

**SECTION 14 12 11  
TRACTION AND WINDING DRUM DUMBWAITER**

SPEC WRITER NOTE: Delete between //\_\_//  
and paragraph content not applicable to  
project and write "not used" after title.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the engineering, furnishing and installation of the complete traction dumbwaiter system as described herein and as indicated on the drawings.
- B. Items listed in the singular apply to each dumbwaiter in this specification except where noted.
- C. Counter Height Dumbwaiter with a maximum capacity of fifty (50) pounds must be // geared traction, // winding drum // microprocessor controller, AC VVVF motor control, with central station dispatching, signal system and car leveling device.
- D. Floor Loading Dumbwaiter with a maximum platform size of 9 square feet and maximum capacity of 500 pounds must be // geared traction, // winding drum // microprocessor controller, AC VVVF motor control, with central station dispatching, signal system and car leveling device.
- E. Automatic loading and unloading with power operated door may be considered but manually loading and unloading with manually operated car and hoistway doors reduces maintenance cost and is the VA standard.

DUMBWAITER SCHEDULE	
Dumbwaiter Number	
Overall Platform Size	
Rated Load - kg(lb)	
Contract Speed - m/s(fpm)	
Total Travel - m/s(fpm)	
Number of Stops	
Number of Openings	
Type of Roping	
Entrance Size and Type	

**1.2 RELATED WORK**

- A. Section 01 33 23 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.

- B. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire-rated construction.
- C. SECTION 09 06 00, SCHEDULE FOR FINISHES: As a master format for construction projects, to identify interior and exterior material finishes for type, texture, patterns, color and placement.
- D. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Requirements for seismic restraint of non-structural components.
- E. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section.
- F. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low Voltage power and lighting wiring.
- G. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- H. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits for cables and wiring.
- I. Section 26 05 73, OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY: Requirements for installing the over-current protective devices to ensure proper equipment and personnel protection.
- J. Section 26 22 00, LOW-VOLTAGE TRANSFORMERS: Low voltage transformers.
- K. Section 26 24 16, PANELBOARDS: Low voltage panelboards.
- L. Section 26 43 13, TRANSIENT-VOLTAGE SURGE SUPPRESSION: Surge suppressors installed in panelboards.
- M. Section 26 51 00, INTERIOR LIGHTING: Fixture and ballast type for interior lighting.

### **1.3 QUALIFICATIONS**

- A. Approval by the Contracting Officer is required for products and services of proposed manufacturers, suppliers and installers and must be contingent upon submission of certificates by the Contractor stating the following:
  - 1. Dumbwaiter contractor is currently and regularly engaged in the installation of dumbwaiter equipment as one of his principal products.
  - 2. Dumbwaiter contractor must have three years of successful experience, trained supervisory personnel and facilities to install elevator equipment specified herein.

3. Mechanic (Installer) must have passed a Mechanic Examination approved by the U.S. Department of Labor and have technical qualifications of at least five years of experience in the elevator industry or 10,000 hours of field experience working in the elevator industry with technical update training. Apprentices must be actively pursuing Certified Elevator Mechanic status. Certification must be submitted for all workers employed in this capacity.
- B. Approval of Dumbwaiter Contractor's equipment will be contingent upon their identifying a maintenance service provider that must render services within // one hour // two hours // 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 dumbwaiter installation.
- C. Approval will not be given to contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record for unsatisfactory installations, have failed to complete awarded contracts within the contract period and do not have the requisite record of satisfactorily performing installations of similar type and magnitude.
- D. Equipment within a group of dumbwaiters must be the product of the same manufacturer.
- E. The Contractor must provide and install safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures supplies or installs the equipment.
- F. Welding at the project site must be made by welders and welding operators who have previously qualified by test as prescribed in American Welding Society Publications AWS D1.1 to perform the type of work required. Certificates must be submitted for all workers employed in this capacity. A welding or hot work permit is required for each day and must be obtained from the VAMC safety department. Request permit one day in advance.
- G. Electrical work must be performed by a Licensed Master Electrician and Licensed Journeymen Electricians as requirements by NEC. Certificates must be submitted for all workers employed in this capacity.

#### **1.4 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification. Dumbwaiter installation must 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. Federal Specifications (Fed. Spec.):

J-C-30B.....Cable and Wire, Electrical (Power, Fixed Installation)

J-C-580.....Cord, Flexible and Wire, Fixture

W-S-610.....Splice Connectors

W-C-596F.....Connector, Plug, Electrical; Connector, Receptacle, Electrical

W-F-406E.....Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible

HH-I-558C.....Insulation, Blankets, Thermal (Mineral Fiber, Industrial Type)

W-F-408E.....Fittings for Conduit, Metal, Rigid (Thick-Wall and Thin-wall Type)

RR-W-410.....Wire Rope and Strand

TT-E-489J.....Enamel, Alkyd, Gloss, Low VOC Content

QQ-S-766.....Steel, Stainless and Heat Resisting, Alloys, Plate, Sheet and Strip

C. American Society of Mechanical Engineers (ASME):

A17.1.....Safety Code for Elevators and Escalators

A17.2.....Inspectors Manual for Electric Elevators and Escalators

D. National Fire Protection Association:

NFPA 13.....Standard for the Installation of Sprinkler Systems

NFPA 70.....National Electrical Code (NEC)

NFPA 72.....National Fire Alarm and Signaling Code

NFPA 101.....Life Safety Code

NFPA 252.....Fire Test of Door Assemblies

E. International Building Code (IBC)

F. American Society for Testing and Materials (ASTM):

A1008/A1008M-09.....Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Formability

