

**SECTION 14 92 00**  
**PNEUMATIC TUBE**

**PART 1 - GENERAL**

**1.1. RELATED DOCUMENTS:**

- A. Drawings and general provisions of the contract including general and supplementary conditions of Division 1 of the Specification sections apply to the work of this section.

**1.2. DESCRIPTION OF WORK:**

- A. Furnish all engineering, materials and labor for the addition to the existing Swisslog computer controlled pneumatic tube distribution system, hereinafter referred to as the "System". The System shall be manufactured and installed by TransLogic Corporation hereinafter referred to as the "Contractor". Contact Mike Donnelly at 949-249-4928.
- B. All work shall be completed in a workmanlike manner, complete in all respects, including all items specified herein and as may be necessary for the satisfactory installation and operation of the specified system.
- C. The types and locations of the stations in this specification shall be as indicated on the drawings and shall be in strict accordance with the standards established by the Contractor.
- D. The Contractor shall work with the General Contractor and all trades to ensure coordination for System right-of-way.

**1.3. QUALITY ASSURANCE:**

- A. The Contractor shall regularly and presently manufacture, install and warrant the computer controlled material distribution equipment as specified herein as one of their principle products. The equipment furnished shall be the product of the Contractor and shall be installed by skilled mechanics under direct employment and supervision of the Contractor. No third party substitutions shall be involved in design, layout, installation, warranty efforts or service offerings. The Contractor shall have a quality assurance program in place, demonstrable to the Owner.
- B. The Contractor shall be totally responsible for the manufacture, installation and guarantee of the specified System.

- C. The Contractor shall maintain a training facility that shall include the specified equipment installed and operational for comprehensive hands-on maintenance instruction of Owner maintenance personnel. The training facility shall be separate from the Contractor's manufacturing or development areas to prevent interruptions during the training process.
- D. The Contractor shall have a service branch within 100 miles of the installation, and shall provide service within 24 hours of a call.
- E. The Contractor shall maintain a 24 hour, 7 day per week toll-free phone number for contacting maintenance personnel who are factory trained in the specified System. Response shall be 3 hours or less.
- F. All electrical equipment shall be listed with Underwriter's Laboratory (UL) and all field wiring shall be in conformance with NEC requirements and local codes. UL listing shall be for all assemblies and components of assemblies. UL listing must be current prior to bid.

1.4. WORK INCLUDED IN THIS SECTION:

- A. The Contractor shall furnish and install all motor starters with properly sized thermal overload protection in each phase at the blower packages.
- B. The Contractor shall provide and install all low voltage control wiring and connections necessary for the proper operation of the System.

1.5. WORK NOT INCLUDED IN THIS SECTION:

- A. Items described herein relate to the installation of the System, but are excluded from this section of the specification. The Contractor shall provide information as required to perform the work.
- B. General items.
  - 1. Supply and installation of architectural enclosures for equipment as specified on the contract drawings or shop drawings.
  - 2. Equipment fur-in to match existing surroundings.
  - 3. A clear and unobstructed right-of-way space for System equipment.
  - 4. Cutting, patching or painting.
  - 5. Removal, repair or replacement of existing ceilings or walls to match existing surroundings.
  - 6. Removal, relocation and/or replacement of other mechanical equipment, fixtures, conduit, pipe, etc.
  - 7. Hole cutting and sleeve setting in floors and walls.

8. Patching/fireproofing of sleeves and openings in floors, walls and ceilings where required.
9. Supply and installation of access panels where specified on contract drawings and/or shop drawing submittals.
10. Painting of exposed tube and unfinished exposed surfaces where required.
11. Safe, dry and adequate storage space for materials on the job site during construction.
12. Elevator, hoisting or crane services for equipment and personnel during construction.
13. Dust protection if required.
14. Sealing of sprayed fire-retarding insulation in close proximity to any System equipment.
15. Cleaning of all plaster, mortar, paint, and other debris in or on the System equipment resulting from other trades.
16. Repairing, replacing or repainting of equipment damaged by other trades.

(continued)

C. Electrical items:

1. A 115 VAC single phase, 50/60 Hz power supply wired to terminals in a factory installed duplex receptacle within each station, transfer unit and blower package.
2. A local 208/230/460 VAC, three phase, 50/60 Hz power supply and disconnect switch wired to terminal strips in a factory supplied junction box on each blower package.
3. A local 105 to 125 VAC, single phase, 50/60 Hz dedicated power source to a duplex receptacle within 5' of the system control center.
4. Temporary power to facilitate testing when required.
5. Wiring, conduit and installation as required to connect a set of dry contacts from the building fire alarm system to terminal strips inside each blower package as shown on the shop drawings.

