

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

RAIL DIVISION



Standards & Practices
for
NCDOT Passenger Cars & Locomotives

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1 General Terms & Conditions

1.1 Purpose

This document is issued by the North Carolina Department of Transportation Rail Division, hereafter referred to as NCDOT, to establish a set of standards and practice to be upheld on work done by contractors on NCDOT owned passenger cars and locomotives.

1.2 Compliance with Applicable Regulations

1.2.1 Rolling Stock Standards

All NCDOT owned equipment shall comply in all respects with the applicable Standards and Recommended Practices adopted by the Association of American Railroads (AAR), Amtrak, laws, rules and regulations stipulated by the states in which Amtrak trains operate.

AMTRAK	National Railroad Passenger Corporation
AREA	American Railway Engineering Association
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASTM	American Society Testing Materials
FDA	Food and Drug Administration, US HEW
IES	Illuminating Engineering Society
USPHS	United States Public Health Service, US HEW
APTA	American Public Transportation Association
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
ASTM	American Society for testing and Materials
AWS	American Welding Society
NFPA	National Fire Protection Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
IEEE	Institute of Electrical and Electronic Engineers
SAE	Society of Automotive Engineers
DOT	United States Department of Transportation
FRA	Federal Railroad Administration, US DOT
NRPC	National Railroad Passenger Corporation

The Amtrak Private Car HEP Conversion Manual for conventional cars, which can be obtained from Amtrak, outlines the HEP requirements for making the cars compatible for use in Amtrak service.



1.2.2 FRA Passenger Equipment Safety Standards

NCDOT Contractors shall certify that any work performed on all NCDOT owned equipment complies with current FRA Passenger Equipment Safety Standards (49 CFR Parts 216, 223, 229, 231, 232, 238, & 239). All equipment shall be regarded as being designated FRA "Tier I" or suitable for a maximum of 125 MPH operation.

1.2.3 Amtrak Standard Maintenance Procedures

For overhaul or refurbishment, NCDOT Contractors shall insure that all work performed on NCDOT owned equipment:

1. Meets or exceeds Amtrak [SMP 25603](#) (Design Criteria for Operating Speeds of Private and Railroad Business Cars);
2. Meets or exceeds Amtrak [SMP 28603](#) (Standards for Handling Privately-Owned Cars In Amtrak Trains);
3. Meets or exceeds Amtrak [SMP 46617](#) (Heavy Truck Overhaul Procedure);
4. Meets or exceeds Amtrak [SMP 48001](#) (Repair of Truck Frames and Bolsters by Welding);
5. Meets or exceeds Amtrak [SMP 46605](#) (Reclamation of Truck Crossbars and Swing Hangers);
6. Meets or exceeds Amtrak [SMP 46606](#) (Required Use of Huck Fasteners);
7. Meets or exceeds Amtrak [SMP 49602](#) (Repair and Reinforcement of Equalizer Spring Seats).
8. Is not equipped with rim stamped wheels at any position;
9. And that all tests, inspection forms, etc. required by these or any other applicable SMP's are completed, accepted, and signed off by an authorized Amtrak inspector prior to delivery.

1.2.4 Equipment Clearance

Car clearance envelopes shall be in accordance with NCDOT drawing # [000654A-01](#). All clearance measurements shall be made with the car complete in every respect, without any supplies (all water and/or waste tanks empty), after all leveling and shimming of the trucks, couplers, etc. has been completed. All horizontal clearances shall be measured from the centerline of the carbody, accounting for the maximum lateral travel in the trucks and suspension. The Contractor shall furnish a complete car clearance diagram to Amtrak and NCDOT showing all measurements taken.

1.2.5 Car Weighing

NCDOT equipment shall be weighed on an approved scale or scales, each end of the car with trucks and the car fully supplied for service (full water tank(s), empty retention tank(s), etc.) with the car complete in every respect. Scale weight tickets shall be furnished to NCDOT.

1.3 Drawings / Documentation

1.3.1 General

NCDOT shall require any drawings and/or documentation submitted by contractors in electronic format to be in either Adobe PDF or AutoCAD DWG format. Specifications and technical manuals may be provided in Adobe PDF format. Passenger car and locomotive drawings which include any form of subsystem details shall be submitted in AutoCAD format.

NCDOT may from time to time photographically document job progress of contractor projects, either in traditional film based, or newer video or digital imaging technologies. Although it is not required, contractors are encouraged to also photographically document progress on any NCDOT project.

All materials submitted to NCDOT shall include the provision that they may be reproduced (electronically or otherwise) for use by NCDOT (or its mechanical/electrical sub-contractors) for the purpose of



maintaining and/or servicing NCDOT owned equipment. Proprietary rights to the data contained within such submitted materials shall remain the property of the respective owner.

1.4 NCDOT Quality Standards

NCDOT is committed to providing a product and service of the highest quality that exceeds customer needs and expectations. NCDOT requires contractors and employees to uphold and comply with NCDOT Rail Division standards by ensuring all work performed is of the highest quality possible.

All work performed on NCDOT owned railcars must meet all applicable standards of the Federal Railroad Administration, Amtrak, and NCDOT-assigned inspector(s).

2 Design Criteria & Standards

2.1.1 Load Criteria-General

All equipment, mounting brackets, and associated hardware, installed either internally or externally to the carbody, shall be designed to remain firmly attached to the carbody when subjected to individually applied forces of:

Longitudinal-8g
Vertical-4g
Lateral-4g

These loadings shall be applied individually and shall produce stresses below that of ultimate tensile or shear strengths of the material used.

2.1.2 Load Criteria-Passenger Seats

Seat attachments to floor and side frame shall meet the loading criteria of [Section 2.1.1](#) above while occupied by two-185 pound test dummies. Seat attachment (into floor tapping plates) shall use as a minimum SAE Grade 5, or ASTM A325 national coarse-threaded fasteners.

2.1.3 Load Criteria-Overhead-Mounted Baggage Racks

Baggage rack loading shall be a vertically applied load of 50 pounds per square foot uniformly distributed between points of rack attachments and meeting the criteria of [Section 2.1.1](#) above. The maximum deflection shall not exceed .50". The luggage rack shall not resonate at any frequency excited by the carbody at speeds up to 125 mph. Baggage racks shall be attached using, as a minimum, SAE Grade 5, or ASTM A325 national coarse-threaded fasteners.

2.1.4 Load Criteria-Floor-Mounted Baggage Shelves (Baggage Room)

Luggage compartment loading shall be a longitudinally applied load of 500-pounds total, uniformly distributed over the area of the lateral partition separating the luggage compartment from the passenger compartment, and meeting the criteria of [Section 2.1.1](#) above.

2.1.5 Load Criteria-Floor-Mounted Baggage Shelves (Passenger Area)

Baggage shelf loading shall be a vertically applied load of 50 pounds per square foot uniformly distributed between points of shelf supports and meeting the criteria of [Section 2.1.1](#) above. The luggage rack shall not resonate at any frequency excited by the carbody at speeds up to 125 mph.



2.1.6 Undercar Equipment Supports

All newly-installed undercar equipment supports shall meet the criteria of [Section 2.1.1](#) above. Where possible and appropriate, supports for heavy apparatus shall rest on horizontal flanges of the underframe structure. Underfloor apparatus shall not be supported by bolts in tension. The primary loading on attachment bolts shall be in shear. Apparatus requiring removal and replacement shall be supported so that both bolts and nuts are accessible.

Equipment supported on resilient mounts shall have safety straps or other devices which shall support it in case of failure of the resilient mounts. No equipment shall be supported by bolts in holes tapped in the floor structure. Flexible electric ground straps shall be provided where necessary. All equipment supports shall be primed prior to application to the car.