E1042-02.....Acoustically Absorptive Materials Applied by Trowel or Spray

- G. Society of Automotive Engineers, Inc. (SAE)  
J517-91.....Hydraulic Hose, Standard
- H. Gauges:  
Sheet and Plate: U.S. Standard (USS)  
Wire: American Wire Gauge (AWG)
- I. American Welding Society (AWS):  
D1.1.....Structured Welding Code Steel
- J. National Electrical Manufacturers Association (NEMA):  
LD-3.....High-Pressure Decorative Laminates
- K. Underwriter's Laboratories (UL):  
486A.....Safety Wire Connectors for Copper Conductors  
797.....Safety Electrical Metallic Tubing
- L. Institute of Electrical and Electronic Engineers (IEEE)
- M. VA Seismic Design Manual H-18-8

### 1.5 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 must include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity and rating) and corresponding specification reference (Federal or project specification number and paragraph). All submitted drawings and related dumbwaiter material must be forwarded to the Contracting Officer.
- C. Shop Drawings:
  - 1. Complete scaled and dimensioned layout in plan and section view showing the arrangement of equipment and all details of each dumbwaiter unit specified including:
    - a. Hoisting machine, controller, governor, power conversion devices, and all other components located in machine room.
    - b. Car, counterweight, sheaves, supporting beams, guide rails, brackets, buffers, size of car platform and car frame members.
    - c. Rail bracket spacing and maximum vertical forces on guide rails in accordance with VA Seismic Design Manual H-18-8.
    - d. Reactions at points of supports and buffer impact loads.
    - e. Weights of principal parts.
    - f. Top and bottom clearances and over travel of car and counterweight.

- g. Location of circuit breaker, switchboard panel, light switch and feeder extension points in the machine room.
2. Drawings of hoistway entrances and doors showing details of construction and method of fastening to the structural members of the building.
  - a. If drywall construction is used to enclose hoistway, submit details of interface fastenings between entrance frames and drywall.
  - b. Sill details including sill support.
- D. Samples:
  1. One each of stainless steel, 76 mm x 127 mm (3 in. x 5 in.).
  2. No other samples of materials specified must be submitted unless specifically requested after submission of manufacturer's name. If additional samples are furnished pursuant to request, adjustment in contract price and time will be made as provided in Section 00 72 00, GENERAL CONDITIONS.
- E. Name of manufacturer, type or style designation and applicable data of the following equipment must be shown on the dumbwaiter layouts:
  1. Hoisting machine.
  2. Hoisting machine motor, HP rating and RPM.
  3. Controller.
  4. Starters and overload current protection devices.
  5. Car and counterweight safety devices; maximum and minimum rated loads and rated speeds.
  6. Hoistway door interlocks.
  7. Car and counterweight buffers; maximum and minimum rated loads, maximum rated striking speed and stroke.
  8. Hoist ropes; ultimate breaking strength, allowable working load and actual working load.
- F. Complete construction drawings of dumbwaiter enclosure, showing dimensioned details of construction, fastenings to platform, car lighting and location of car equipment.
- G. Complete dimensioned detail of vibration-isolating foundation for traction hoisting machine.
- H. Dimensioned drawings showing details of:
  1. All signal and operating fixtures.
  2. Car and counterweight slide guides.
  3. Hoistway door tracks, hangers and sills.

I. Cuts or drawings showing details of controller.

#### **1.6 WIRING DIAGRAMS**

- A. Provide three complete sets of paper and one electronic set field wiring and straight-line wiring diagrams showing all electrical circuits in the hoistway, machine room and fixtures. Install one set coated with an approved plastic sealer and mounted in the dumbwaiter machine room as directed by the Resident Engineer.
- B. In the event field modifications are necessary during installation, diagrams must be revised to include all corrections made prior to and during the final inspection. Corrected diagrams must be delivered to the Resident Engineer within thirty (30) days of final acceptance.
- C. Provide the following information relating to the specific type of microprocessor controls installed:
  - 1. Owner's information manual, containing job specific data on major components, maintenance and adjustment.
  - 2. System logic description.
  - 3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and replacement of components. Diagrams must be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
  - 4. Changes made during the warranty period must be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

#### **1.7 PERFORMANCE STANDARDS**

- A. The dumbwaiter must meet the highest standards of the industry and specifically the following:
  - 1. Contract speed is high speed in either direction of travel with rated capacity load in the dumbwaiter. Speed variation under all load conditions, regardless of direction of travel, must not vary more than three (3) percent.
  - 2. Starting, stopping and leveling must be smooth without appreciable steps of acceleration and deceleration.
- B. Dumbwaiter control system must be capable of starting the car without noticeable "roll-back" of hoisting machine sheave, regardless of load condition in car, location of car, or direction of travel.
- C. Floor level stopping accuracy must be within 3 mm (.125 in.) above or below the floor, regardless of load condition.

- D. Noise and Vibration Isolation: All dumbwaiter equipment including their supports and fastenings to the building, must be mechanically and electrically isolated from the building structure to minimize objectionable noise and vibration transmission to car, building structure, or adjacent occupied areas of building.
- E. Sound Isolation: Noise level relating to dumbwaiter equipment operation in machine room must not exceed 80 db. All db readings must be taken three (3) feet off the floor and three (3) feet from equipment.
- F. Airborne Noise: Measured noise level of dumbwaiter equipment during operation must not exceed 50 db in dumbwaiter lobbies under any condition including door operation.

