

SPECIFICATIONS FOR RAPID TRANSIT CARS

SECTION 3

CAR BODY

3.01 General

(a) The car body units shall be constructed and assembled in conformity with the general arrangement and dimensions of the finished car as specified in Section 2 of these Specifications.

(b) The car body and attached equipment shall be designed to provide the necessary clearances for the trucks.

(c) These Specifications cover both single-car and two-car units.

Single-car units shall contain all equipment necessary for independent single-car operation, and shall be equipped with motorman's cabs and control equipment at both ends.

Two-car units shall comprise two cars, the first designated an "A" car, and the second a "B" car, and shall be equipped with one motorman's cab and control equipment in one end of each unit.

It will not be possible to operate "A" or "B" units independently as single-car units, but "A" or "B" units shall be so arranged that any "A" or "B" unit will operate when coupled with either a single-car unit, or with a two-car unit.

(d) Both single-car units and two-car units shall be arranged for multiple unit operation of two to ten cars, comprised of either single-car units; two-car units, or a combination of both. The design shall provide for maximum possible ease and safety of passage from car to car through the end doors.

(e) The car body structure shall provide ducts for an underframe

traction motor ventilating system, as required.

(f) Equipment supports and housings shall be incorporated into the underframe so that the maximum usefulness of metal can be obtained.

(g) The car body shall be a steel welded structure of approved copper-bearing steel, except that screwed or bolted fastenings shall be used for removable parts and that rivets may be used at locations where it is agreed that welding is impracticable.

(h) The car body structure shall be designed so that jacks or cradles may be used for lifting from any point along each side or under end sills. The center section of side sill shall not be required to lift both ends of the car simultaneously. Jacking pads shall be provided at approved locations under the car body.

(i) Camber of car between bolsters, fully equipped ready to run, plus simulated maximum passenger load, shall be minus 0", plus 1/8".

(j) No part or appliance on car body shall be less than 2½ inches above the top of rail.

3.02 Motorman's Cab

(a) On single-car units, a motorman's cab shall be located at the right hand corner at each end.

On two-car units, a motorman's cab shall be located at the right hand corner at one end of each car, providing an operating cab at each end of the two-car unit.

(b) The cab door shall be hung with a piano hinge and shall be so designed as to enclose the operating equipment when the door is closed and the cab is not made up. When latched in the made-up position, the door shall complete the operating cab enclosure. In the made-up position, the cab door shall be designed to open either into the cab, or further

open into the car, to permit ingress or egress to the cab, necessary stops and latches being provided. Cab door shall be equipped with a lock operable with Railroad's existing standard key. Cab door shall not be equipped with a window, but must be provided with an adjustable louvre of approved type for ventilation.

(c) The back of the cab shall be formed by a partition which shall house the switch panels, cable ducts and other equipment as described in Section 12 of these Specifications. A hinged panel shall provide access to the rear of the switch panel, and shall be provided with a lock operable with Railroad's existing standard key.

3.03 Framing Structure

(a) All metal used in the fabrication of the car body structure and its associated parts shall be of an approved type and quality.

(b) The framing and sheathing of the car body shall form an integrated structure capable of resisting, without destructive deformation, the buffing and other stresses inherent in the type of service for which the cars are designed. The unit structure shall resist a minimum static end load of 400,000 pounds at the rear draft stops ahead of the bolster on the center line of draft, without developing any permanent deformation in any member of the unit structure.

(c) The sides shall be as smooth as possible on the outside and the overall thickness of the sides shall be the minimum, consistent with the necessary strength, to provide the maximum room inside the car.

(d) An anti-climbing arrangement shall be applied to each end of the car, designed so that coupled units under full compression shall mate in a manner which will resist one unit from climbing the other. This arrangement shall resist a vertical load of 75,000 pounds without

exceeding the yield point of its various parts or its attachments to the unit structure. Anti-climbers shall be riveted or welded firmly to structural members of the end sills. Anti-climbers shall be so designed as to properly contact opposing anti-climbers of existing Railroad equipment.

(e) The outside end of each unit shall be provided with two main vertical members, one at each side of the end doors. Each main member shall have an ultimate shear value of not less than 200,000 pounds at a point even with the top of the underframe members to which it is attached. The attachments of these members at bottom shall be sufficient to develop their full shear value. If reinforcement is used to provide the shear value, such reinforcement shall have full value for a distance of 18 inches up from the underframe connection, then taper to a point approximately 30 inches above the underframe connection.

3.04 Bolster

(a) The car body bolster shall be a built-up structure of formed and welded steel plates, carrying a cast steel center bearing member, and means shall be provided for locking car body bolster to the truck.

(b) The Builder shall provide an approved wear plate between the center bearing surfaces. Means shall be provided for lubricating these surfaces, if required.