2.1.7 Interior Equipment Supports

All interior equipment such as baggage racks, vending machines, seats, tables, etc., newly installed on NCDOT owned passenger cars shall be mounted and supported with tapping plates and/or support brackets fixed to the carbody. Equipment attached to carbody with tapping plates or support brackets shall meet the criteria of [Section 2.1.1](#) above.

2.1.8 Materials

All structural material used in the fabrication of brackets, supports, tapping plates, boxes, platforms, modification of car structure, etc., shall either be high-strength low-alloy carbon steel (HSLA) or stainless steel. HSLA steel shall be of a minimum 50,000 psi-yield for materials less than .75"-thick. Stainless steel shall be minimum Type 304 annealed. Other material may be used in non-structural applications as approved by NCDOT.

Threaded fasteners used in structural applications shall be a minimum of SAE Grade 5 or ASTM A325. Coarse threads are preferred. Initial tightening should not produce preloads of more than 50% of yield stresses.

Two-piece rivets, such as the Huckbolt, which develop the strength criteria of ASTM A325 may be used. Blind rivets used in structural applications shall be similar to the Avdel Monobolt in .187" and .250" diameters and the Huck BOM fasteners in .625" diameter and larger. All carbon steel blind and two-piece rivets shall be painted with finish paint after installation.

Welding processes shall be compatible with materials being joined in accordance with AWS recommended practices.

2.1.9 Recommended Practice- Bolted Joints

For NCDOT railcars, NF-threaded bolts should be used in joints subject to steady vibration. NC-threaded bolts should be used where the hole is tapped in a weaker material (cast iron, aluminum alloys, etc.); NC bolts are generally preferred. NC threaded bolts can be used if the bolt diameter is a minimum of ¼". Tap or stud bolts should be avoided. Nylon-insert lock nuts shall be used to the greatest extent possible. Minimum size bolt is #10 and shall be used in groups of four or more except for interior applications. Bracket designs that induce bending in the bolt should be avoided.

2.1.10 Recommended Practice-Welded Joints

Materials being welded shall have thickness ratios no greater than 1:1.5.

Single plate gussets, welded on one side only, shall have the weld carried around the end to provide positive anchoring of the gusset end.

Welded joints shall not be designed to take bending loads unless supported by auxiliary means.



Do not weld washers to lugs or other parts of a fitting.

Avoid joints which require welding at the inside junction of two members forming an acute angle.

Avoid joints in parts which are heat-treated.

Do not weld a brazed joint. The reverse practice of brazing a welded joint shall be permissible.

Avoid designs which require welding into deep pockets because of blowback or arc-over.

Do not weld parts previously spot-welded because of the possibility/probability of inclusion of flux or flux removal fluid in the seam weld.

All welded joints shall be properly protected from corrosion by the application of primers, etc. prior to finish painting.

2.1.11 Interior Finish – Fabric & Leather

a) Synthetic Leather

Synthetic leather used on NCDOT passenger cars shall be Luxor II or equivalent and shall meet the following criteria:

Width	54 Inches	
Weight	17/18 oz. Per linear yard	
Composition	100% Polyurethane face Cotton/rayon backing	
Abrasion	1,000,000 rubs Tabor test: Exceeds 500	ASTM D4157-82 ASTM D3885-92
Tensile	Warp: 225.6 lbs. Average Filling: 160.4 lbs. Average	ASTM D5034
Seam Slippage	Warp: 112.3 lbs. Average Filling: 134.8 lbs. Average	ASTM D4034
Brush Pill	Class 5	ASTM D3511
To Light	Class 5 - 100 hours	AATCC 16a - 1990
Color Fastness to Crocking	Dry: Class 4.5 Wet: Class 4	AATCC 8, Flat - Gray Scale
F/R Rating	*Pass Vertical (treated) *Pass Radiant Panel Test *Pass Smoke Chamber Test	FAR 25.853 (b) ASTM 162 ASTM 662
	* Requirements of FRA	



b) Fabric

Fabrics used on NCDOT passenger cars shall be transportation quality woven fabrics and be of 90% wool and 10% nylon construction. The fabrics shall have the following physical characteristics when tested according to Federal Test Method # 191:

NUMBER 191 TEST	WOOL & NYLON TEST
Test 5106 - Tensile Strength	Warp: 200 lbs. Fill: 150 lbs.
Test 5110 – Seam Strength	Warp: 20 lbs. Fill: 50 lbs.
Test 5134 - Tear Strength	Warp: 14 lbs. Fill: 18 lbs.
Test 5306 - Abrasion Resistance, 500 gram load CS-10 Calibrase Wheel	No thread breakage after 1000 cycles
Test 5651 - Crocking	Good, both wet and dry
Test 5660 - Color fastness - 100 hours	

2.1.12 Climate Control

NCDOT passenger cars are equipped with fixed temperature thermostats. All thermostats installed on NCDOT equipment should match application, function, and setpoints are as follows:

Application	Function	Setpoint
Cooling Operation Ambient Lockout	NC – opens at or below setpoint	45
Heating Layover (Floor & Overhead)	NO – closes at or below setpoint	45
Cooling Layover	NC – opens at or below setpoint	80
Overhead Heat Day	NO – closes at or below setpoint	72
Cooling Day	NC – opens at or below setpoint	72
Overhead Heat Night	NO – closes at or below setpoint	76
Cooling Night	NC – opens at or below setpoint	76
Floor Heat Zone 1	NO – closes at or below setpoint	70
Floor Heat Zone 2	NO – closes at or below setpoint	70
Local Floor Heat (Restrooms) ¹	NO – closes at or below setpoint	70
Freeze Protection	NO – closes at or below setpoint	45

Settings shown are degrees Fahrenheit.

¹ Line voltage thermostat, 240VAC.

3 Reconditioning & Exterior Finish

NCDOT recommends the following standards as a minimum for exterior finish paint applications and surface reconditioning on NCDOT owned equipment.



3.1.1 Paint Application and Exterior Finish Specifications

Surface reconditioning, primer coating, finish coating, and clearcoat application processes are specified by the supplier. A two part polyurethane paint shall be used on all exterior painted surfaces except for fuel tanks, air reservoirs, trucks, battery boxes, and other undercarriage painted surfaces which shall be a single part enamel. Surfaces shall be primed per paint manufacturer's instruction. Refer to recommended application process and other related product specifications provided by each supplier.

3.1.2 Surface Preparation Standards

The contractor will be required to abide by recommended surface preparation standards adopted by NCDOT Rail Division. Sections a)-h) are standards of common practice as recommended by *Finnaren & Haley Paint & Coatings*.

a) Solvent Cleaning

This procedure removes all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. This procedure does not remove rust or mill scale. It is recommended to change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process.

b) Hand Tool Cleaning

This procedure removes all loose mill scale, loose rust, non-adhered paint and other detrimental foreign matter by way of hand chipping scraping, sanding, wire brushing, etc. It is not intended that adherent mill scale, rust, and paint be removed by this process. Visible oil, grease, soluble welding residues, and salts will need to be removed before hand tool cleaning by methods described in section describing [Solvent Cleaning](#).

c) Power Tool Cleaning

This procedure removes all loose mill scale, loose rust, and other detrimental foreign matter by way of power tool chipping, descaling, sanding, wire brushing, grinding, etc. It is not intended that adherent mill scale, rust, and paint be removed by this process. Visible oil, grease, soluble welding residues, and salts will need to be removed before hand tool cleaning by methods described in section describing [Solvent Cleaning](#).

d) White Metal Blast Cleaning

A white blast cleaned surface when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, paint, oxides, corrosion products, and other foreign matter.

e) Commercial Blast Cleaning

A commercial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33% of each square inch of the surface area and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied paint. Visible deposits of oil or grease will need to be removed before hand tool cleaning by methods described in section describing [Solvent Cleaning](#) or other agreed upon methods.

f) Brush-Off Blast Cleaning

A brush off cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating. Tightly adhered mill scale, rust, and coating may remain on the surface. Mill scale, rust, and coating are considered tightly adherent if they cannot be removed with a dull putty knife.



g) Near White Blast

A near white blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5% of each square inch of surface area and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by methods described in section describing [Solvent Cleaning](#) or other agreed upon methods.

h) Water Jetting

This standard provides requirements for the use of high and ultrahigh pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

Low pressure water cleaning is performed at pressures less than 5,000psi.