#### **1.8 WARRANTY**

- A. Submit all labor and materials furnished regarding dumbwaiter system and installation to terms of "Warranty of Construction" articles of FAR clause 52.246-21. The One-Year Warranty and Guarantee Period of Service must commence and run concurrent after final inspection, completion of performance test and upon acceptance of each dumbwaiter.
- B. During warranty period if a device is not functioning properly in accordance with specification requirements, more maintenance than the contract requires keeping device operational, device must be removed and a new device meeting all requirements must be installed as part of work until satisfactory operation of installation is obtained. Period of warranty must start anew for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

#### **1.9 POWER SUPPLY**

- A. For power supply in each machine room, see Specification 26 05 19, Electrical specifications and Electrical drawings.
- B. Provide Surge Suppressors to protect the elevator equipment.

#### **1.10 EMERGENCY POWER SUPPLY**

- A. Emergency power supply, its starting means, transfer switch for transfer of elevator supply from normal to emergency power, two pair of conductors in a conduit from an auxiliary contact on the transfer switch (open or close contacts as required by Dumbwaiter Controller Manufacturer) to terminals in the group elevator controller and other related work must be provided by the Electrical Contractor.
- B. Upon loss of normal power supply there must be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds

maximum, the delay must be accomplished through an adjustable timing device.

#### **1.11 ELEVATOR MACHINE ROOM AND MACHINE SPACE**

- A. Provide a machine room that meets the requirements of ASME A17.1, NEC and IBC.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Where stainless steel is specified, it must be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, Condition A with Number 4 finish on exposed surfaces. Stainless steel must have the grain of belting in the direction of the longest dimension and surfaces must be smooth and without waves. During installation all stainless-steel surfaces must be protected with suitable material.
- B. Where cold rolled steel is specified, it must be low-carbon steel rolled to stretcher level standard flatness, complying with ASTM A109.

#### **2.2 MANUFACTURED PRODUCTS**

- A. Materials, devices and equipment furnished must be of current production by manufacturers regularly engaged in the manufacture of such items. The dumbwaiter equipment including controllers, door operators and supervisory system must be the product of manufacturers of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure compatibility with the total operating system.
- B. Manufacturers of equipment assemblies which include components made by others must assume complete responsibility for the final assembled unit. Components must be compatible with each other and with the total assembly for the intended service.
- C. Mixing of manufactures related to a single system or group of components must be identified in the submittals.
- D. Key operated switches provide for this elevator installation must be provided with four (4) keys for each individual switch or lock. Provide different key tumblers for different switch and lock functions. Each key must have a tag bearing a stamped or etched legend identifying its purpose.

#### **2.3 CONDUIT AND WIREWAY**

- A. Provide new conduit and wireway. Install electrical conductors, except traveling cable, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller

than 18.75 mm (.75 in.) or electrical metallic tubing smaller than 12.5 mm (.50 in.) electrical trade size must not be used. All raceways completely embedded in concrete slabs, walls, or floor fill must be rigid steel conduit. Wireway (duct) must be installed in the hoistway and to the controller and between similar apparatus in the dumbwaiter machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than 9.375 mm (.375 in.) electrical trade size may be used, not exceeding 45 cm (18 in.) in length unsupported, for short connections between risers and limit switches, interlocks and for other applications permitted by NEC.

- B. All conduits terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations must have approved insulation bushings. Install a steel lock nut under the bushings if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.
- C. Rigid conduit and EMT fittings using set screws or indentations as a means of attachment must not be used.
- D. Connect motor or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits.

#### **2.4 CONDUCTORS**

- A. Conductors must be stranded or solid coated annealed copper in accordance with Federal Specification J-C-30B for Type RHW or THW. Where 16 and 18 AWG are permitted by NEC, single conductors or multiple conductor cables in accordance with Federal Specification J-C-580 for Type TF may be used provided the insulation of single conductor cable and outer jacket of multiple conductor cable is flame retardant and moisture resistant. Multiple conductor cable must have color or number coding for each conductor. Conductors for control boards must be in accordance with NEC. Joints or splices are not permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all UL requirements.
- B. Provide all conduit and wiring between machine room, hoistway and fixtures.

- C. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground must be a minimum of one megohm.
- D. Where size of conductor is not given, voltage and amperes must not exceed limits set by NEC.
- E. Provide equipment grounding. Ground the conduits, supports, controller enclosure, motor, platform and car frame and all other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires must be copper, green insulated and sized as required by NEC. Bond the grounding wires to all junction boxes, cabinets and wire raceways.
- F. Terminal connections for all conductors used for external wiring between various items of elevator equipment must be solderless pressure wire connectors in accordance with Federal Specification W-S-610. The Dumbwaiter Contractor may, at his option, make these terminal connections on #10 gauge or smaller conductors with approved terminal eyelets set on the conductor with a special setting tool, or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

## **2.5 TRAVELING CABLES**

- A. All conductors to the car must consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables must run from the junction box on the car directly to the controller. Junction boxes on the car must be equipped with terminal blocks. Terminal blocks having pressure wire connectors of the clamp type that meet UL 486A requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks must have permanent indelible identifying numbers for each connection. Cables must be securely anchored to avoid strain on individual terminal connections. Flame and moisture resistant outer covering must remain intact between junction boxes. Abrupt bending, twisting and distortion of the cables must not be permitted.
- B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 5 spare conductors in each traveling cable.
- F. Traveling cables that contact the hoistway or dumbwaiter due to sway or change in position, provide shields or pads to the dumbwaiter and hoistway to prevent damage to the traveling cables.