D. Data Connections:

E. Hazardous Materials:

1. Identification of all areas with unabated asbestos.

2. All inspections, testing, monitoring, abatement and containment for any hazardous material including asbestos, which is encountered anytime in the duration of the project.

Submittals:

- A. Shop drawings which show tube routings on architectural floor plans, tubing riser diagram, electrical riser diagram, right-of-way, methods of suspending and anchoring tubing, station details, equipment locations and detailed dimensions of all major components. Tube routings shall be shown on owner-supplied architectural floor plan backgrounds in AutoCAD release 14.0 or higher.
- B. Contractor's marked literature showing illustrations, data and description of system to be furnished.
- C. Single User Software License form with submittal for signing by the Owner and Contractor.

1.6. WARRANTY:

- A. The Contractor shall guarantee all components to be free from defects in material and workmanship, under normal use, for a period of 12 months.
- B. Defective material shall be repaired or replaced at the discretion of the Contractor, free of charge.
- C. Specifically excluded from this warranty are failures resulting from normal wear, improper operation, improper maintenance or lack of prescribed owner preventive maintenance of the system.
- D. Signed acceptance or use of the System by the Owner shall commence the warranty period.
- E. The Contractor's liability shall not be enforceable until receipt of full payment for the System.

## 2.0 PRODUCTS

1.1 SYSTEM DESCRIPTION:

- A. The System shall be a computer controlled TransLogic TL2009 pneumatic tube materials distribution system consisting of tubing, stations, transfer units, blower packages, carriers and a control center.
- B. The System shall be configured of groups of stations (zones) connected together by interzone tubes. Each station shall be connected to the System by a single tube to a transfer unit.

- C. Each zone shall include a blower and function independently.
- D. The dispatching, routing, and storage of carriers shall be directed by the system control center to provide automatic unattended transmission of carriers between any two stations.
- E. The System shall provide shortest route vacuum-pressure travel. Transactions within a zone shall turn around at the nearest transfer unit common to the origin and destination stations.
- F. To dispatch a carrier from a station, the operator shall place the latched carrier in the dispatcher, select the destination address and press the "Send" push-button at the station.
- G. Systems with more than one zone shall allow multiple carriers to be in transit simultaneously. The System shall allow all station dispatchers to be loaded simultaneously, destinations to be selected and all transactions processed automatically until the System is clear.
- H. The System addition shall consist of 2 stations.
- I. The System shall provide for a minimum capacity of 996 units on 32 zones without the need to modify or replace existing equipment. Additions shall require no modifications to existing equipment.
- J. The modular design of the System components shall permit changes in the number of stations and/or zones as Owner requirements change.
- K. The System shall provide automatic empty carrier redistribution. The System shall enable operators to dispatch excess empty carriers to carrier-deficient stations which shall be automatically identified and selected by the System. The need shall be determined by the ratio of carriers assigned to carriers present taking into account carriers in transit to the station, carriers queued for dispatch to the station and carriers queued for dispatch from the station.
- L. Individual stations or zones shall be able to be shut down without affecting the remainder of System.
- M. Destinations which are unavailable (non-existing, full, out-of-service) shall be rejected at the origination station. Prior to dispatch the route to the destination station shall be checked twice to ensure that all sections of the System involved in the transaction are operating properly.
- N. A transaction to a station that becomes unavailable after dispatch shall be rerouted to the origin station.
- O. Transactions in process or pending when any part of the System is signed off shall deliver to their destinations. Any new requests to send shall be rejected.

- P. If a power failure occurs, the system will continue to process carriers under UPS power and an advisory will be posted at the SCC. If UPS voltage drops below a programmable threshold, a second message will be posted at the SCC monitor and the system will automatically switch to Quick-off. All in-transit carriers will be processed to their destinations and all pending transactions will be cancelled.
- Q. If power fails at a blower, transfer unit or station, the controls will identify that device as unavailable voiding all transactions which involve the affected device.
- R. Each station shall be able to be individually assigned a schedule of events per day including; on/off times, send and receive priorities, carrier forwarding on/off and quantity of assigned carriers.
- S. Station sending and receiving and System priorities shall ensure that carriers are processed to their destinations in the shortest time.
- T. Closed loop control shall verify via feedback loops that a command to a System component is properly executed before the next segment of the transaction is initiated.
- U. A 115 VAC duplex receptacle and device on/off switch shall be provided at each station, transfer unit, exchanger and blower package.
- V. The destinations available at each station shall be individually configurable at the system control center.
- W. Stations shall be able to be individually scheduled to be able to dispatch but not receive carriers.
- X. Each station, transfer unit, exchanger and blower shall include diagnostic capability at the unit.