High pressure water cleaning is performed at pressures between 5,000psi and 10,000psi.

High pressure water jetting is cleaning performed at pressures between 10,000psi and 25,000psi.

Ultra high water jetting is cleaning performed at pressures above 25,000psi.

3.1.3 Paint Specifications

NCDOT requires standard coats to be of the DuPont Imron product line. Previous NCDOT projects required the use of the following DuPont products:

DESCRIPTION	DUPONT P/N	NCDOT P/N
Paint, Imron, Blue	40P3759	004891
Paint, Imron, Red	40P1664	004892
Paint, Imron, Activator for Red/Blue	VG6005	004893
Paint, Imron, Silver	N0183HN	004894
Paint, Imron, Activator for Silver	193S	004895
Paint, Imron, White	610P12074	004896
Paint, Imron, Black	610H28906	004897
Paint, Imron, Thinner for Black/White	68083	004899
Imron 5000 Reducer	8685S	
Activator	VGY-610	
Thinner for 610 & 40P	Y32035	
Clear Top Coat	610P	

It is the responsibility of the contractor to obtain adequate coating materials necessary to complete the specified project. Paint suppliers shall be determined by successful bidder. NCDOT can recommend suitable vendors if desired.

Any substitutions of any exterior finish material will not be allowed without the expressed written consent of NCDOT. Material substitutions shall be approved by NCDOT, must comply with test requirements specified by NCDOT, and be made available to NCDOT for review.

Unused materials purchased specifically for this project are the property of NCDOT and shall be returned to NCDOT upon completion of the project.



3.1.4 Recommended Tests

If substitutions are approved, NCDOT recommends but does not require the vendor to provide information on product testing which includes adhesion, gloss, film thickness, solvent resistance, film hardness, lead-free, impact, ultraviolet resistance, etc.

3.1.5 Quality Control & Workmanship

All exterior finish surfaces shall be prepared according to recommendations by paint supplier to ensure the intended maximum quality finish coating and resilience. Reconditioned surfaces pre-paint shall comply with procedures described in section [1.5.2 Surface Preparation Standards](#).

NCDOT recommends at the minimum the following coating systems:

Surface Preparation: Near White Metal Blast or Brush Off Blast Cleaning

Primer: Coating applied at 3-5 mils dry film thickness.

Second Coat: Coating applied at 3-5 mils dry film thickness.

Top Coat: Applied at 2-3 mils dry film thickness.

Clear Coat: Applied at 2-3 mils dry film thickness.

3.1.6 Finish Defects

Exterior finish coating shall be visually inspected for undesirable conditions as described in SAEJ1800 APR87, Section 9 Appendix – Glossary of terms. See [Appendix A](#) at the end of this document for a listing and descriptions of unacceptable exterior finish conditions.

Final inspections will be conducted by an NCDOT assigned inspector. Acceptance of locomotive and/or passenger car based on this criteria will be up to the discretion of the NCDOT inspector.

3.1.7 Decals /Striping/Taping

NCDOT has adopted a standard color scheme for all equipment of black, white, blue, silver metallic/platinum mist, safety red, and yellow. These may be applied in the forms of paint, decals, standard tape, or Scotchlite tape.

The following decals and reflective stripes are used on NCDOT equipment. Decals are normally supplied by International Nameplate.

Passenger Cars		
ITEM	Description	# Per Car
1	Tape, Reflective White, Scotchlite 1" wide	24 feet
2	Tape, Reflective Red, Scotchlite 2" Wide	160 feet
3	Decal, Stripe/Stars, North Carolina	2
4	Decal, Car Number, 6"	2
5	Decal, Car Name, 6"	2

Locomotives			
ITEM	Description	# Per Unit	NCDOT #
1	Tape, Reflective Yellow, Scotchlite 2" wide	~75 feet (F59)	1237
2	Tape, Reflective Red, Scotchlite 4" Wide	~130 feet	1238



3	Decal, Stripe/Stars, Right Side Locomotive	1	0853
4	Decal, Stripe/Stars, Left Side Locomotive	1	0852
5	Decal, Road Number, 1755, 10"	2	0841
6	Decal, Road Number, 1755, 8"	2	0844
7	Decal, North Carolina, 24"	2	0850
8	Decal, NC Star, F59PHI, Locomotive Nose	1	0859

For refurbishment or repainting projects, unless otherwise specified, NCDOT will require contractors to supply graphics decals, scotchlite tape, standard locomotive and car stickers (ie high voltage, danger, watch your step).

4 Tests & Adjustments

4.1 General

As a minimum, prior to final acceptance and/or shipping of cars or locomotives, the following tests shall be performed by contractors as required or necessary. All test data shall be recorded and furnished to NCDOT in a format to comply with other documentation requirements. All such final acceptance testing shall be witnessed by NCDOT staff and/or authorized inspector.

4.2 Wiring / Electrical

4.2.1 27 Pin Communications & MU Trainlines

Continuity of 27-pin Communication and MU Trainline Wiring side to side and end to end. A 2 ohm resistance shall be the maximum permitted, including the test wire.

Megger of the 27-pin systems, all wiring included. During this test, the battery charger and battery, and PA system shall be disconnected. The test shall be done with a 500 volt megger; 2 megohm shall be the minimum measured value.

Check for proper operation of loop relays and associated trainlines, tested from both ends.

Check for proper operation of conductor signal trainline.

Operational test of PA system, including cutout of speaker at location nearest announcer's location (where applicable).

4.2.2 Outlets & Receptacles

All outlets and receptacles shall be checked for proper voltage, polarity, and grounding.

4.2.3 Battery Charger

With the car supplied with 480 volt power, the output voltage of the battery charger shall be checked. With only the battery and emergency lighting as loads, and with the battery fully charged, the output charger voltage shall be 75 + 5volts.

4.2.4 Marker Lights

Marker light voltages shall be adjusted to 35.0 volts, as measured at the lamp. This adjustment shall be done with the battery charger operating with output voltage of 75 volts. If voltage is other than 75 volts, the lamp voltage shall reflect the difference ½ volt at the marker lamp for each volt deviation at the charger.



4.2.5 HEP Trainline

Continuity of the 480 volt trainline system, including power loop circuits.

Check for proper phasing of the 480 volt receptacles and all connected carbody equipment.

4.2.6 Insulation Resistance

Insulation resistance to ground of each nominal voltage system and separable circuit when measured with a 500 volt megger, at the time of final car construction in the Contractor's plant, shall be at least the following values:

Nominal Voltage	Minimum Resistance Value to Ground
64	2 Megohms
120	3 Megohms
240	3 Megohms
480	3 Megohms

4.3 HVAC System

Pressure test air conditioning system with freon-nitrogen mixture at a minimum pressure of 250 psi. Install new filter drier core in air conditioning system following completion of pressure test. Evacuate and de-hydrate air conditioning system. System shall be pumped down to 5000 microns and held for a minimum of 30 minutes.

Functional test of heating system to ensure proper thermostatic control of heat in all modes of operation. Check of proper fan rotation.

Functional test of each electric overhead heater overheat shutoff. This shall be done by deactivating the blower and observing that the vane switch does control the operation of the heat contactor.

Air distribution shall be measured and adjusted on the car as necessary to achieve appropriate balance as recommended by the HVAC system OEM.