- D. Hardware cloth may be installed from the hoistway suspension point to the dumbwaiter pit to prevent traveling cables from rubbing or chafing and securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flat wall.

#### **2.6 CONTROLLER AND SUPERVISORY PANEL**

- A. UL/CSA Labeled Controller: Mount all assemblies, power supplies, chassis switches and relays on a steel frame in a NEMA Type 1 General Purpose Enclosure. Cabinet must be securely attached to the building structure.
- B. Properly identify each device on all panels by name, letter, or standard symbol which must be neatly stencil painted or decaled in an indelible and legible manner. Identification markings must be coordinated with identical markings used on wiring diagrams. The ampere rating must be marked adjacent to all fuse holders. All spare conductors to controller and supervisory panel must be neatly formed, laced and identified.

#### **2.7 MICROPROCESSOR CONTROL SYSTEM**

- A. Provide a microprocessor control system to control dispatching, signal functions and VVVF Drive for hoist motor control. Complete details of the components and printed circuit boards, together with a complete operational description, must be submitted for approval. Add Regenerative Drive when economically advantages to the VA.
- B. Controller manufacturer must provide factory training, engineering and technical support, including all manuals, wiring diagrams and tools necessary for adjusting, maintenance, repair and testing of equipment to the VA for use by the VA's designated Elevator Maintenance Service Provider.

#### **2.8 CALL AND SEND OPERATION**

- A. Car must be dispatched from landing by manually closing car door and hoistway door and pressing call button for the landing corresponding to floor to be served, provided interlocked circuits have been established.
- B. Car must be called to a landing by pressing the call button at floor to be served and must proceed to that destination.
- C. Doors must be opened manually after car has stopped at landing.
- D. Landing push buttons must be ineffective during travel of car through hoistway and for an adjustable time after car has stopped to allow manual opening of doors.

## 2.9 CORRIDOR OPERATING STATIONS

- A. Provide new corridor operating device faceplates must be 3 mm (.125 in.) thick flat stainless steel with all edges beveled 15 degrees.
  - 1. All faceplates must have edges beveled at 15 degrees.
  - 2. Fasten all faceplates with non-corrosive stainless steel tamperproof screws.
  - 3. Each switch and operating device must have indelible, 6 mm (1/4 in.) high legends to indicate its identity and position.
- B. Provide each floor served by dumbwaiter with "Vandal Resistant" hall buttons and indicator lights that are LED illuminated upon registration of a call and shall extinguish when that call is answered. Operating push buttons must have 12.5 mm (.5 in.) numbers in the face of the button corresponding to the floors served. Provide an "In Use" light in the panels to show when dumbwaiter is in operation, or the door is open.
- C. Provide dumbwaiter with a control panel at the makeup area and as shown on drawings, containing the following:
  - 1. Key operated "ON/OFF" service switch.
  - 2. Call and Send buttons to upper floors.
  - 3. A red LED illuminated indicator light to indicate a malfunction in the system.

## 2.10 CORRIDOR LANTERN/POSITION INDICATOR

- A. Provide new combination corridor lantern/position indicator digital display mounted over the hoistway entrances at each floor. Each lantern must contain a single stroke chime so connected that when the dumbwaiter arrives at a landing, the chime must sound momentarily. The lenses in each lantern must be red, LED illuminated. Lanterns must signal in advance of dumbwaiter arrival at the landing. Audible signal must not sound when a dumbwaiter passes the floor without stopping. Provide adjustable sound level on audible signal. Car riding lanterns are not acceptable.
- B. Provide alpha-numeric digital position indicators directly over hoistway landing entranceways between the arrival lanterns at each floor. Indicator faceplate must be stainless steel. Numerals must be not less than 25 mm (1 in.) high. Cover plates must be readily removable for re-lamping.
- C. Provide LED illumination to indicate the position and direction the dumbwaiter is traveling by illuminating the proper alpha-numeric

symbol. When the dumbwaiter is standing at a landing without direction established, arrows must not be illuminated.

### **2.11 MACHINE BEAMS**

- A. Provide structural steel beams, required to support hoist machine, deflector sheaves, overhead sheaves and rope dead-end hitch assemblies.
- B. Provide bearing plates, anchors, shelf angles, blocking, embedment, etc., for support and fastening of machine beams or equipment to the building structure.
- C. Provide hold-down bolts for offset hoist machines located beside or at bottom of hoistway where concrete hold-down pad is provided.

### **2.12 GEARED TRACTION OR WINDING DRUM MACHINE**

SPEC WRITER NOTE: Select A-C or D-F and delete other.

- A. The geared traction machine for dumbwaiter must be single worm and gear, single-wrap traction type, with AC motor, spring applied and electrically released brake, sheave, pedestal mounted in proper alignment on a sound isolated steel plate. Mount machine in top or bottom of hoistway.
- B. Hoisting motor must be rated for 50 degrees C. rise, 60-minute duty and have sufficient capacity to operate dumbwaiter with rated load at rated speed without overheating.
- C. Furnish vibration isolating machine foundation for machines mounted over the hoistway. Isolation foundation must prevent the transmission of machine vibration and sound to the building structure. Location and deflection characteristics of the isolation units must produce uniform and non-excessive loading on the units under all operating conditions. The foundation must incorporate positive means to prevent lateral displacement in any direction of the machine.
- D. The geared winding drum machine must be of the single worm and gear type, with AC motor, spring applied and electrically released brake, sheave, pedestal mounted in proper alignment on a sound isolated steel plate. Mount machine in top or bottom of hoistway.
- E. Hoisting motor must be rated for 50 degrees C. rise, 60-minute duty and have enough capacity to operate dumbwaiter with rated load at rated speed without overheating.
- F. Furnish vibration isolating machine foundation for machines mounted over the hoistway. Isolation foundation must prevent the transmission of machine vibration and sound to the building structure. Location and

deflection characteristics of the isolation units must produce uniform and non-excessive loading on the units under all operating conditions. The foundation must incorporate positive means to prevent lateral displacement in any direction of the machine.