## 1.2 EQUIPMENT:

### A. Line material:

- 1. Tubing shall be 6" 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, and
  - d. At equipment connections
7. Hangers shall be pre-threaded, zinc plated rod attached to the building structure. Tear-drop hangers fastened to the rod shall support the tubing.

B. Transfer Units:

1. 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.
2. Transfer units shall be installed with split sleeves and sway braced against motion.
3. Transfer units shall be located to allow for complete and clear access to service mechanical and electrical components.
4. The offset through the transfer unit shall be gradual using a curved tube section.
5. All transfer units component position sensing and carrier sensing shall be by non-contact sensors.
6. All visible metal surfaces shall be galvanized steel, aluminum, or finished with a factory painted electrostatically applied, baked-on, powder coat finish.
7. Transfer units shall be provided as required in 1 to 2 ports, 1 to 4 ports and 1 to 6 ports.

C. Blower packages;

1. Blower units shall be modular, factory assembled, complete with integral vibration isolators, screen cleanout boxes and air shifting valves as required.
2. Blowers shall be located to allow complete and clear access to service mechanical and electrical components.

3. Zone blower packages:

- a. One zone blower package shall be provided per zone.
- b. Zone blowers shall be the regenerative type.
- c. Zone blower packages shall be designed to be mounted above ceilings or on floors.
- d. 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.
- e. Zone blowers shall be sized to provide vacuum and pressure in the tubing network to maintain nominal carrier speed of 20 25 fps.
- f. For energy conservation blowers shall automatically shut down during low use periods.
- g. Air tubing shall be 4" 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.
- h. All component position sensing shall be by non-contact switches.
- i. All visible metal surfaces shall be galvanized steel, aluminum, or finished with a factory painted electrostatically applied, baked-on, powder coat finish.

D. Stations:

1. Stations shall consist of dispatch equipment, receive equipment and electrical controls enclosed in a sheet metal housing.
2. Stations shall be up send, down receive.
3. All mechanical and electrical components shall be front accessible and removable for repair or replacement.
4. Electronic control units shall be solid state plug-in type for fast replacement and shall be interchangeable with units in other stations.
5. All component position sensing and carrier sensing shall be by non-contact sensors.
6. All visible metal surfaces shall be factory painted with an electrostatically applied, baked-on, powder coat epoxy. Bright metal finish parts shall be stainless steel, brushed aluminum or chrome plated.
7. The dispatcher shall hold one carrier at a time.

8. The receiver shall be independent of the dispatcher.
9. The dispatcher shall enable a carrier to be staged for dispatch while a carrier is incoming to a station.
10. When station's receiver becomes full, that station's receive and dispatch functions shall be disabled. A message on the station display and at the system control center shall indicate the full condition. The condition shall automatically reset upon carrier removal from receiver.
11. Stations shall provide air-cushioned carrier arrival at the receive slidegate.
12. Stations shall be capable of dispatching a seven pound payload. Multiple address capability:
  - a. Multiple addresses enable a station to be shared by several departments. Each station shall have the capability for up to six discrete addresses.
  - b. Each address shall correspond to a remote personal indicator (RPI). An RPI is a recessed, wall mounted visual and audible signal device with reset switch, located remote from the station.
  - c. Carriers received via the automatic carrier redistribution feature shall not activate RPI's.
13. Each station shall be equipped with one modular operator control panel per dispatcher.
  - a. The I.Q. operator control panel shall include:
    - 1) A membrane keypad for destination and special function selection.
    - 2) A liquid crystal display panel (LCD) with up to 8 lines of 40 characters each for message display. The LCD panel shall display:
      - a) The last destination selected.
      - b) Help menu selections.
      - c) A directory of stations.
      - d) Special functions.
      - e) Operator feedback information.
    - 3) "Up" and "Down" arrow keys for scrolling through the LCD displays.
    - 4) A "Send/Enter" key to activate the dispatch after destination selection or to enter data for special functions.

- 5) A "Cancel/Clear" key to allow for transaction cancellation or clearing of the display during special function activation.
- 6) An "Empty Send" key for surplus carrier redistribution.
- 7) A "Call Carrier" key to call an empty carrier from the carrier storage system (if equipped)
- 8) A "Track Carrier" key to track a transaction.
- 9) Up to six LED's for RPI visual indication.
- 10) Twelve programmable keys all of which can be used for one button addressing of high traffic stations or up to six of which can be used for resetting RPI's.
  - a) Keys shall be individually programmable per station.
  - b) Programming of keys can be done locally at the station or set at the system control center and download to the station.
  - c) In addition to the destination, keys may also be programmed with a transaction attribute of "STAT", "SECURE", "PIN SECURE" or "SLOW" (if equipped with variable speed blowers.
  - d) The RPI audible signal can be reset at the RPI. The station and RPI LED's are reset at the station.
- 11) A "Carrier Returned" message and indicator to signal that a transaction was unable to be completed and the carrier was returned to its origin station.
- 12) A "Menu" key for selecting special functions.
  - a) Stat Transaction
  - b) Secure Transaction
  - c) PIN Secure Transaction
  - d) Assign Carriers Present
  - e) Traffic Forwarding
  - f) Emergency Shutdown
  - g) Incoming Carrier Query
  - h) Station On/Off
  - i) Carrier Inventory Adjustment
  - j) Station Diagnostics
  - k) Audible Carrier Arrival