Air conditioning system shall be operated a minimum of eight hours during final test. Record all measurements at the start of the test cycle, and again at one hour intervals. Measurements to include:

- outside (min. 85 F) ambient temperature
- return air temperature (as measured at the return air grill)
- inside carbody air temperature (to be taken in at least six locations throughout the carbody, approximately four feet from the floor).
- system voltage and current measurements shall be taken off the Evaporator, Condenser and Compressor motors.

A temperature balance of ± 2 degrees F shall be obtained.

The following items shall be checked as part of this test:

- Expansion Valves
- Solenoid Valves
- Pressure Switches for Setting and Operation
- System unloading
- Moisture Indicator
- Freon Level



4.4 Doors

Weather stripping shall be checked to ensure air-tight seals at all doors.

Manual end door operators shall operate smoothly and shall properly latch the door when closing.

4.5 Decelostat System

Decelostat system shall be tested in accordance with manufacturer’s recommendations, including speed sensor air gaps.

4.6 Braking System

Air and hand brakes shall be tested in accordance with current FRA requirements. Car shall have a C.O.T. & S. date no greater than 30 calendar days prior to delivery to NCDOT. All tests performed shall be documented and submitted to NCDOT.

Refurbished equipment shall require a ‘Golden Shoe’ test unless otherwise specified by NCDOT.

4.7 Water System

A water system leak test shall be performed at a minimum system pressure of 50psi. Water system to be readjusted to a nominal 35psi pressure following completion of test.

4.8 Carbody Water Test

A carbody water tightness test, including all windows, shall be performed on all cars prior to shipment.

4.9 Pre-Revenue Service Acceptance Testing Plan

The Contractor shall prepare for and fully comply with the requirements under 49CFR§238.111.

4.10 Other Federally Mandated Testing

The Contractor immediately prior to releasing each car for shipment to NCDOT shall perform and fully document all federally mandated testing as required through the annual level, including but not limited to:

- ☞ Exterior Calendar Day Mechanical Inspection (49CFR§238.303)
- ☞ Interior Calendar Day Mechanical Inspection (49CFR§238.305)
- ☞ Periodic Mechanical Inspection (49CFR§238.307)
- ☞ Periodic Brake Equipment Maintenance (49CFR§238.309)
- ☞ Single Car Test (49CFR§238.311)
- ☞ Class I Brake Test (49CFR§238.313)

5 Components List

This section includes details on components currently installed on NCDOT owned passenger cars. NCDOT recommends contractors match existing components or match with equivalent.

5.1 Carbody

Component	Manufacturer	OEM Part #	NCDOT #
Diaphragm (Amfleet-Type)	SMR	5MA1148-1	542
Diaphragm Curtain	Adams-Westlake		



Component	Manufacturer	OEM Part #	NCDOT #
Diaphragm Curtain Shield	Adams-Westlake		
Door Closer, End Doors	Norton	8301BF	830
Flooring, Plymetal Septum	Greenwood Forest Products		
Platform Folding Tail Gate, Model 5	Adams-Westlake	5	611
Rack, Baggage-Overhead	Contec Inc.	A-9427	
Window Assy., 66 Seat Coach, Emergency	J. T. Nelson Company	R00F40026	612
Window Assy., 66 Seat Coach, Large	J. T. Nelson Company	R01R00012	613
Window Assy., 66 Seat Coach, Small	J. T. Nelson Company	R01R00013	614
Window Assy., Lounge End Door, Large	J. T. Nelson Company	R01H60156	615
Window Assy., Lounge End Door, Small	J. T. Nelson Company	R01A60199	616
Window Assy., Vestibule Door, Left Hand	J. T. Nelson Company	R00D40001	617
Window Assy., Vestibule Door, Right Hand	J. T. Nelson Company	R00D40003	618

5.2 Communications

Component	Manufacturer	OEM Part #	NCDOT #
Conductor's Signal	AIC	SEA 213 A1	
PA Unit	Safetran	A 47034-300	451
PA Unit Enclosure	Safetran	A 47035	619
Speaker Grille	Safetran	A 47029	620
Speaker w/Enclosure	Safetran	A 47045	621

5.3 Electrical

Component	Manufacturer	OEM Part #	NCDOT #
AN-100/12 Railcar Annunciator	Mid-America Controls	238	
Battery Charger, 480V AC/75VDC, 45A	SAFT NIFE	75BC45	604
Battery, 80 AH, 50-cell, NiCd, Flame Ret	SAFT NIFE	SRM80F3	622
DC Meter Panel, 80V	Mid-America Controls	233	
ELR Type I Panel	Mid-America Controls	235	
HEP TL Disconnect	Mid-America Controls	854	
Light Switch Panel	Mid-America Controls	251	
Loop Relay Panel	Mid-America Controls	242	
Power Source Selection System, 480V	Mid-America Controls	859	
Relay, Low Voltage, 50A, 74V, 74 V Coil	Vapor	36040001-31	
Transformer, 480/120VAC, Dry, 5KVA	Westinghouse	S48G11S05N	623
Transformer, 480/240VAC, Dry, 10KVA	Westinghouse	S48G11S10N	624
Type I Power Distribution Panel	Mid-America Controls	215	
Type II Power Distribution Panel	Mid-America Controls	217	
Type III Power Distribution Panel	Mid-America Controls	219	

5.4 HVAC

Component	Manufacturer	OEM Part #	NCDOT #
Climate Control System	Mid-America Controls	027	
Condensing Unit, 8-Ton	Safety	B-3740-2	
Duct, High Temp Flex	Avalon Industries		
Duct, Flexible		55015K43	
Diffuser	Tuttle & Bailey	6402BOINT72SA	



Component	Manufacturer	OEM Part #	NCDOT #
End Seal Kit	Raychem	STK1	
Evaporator Assy, 8-Ton	Safety	B-1444-19 (Right)	
Exhaust Fan Assembly	Dayton	4C447	601
F. H. Junction Box Cover	Mid-America Controls	399	568
F. H. Junction Box, Left (Includes cover)	Mid-America Controls	414	566
F. H. Junction Box, Right (Includes cover)	Mid-America Controls	416	567
Filters, Air, 16x20x2 Pleated	Farr American Air Filter	049880001	37
Heater Assy, Floor, Liquid-Filled, 500W	Mid-America Controls	407	569
Heater Assy, Floor, Liquid-Filled, 750W	Mid-America Controls	408	
Heater Assy, Floor, Liquid-Filled, 1000W	Mid-America Controls	409	
Heater Assy, Floor, Liquid-Filled, 1250W	Mid-America Controls	410	
Heater Assy, Floor, Liquid-Filled, 1500W	Mid-America Controls	411	
Heater Assy, Floor, Liquid-Filled, 2000W	Mid-America Controls	412	570
Switch, Emergency Fan	AIC	SED-042	
Thermostat Assy-20, 40, 50, 100 Fresh Air	Ogontz	2-3-4-56-009	625
Thermostat Assy-45,71 Floor Heat	Ogontz	2-3-4-56-006	626
Thermostat Assy-68, 78 Return Air	Ogontz	2-3-4-56-011	627
Thermostat Assy-70 Fresh Air	Ogontz	2-3-4-56-012	628
Thermostat Assy-70, 72, 74, 76 Return Air	Ogontz	2-3-4-56-010	629

5.5 Lighting

Component	Manufacturer	OEM Part #	NCDOT #
Ballast, AC, 120V AC, 1-F40T12	Advance	RL140TP	
Ballast, AC, 120V AC, 2-F40T12	Advance	RL2540TP	
Ballast, DC, 75 VDC (Inverter)	RIMSCO	83-018	514
Bracket, Resistor	Ward Leonard	805-D	
Light, Blind End	Trans-Lite	82816	
Light, Ground Fixture	Trans-Lite	FP-GDA-15-3	543
Light, Locker Fixture	Trans-Lite	AL-4330-3	
Light, Marker Fixture	Luminator	0103086001	
Light, Marker Resistor	Ward Leonard	100A30	
Light, Plenum	Appleton	VU100	
Light, Reading Assy	Luminator	0107644	
Receptacle, Duplex GFCI	Bryant	5342	
Receptacle, Twist Lock, 3P, 4-Wire	Hubbell	20443	
Receptacle, Twist Lock, Type ML-2R	Bryant	7596-ER	
Switch, Ground Light (Vest. Trap Door)	Square-D	9007-C54E	516
Switch, Limit	Microswitch	BAF1-2RM-RH	

