

# 1 General

## **.1 Codes & Standards**

- .a Designs, clearances, construction, workmanship and material, unless specifically expected, shall be in accordance with the following:
  - i. ASME 17.1 under edition as adopted by local authorities having jurisdiction.
  - ii. ASME A17.2, Guide for Inspection of Elevators, Escalators and Moving walks.
  - iii. ASME A17.3, Safety Code for Existing Elevators and Escalators.
  - iv. ASME A17.4, Guide for emergency evacuation of passengers from elevators.
  - v. Standard for Elevator and Escalator Electrical Equipment, ASME A17.5.
  - vi. ADA Architectural Guidelines.
  - vii. National electric Code, ANSI/NFPA 70.
  - viii. North Carolina Building Code in effect at the time of permitting.
  - ix. North Carolina Department of Labor
- .b Wake County Standards
  - i. Conform to Wake County's "Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County, Raleigh, North Carolina", attached herein.
  - ii. Wake County Security Standards

# 2 Products Elevators

## **.1 Manufacturers**

- .a Reputable manufacturer with a minimum of 20 years' experience in elevator system construction.
- .b Qualification – "Non-Proprietary Equipment Affidavit" shall be submitted with equipment submittals, or manufacturer supplies service tool with all diagnostics information.
- .c Acceptable Manufacturers: Otis, Thyssenkrupp, Schindler, Kone.
- .d County will entertain other manufacturers that meet the minimum 20 years' experience requirement. Owner to select prior to acceptance of bid. Consideration will be provided to regional service.

## **.2 General Data Elevator Information**

### **.a Passenger Elevators**

- i. Minimum Requirements
  - (a) CAPACITY: 3500 pounds min.
  - (b) SPEED: 125 FPM min.
  - (c) OPERATION: Refer to "Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County", attached herein.
  - (d) CAB SIZE: Cab must accommodate a gurney. If bank of elevators provided at a minimum one elevator cab must accommodate a gurney. Single speed side opening doors are required to accommodate stretcher requirements.
  - (e) OPENING SIZE: Minimum 42" X 84"
  - (f) CLEAR CEILING HEIGHT: 8'-0" minimum
  - (g) POWER SUPPLY: Coordinate with building electrical system

- ii. Hydraulic Operated Elevators
  - (a) EQUIPMENT: Hydraulic single stage hole less or single acting, under the car, hydraulic plunger **(NO TELESCOPIC OR INVERTED JACKS WILL BE ACCEPTED)**
  - (b) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- iii. Traction Operated Elevator
  - (a) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
  - (b) Provide Regenerative Drive where possible and as approved by owner.
- iv. Machine Room-less Operation
  - (a) County Preference is Machine Room-less with a separate control room.
  - (b) EQUIPMENT: Machine Room-less
  - (c) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- v. Controls to coordinate with security requirements.

**.b Service Elevators**

- i. Minimum Requirements
  - (a) CAPACITY: 5000 pounds min.
  - (b) SPEED: 125-150 fpm up to 3 floors, 200 up to 6 floors, 350 fpm over 6 floors.
  - (c) OPERATION: Refer to “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”
  - (d) CAB SIZE: Cab must accommodate a gurney. If bank of elevators provided at a minimum one elevator cab must accommodate a gurney.
  - (e) OPENING SIZE: Minimum 48” X 84”
  - (f) CLEAR CEILING HEIGHT: 10’-0” OA Cab height minimum with 2’-0” high “doghouse” at rear of elevator car
  - (g) POWER SUPPLY: Coordinate with building electrical system
- ii. Hydraulic Operated Elevators
  - (a) EQUIPMENT: Hydraulic single stage hole less or single acting, under the car, hydraulic plunger **(NO TELESCOPIC OR INVERTED JACKS WILL BE ACCEPTED)**
  - (b) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- iii. Traction Operated Elevator
  - (a) EQUIPMENT: Conventional geared or gearless machines
  - (b) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
  - (c) Provide Regenerative Drive where possible and as approved by owner.
- iv. Machine Room Less Operation
  - (a) County Preference is Machine Room Less with separate control room.
  - (b) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- v. Controls: Coordinate with security requirements.