3.05 Ventilating Ducts

(a) Provision shall be made in the design of the bolster and body framing for adequate air ducts and connections thereto.

(b) The connections from the body air ducts to the motors shall be of an approved design.

(c) An approved means shall be provided for ventilating traction motors.

(d) Suitable screens or louvres, or both, shall be provided to prevent admission of rain, snow or dirt at the intake openings of ventilating ducts. Intake screens or louvres shall be easily removable for cleaning of ducts. Ducts shall be free from noise or rattle and covers shall be provided to give suitable access to equipment as well as for cleaning ducts.

3.06 Roof

(a) The design of the roof shall be adequate to carry the imposed load. The end of the roof shall be sufficiently strong to withstand the reaction from the end posts. The roof shall be reinforced with purlines attached to carlines. Eaves and side girder top chords shall be designed to promote maximum resistance to collision impact and to provide efficient connection of roof to the side structure. An anti-telescoping plate with necessary reinforcement shall be included in roof structure at ends.

All members of the roof framing shall be so designed and disposed as to facilitate the fastening of stanchions and roof covering, and the installation of air-conditioning ducts, roof wiring, lighting, fixtures, and other required equipment in a secure, convenient and workmanlike manner.

(b) Water deflecting gutters shall be installed on roof over entire side and ends of car.

3.07 Ceiling and Side Lining

(a) The ceiling shall be arranged to receive and support the lighting fixtures and shall form a part of the roof ventilating system.

(b) The ceiling shall be made of Formica, or approval equal. The underside of carlines shall be covered with approved cork adhesive tape, or approved equal, before fastening the lining, and shall be so supported

as to prevent sagging. The longitudinal dimension of the material shall not exceed eight feet.

(c) Area between bottom of side windows and back of seats shall be so shaped as to eliminate window-sills and other dirt collecting projections, and shall be of Formica or approved equal, applied and fastened in an approved manner so as to permit ready removal for maintenance.

(d) Scuffing plates of rigidized stainless steel shall be provided at areas on ends of cars adjacent to doors, and on rear panels of motormen's cabs adjacent to side doors. Kick plates of the same material shall be applied to bottom of interior of side and end doors, and on seat ends at door openings.

3.08 Floor

(a) Floor sheets shall be "Trussplate" or approved equal of No. 20 US gauge galvanized copper-steel, laid across and securely fastened to floor supports of the underframe with rivets or self-threading screws. The formed floor sheet shall be $\frac{1}{2}$ " in depth. Floor sheets shall be given a coat of approved preservative on both sides.

(b) An underlayment of latex shall be applied to the "Trussplate" floor sheets, to a depth of $\frac{1}{4}$ " above top of formed section.

(c) The floor covering shall be of $1/8$ " vinyl-asbestos tile of design and color scheme to be specified by the Railroad. Floor covering shall be attached to sub-floor as recommended by the supplier.

(d) Where the floor covering reaches the walls of the car body it is to be finished with a suitable sanitary cove. Sanitary corner coves shall be fitted at all corners.

(e) At all door openings the floor shall connect properly with the threshold plates.

(f) At car ends, the platform shall be covered with a diamond-plate non-skid material, or approved equal.

(g) Floors of motormen's cabs shall be heat insulated.

3.09 Windows

(a) All windows shall be unit assemblies. The units shall be of stainless steel or anodized aluminum and shall be of the minimum rail dimension to provide maximum vision. Units shall be Adams-Westlake or approved equal. The frames shall be mounted in the sheets as flush as possible and shall form the exterior and interior trim.

(b) All frames and sash shall be so arranged that they are easily removable for repairs or replacement.

(c) All sash shall have internally-rounded corners, both inside and outside the car, to facilitate cleaning.

(d) Four side windows, as designated on Railroad Drawing No. _____ File _____, shall be drop sash, and shall include the necessary locks, racks and effective weather strip. Locks shall be operable with a special key. All other side windows, except at motorman's cab and at conductor's operating position at opposite end of two-car units, shall be stationary sash arranged to be kicked out in an emergency.

(e) End windows shall be stationary glass so located that motorman will have a clear view of track and signals from his usual position while operating unit.

(f) Side window in motorman's cab, and at conductor's operating position at diagonally opposite end of two-car units, shall be a movable sash dropping into a pocket in the car body. The drop sash shall be effectively weather-stripped

and designed to facilitate operation and to withstand hard usage. Drop sash shall be equipped with a rotary window operator equipped with a detachable handle of approved design.

(g) All glass shall be 7/32" safety sheet of an approved type. The glass shall be mounted in rubber in an approved manner.

(h) Door windows and destination sign openings shall be glazed and mounted with a rubber moulding of an approved type directly in the sheet.

3.10 Seats

(a) Longitudinal seats shall be installed in accordance with Railroad Drawing No. 9980 File 67.