5.6 Toilets

Component	Manufacturer	OEM Part #	NCDOT #
Dispenser, Multi-Purpose	Bobrick	B-3301	
Grab Bar, L-Shaped, LH	Bobrick	B-6156	
Grab Bar, L-Shaped, RH	Bobrick	B-6146	
Grab Bar, Straight-30"	Bobrick	B6106x30"	
Receptacle, Trash	Bobrick	B-525	
Sink	Jasons Sheet Metal	F82	
Toilet Assembly, Complete	Microphor	52601	111



Component	Manufacturer	OEM Part #	NCDOT #
Waste Holding Tank (300-gal)	Microphor	52037	
Flush Button Assembly	Microphor	89036	
Air Panel Assembly	Microphor	52074 / 52075	
Aisle Control Panel	Microphor	52034	
Undercar Electrical Box	Microphor	52036	
Tank Drain Valves	Microphor	29085	
Tank Vent Housing	Microphor	52086	
Toilet System Status Panel	Microphor	54016	
Toilet Closed Light Assembly	Microphor	52350	
Water Panel Assembly	Microphor	52072 / 52073	
Toilet Control System	Microphor	52035	

5.7 Trainline

Component	Manufacturer	OEM Part #	NCDOT #
Housing, 480V Receptacle	Pyle National	RCP-17-WO	234
Jumper, 27-Point Communication-60	Pyle National	WWPCJ2746AM TR	240
Jumper, 27-Point MU-60"	Pyle National	WWPCJ2746- S699	242
Jumper, 480V Fixed w/Strain Relief-84.5"	Pyle National	RPC-14-85	230
Lugs, Electrical, 22 - 10 AWG	AMP	PIDG Series	
Lugs, Electrical, 8 - 2 AWG	AMP	Solistrand Series	
Lugs, Electrical, 1/0 - 4/0	AMP	Ampower Series	
Plug, PV Audio Trainline	Pyle National	PZEDK-7- 101221	
Receptacle, 27-point Communication	Pyle National	WWRF-27- AMTR XL 180	238
Receptacle, 27-point Dummy Communication	Pyle National	WWRF-27- AMTR XL 180	
Receptacle, PV Audio Trainline	Pyle National	RZEBB-3- 101221	
Receptacle, 27-point MU	Pyle National	WWRF-27-L180	244
Receptacle, 480V w/30" Leads	Pyle National	RPC-15-30	232
Sleeve, Insulating-10.5"	Mark Equipment Co.	M-105A	
Trainline Kit, Complete	Power Parts Co.	PPC 16300	
Wire, 16/2 Shielded Pair	Suprenant	AMTK Dwg D- 04-7229-4	
Wire, 4/0-Double Wall Insulated, 2000V	Suprenant	FXE-55024V105	
Wire, General	Suprenant	Exane DAA-1068 A	
Wire, High-Temp-260 degrees C, 12AWG	Suprenant	AMTK DWG D- 12-7228-3	
Wire, Twisted PR, 14/2x5 individually- Shielded	Suprenant	AMTK DWG D- 12-7229-2	

5.8 Water

Component	Manufacturer	OEM Part #	NCDOT #
Cooler, Water	Sunroc	RPR-3/PS	
Heater, Drain, 1.25", 120VAC	Ogontz	2-3-4-65-007	



Component	Manufacturer	OEM Part #	NCDOT #
Heater, Water (Non Flash)	Ogden	CKV-130	
Insulation, Pipe (undercar)	Armstrong	Armflex II	
Insulation, Pipe (Underfloor heat)	Nomex Fiber	NX-08	
Tape, Aluminum	Raychem	AT-150	
Tape, Heat Trace, 8W/Ft, 120VAC	Raychem	TLT-120BB	
Thermostat & Well, 45 degrees	Fenwal	80016-4-45 degrees	
Thermostat & Well, 55 degrees	Fenwal	80016-4-55 degrees	
Valve, Auto Drain-Heated , .75	Ogontz	1-3-4-39-015	
Valve, Vacuum Relief	Watts	36A	

5.9 Wheel Slide

Component	Manufacturer	OEM Part #	NCDOT #
Connector, Circular	Amphenol	MS-3102A-20-07P	
Control Unit, w/Connectors, E-7	WABCO	591731	358
Fitting, Test	Salem	700-1	
Harness, T-type	WABCO	672967	361
Pipe Bracket, Magnet Valve, D-1	WABCO	673271	360
Switch, Pressure,-DPDT, 23R-10F	Square-D	ACW-21	

5.10 Passenger Car Signage

Refer to Appendix B for details on interior signage for:

- 66 Seat Coaches – 400001-400005
- 56 Seat Coaches – 400006-400008
- Combination 34 Seat Coach/Baggage – 400101-400102
- Lounges – 400201-400202

All interior signage is supplied by International Nameplate Supplies (INPS).

6 Reference Specifications

6.1 Amtrak

Amtrak Private Car HEP Conversion for Conventional Cars Manual; Includes wire specification Q-78-7.

Amtrak issued SMP (Standard Maintenance Procedure) documents including, but not limited to, those listed in [Section 1.2.3](#) above.

These specifications may be obtained from:

Amtrak
 Engineering Mechanical Service Center
 15 South Poplar Street
 Wilmington, DE 19801
 302-683-2066

6.1.1 Document 0001311A

Amtrak National On-Board Signage Guidelines and Mechanicals Manual



6.2 FRA

FRA Passenger Equipment Safety Standards
49 CFR Parts 216, 223, 229, 231, 232, 238, & 239

6.3 NCDOT

6.3.1 Document 0001414A

Repainting Specification for NCDOT F59PHI Locomotives

6.3.2 Document 0001423A

Refurbishment Specification for NCDOT 66 Seat Coaches

6.3.3 Document 0001411A

Refurbishment Specification for NCDOT 38 Seat Coach / Baggage Combine

6.3.4 Document 0001412A

Refurbishment Specification for NCDOT Lounge / Baggage Combine

6.3.5 Document 0000789A

Flammability, Smoke, & Toxic Gas Emission Standards For Materials Used In The Refurbishment of NCDOT Owned Railway Passenger Cars

6.3.6 Document 0000739A

56 Seat Coach Color and Material Schedule

6.3.7 Document 0000700A

Electrical Control Equipment Specification for Railway Passenger Cars # [9805](#).

7 Reference Equipment

7.1 General

NCDOT desires to standardize its equipment to use the same items, assemblies, and/or products to the greatest extent practical. For this reason, many of the detail items contained within this specification are referenced as being the "preferred solution".

Contractors wishing to conduct inspections, research, etc. should please contact the Capital Yard Engineering Office or Rail operations Manager at (919) 715-5753 to arrange access at least 72 hours ahead.

All equipment is currently in service for trains 73 /74, and based at the NCDOT Capital Yard Maintenance Facility. Equipment may be available for comparison, research, etc.

7.2 NCDOT 400001- 400005 66 Seat Coaches

400001 Cardinal
400002 Dogwood
400003 Honey Bee
400004 Long Leaf Pine
400005 Scotch Bonnett



Originally built in 1965 by Pullman Standard for the Kansas City Southern as 72 seat coaches, these cars were first refurbished in 1993 (or 1995 – 400003) to a handicap accessible 66 seat configuration. The 400001-400003 and 400005 were refurbished again in 2007.