**.c Freight Elevators**

- i. Minimum Requirements**
  - (a) **CAPACITY:** Capacity to be determined by cab size required and/or weight of items (Code dictates minimum capacity based on platform area).
  - (b) **SPEED:** 100 FPM minimum
  - (c) **OPERATION:** Refer to “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
  - (d) **CAB SIZE:** Sized to accommodate largest equipment component. Final size to be confirmed and approved by owner.
  - (e) **OPENING SIZE:** Opening to be sized to accommodate largest equipment component.
  - (f) **CLEAR CEILING HEIGHT:** 10’-0” minimum
  - (g) **POWER SUPPLY:** Coordinate with building electrical system
- ii. Hydraulic Operated Elevators**
  - (a) **EQUIPMENT:** Hydraulic under the car, hydraulic plunger (**NO TELESCOPIC OR INVERTED JACKS WILL BE ACCEPTED**)
  - (b) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- iii. Traction Operated Elevator**
  - (a) **EQUIPMENT:** Conventional geared or gearless machines
  - (b) Refer to additional information as indicated in “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.

**.3 Machine Room Equipment**

- .a** Comply with Codes and Standards indicated in Section .1 of this document.
- .b** Refer to Section 2.5, D, 8 of the “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- .c** Elevator Machine Rooms are to be equipped with Dual Action Pre-Action fire protection system.
- .d** Cooling of elevator machine rooms shall be by the buildings HVAC system.
- .e** Coordinate with building electrical.

**.4 Travel Cable**

- .a** In additional to cable requirements to meet manufacturers operations, Wake County requires additional spares. Coordinate with Wake County for additional Co-Ax, Fiber, or Twisted Shield Pairs cables needed to meet owner requirements.
- .b** Coordinate with Wake County Security Standards to meet security cabling needs.

**.5 Elevator Pit Equipment & Sizing**

- .a** Comply with Codes and Standards indicated in Section .1 of this document.
- .b** Refer to Section 2.5, D, 7 of the “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- .c** Pit size shall be considered prior to bidding, so as to accommodate any elevator manufacturer’s equipment.
- .d** Pit size dimensioning may not preclude any manufacturers.

- .e Pit lighting shall be LED.
- .f Sump pump as required by Building Code.

**.6 Signal Fixtures**

**.a Car Operating Panel**

- i. Comply with Codes and Standards indicated in Section .1 of this document.
- ii. Refer to Section 2.5, D, 8 of the “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- iii. All lamps shall be LED.
- iv. Coordinate with security requirements.

**.b Hall Operating Stations**

- i. Comply with Codes and Standards indicated in Section .1 of this document.
- ii. Refer to Section 2.5, D, 8 of the “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- iii. All lamps shall be LED.

**.7 Hoistway Entrances**

**.a Frames**

- i. General Notes
  - (a) Bolted construction
  - (b) Tactile handicap jamb plates
  - (c) Finish and material shall be of durable construction. (as selected by Design Consultant and approved by owner)

**.b Door Panels**

- i. General Notes
  - (a) Adjustable door gibs with fire tabs.
  - (b) Finish and material shall be of durable construction. (as selected by Design Consultant and approved by owner)

**.c Aluminum Sills**

- i. General Notes
  - (a) UL labeled doors and entranced
  - (b) Fascia, toe guards, struts, and dust covers (as required by code)

**.8 Door Operation**

- i. Comply with Codes and Standards indicated in Section .1 of this document.
- ii. Refer to Section 2.5, D, 8 of the “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein.
- iii. Refer to Section 3.1, A, 4 of the “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”, attached herein for door operating speeds.
- iv. Doors to have infrared door detector sensors.

**.9 Elevator Cab Enclosures**

**.a Cab Enclosure Standards**

- i. Durable finishes and materials as selected by the Design Consultant, compatible with the building color scheme, as reviewed and approved by the Owner.
- ii. Two speed exhaust fan with aluminum grille.
- iii. Pads and hooks on side and rear walls.
- iv. Elevator controls to be located behind locked access panel.
- v. Security Accessories to be coordinate with Wake County Security Guidelines.
- vi. Lighting to be LED.
- .b Passenger Elevators**
  - i. Handrails
    - (a) Stainless Steel or Bronze
    - (b) Locate at a minimum on both side walls.
    - (c) Rail cross section to be round or be a bent plate.
  - ii. Floors finish as selected by Design team and approved by owner. Owner preference is Terrazzo.
- .c Service Elevators**
  - i. Handrails
    - (a) Stainless Steel
    - (b) Locate on side and rear walls.
    - (c) Rail to be bent plate construction.
    - (d) Locate at code required rail height and additional rails at 12”AFF.
  - ii. Floors finish as selected by Design team and approved by owner. Owner preference is Terrazzo.
- .d Freight Elevators**
  - i. Handrails
    - (a) Stainless Steel
    - (b) Locate on side and rear walls.
    - (c) Rail to be bent plate construction.
    - (d) Locate at code required rail height and additional rails at 12”AFF.
  - ii. Steel plate with diamond pattern floors finish.

