

Facilities Division Standards

Section 14520 Baggage Handling Systems



This section describes the design requirements and materials/products for baggage handling systems.

DESIGN REQUIREMENTS

- 1 Coordinate with the McCarran AEM Shop.
- 2 Coordinate with the EDS provider and the TSA for proper interface with the equipment.
- 3 Conform to the current I.B.C. as amended by Clark County.
- 4 Transport system or systems of baggage consisting of a complete system of static and dynamic mechanical and electrical components as specified herein.
- 5 The computer servers, interfaces and software that, when integrated, cause the Baggage Handling System (BHS) to operate as a single integral system for the identification of specific bags for the purpose of identifying Selectee status, screening bags, sorting bags and ensuring bags are properly routed through the baggage system and delivered to the appropriate air carrier for make-up.

MATERIALS/PRODUCTS

A. INCLINE-PLATE DEVICES

1. Rotating, inclined-plane display devices, consisting of a stationary curb and top with a canted moving surface for baggage display constructed of linked flights.
2. Devices shall be capable of operating with a minimum 50# per square foot and a minimum live load of 250# per peripheral foot, starting fully loaded.
3. Devices shall rotate at a constant peripheral speed neither less than 80 FPM nor greater than 100 FPM and coordinated with the input velocity of the feed conveyors.
4. Flights shall be constructed of no less than 12 gauge 304 stainless steel with # 4 brushed finishes.
5. Flight support assemblies shall consist of a steel flight support panel, an upper support wheel, attaching points for lower support directional wheels, associated linkage, and molded rubber bumper. Chain Dog plates are attached to each flight support assembly. Chain Dog Plates are attached to brackets beneath the lower end of the flight support panels, and are directly inline with the drive chain. Each Dog Plate has five inline teeth that engage the rollers of the drive chain, and the drive chain will engage at least two flight support panels at all times.
6. Linkage assemblies attach to the outboard end of the flight support panels and

- will consist of drive links, support wheels, and alignment wheels.
7. Drive links will interconnect between flight support panels and provide support and continuity for the panel train. A flight support panel will bolt to, and be carried by, each link. Each link will, in turn, connect to the link of the next supporting wheel assembly.
 8. Each lower wheel support assembly will consist of a vertically mounted lower support wheel and two horizontally mounted alignment wheels.
 9. The drive chain shall be driven using a Dodge Quantis gearbox and Reliance motor with a soft start.
 10. The preferred provider of Inclined-plane devices is G&T Conveyor Co., Inc.

B. CRESCENT PLATE DEVICES

1. Oversize width with 39"± clear conveying surface.
2. The maximum structural load shall be 200 pounds per linear foot. The normal live load shall be a minimum of 75 pounds per linear foot.
3. Flat plate conveyor shall be ¼" thick steel plate with molded poly top coating. The plates must be 22" pitch only.
4. The preferred providers of Crescent plate devices are Horsley or G&T Conveyor Co., Inc.

C. SLIDER BED BELT CONVEYORS

1. Steel frame slider bed conveyors for normal and high speed operations.
2. Frame shall be welded construction (not bolt together type).
3. Sliders shall be 11 ga. min., sides shall be 12 ga. min., and sides at drives shall be 10 ga. min.
4. Preferred conveyor lengths are 10' to 15' sections.
5. Conveyor components exposed to weather shall be powder coated (not pulleys).
6. The preferred providers of Slider bed conveyors are Horsley or G&T Conveyor Co., Inc.

D. TICKET COUNTER CONVEYORS

1. Ticket counter conveyors shall have controls on cannon plugs in panel to facilitate maintenance.
2. Ticket counter conveyor controls shall be mounted in a recessed method so the top of the controls are lower than or flush with stainless shrouding.
3. Ticket counter conveyors shall use Polychain drive on output to head pulley (no roller chain or HTD).
4. Ticket counter conveyor shrouding shall be 10 ga. brushed stainless steel in removable sections for maintenance.

5. Ticket counter conveyor reducers shall be accessed from the top slider bed (with belt split at splice) with built in removable plate that allows full access to motor, output shaft and reducer.
7. Motorized pulleys shall not be used on ticket counter conveyors.
6. The preferred provider of Ticket counter conveyors is G&T Conveyor Co., Inc.