7.3 NCDOT 400006 - 400008 56 Seat Coaches

400006 Emerald
400007 Box Turtle
400008 Gray Squirrel

Originally built in 1964 by St. Louis Car Company for the Union Pacific Railway as 44 seat coaches, these cars were part of the Amtrak HEP Conversion "Heritage" fleet until purchased by NCDOT. They were converted to a 56 seat coach configuration in 2007, with new restrooms, etc. to allow wheelchair access at the B end.

7.4 NCDOT 400101- 400102 34 Seat Coach / Baggage Cars

400101 Yadkin River
400102 Haw River

Originally built in 1953 by St. Louis Car Company for the US Army as a full length Hospital Car. The 400101 was acquired from the Chesapeake & Ohio Historical Society and converted to a 34 seat coach/baggage by NCDOT in 2007. The 400102 was converted to a track inspection car by the FRA and acquired by NCDOT in 2006 for conversion to a 34 seat coach/baggage car.

7.5 NCDOT 400201- 400202 Lounge / Baggage Cars

400201 Pamlico Sound
400202 Albemarle Sound

Originally built in 1953 by St. Louis Car Company for the US Army as a full length Hospital Car and converted to 3100 series lounge cars by Amtrak. These cars underwent refurbishment for NCDOT in 1995 and 1997 respectively. The 400201 and 400202 will be converted into combination baggage/lounge cars with vending machine food and beverage service.

7.6 NCDOT 1792 GP40H-2 Locomotive

1792 City of Raleigh

Originally built in 1966 for the Louisville & Nashville Railroad and rebuilt for NCDOT in 1992. NCDOT 1792 has undergone repainting in 2004.

7.7 NCDOT 1755 & 1797 F59 PHI Locomotive

1755 City of Salisbury
1797 City of Asheville

This Electro-Motive Division F59PHI Locomotive was built in 1999 for NCDOT Rail Division for service on the Piedmont passenger train. Both locomotives have been repainted – NCDOT 1755 in 2006 and NCDOT 1797 in 2004.



8 Appendices

8.1 Appendix A - Exterior Finish Defect Conditions Descriptions

From SAEJ1800 APR87, Section 9 Appendix – Glossary of terms

Alligatoring—A uniform distribution of surface cracking in a symmetrical pattern resembling the skin of an alligator.

Black Lining—Dark lines that appear along the tops of ridges in the sealer due to paint flowing down the sides of the ridges.

Blistering—Raised areas on the paint's surface due to volatile substances coming out of the sealer after the topcoat has started to "cure."

Blushing—A lightening of the paint's hue due to moisture in the air, moisture in the sealer, or poor hiding power of the topcoat.

Cracking—Separations in the topcoat film before or after baking. Cracking can be caused by shrinkage of the paint film during the bake cycle, swelling of the sealer after the topcoat has started to cure, or sliding of the uncured paint film on the uncured sealer due to incompatibility.

Cratering—Round depressions in the paint's surface, usually due to contaminants in the paint or on the surface being painted.

Discoloring—A change in the absolute color of the topcoat usually due to a chemical interaction between the topcoat and the sealer.

D.O.I.—Distinctness of Image.

Dulling—A reduction in the level of gloss, or D.O.I., of the topcoat, usually due to an interaction between the topcoat and the sealer beneath.

Fish Eyes—Circular areas devoid of topcoat caused by the wet paint "drawing" in on itself due to surface contaminants such as oil or silicones or a general incompatibility of paint and sealer.

Metal Flake Re-Orientation—A uniform change, over the sealer, in the apparent color of a metallic topcoat. This difference is independent of the configuration of the sealer bead. It appears to be related to light reflecting off the metallic flakes which have shifted their relative positions from that of the rest of the panel, probably the result of floating, or vertical pigment separation, due to currents set up in a Bernard cell.

Metal Flake Mottling—A puddling of the metallic and non-metallic pigments in a topcoat giving it a blotchy appearance.

Pinholing—Small holes, the size of a pinpoint, in the surface of the topcoat that result when small bubbles burst as the paint cures.

Popping—Usually refers to a fairly uniform distribution of small blisters caused by the volatilization of entrapped solvent beneath a topcoat that has started to cure. The volatile material can be from the sealer coated or from a layer of paint that is excessively thick.

Running—A movement or flowing of wet topcoat over the sealer caused by a paint-sealer incompatibility or an excessive application of topcoat.

Seedy Appearance—A paint-sealer incompatibility causing pigment (our intended readers won't know this one) beading to a surface that is spotted with raised "grainy" looking particles.

Soft Paint—A paint film that has not achieved its specified hardness. This can be caused by the migration of plasticizers, into the topcoat, from the sealer, or by the sealer chemically retarding the topcoat's curing system.

Staining—A discoloring of the topcoat due to a sealer-topcoat interaction.

Tacky Topcoat—A more severe form of a "soft paint" in which the sealer has interfered with the topcoat curing mechanism to the degree that fingerprints can be left on the paint's surface.

Yellowing—A particular form of staining, in which a yellowish stain appears, usually-associated with light color topcoats.



Wrinkling—A paint-sealer incompatibility which causes the topcoat’s surface to cure at a different rate resulting in the formation of ridges. These ridges can vary in absolute size but generally are uniform in size on any one particular panel.

8.2 Appendix B – Signage For NCDOT Passenger Cars

8.2.1 66 Seat Coaches – 40001-40005

NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 66	LOCATION
005777	0298NS	Sign, "Fully Equipped FRA..."	2 EA	Vestibule-Beside End Doors
005785	0078NS	Sign, "No Smoking"	8 EA	2-A-end Walls 2-Booth Walls 2-B-end Walls 1-Unisex 1-Handicap
005800	0005NS	Sign, Emergency Tools	1 EA	A-End Tool Storage
005801	0026NS	Sign, "Rest Room" Unisex, w/Braille	1 EA	Unisex Restroom Ext Door
005783	0174NS	Sign, Sliding Door Open"	1 EA	Handicap Restroom Ext Door
005784	0019NS	Sign, "Trash" w/Braille	5 EA	2-A & B End Trash Lockers 1-Unisex 2-Handicap
005802	0027NS	Sign, "Towels" w/Braille	2 EA	1-Handicap 1-Unisex
005803	0184NS	Sign, "Flush" w/Braille	2 EA	1-Handicap 1-Unisex
005804	0002NS	Sign, "Do Not Throw Trash Into Toilet"	2 EA	1-Handicap 1-Unisex
005776	0310NS	Sign, "Reserved For Passengers..."	1 EA	B-End Wheelchair Section
005805	0032NS	Sign, "Caution-Do Not Sit Or Lean..."	2 EA	A-End Tables
005786	0185NS	Sign, "First Aid Kit", Red	1 EA	A-End Compartment
005787	0154NS	Sign, Fire Extinguisher", Red	1 EA	A-End Compartment
005782	0646NS	Sign, "Crew Storage"	1 EA	A-End Locker
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 66	LOCATION
005807	0561NS	Sign, "Restroom", Handicap w/Braille	1 EA	Handicap Restroom Ext Door
005808	0024NS	Sign, "Toilet Paper" Restrooms, w/Braille	2 EA	1-Handicap 1-Unisex
005809	0335NS	Sign, "Emergency Blower Shut Off"	N/A	
005810	0153NS	Sign, "Caution-For Your Safety..." Vestibule	2	Vestibule-End Walls
005790	0045NS	Sign, "Do Not Enter..." w/Braille	1	Electrical Locker
005778	0007NS1	Sign, Seat Number Set, w/Braille (1-8)	N/A	
005779	0007NS3	Sign, Seat Number Set, w/Braille (33-48)	N/A	
005780	0007NS4	Sign, Seat Number Set, w/Braille (49-66)	N/A	
005781	0007NS5	Sign, Seat Number Set, w/Braille (67-84)	N/A	
005792	0039NS	Sign, "Unlock/Lock" w/Braille, Handicap Restroom	2	1-Handicap 1 Unisex Int Doors
005793	0614NS	Sign, "Push Gently to Close Door", Restrooms	N/A	
005794	0528NS	Sign, "Changing Table", Handicap Restroom, 56 Seat Coach	1	Handicap Restroom
005795	0146NS	Sign, "Lighting & A/C Controls", Electric Locker	1	Electrical Locker
005796	0062NS	Sign, "Soap", w/Braille, Restrooms	2	1-Handicap 1-Unisex
005797	0239NS	Sign, "Brake For Emerg. Use Only", Red	N/A	
005798	0320NS	Sign, "Caution-Max. 25 Lbs.", Baby Changing Table	1	Handicap Restroom
005811	0615NS	Sign, "120 Volts", 1/4" x 2", Elect. Outlet, 56 Seat Coach	9	2-Ext. Outlets 7-Int. Outlets
005107	0427NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, One Arrow	6	Emerg. Window Aisles
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 66	LOCATION
005812	0618NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, Two Arrows	6	Emerg. Window Aisles
000283	0428NS	Sign, HPPL, "Emerg. Exit", Emergency Window Handle	12	Emerg. Pull Handles
005101	0309NS	Sign, HPPL, "Exit", w/Braille, Hor., Int., End Doors, Top	4	End/Vest. Doors (1EA)