### **2.13 SHEAVES**

- A. Provide deflector sheaves with a metal basket type guard mounted below the sheave and a guard to prevent ropes from jumping out of grooves. Securely fasten guard to sheave support beams.
- B. Two-to-one idler sheaves on car and counterweight, if used, must be provided with metal guards that prevent foreign objects from falling between ropes and sheave grooves and to prevent ropes from jumping out of grooves.

SPEC WRITER NOTE: If hoisting machine is located at bottom of hoistway or offset from hoistway, include paragraph C.

- C. Securely mount overhead sheaves on overhead beams in proper alignment with basement traction sheave, car and counterweight rope hitches or sheaves. Provide blocking beams where sheaves are installed on two or more levels.

### **2.14 HOIST ROPES**

- A. Provide dumbwaiter with the required number and size of ropes to insure adequate traction and required safety factor. Ropes must be traction steel conforming to Federal Specification RR-W-410 with minimum nominal diameter of 0.25 inch.
- B. Ends of hoisting ropes must be turned back and fastened with U-bolt clamps or shackled to permit tension in ropes to be equalized.
- C. Where hoisting ropes pass around sheaves on car and counterweight, provide a suitable guard on each sheave to prevent the ropes from jumping out of grooves.
- D. Securely attach a corrosion resistant metal data tag to one hoisting rope fastening on top of the dumbwaiter.

### **2.15 CAR // AND COUNTERWEIGHT // SAFETY DEVICE**

- A. Provide Type "A" Safeties on the dumbwaiter // and counterweight //.

### **2.16 CAR AND COUNTERWEIGHT BUFFERS**

- A. Provide one spring buffer for each car and one for each counterweight. Buffers and supports must be securely fastened to the pit channels and in the alignment with striker plates. Every installed buffer must have

a permanently attached metal plate showing stroke and loading rating.  
Buffer anchorage must not puncture pit waterproofing.

- B. Buffers must be designed and installed to provide minimum car runby.
- C. Pipe stanchions and struts must be furnished, as required, to properly support the buffer.

SPEC WRITER NOTE: Delete section when  
winding drum machine is used.

#### **2.17 COUNTERWEIGHT**

- A. Dumbwaiter must be counterweighted to the extent of the weight of the car plus 40-50 percent of the rated capacity load, as required by controller manufacturer.
- B. Provide two (2) tie rods with cotter pins and double nuts at top and bottom. Install set collars or other approved means on tie rods to prevent counterweight sub-weights from jumping and/or rattling. Both ends of tie-rods must be visible and accessible.

#### **2.18 CAR AND COUNTERWEIGHT GUIDES**

- A. Install on car and counterweight frame four sliding guide shoes each assembled, to permit individual self-alignment to the guide rails.
- B. Provide each shoe with renewable non-metallic gibs having low coefficient of friction and long-wearing qualities to operate on guide rails receiving light applications of rail lubricant. Gibs containing graphite or other solid lubricants are not acceptable.
- C. Flexible guide shoes of approved design, other than swivel type, may be used provided they are self-aligning on all three faces of the guide rails.

#### **2.19 GUIDE RAILS, SUPPORTS AND FASTENINGS**

- A. Guide rails for car and counterweight must be "Channel" type provided by the dumbwaiter manufacturer or planed steel "T-rails" and weigh 12 kg/m (8 lbs/ft).
- B. Securely fasten guide rails to the brackets or other supports by heavy duty steel rail clips.
- C. Provide necessary rail brackets of sufficient size and design to secure substantial rigidity to prevent spreading or distortion of rails under any condition.
- D. Guide rails must extend from channels on pit floor to within 75 mm (3 in.) of the underside of the concrete slab or grating at top of hoistway with a maximum deviation of 3 mm (.125 in.) from plumb in all directions. Provide a minimum of 19 mm (.75 in.) clearance between bottom of rails and top of pit channels.

- E. Guide rail anchorages in pit must be made in a manner that will not reduce effectiveness of the pit waterproofing.
- F. In the event inserts or bond blocks are required for the attachment of guide rails, the Contractor must furnish inserts or bond blocks and must install them in the forms before the concrete is poured. Use inserts or bond blocks only in concrete or block work where steel framing is not available for support of guide rails.
- G. Guide rails must be clean and free of any signs of rust, grease, or abrasion before final inspection. Paint the shank and base of the T-section with one field coats of manufacturer's standard enamel.

#### **2.20 NORMAL AND FINAL TERMINAL STOPPING DEVICES**

- A. Mount terminal slowdown switches and direction limit switches on the elevator or in hoistway to reduce speed and bring car to an automatic stop at the terminal landings.
  - 1. Switches must function with any load up to and including 125 percent of rated elevator capacity at any speed obtained in normal operation.
  - 2. Switches, when opened, must permit operation of elevator in reverse direction of travel.
- B. Mount final terminal stopping switches in the hoistway.
  - 1. Switches must be positively opened should the car travel beyond the terminal direction limit switches.
  - 2. Switches must be independent of other stopping devices.
  - 3. Switches, when opened, must remove power from hoist motor, apply hoist machine brake and prevent operation of car in either direction.