E. MOTORS

1. Motors shall be equipped with Polychain drive sheaves.
2. Motors shall be sized for maximum load and belt speed requirements under continuous operation (minimum size 1 H.P., maximum size 7 ½ H.P.), and shall be capable of withstanding shock caused by frequent starting and stopping under full load.
3. Motors shall meet NEMA (EPAct) efficiency ratings and shall be wired for operation with 230/460 volt, 3-Phase, 60 Hz current, Class B insulation and operable in an ambient temperature up to 40°C.
4. Motors shall be copper wound NEMA "B" TEFC with a service factor of 1.15. Speed under full load shall be constant at approximately 1800 RPM.
5. On all conveyor sections with frequent start/stop operations, such as indexing belts, all motors shall be a continuous running NEMA "B" design coupled with an electro-magnetic clutch-brake arrangement. The D.C. power supply for the clutch-brake units shall embody separate, adjustable torque/voltage outputs for both the clutch and the brake.
6. All motors controlled by variable frequency drive (VFD) shall be VFD or Vector rated.
7. The preferred provider of all motors is Reliance Electric.

F. REDUCERS

1. Shaft-mounted reducers shall be Right-Angle Helical Bevel, NEMA C-Face motor flange, Triple reduction no shaft gear reducer with twin taper bushings. Type Dodge "Quantis-RHB-BF" series preferred.
2. In-line reducers shall be In-Line Helical Bevel, NEMA C-Face motor flange, Double/Triple reduction solid shaft gear reducer, with foot and flange mount. Type Dodge "Quantis-ILH-HB / ILH-HF" series preferred.
3. Reducers shall be sized for Class II applications as a minimum. Reducers used on inclines where rollback would be critical, shall be equipped with a motor brake or "Backstop" device.
4. Reducers shall be set up for and delivered with synthetic oil.
5. Output shafts on tapered bore shall be protected with a cover on one side.
6. Reducers shall have all steel stamped name tags (no plastic).

7. All drive units shall be equipped with drip pans.

G. BEARINGS

1. All bearings shall be lubricated for life with synthetic lubrication, sealed, self-aligning, anti-friction type.
2. The preferred provider of all bearings shall be Dodge GT sealed for ABHS service grip tight tapered bushings.

H. PULLEYS, SHAFTS AND ROLLERS

1. Pulleys shall be panel slide out design on frame.
2. Pulleys shall have QD type bushings (no taperlock).
3. Drive pulleys shall use Durathane lagging.
4. Shafts shall be of AISI 1045 TGP precision shafting material.
5. Shaft material shall be .0005" shaft tolerances for shaft mount reducers (.0015" TIR on shaft drive ends).
6. Return rolls shall be 2 ½" - 3 ½" construction with ABEC 1 type precision ball bearings.
7. Drum crowned pulleys shall be made from AirForm shells (pulley outer case or tube).
8. Drum crowned AirForm pulleys shall maintain .020 TIR on 10-11 gauge material.

I. POWER TURNS AND SPIRAL TURNS

1. Turns shall be steel or cast aluminum frame construction and shall be sized with 7'-3" approximate radius from center to inside face of outside sideguard ("C" size) except at the ticket counters where the turns shall be sized with 4'-11" approximate radius from center to inside face of outside sideguard ("B" size).
2. Turns shall be sized so that the side guards of the turn match in width with the side guards of adjacent conveyors.
3. The preferred provider of all Power and Spiral turns is Transnorm Systems, Inc.

J. DIVERTERS

1. Power Face Diverters shall be electric, motor driven and shall selectively transfer baggage from the associated conveyor onto an adjacent slide or conveyor. The diverter shall be of supplier's proven standard design with 60 bags-per-minute capacity maintained throughput with a maximum rate of 80 bags-per-minute in the future and shall be designed to minimize potential baggage jams and damage to baggage. The diverting surface contacting the bag shall be a VFD controlled vertical driven belt extending across the conveyor bed. The diverter unit shall consist of a rigid structural steel support frame to reduce vibration and

beam deflection. The diverter shall be supplied with a VFD rated motor.

2. The preferred provider of Power face diverters is SiemensDematic Model 6650.
3. Vertical Diverters shall consist of two short conveyors that provide selective transfer of baggage from the associated conveyor onto two stacked conveyors. The diverter shall be of supplier's proven standard design with 30 to 35 bags-per-minute capacity throughput and shall be designed to minimize potential baggage jams and damage to baggage. Unit shall be enclosed by expanded metal or woven metal fencing with $\frac{3}{4}$ " openings, maximum.
4. The preferred provider of Vertical diverters is Siemens "Vertisort".

K. CATWALKS AND LADDERS

1. Provide and install catwalks and ladders as required to provide unrestricted access to all portions of the baggage handling system for maintenance purposes and for ease of clearing jams.
2. Catwalks and ladders shall conform to OSHA and Clark County building code standards and requirements.
3. All ladders shall be of the "ships ladder" type, unless the specific location will not accommodate this design. Coordination with the Owner is required.