## **3 Products Escalators**

### **.1 Manufacturers**

- .a Reputable manufacturer with a minimum of 20 years’ experience in elevator system construction.
- .b Qualification – “Non-Proprietary Equipment Affidavit” shall be submitted with equipment submittals.
- .c Acceptable Manufacturers: Otis, Thyssenkrupp, Schindler, Kone.
- .d County will entertain other manufacturers that meet the minimum 20 years’ experience requirement. Owner to select prior to acceptance of bid. Consideration will be provided to regional service.

### **.2 General Data Escalators**

#### **.a Escalators**

##### **i. Standards Escalators**

- (a) EQUIPMENT: Cleated Step riser reversible type for passenger service. Escalator shall have (2) two steps flat before entering comb plates.

- (b) SPEED: 100 FPM minimum
- (c) STEP WIDTH: Minimum 40"
- (d) POWER SUPPLY: Coordinate with building electrical system

**ii. Balustrade**

- (a) Finish and material (as selected by Design Consultant and approved by owner)
- (b) Handrails – Black

**iii. Drive Machine**

- (a) Machine shall be designed for escalator service with long life, smooth running, low maintenance and shall run in an oil tight housing.

**iv. Brake**

- (a) The machine shall be provided with an electro-mechanical brake designed to bring the escalator and its live load to a gradual stop whenever power is interrupted, a stop button is pressed or any of the safety devices are actuated.
- (b) A brake mounted on the main drive shaft shall be provided on chain drive units so that it will operate, stop and hold the escalator and its load.
- (c) The drive will be two stage worm gear or helical gear design.

**v. Motor and Controller**

- (a) Motor shall be a special purpose external rotor motor of a continuously rated type and of adequate size for the duty specified in both directions of travel.
- (b) Insulation shall be class IP33 F.
- (c) The controller shall be of the electro-magnetic type designed for escalator use. It shall include electro-magnetic switches and thermal overload relays which shall be designed to protect the motor, and interrupt power to the motor should a safety device be actuated. The switches and relays shall be mounted on a panel supported by a metal frame. It shall be protected against damage from splashing water.
- (d) A separate fused disconnect switch shall be provided in the upper landing of the escalator truss.
- (e) The controller shall be capable of monitoring and storing the following information:
 

1. Power Supply	6. Hours of Usage
2. Fault Indicator	7. Impulse Lubrication
3. Motor Protection	8. Brake Distance
4. Brake Wear	9. Phase Failure
5. Over/Under Speed	10. Safety Circuits

**vi. Operating Device**

- (a) The Fixtures shall be provided at the upper and lower landing newels to include a momentary pressure emergency stop button and a key actuated starting switch, which shall start the escalator in either direction. The stop button is covered with a plastic cover that, when moved, actuates an alarm in the balustrade. Switch location shall be in accordance with applicable codes.

**vii. Handrail Drive**

- (a) Handrail drive shall be driven by gearing or chain drive arrangements.

**viii. Moving Handrails**

- (a) Each balustrade shall be provided with a handrail moving at substantially the same speed as the steps and in the same direction. The handrail shall be constructed of rubber or neoprene covered canvas with suitable reinforcement and made endless by suitable vulcanized joints. The handrails shall run on formed guides attached to the balustrade. Hand or finger guards shall be provided where the handrails enter or leave the escalator newels. Drive shall be positive through friction drive wheel and not allow slip or stalling unless excessive forces are applied.

**ix. Newels**

- (a) The handrail newels shall contain ball bearing rollers at both ends of escalators. Friction slides shall not be provided.

**x. Truss**

- (a) The structural steel truss shall be designed to support the load of the passengers, the mechanism of the escalator, the balustrades and the exterior cladding of plaster or similar material of equal weight. It shall have a factor of safety as prescribed by ASME A17.1 Code. In the event of track system failure, the truss shall retain the running gear in its guides. Maximum deflection with rated load shall be less than 1:750 inch.
- (b) An oil-tight drip pan shall be welded to the underside of the truss, along the entire length and width of truss designed with sufficient rigidity to support the weight of a workman, throughout the entire length of the truss. No cross bracing or other obstacles shall be on inner surface of truss cover for easy cleaning and debris removal.
- (c) Soffit Exterior - The exterior surface of the truss shall be smooth finish with no seams. It shall be finished to allow for direct application of final painting or finish material application directly to surface.
- (d) Outside Truss Finish - The outside of truss shall be painted with two coats of primer unless specified otherwise in these specifications.

**xi. Step Chain**

- (a) The escalator step chains shall be of the roller type. Minimum pitch 4". Chain pins shall be case hardened (minimum pin diameter ½") for the step chain roller.
- (b) AUTOMATIC PRECISION LUBRICATION
- (c) An automatic central lubrication system shall be provided capable of precise lubrication at each chain link pin and axle point. Interval between lubrication shall be adjustable by time relays.