#### **2.21 CROSSHEAD DATA PLATE AND CODE DATA PLATE**

- A. Permanently attach a non-corrosive metal Data Plate to car crosshead.
- B. Permanently attach a Code Data Plate, in plain view, to the controller.

#### **2.22 LEVELING DEVICE**

- A. Car must be equipped with a leveling/stopping device to automatically bring the car to within 3 mm (.125 in.) of exact level with the landing for which a stop is initiated regardless of load in car or direction.
- B. If the car stops short or travels beyond the floor, the leveling device, within its zone must automatically correct this condition and maintain the car within 3 mm (.125 in.) of level with the floor landing regardless of the load carried.

**2.23 EMERGENCY STOP SWITCHES**

- A. Provide an emergency stop switch, push to stop/pull to run, for each cartop, pit and machine space. Mount stop switch in the pit adjacent to pit access door.
- B. Each stop switch must be red in color and must have "STOP" and "RUN" positions legibly and indelibly identified.

**2.24 HOISTWAY ACCESS SWITCHES**

- A. Provide hoistway access switches for dumbwaiter at top terminal landing to permit access to top of car and at bottom terminal landing to permit access to pit. Mount the access key switch and the "On/Off" access enabled switches in the top and bottom corridor hall stations next to the hoistway entrance jamb.
- B. Exposed portion of each access switch or its faceplate must have legible, indelible legends to indicate "UP", "DOWN" and "OFF" positions.
- C. Each access switch must be a constant pressure lock with key removable only in the "OFF" position.
- D. Lock must not be operable by any other key which will operate any other lock or device used for any other purpose at the VA Medical Center.
- E. Arrange the hoistway switch to initiate and maintain movement of the car. When the dumbwaiter is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor.
- F. Provide emergency access for all hoistway entrances, locked door release system (key access) for dumbwaiters.

**2.25 HOISTWAY ENTRANCES**

- A. Entrances must be the manufacturers' standard size with bi-parting or vertical sliding doors.
- B. Frame must be not less than No. 16-gauge stainless steel, coated inside, with 4.8 mm (.1875 in.) thick sound isolation mastic compound, assembled with smoothly dressed welded joints at the corners. Sill must be rigidly anchored and not less than No. 12-gauge stainless steel and must be set true, straight and level, with hoistway edges plumb over each other.
- C. Weight of the frames and method of fastening to hoistway wall must conform to standard practice of dumbwaiter manufacturer. Provide gibs, struts, chains and steel sheaves with sealed ball or roller bearings. Provide guides and stops for door travel.

- D. Door panels must be flush hollow metal construction and bear a 1.5-hour Underwriters' "B" label, according to NFPA 252, 25 mm (1 in.) thick, of not less than 16-gauge stainless steel on both sides. Panels must be reinforced. Interior of panels must be filled with fireproof material. Upper door section must be fitted with a neoprene non-movable minimum diameter one-inch door astragal. A hand pull must be secured to the upper door section. Door guides must be non-corrosive metal.
- E. The top section of the door panel must be equipped with a glass vision panel of 6 mm (.25 in.) thick wire glass not less than 76 mm (3 in.) or more than 101 mm (4 in.) in diameter.
- F. Equip each hoistway door with an electrical/mechanical interlock, functioning as hoistway unit system, to prevent operation of car until all doors are locked in the closed position unless car is operating in leveling zone or hoistway access switch is used.
- G. Wiring installed from the hoistway riser to each door interlock must be NEC type SF-2 or equivalent.

#### **2.26 CAR FRANE**

- A. Construct car frames of structural shapes, ASTM A-36, rigidly bolted and/or welded together of adequate strength to support car with rated load.
- B. Provide a bonding wire between frame and platform.

#### **2.27 CAR ENCLOSURE**

- A. Car must have width and depth required for contract load and is constructed of minimum 14-gauge stainless steel except car bottom must be minimum 10-gauge stainless steel. Car bottom must be arranged and reinforced to provide adequate support for loading and unloading unit.
  - 1. Provide car entrance with vertical sliding door constructed of sheet panels of stainless steel and connected to counterweights by cables or chains running over sheaves mounted at top of car. Power operated doors must have a safety edge or a curtain scanning device.
  - 2. Provide a flush car light fixture in car ceiling. Light must be connected to illuminate automatically when car arrives at landing and doors is opened and must be automatically extinguished when doors is closed.
  - 3. Provide metal nameplate in car showing name of manufacturer and rated load in pounds, stamped, etched or raised letters.
- B. A service demand bell with a 76 mm (3 in.) diameter gong must be provided on the dumbwaiter car. Bell must be arranged to sound when a

pushbutton is pressed while the car is standing at a floor with the doors open.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Examine work of other trades on which the work of this Specification depends. Report defects to the Resident Engineer in writing that may affect the work of dumbwaiter contractor.
- B. Examine dumbwaiter hoistway openings for plumb, level, in line and pit is proper size, waterproofed, drained with necessary access door and ladder.
- C. Examine machine room for proper illumination, heating, ventilation, electrical equipment and beams are correctly located complete with access stairs and door.
- D. If the Dumbwaiter Contractor requires changes in size or location of trolley beams, beam supports and trap doors, etc., to accomplish their work, changes must be justified, subject to approval of the Contracting Officer and include additional cost in their bid.
- E. Work required prior to the completion of the dumbwaiter installation:
  - 1. Supply of electric feeder wires to the terminals of the dumbwaiter control panel, including circuit breaker.
  - 2. Provide light and GFCI outlets in the dumbwaiter pit and machine room.
  - 3. Furnish electric power for testing and adjusting dumbwaiter equipment.
  - 4. Furnish circuit breaker for car and hoistway lights and receptacles.
  - 5. Supply power for cab lighting.
  - 6. Machine room enclosed and protected from moisture, with self-closing, self-locking door and access stairs.
  - 7. Provide fire extinguisher in/near machine room.
- F. Provide to General Contractor for installation; inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.

