tube to any one of several tubes, providing the tubing network for routing carriers between stations.
- B. Transfer units shall be installed with split sleeves and sway braced against motion.
- C. Transfer units shall be located to allow for complete and clear access to service mechanical and electrical components.
- D. The offset through the transfer unit shall be gradual using a curved tube section.
- E. All transfer units component position sensing and carrier sensing shall be by non-contact sensors.

- F. All visible metal surfaces shall be factory painted with an electrostatically applied, baked-on, powder coat epoxy.
- G. Transfer units shall be provided as required in 1 to 2 ports, 1 to 4 ports and 1 to 6 ports.

## 2.4 BLOWER PACKAGES

- A. Blower units shall be modular factory assembled complete with integral vibration isolators, screen cleanout boxes and air shifting valves as required.
- B. Blowers shall be located to allow complete and clear access to service mechanical and electrical components.
- C. Zone blower packages:
  - 1. One zone blower package shall be provided per zone.
  - 2. Zone blowers shall be the regenerative type.
  - 3. Zone blower packages shall be designed to be mounted above ceilings or on floors.
  - 4. Zone blower packages located above ceilings where the sound level three feet below the ceiling must be less than 65 dB(A) shall be sound deadened with sound insulation and intake and exhaust mufflers.
  - 5. Zone blowers shall be sized to provide vacuum and pressure in the tubing network to maintain nominal carrier speed of 25 feet per second.
  - 6. For energy conservation blowers shall automatically shut down during low use periods.
  - 7. Air tubing shall be 6 inch outside diameter of the same material as transmission tubing. Air tubing shall be of the same material as transmission tubing. Tubing shall be complete with all necessary tees, elbows and fittings.
  - 8. All component position sensing shall be by non-contact switches.
  - 9. All visible metal surfaces shall be factory painted with an electrostatically applied, baked-on, powder coat epoxy.

## 2.5 STATION EQUIPMENT

- A. Terminals shall consist of a self-supporting cabinet, with all required operating assemblies, designed for ready installation, access and removal for maintenance and service. The operating assemblies shall be interchangeable, so that the terminal may be kept in operation while assemblies are serviced.
- B. All the station controls shall be solid state plug-in units for fast replacement. They shall be interchangeable with the control units for the transfer units and blowers.
- C. A carrier accepted for dispatch in the dispatch unit shall not interfere with a carrier arrival at the station.

- D. All visible metal surfaces shall be factory painted with polyurethane coating material to produce a low gloss finish. Bright metal finish parts shall be stainless steel, brushed aluminum or chrome plated.
- E. The carrier storage shall be integral with the station and provide for the storage of not less than 4 carriers.
- F. The carrier receiving compartment shall be accessible through an opening in the front of the station and shall hold a minimum of 5 incoming carriers before overload results.
- G. Receiver overload shall shut down station's dispatcher and receiver. A message shall indicate overload. Condition shall automatically reset upon carrier removal from receiver.
- H. A trim frame shall be used for final mating to the wall.
- I. Station control panel shall contain:
  - 1. Membrane keypad - for destination and special function selection.
  - 2. Liquid crystal display with 48 characters - for message display.
  - 3. Send/enter key - to activate dispatch after destination selection or enter data for special functions.
  - 4. Cancel/clear key - to allow for transaction cancellation or clearing of display during special function activation.
  - 5. Special function key - to request special features.
  - 6. Directory - listing station addresses.
  - 7. Instruction compartment - for operating and special function instructions.
- J. Discrete rejection messages shall be provided for:
  - 1. Dispatching station off.
  - 2. Dispatching station not in service.
  - 3. Receiving station full.
  - 4. Receiving station does not exist.
  - 5. Receiving station off.
  - 6. Receiving station not in service.
  - 7. Selection not permitted.
- K. Messages will be displayed for the following conditions:
  - 1. Incoming carriers at the receiving station.
  - 2. To return surplus carriers when the receiving station has a specified surplus over its assigned number of carriers.
  - 3. To empty a station receiver when it is full.
  - 4. Receiving station not receiving - traffic forwarded to another station.
- L. The following special functions shall be selectable from each station:
  - 1. Transaction tracking.

2. Secured transaction.
3. Emergency shutdown.
4. Stat priority.
5. Alternate destination.
6. Incoming carrier query.
7. Station on/off.
8. Carrier inventory adjustment.
9. Station diagnostics.

M. Stations shall have a send and/or receive priority in accordance with a schedule to be provided by the Owner prior to completion of installation. Program shall be capable of ready re-assignment to comply with Owner's needs.