(b) Space under longitudinal seats shall be entirely enclosed. Seat risers shall be curved back to avoid scuffing.

(c) Seats shall have removable seat cushions and backs, upholstered with foam-plastic.

(d) Seats shall be covered with Koroseal or approved equal, color to be specified by the Railroad.

(e) A motorman's seat shall be provided in each cab and shall be so designed as to provide satisfactory comfort and proper access to equipment with good visibility. The seat shall be upholstered with foam-plastic, and shall be so arranged that it may be moved to permit movement of the cab door. Adjustment as to height and distance from operating

controls shall be provided, and the seat shall be securely positioned in either the operating or non-operating position. Seat shall also be suitable for use by the conductor when he is stationed in the cab.

(f) A hinged seat shall be provided at each conductor's operating position in two-car units. When folded, it shall be recessed within the end of car body, and shall be securely positioned in either the operating or non-operating positions. The seat cushion shall be upholstered with foam-plastic.

3.11 Doors

(a) The doors shall be constructed of aluminum.

(b) Side doors shall be single-leaf, sliding into a pocket in the car body. Doors and jambs shall be equipped with formed rubber bumpers and shall have a total compression of 1/8" when doors are closed and shall insure a possible space of 6" should an object become caught in a door. Inside and outside door pocket posts shall be designed so as to prevent passengers' fingers being pinched between the post and the sliding door. A deflecting plate of aluminum shall be placed in the door pocket to prevent the water that drops from the doors from lodging in the side sills and to deflect the water through suitable holes in the floor.

(c) Doors shall be hung on ball bearing hangers and track of an approved type. Hangers and track shall be accessible

for inspection and removal of doors. Suitable rubber stops shall be provided at both top and bottom of door open position to prevent undue noise and cocking of doors.

(d) Threshold and door track castings shall be of an approved type, and the surface of the threshold shall be designed to minimize slipping. The design of both threshold and door track shall provide for free drainage of water and for minimizing the opportunity of foreign matter obstructing door motion. Provision shall be made for an anti-rattle device for the bottom of sliding doors.

(e) End doors shall slide into a pocket in the car body. They shall be provided with locks and the Railroad's existing key shall be used. End doors shall be provided with a gravity door check of suitable design which will hold the door 3" from the striking post in case it rolls shut at high speed. A back latch shall be provided to hold the door in the open position when required.

(f) Doors shall be effectively weather-stripped to prevent entrance of wind, rain and snow.

3.12 Door Operating Mechanism

(a) An electric mechanism shall be provided to operate side doors and shall hold the door firmly in the closed and open positions respectively. In the closed position, a remote-control positive lock to prevent opening of the door shall be provided.

(b) Each door shall be operated by a door engine located

under the seat.

(c) Door engines and operating linkage shall be of approved type. Provision shall be made for adjustment of position, cushioning and speed of operation in both directions, and for later take-up in places where significant wear may be expected. Provision shall be made for access to the door engines for maintenance.

(d) The speed of the doors shall be such that from the moment of operating the control switch to the completion of the operation, including cushioning, the time shall be two seconds maximum for opening and four seconds for closing, and shall be adjustable. The maximum pressure on the door edge measured at mid-travel shall not exceed 30 lbs. in case closing travel is obstructed.

(e) Door engines shall be controlled by an electric relay operated from the 32-Volt battery circuit. The relay shall be energized when the doors are in the open position. Provision shall be made to prevent draining of battery through the door control circuits when the car is out of service.

(f) Provision shall be made to open doors manually in case of emergency.

(g) A switch shall be provided adjacent to each door engine to open door-operating and lock circuits and to bypass door signal interlock in case of failure.

3.13 STANCHION, RAILS, BARRIERS, GRAB HANDLES AND STEPS

(a) Stanchions, hand rails, barriers and hand holds shall be provided as indicated on Railroad Drawing No. _____ File _____. Stanchions shall consist of $1\frac{1}{4}$ " O.D. stainless steel veneered tubing with an approved finish, Allegheny architectural tubing or approved equal. It shall have a thickness of not less than 0.026". The insert shall be made of soft steel and shall have a wall thickness of 0.049". Interior hand holds shall be of an approved type and design with stainless steel grips.

(b) Stanchions shall be clamped or otherwise securely held top and bottom in fittings, and joining of stanchions and hand rails shall be with fittings having an approved form of screwed lock. Fittings shall be of stainless steel. All fittings shall provide a permanently tight and rattle-proof fastening.

(c) Hand rails shall be of the same size and material as the stanchions.

(d) A hand rail shall be installed at side window of motor-man's cab, and at conductor's operating position at diagonally-opposite end of cars on two-car units. Height of hand rail shall be such as to provide a convenient support for conductors when observing doors.

(e) Forged steel steps and hand holds shall be provided on the exterior of the car as required by Governmental regulations.