#### **3.2 ARRANGEMENT OF EQUIPMENT**

- A. Arrange equipment in machine room so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same machine room. Locate controller near and visible to its respective hoisting machine.

### **3.3 INSTALLATION, WORKMANSHIP AND PROTECTION**

- A. Installations must be performed by Certified Elevator Mechanics and Apprentices to best possible industry standards. Details of the installation must be mechanically and electrically correct. Materials and equipment must be new and without imperfections.
- B. Recesses, cutouts, slots, holes, patching, grouting, refinishing to accommodate installation of equipment must be included in the Contractor's work. All new holes in concrete must be core drilled.
- C. Structural members must not be cut or altered. Work in place that is damaged or defaced must be restored equal to original new condition.
- D. Finished work must be straight, plumb, level and square with smooth surfaces and lines. All machinery and equipment must be protected against dirt, water, or mechanical injury. At final completion, all work must be thoroughly cleaned and delivered in perfect unblemished condition.
- E. Sleeves for conduit and other small holes must project 50 mm (2 in.) above concrete slabs.
- F. Hoist cables that are exposed to accidental contact in the machine room and pit must be completely enclosed with 16-gauge sheet metal or expanded metal guards.
- G. Exposed gears, sprockets and sheaves must be guarded from accidental contact.

### **3.4 CLEANING**

- A. After completion of installation and prior to final inspection, all equipment must be thoroughly cleaned of grease, oil, cement, plaster, dust and other debris.
- B. Clean machine room and equipment.
- C. Perform hoistway clean down.
- D. Prior to final acceptance remove protective coverings from finished or ornamental surfaces. Clean and polish as required for type of material.

### **3.5 PAINTING AND FINISHING**

- A. Hoist machine, motor, must be factory painted with manufacturer's standard finish and color.
- B. Controller, sheave, car frame and platform, counterweight, beams, rails and buffers except their machined surfaces, cams, brackets and all other uncoated ferrous metal items must be painted one factory primer coat or approved equal.

- C. All equipment, except specified as architectural finish, must be painted one coat of approved color, conforming to manufacturer's standard.
- D. Dumbwaiter hoisting machine, controller, governor, main line circuit breaker, safety plank and cross head of car must be identified by 101 mm (4 in.) high numerals and letters located as directed. Numerals must contrast with surrounding color and must be stenciled or decaled.
- E. Hoistway entrances of dumbwaiter:
  - 1. Door panels must be stainless steel with a brushed finish.
  - 2. Fascia plates, toe guards, dust covers, hanger covers and other metal work, including built-in or hidden work and structural metal, (except stainless steel entrance frames and surfaces to receive baked enamel finish) must be given an approved prime coat in the shop and one field coat of paint of approved color.

### **3.6 PRE-TESTS AND TESTS**

- A. Pre-test the dumbwaiter and related equipment in the presence of the Resident Engineer/Contracting Officer or authorized representative for proper operation before requesting final inspection. Conduct final inspection at other than normal working hours, if required by Resident Engineer.
  - 1. The VA must obtain the services of an Independent Qualified Elevator Inspector, ANSI/ASME QEI-1 Certified, that must witness all tests. The QEI must utilize an Elevator Acceptance Inspection Form to record the results of inspection and all testing and to identify safety code and contract deficiencies. Specific values must be provided for all tests required by ASME A17.1, ASME A17.2 and contract documents. Upon completion of inspection and testing, the QEI must sign a copy of the completed form and provide to the Contracting Officer. Within 2 weeks of the inspection, the QEI must also prepare a formal inspection report, including all test results and deficiencies. Upon successful completion of inspection and testing, the QEI will complete, sign and provide a certificate of compliance with ASME A17.1.
  - 2. Contractor must furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked test weights, voltmeter, amp-meter and amp probe, thermometers, direct reading tachometer and a means of two-way communication.

- B. Inspection of workmanship, equipment furnished and installation for compliance with specifications.
- C. Balance Tests: The percent of counterbalance must be checked by placing test weights in car until the car and counterweight are equal in weight when located at the mid-point of travel. If the actual percent of counterbalance does not conform to the specification, the amount of counterweight must be adjusted until conformance is reached.
- D. Full-Load Run Test: Dumbwaiter must be tested for a period of one-hour continuous run with full contract load in the car. The test run must consist of the dumbwaiter stopping at all floors, in either direction of travel, for not less than five or more than ten seconds per floor.
- E. Speed Test: The actual speed of the dumbwaiter must be determined in both directions of travel with full contract load, balanced load and no load in the dumbwaiter. The actual measured speed of the dumbwaiter with all loads in either direction must be within three (3) percent of specified rated speed. Full speed runs must be quiet and free from vibration and sway.
- F. Temperature Rise Test: The temperature rise of the hoisting motor must be determined during the full load test run. Temperatures must be measured using thermometers. Under these conditions, the temperature rise of the equipment must not exceed 50 degrees Centigrade above ambient temperature. Test must start when all machine room equipment is within five (5) degrees Centigrade of the ambient temperature. Other tests for heat runs on motors must be performed as prescribed by the Institute of Electrical and Electronic Engineers.
- G. Car Leveling Test: Dumbwaiter leveling devices must be tested for accuracy of leveling at all floors with no load in car in car and with contract load in car, in both directions of travel. Accuracy of floor level must be within plus or minus 3 mm (.125 in.) of level with any landing floor for which the stop has been initiated regardless of load in car or direction of travel. The car leveling device must automatically correct over travel as well as under travel and must maintain the car floor within plus or minus 3 mm (.125 in.) of level with the landing floor regardless of change in load.
- H. Brake Test: The action of the brake must be prompt and a smooth stop must result in the up and down directions of travel with no load and rated load in the elevator.