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005102	0305NS	Sign, HPPL, "Exit", Vert., Int., End Doors, Bottom	4	End/Vest. Doors (1EA)
005106	N/A	Tape, HPPL, 1" Wide, Int. Ext Doors (30 Ft Roll)		End/Vest. Doors
005108	210-96	Sign, Holder Only, Emerg. Exit Decal (005107)	6	Emerg. Window Aisles
005110	B-1219HCCW	Sign, HPPL, Arrow, CCW, Int. Door Handles	2	Vestibule Doors
005103	B-1219HCW	Sign, HPPL, Arrow, CW, Int. Door Handles	2	Vestibule Doors
005109	INSPSP100	Sign, Emergency Access, White, Reflective	2	Ext. Vest. Doors Lounge
005104	B-1219RCCW	Sign, Reflective Arrow, CCW, Ext. Door Handles	2	Vestibule Doors
005111	B-1219RCW	Sign, Reflective Arrow, CW, Ext. Door Handles	2	Vestibule Doors
000412	0360NS	Sign, Emerg. Window Instr. Int. Dbl. Top, 66 Seat Coaches	12	Emerg. Windows
005581	0452NS	Sign, Emerg. Window Instr. Int. Single Pane, Top, 56 Seat Coaches	N/A	56 Seat Coaches
003118		Sign, Emerg. Window Instr. Int. Dbl. Bottom, Lounge	N/A	Lounge Cars
005813	1400NS	Sign, Danger 480 Volts AC	1	Electrical Locker
005483		Sign, "Door Not An Exit"	3	1-Handicap 1-Unisex 1-Elect. Lckr
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 66	LOCATION
003961		Sign, Ext. Handicap Accessible Icon	3	2-B-End Ext. Carbody 1-B-End Ext. End Door
005470	HERZOG100(RB)	Sign, Emerg. Window Instr. Ext. Reflective, Single, Top	N/A	56 Seat Coaches
005442	HERZOG100A	Sign, Emerg. Window Instr. Ext. Reflective, Double, Top	6	Emerg. Windows
005789	0023NS	Sign, "Caution-Watch Your Step", Ext. Top Vestibule Step	2	Vest. Top Step
005806	0151NS	Sign, "Caution-Watch Your Step", Ext. Bottom Vest. Steps	6	Bottom Vest. Steps
01144		Danger, High Voltage Within, 4.5" W x 3.25" T	4	3-Transformers 1-Battery Charger
005791		Sign, "B-Grounded", Battery Box	2	Battery Boxes
N/S	0221NS	Sign, "Batteries"	2	Battery Boxes
N/S	1045NS	Sign, "Brake Cylinder Cut-Out"	2	Cut-Out Cocks
N/S		Sign, "Brake Indicator"	4	Brake Indicators
N/S		Sign, "Jacking Pad"	8	Jacking Pads
N/S		Sign, "Potable Water Fill"	2	Water Fills
		Sign, Car Number	4	Ext/Int End Doors
		Sign, Car Name	4	Ext/Int End Doors

8.2.2 56 Seat Coaches – 400006-400008

NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 56	LOCATION
005777	0298NS	Sign, "Fully Equipped FRA..."	2	Vestibule-Beside End Doors
005785	0078NS	Sign, "No Smoking"	9	2-A end walls 2-Booth walls 1-Trash wall 2-B-e end walls 1-Handicap 1-Unisex
005800	0005NS	Sign, Emergency Tools	1	A-End Tool Storage
005801	0026NS	Sign, "Rest Room" Unisex, w/Braille	1	Unisex Restroom Ext Door
005783	0174NS	Sign, Sliding Door Open"	1	Handicap Restroom Ext Door
005784	0019NS	Sign, "Trash" w/Braille	4	2-A End Trash Doors 1-Handicap 1- Unisex
005802	0027NS	Sign, "Towels" w/Braille	2	1-Handicap 1-Unisex
005803	0184NS	Sign, "Flush" w/Braille	2	1-Handicap 1-Unisex
005804	0002NS	Sign, "Do Not Throw Trash Into Toilet"	2	1-Handicap 1-Unisex
005776	0310NS	Sign, "Reserved For Passengers..."	1	B-End Wheelchair Section



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005805	0032NS	Sign, "Caution-Do Not Sit Or Lean..."	2	A-End Tables
005786	0185NS	Sign, "First Aid Kit", Red	1	A-End Compartment
005787	0154NS	Sign, Fire Extinguisher", Red	1	A-End Compartment
005782	0646NS	Sign, "Crew Storage"	3	A-End Lockers
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 56 SEATER	LOCATION
005807	0561NS	Sign, "Restroom", Handicap w/Braile	1	Handicap Restroom Ext Door
005808	0024NS	Sign, "Toilet Paper" Restrooms, w/Braile	2	1-Handicap 1-Unisex
005809	0335NS	Sign, "Emergency Blower Shut Off"	2	A & B End Switches
005810	0153NS	Sign, "Caution-For Your Safety..." Vestibule	2	Vestibule-End Walls
005790	0045NS	Sign, "Do Not Enter", Combine Baggage Entrance Door	1	Electrical Locker
005778	0007NS1	Sign, Seat Number Set, w/Braile (1-8)	4	Seat Aisles
005779	0007NS3	Sign, Seat Number Set, w/Braile (33-48)	20	Seat Aisles
005780	0007NS4	Sign, Seat Number Set, w/Braile (49-66)	N/A	
005781	0007NS5	Sign, Seat Number Set, w/Braile (67-84)	N/A	
005792	0039NS	Sign, "Unlock/Lock" w/Braile, Handicap Restroom	2	1-Handicap 1 Unisex Int Doors
005793	0614NS	Sign, "Push Gently to Close Door", Restrooms	N/A	
005794	0528NS	Sign, "Changing Table", Handicap Restroom, 56 Seat Coach	1	Handicap Restroom
005795	0146NS	Sign, "Lighting & A/C Controls", Electric Locker	1	Electrical Locker
005796	0062NS	Sign, "Soap", w/Braile, Restrooms	2	1-Handicap 1-Unisex
005797	0239NS	Sign, "Brake For Emerg. Use Only", Red	2	A & B End Pulls
005798	0320NS	Sign, "Caution-Max. 25 Lbs.", Baby Changing Table	1	Handicap Restroom
005811	0615NS	Sign, "120 Volts", 1/4" x 2", Elect. Outlet, 56 Seat Coach	50	48-Int. Electrical Outlets 2-Ext
005107	0427NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, One Arrow	N/A	
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 56 SEATER	LOCATION
	0618NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, Two Arrows	3	Emerg. Window Aisles-Centered
000283	0428NS	Sign, HPPL, "Emerg. Exit", Emergency Window Handle	12	Emerg. Pull Handles
005101	0309NS	Sign, HPPL, "Exit", w/Braile, Hor., Int., End Doors, Top	4	End/Vest. Doors (1EA)
005102	0305NS	Sign, HPPL, "Exit", Vert., Int., End Doors, Bottom	4	End/Vest. Doors (1EA)
005106	N/A	Tape, HPPL, 1" Wide, Int. Ext Doors (30 Ft Roll)		End/Vest. Doors
005108	210-96	Sign, Holder Only, Emerg. Exit Decal (005107)	N/A	Emergency Windows
005110	B-1219HCCW	Sign, HPPL, Arrow, CCW, Int. Door Handles	2	Vestibule Doors
005103	B-1219HCW	Sign, HPPL, Arrow, CW, Int. Door Handles	2	Vestibule Doors
005109	INPSPC100	Sign, Emergency Access, White, Reflective	2	Ext. Vest Door Lounge
005104	B-1219RCCW	Sign, Reflective Arrow, CCW, Ext. Door Handles	2	Vestibule Doors
005111	B-1219RCW	Sign, Reflective Arrow, CW, Ext. Door Handles	2	Vestibule Doors
000412	0360NS	Sign, Emerg. Window Instr. Int. Dbl. Top, 66 Seat Coaches	N/A	
005581	0452NS	Sign, Emerg. Window Instr. Int. Single Pane, Top, 56 Seat Coaches	6	Emergency Windows
003118		Sign, Emerg. Window Instr. Int. Dbl. Bottom, Lounge	N/A	
005813	1400NS	Sign, Danger 480 Volts AC	1	Electrical Locker
005483		Sign, HPPL, "Door Not An Exit"	3	1-Handicap 1-Unisex 1-Elect. Lckr
	0065NS	Sign, "120 Volts", w/Braile	Surplus	
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER 56 SEATER	LOCATION
003961		Sign, Ext. Handicap Accessible Icon	3	2-B-End Ext. Carbody 1-B-End Ext. End Door
005470	HERZOG100(RB)	Sign, Emerg. Window Instr. Ext. Reflective, Single, Top	6	Emerg. Window Ext-Centered