- l) Audible Surplus Carriers
  - m) Audible Full Station
    - o A "Station Directory" key for displaying a directory of station addresses.
    - o Instructions for operating the station and special functions.
    - o Discrete rejection messages to indicate:
  - n) Dispatching station off
  - o) Dispatching station not in service
  - p) Selection full - try later
  - q) Selection does not exist
  - r) Selection scheduled off
  - s) Selection signed off
  - t) Selection not in service
  - u) Selection is secured
  - v) Selection not permitted
    - i) LCD message capability for the following conditions:
  - w) A carrier is incoming to the station.
  - x) The station carrier count exceeds its assigned number, return surplus carriers.
  - y) The station is full, remove carriers from receiver.
  - z) The station is not receiving carriers; traffic is forwarded to another station.
- E. Recessed single dispatcher stations:
- 1. Recessed single dispatcher stations shall include one dispatch chamber and an integral receive bin. The receive bin shall provide open storage nominally for seven carriers.
  - 2. The station shall be designed to be wall recessed enabling all non-operator accessible equipment to be concealed behind walls. A trim frame shall be provided to conceal the joint between the wall and the station housing.
  - 3. To minimize damage, stations shall be installed in two phases; a housing in the initial stages of construction, and a mechanical/electrical finish kit after construction work in the area is substantially complete.

F. Carriers and liners:

1. Sealed carriers:

a. Provide 8 sealed carriers as follows.

- Clear molded plastic.
- Full access side opening.
- Bi-directional.
- Replaceable wear bands which also serve as the hinges.
- Easy open positive closure latches.
- Compression gasket which seals the carrier halves when closed.
- Capable of carrying: specimens, medications, x-ray film, 1,000 ml IV bags with up to 100 ml's additives.
- Clear inside dimensions: 4-1/2" diameter by 15-5/8" length.

2. Provide 4 thin carrier liners for cushioning large items.

3. Provide 4 full carrier liners for cushioning small items.

G. Low voltage control cable:

1. Cable for System low voltage controls shall be plenum rated with minimum 22 gauge conductors. Cable shall be strapped to the transmission tubing at minimum 10' intervals.

**Execution:**

1.3 INSTALLATION:

- A. The System and components shall be assembled and installed in strict accordance with contract documents, applicable codes and regulations, approved shop drawings, and Contractor's recommendations.
- B. The System and components shall be anchored and fastened to building construction as required for a stable, secure installation. All exposed parts of the System and finish components shall be closely fit and joined to provide a neat uniform appearance.

1.4 SYSTEM TESTING AND ACCEPTANCE:

- A. Prior to a formal System performance test, the Contractor shall perform preliminary tests, verifying all components are in fully 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. The Contractor shall provide all personnel, equipment and instruments required for such examination.
- C. In the presence of the Architect and Owner, the Contractor shall perform all operational tests, inspecting System components and verifying that the 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.

#### 1.5 INSTRUCTIONS:

- A. Operator training
  - 1. The Contractor shall train the Owner's training staff on-site in the use and operation of the System. Training shall be provided for one person per station with a minimum of ten.
  - 2. The training shall include:
    - a. A commercially prepared video describing the System and its capabilities and potential benefits.
    - b. Review of information and standards regarding regulations of OSHA, NACCLS, CDC, etc. for transport of hazardous materials in the System.
    - c. Containment and immobilization of items transported in the System.
    - d. Review of common System alarms and their correction.
    - e. Use and functions of the System.
    - f. Package of training materials for the Owner's trainers to use.
    - g. A decontamination/infection control procedure and a cleanout kit with procedures for cleaning liquid spills in the System.
- B. The Contractor shall provide as-built shop drawings on AutoCAD release 14.0 for instruction and future reference by the Owner. If Owner-supplied architectural electronic backgrounds are not available in the design phase, three (3) sets of paper copies may be substituted.

#### 1.6 EXCEPTIONS:

- A. Exceptions to the specification shall be clearly identified in a separate proposal section entitled, "Exceptions to Specifications".

1.7 ALTERNATIVES:

- B. Base bid to be quoted. Alternatives to be offered in a separate proposal section entitled, "Alternatives".

END OF SECTION