**xii. Step Chain Tension Device**

- (a) The escalator shall be provided with a device at the lower landing to maintain tension in the step chains. Safety switches shall be provided which will interrupt power to the motor if the step chains wear should exceed pre-determined limits or should either step chain break.

**xiii. Escalator Steps And Risers**

- (a) The treads shall be die-cast aluminum with closely space cleats designed to provide a secure foothold and comfortable standing surface, and to provide wearing surfaces for long life. Step risers shall include vertical cleats designed to pass between the cleats of the adjacent steps thus providing a combing action with minimum clearances, A demarcation line shall be provided at front and back of the step tread. Steps shall be of a one piece die cast material.

(b) The design shall permit the easy removal of a step without disturbing the balustrade.

**xiv. Step Roller Tracks**

(a) The step roller tracks shall be accurately aligned and fitted with diagonal splices to minimize any effect of roller movement in a vertical direction. The splices shall be ground smooth. Tracks shall be of such design that they can be replaced if required with minimum time required.

**xv. Skirt Obstruction Device**

(a) Skirt switches shall be provided in accordance with ASME A17.1 code compliance.

**xvi. Step Demarcation Lights**

(a) Lights shall be in accordance with ASME A17.1 code requirements

**xvii. Comb Plates**

(a) Combs of the sectional type shall be located at the top and bottom landings designed to properly mesh with the cleats on the step treads, It shall be made in sections so that a section can be readily replaced without the use of special tools.

**xviii. Floor Plates**

(a) Structural steel frames at upper and lower landings, shall be provided with extruded aluminum floor plates to match the comb plates. Floor plates are to have ribbed surface with black enamel in-fill.

**xix. Comb Lights**

(a) The escalator shall be provided with two lights, each located in the skirt panels on each side of the comb plates at each landing. The lights shall be Ultra High Intensity LED bulbs and arranged to be continually lit whenever the escalator is operating.

**xx. Reverse Phase Relay**

(a) The escalator shall be provided with a device which when activated, due to the loss or reversal in the phase of the main power will cause interruption of escalator operation.

**xxi. Minimum Safety Switch to be Provided**

- (a) Handrail inlet switches
- (b) Step lowering switch to detect sagging step
- (c) Comb plate movement switch
- (d) Slack handrail switch
- (e) Slack stop chain switch
- (f) Skirt switches
- (g) Stop switches
- (h) Non-reversing detection until stopped
- (i) Overspeed detection
- (j) Broken or slack drive chains (if provided)
- (k) Floor plate cover switch
- (l) Missing step detection.

**xxii. Optional Equipment To Be Provided**

- (a) Fault detector display
- (b) Soffit guards at the intersecting angle of the outside deck and ceiling.
- (c) Transparent deck barriers between adjacent parallel escalators and on the outboard side of single escalators.
- (d) Side skirt safety brushes.

## 4 Maintenance & Warranty

### .1 Warranty

- .a Special Project Warranty: Provide special project warranty, signed by Elevator Contractor, agreeing to replace, repair, or restore defective materials and workmanship of elevator work during twelve (12) month warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Elevator Contractor under the Contract Documents.
  - i. “Defective” is hereby defined to include, but not by way of limitation, operation or control system failures, performances below specified ratings, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected and unsatisfactory conditions.
  - ii. Warranty period is 12 months starting on the date of final acceptance of the last elevator unit by the Owner and receipt of all required documentation/diagnostics information.
- .b Provide a written Manufacturer’s Warranty Certificate indicating that the controllers were manufactured and furnished to the full extent of the specification and the conditions of the contract. The elevator contractor must further warranty that all apparatus furnished will develop rating, capacities and characteristics specified. Certificate is to include dates warranty coverage begins and ends.

### .2 Maintenance

- .a Elevator/Escalator Contractor is to provide full and complete maintenance (during the warranty period and extended term) of the elevator/escalator equipment in accordance with the requirements attached herein, titled “Owners for of Vertical Transportation Maintenance Contract & Specifications Full Coverage for Wake County”.

### .3 Temporary Service

- .a The elevator/escalator shall not be used for temporary service or for any other purposes prior to completion and acceptance by the Owner unless agreed to by the owner.

### .4 End User Demonstration

- .a A factory-authorized service representative shall perform a minimum of 8 hours training to the Owner’s building and maintenance staff. Proper use, operation, and fire service test shall be demonstrated at this time.
- .b The Contractor shall make a final check of the elevator operation with the Owner’s maintenance personnel present. The Contractor shall ensure that the Owner has all necessary keys, manual, etc. as required in the specifications.