- I. Insulation Resistance Test: The dumbwaiter's complete wiring system must be free from short circuits and grounds and the insulation resistance of the system must be determined by use of megohm meter, at the discretion of the Inspector conducting the test.
- J. Safety Devices: Car and counterweight safety devices must be tested.
- K. Overload Devices: Test all overload current protection devices in the system at final inspection.
- L. Limit Stops:
  - 1. The position of the car when stopped by each of the normal limit stops with no load and with contract load in the car must be accurately measured.
  - 2. Final position of the dumbwaiter relative to the terminal landings must be determined when the dumbwaiter has been stopped by the final limits. The lower limit stop must be made with contract load in the dumbwaiter. Dumbwaiter must be operated at inspection speed for both tests. Normal limit stopping devices must be inoperative for the tests.
- M. Operating and Signal System: The dumbwaiter must be operated by the operating devices provided and the operation signals and automatic floor leveling must function in accordance with requirements specified. Starting, stopping and leveling must be smooth and comfortable without appreciable steps of acceleration or deceleration.
- N. If equipment fails test requirements and a re-inspection is required, the Contractor must be responsible for the cost of re-inspection; salaries, transportation expenses and per-diem expenses incurred by the elevator inspector and representative of the Resident Engineer.

### **3.7 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 must commence after completion of all work and at the time and place directed by the Contracting Officer.
- B. Written instructions in triplicate relative to care, adjustments and operation of all equipment and accessories must be furnished and delivered to the RE/CO or authorized representative in independently bound folders. DVD recordings will also be acceptable. Written instructions must 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 diagrams of equipment and parts. Information must also include electrical operation characteristics of all circuits, relays, timers, electronic devices 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 of Construction".

### **3.8 GUARANTEE PERIOD OF SERVICE: MAINTENANCE SERVICE AND INSPECTIONS**

- A. Provide complete maintenance service and inspections on each dumbwaiter installation for a period of one (1) year after completion and acceptance of each dumbwaiter in this specification by the Resident Engineer. This maintenance service must run concurrently with the warranty. Maintenance work must be performed by Certified Elevator Mechanics and Apprentices.
- B. This contract covers full maintenance including emergency call back service, inspections and servicing the dumbwaiter listed in the schedule of elevators. The Elevator Contractor must perform the following:
  1. Monthly systematic examination of equipment.
  2. During each maintenance visit the Elevator Contractor must clean, lubricate, adjust, repair and replace all parts as necessary to keep the equipment in first class condition and proper working order.
  3. Furnishing all lubricant, cleaning materials, parts and tools necessary to perform the work required. Lubricants must be only those products recommended by the manufacturer of the equipment.
  4. Equalizing tension, shorten or renew hoisting ropes where necessary to maintain the safety factor.
  5. As required, motors, controllers, selectors, leveling devices, operating devices, switches on cars and in hoistways, hoistway doors and car doors or gate operating device, interlock contacts, guide shoes, guide rails, car door sills, hangers for doors, car doors or gates, signal system, car safety device, tension and sheaves in pit must be cleaned, lubricated and adjusted.
  6. Guide rails, overhead sheaves and beams, counterweight frames and bottom of platforms must be cleaned every three months. Car tops and

- machine room floors must be cleaned monthly. Accumulated rubbish must be removed from the pits monthly. A general cleaning of the entire installation including all machine room equipment and hoistway equipment must be accomplished quarterly. Cleaning supplies and vacuum cleaner must be furnished by the Contractor.
7. Maintain the performance standards set forth in this specification.
  8. The operational system must be maintained to the standards specified hereinafter including any changes or adjustments required to meet varying conditions of hospital occupancy.
  9. Maintain smooth starting and stopping and accurate leveling at all times.
- C. Maintenance service must not include the performance of work required because of improper use, accidents and negligence for which the Dumbwaiter Contractor is not directly responsible.
- D. Provide 24-hour emergency call-back service that must consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency develop between regular examinations. Overtime emergency call-back service must be limited to minor adjustments and repairs required to protect the immediate safety of the equipment and persons using the dumbwaiter.
- E. Service and emergency personnel must report to the Resident Engineer/ Contract Officer or authorized representative upon arrival at the hospital and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed must be given to the RE/CO or authorized representative.
- F. The Dumbwaiter Contractor must maintain a log in the machine room. The log must list the date and time of all monthly examinations and all trouble calls. Each trouble call must be fully described including the nature of the call, necessary correction performed, or parts replaced.
- G. Written "Maintenance Control Program" must be in place to maintain the equipment in compliance with ASME A17.1 Section 8.6.

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