L. PROGRAMMABLE CONTROLLERS

1. Provide and install totally redundant programmable logic controllers (PLC).
2. The preferred provider of Programmable logic controllers is Allen-Bradley ControlLogic/1756 System with Logix5562 CAT# 1756L62 Processor.
3. The preferred control network is Allen-Bradley ControlNet.
4. The preferred remote I/O is Allen-Bradley 1794 Flex I/O

M. VARIABLE FREQUENCY DRIVES

1. Provide and install variable frequency drives (VFD) as required.
2. The preferred provider of Variable frequency drives is Allen-Bradley "Power Flex 40".

N. UNINTERRUPTIBLE POWER SUPPLY (PLC)

1. Furnish and install one UPS to provide a minimum of 15 minutes of power to PLCs and control all computer systems during a power outage, prior to emergency power activation. This unit shall have a network connection for supervision of unit's health.

O. ELECTRICAL COMPONENTS

1. The entire electrical installation shall meet the requirements of the Clark County building codes and shall be provided and installed in accordance with the DOA Standard Electrical Specifications.

P. RADIO FREQUENCY IDENTIFICATION HARDWARE

1. Provide and install totally redundant stationary fixed mount tag reader arrays.
 - a. The preferred provider of RFID tag readers is Motorola Corp. (formerly Symbol Technologies); preferred reader hardware is the XR 400 fixed reader. (This reader is capable of interacting with both Gen1 and Gen2 tags.)
2. All reader arrays built into the BHS conveyors will include four (4) antennas. Two will be 32" x 10" Long Shelf and two will be 10" x 18.75" Short Shelf.
 - a. The preferred provider of the antenna assemblies is CapTron Corporation. The part numbers for the above referenced antennas are as such: Long Shelf # C-250014-001 and Short Shelf # C-250016-001
3. All RF cabling shall be provided and installed using LMR-240 cable, not to exceed 15 feet or 180 inches in length and not to exceed a 2db loss.
4. The readers shall be connected to the antennas via the use of coaxial Power Splitter / Combiners.
 - a. The preferred provider of the Power Splitter / Combiners is Mini - Circuits. The part number for the combiner is ZF2SC11DB-2
5. If TSA hand check stations are to be installed in the system, the use of one antenna per reader is required. The antenna of choice at these stations will be the 10" x 18.75" Short Shelf model.
 - a. At these stations the readers shall be connected to the antennas using DC Pass directional Couplers. 800 to 1000 MHz, 50 ohm, 1 input, 2 outputs, and 3 coupled coaxial connections.
 - b. The preferred provider of the DC Pass couplers is Mini - Circuits. The part number for the DC Pass couplers is ZFDC-15-10-S
6. Provide and install the means of data communication between the RFID readers and the MVI modules, means shall be fiber optics. The fiber shall be duplex, 62.5/125 multi - mode, orange in color.
7. The use of serial media converters will be needed to go from fiber to copper communication.
 - a. The preferred provider for the converter is Transition Networks.
8. Singulation of tag reads is required; therefore, it may be necessary to utilize RF curtains to eliminate leakage. Curtains should be reflective material.
 - a. The preferred provider of the curtains is MWT. The part numbers of the current curtains are: MAC-8101-RFID Isolation Curtains (each unit is comprised of 1 piece subpart number 100879-1 Reflective Isolation Cover and 1 piece subpart number 100800-1 Flexible Absorber Cover).
9. Brandonite bed sections are required to allow the antennas to pick up the RF signal.
 - a. The preferred product is part number 51400-1239-160B 1'-8" Brandonite Filler

Assembly.

NOTE: The antenna and cable assemblies with couplers and splitter / combiners can be purchased as a package through CapTron Corporation.

Q DIRECTIONAL INTERFACE DEVICE (DID)

1. If L3 does not supply EDS machines that have integral centering devices, the Contractor shall provide a DID at the input to each EDS.
2. The DID shall consist of a centering belt or belts and or a directional belt or belts depending on the length. The conveyor section shall consist of Intralox belting and any hardware needed to drive the belt.
3. The DID sections shall use Dodge Quantis gear boxes and VFD rated Reliance motors. Motors shall be driven from a VFD.
4. The DID conveyor sections shall have one sidewall attached with a hinge on the leading edge of the conveyor section. This sidewall shall automatically move to the width of the opening of the EDS on the trailing end of the section as a bag approaches.
5. The DID conveyor sections including the movable sidewalls shall be integrated into the programming of the BHS and shall operate seamlessly.