## 2.6 CARRIER ARRIVAL INDICATOR (ANNUNCIATOR)

- A. Provide carrier arrival indicators with piezoelectric horns, visual indicator panel and reset switch, housed in a 4-1/2" x 4-1/2" x 2-1/8" steel cabinet.
- B. Unit Functions:
  1. Sounds audible alarm and visual indicator when a carrier arrives at the station which is designated for that room.
  2. Alarm tone and light sound and light continuously if the station becomes overloaded.
  3. Indicator and alarm can be read with a pushbutton.
  4. Audible tone automatically ceases after a preset interval.

## 2.7 CARRIERS

- A. Provide six (6) clear molded plastic carriers per station with the following characteristics:
  1. Full access side opening and self-latching upon closure.
  2. Inside Dimensions: 4-1/2 inch I.D. by 8-1/2 inch I.L.
  3. Bi-directional.
  4. Replaceable wear bands and latches.
  5. Capable of carrying: Specimens, medications, x-ray film, 1,000 ml IV bags filled up to 1100 cc's.
  6. Clear inside dimensions: 4-1/2 inch diameter by 8-1/2 inch length, tapering to 2 inches square at each end.
  7. Foam inserts as recommended for the safe transport of specimens, medications, etc.

## 2.8 LOW VOLTAGE CONTROL CABLE

- A. Cable for System low voltage controls shall be plenum rated with minimum 18 gauge conductors. Cable shall be strapped to the transmission tubing at minimum 10-foot intervals.



- B. Cable for low voltage System controls shall be minimum 18 gauge conductors and installed in conduit.

## 2.9 CONTROL CENTER

- A. A new Pneumatic Control Center shall be provided at a location within the new hospital to be determined by the owner.
- B. Computer shall monitor all system functions, control all movements of carriers, and store various operating data.
- C. The computer circuits shall be modular and shall use solid state components throughout. Each circuit module shall be readily removable for ease of maintenance.
- D. The control center shall retain memory for up to 10 hours without power.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Prior to any work beginning, a preconstruction conference will be held with the Architect/ Engineer, Construction Manager and Owner.

### 3.2 INSTALLATION AND CLEANING

- A. Assemble and install pneumatic tube systems and components in strict accordance with Architect's Drawings, Specification, applicable codes and regulations, the approved Shop Drawings and manufacturer's recommendations.
- B. Anchor and fasten system and components to building construction as required for a stable, secure installation. Closely fit and join all parts of the tube systems and finished components exposed to view so as to provide a neat, uniform appearance. Make final adjustments to system and components prior to acceptance.
- C. Manage installation operations in an orderly manner and maintain clean conditions by removing crating, cartons and packing debris. Refer to Division 1 for additional cleaning requirements.
- D. Remove protective coatings and clean finished surfaces to remove markings and fingerprints, leaving equipment and adjacent surfaces clean.

### 3.3 CLOSEOUT

- A. Instruct Owner's personnel as specified herein.

- B. Submit instruction manuals and record drawings to Architect.
- C. Submit signed copy of warranty to Architect.

### 3.4 FIELD QUALITY CONTROL

- A. Prior to a formal system performance test, Contractor shall perform preliminary tests, verifying all components are in full operational condition for carrier dispatch and receive between all possible station combinations.
- B. The Contractor shall provide written notification to the Architect/Engineer thirty (30) days in advance of the scheduled system performance test. Contractor shall provide all personnel, equipment and instruments required for such examination.
- C. In the presence of the Architect/Engineer and Owner, the Contractor shall perform all operational tests, inspecting system components and verifying equipment is installed and operating in proper condition, according to the intent of the contract.
- D. The Owner's representative shall sign a written statement indicating that the system has been turned over and accepted by the Owner.
- E. The system manufacturer shall provide all necessary instruction in the use, operation and maintenance of the system to personnel designated by the Owner.
- F. The system manufacturer shall provide the number of sets of operating and maintenance manuals specified in Division 1. Manuals shall include:
  - 1. System components and part descriptions.
  - 2. Starting and stopping procedures.
  - 3. General operating instructions.
  - 4. Specific maintenance and troubleshooting instructions.
  - 5. Recommended service schedule for adjustment, lubrication and inspection.
  - 6. Recommended spare parts inventory.

### 3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensures that the relocated Pneumatic Tube System (PTS) stations are without damage or deterioration at time of Substantial Completion of the system.

END OF SECTION 14700