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005442	HERZOG100A	Sign, Emerg. Window Instr. Ext. Reflective, Double, Top	N/A	
005789	0023NS	Sign, "Caution-Watch Your Step", Ext. Top Vestibule Step	2	Vest. Top Step
005806	0151NS	Sign, "Caution-Watch Your Step", Ext. Bottom Vest. Steps	6	Bottom Vest. Steps
005791		Sign, "B-Grounded", Battery Box	2	Battery Boxes
001144		Label, Danger, High Voltage Within, 4.5" W x 3.25" T	4	3-Transformers 1-Battery Charger
N/S	0221NS	Sign, "Batteries"	2	Battery Boxes
N/S	1045NS	Sign, "Brake Cylinder Cut-Out"	2	Cut-Out Cocks
N/S		Sign, "Brake Indicator"	4	Brake Indicators
N/S		Sign, "Jacking Pad"	8	Jacking Pads
N/S		Sign, "Potable Water Fill"	2	Water Fills
		Sign, Car Number	4	Ext/Int End Doors
		Sign, Car Name	4	Ext/Int End Doors
004743		Sign, Roof Hatch Access, 56 Seat Coach	1	Roof Hatch Access

8.2.3 Combination 34 Seat Coach/Baggage 400101-400102

NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER COMBINE	LOCATION
005777	0298NS	Sign, "Fully Equipped FRA..."	2	2-Vestibule Besdie End Door
005785	0078NS	Sign, "No Smoking"	5	2-B-End Walls 2-Baggage Walls 1-Handicap Restroom
005800	0005NS	Sign, Emergency Tools	1	Below PLC Cabinet
005801	0026NS	Sign, "Rest Room" Unisex, w/Braille	N/A	
005783	0174NS	Sign, Sliding Door Open"	1	Handicap Restroom Ext Door
005784	0019NS	Sign, "Trash" w/Braille	2	2-B End Trash Door 1-Handicap Restroom
005802	0027NS	Sign, "Towels" w/Braille	1	1-Handicap Restroom
005803	0184NS	Sign, "Flush" w/Braille	1	1-Handicap Restroom
005804	0002NS	Sign, "Do Not Throw Trash Into Toilet"	1	1-Handicap Restroom
005776	0310NS	Sign, "Reserved For Passengers..."	1	B-End Wheelchair Section
005805	0032NS	Sign, "Caution-Do Not Sit Or Lean..."	2	A-End Tables
005786	0185NS	Sign, "First Aid Kit", Red	N/A	
005787	0154NS	Sign, Fire Extinguisher", Red	2	1-Bag Rack Shelf 1-Wall Above Fire Ext
005782	0646NS	Sign, "Crew Storage"	N/A	
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER COMBINE	LOCATION
005807	0561NS	Sign, "Restroom", Handicap w/Braille	1	Handicap Restroom Ext Door
005808	0024NS	Sign, "Toilet Paper" Restrooms, w/Braille	1	1-Handicap Restroom
005809	0335NS	Sign, "Emergency Blower Shut Off"	2	A & B End Switches
005810	0153NS	Sign, "Caution-For Your Safety..." Vestibule	2	Vestibule-End Walls
005790	0045NS	Sign, "Do Not Enter...", w/Braille	3	1 Elect. Lckr 1-Cond. Station 1-Bag Door
005778	0007NS1	Sign, Seat Number Set, w/Braille (1-8)	4	Seat Aisles
005779	0007NS3	Sign, Seat Number Set, w/Braille (33-48) (33-34 Only)	1	Seat Aisles
005780	0007NS4	Sign, Seat Number Set, w/Braille (49-66)	N/A	
005781	0007NS5	Sign, Seat Number Set, w/Braille (67-84)	N/A	
005792	0039NS	Sign, "Unlock/Lock" w/Braille, Handicap Restroom	2	1-Handicap 1 Cond. Station Int. Door
005793	0614NS	Sign, "Push Gently to Close Door", Restrooms	N/A	



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005794	0528NS	Sign, "Changing Table", Handicap Restroom, 56 Seat Coach	1	Handicap Restroom
005795	0146NS	Sign, "Lighting & A/C Controls", Electric Locker	2	1-Electrical Locker 1-PLC Cabinet
005796	0062NS	Sign, "Soap", w/Braile, Restrooms	1	1-Handicap Restroom
005797	0239NS	Sign, "Brake For Emerg. Use Only", Red	2	A & B End Pulls
005798	0320NS	Sign, "Caution-Max. 25 Lbs.", Baby Changing Table	1	Handicap Restroom
005811	0615NS	Sign, "120 Volts", 1/4" x 2", Elect. Outlet, 56 Seat Coach	21	19-Int. Electrical Outlets 2-Ext
005107	0427NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, One Arrow	N/A	
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER COMBINE	LOCATION
005812	0618NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, Two Arrows	2	Emerg. Window Aisles-Centered
000283	0428NS	Sign, HPPL, "Emerg. Exit", Emergency Window Handle	8	Emerg. Pull Handles
005101	0309NS	Sign, HPPL, "Exit", w/Braile, Hor., Int., End Doors, Top	6	End/Vest/Bag. Doors
005102	0305NS	Sign, HPPL, "Exit", Vert., Int., End Doors, Bottom	7	End/Vest/Bag Doors 1-B-End Above Entry
005106	N/A	Tape, HPPL, 1" Wide, Int. Ext Doors (30 Ft Roll)		End/Vest. Doors
005108	210-96	Sign, Holder Only, Emerg. Exit Decal (005107)	N/A	Emergency Windows
005110	B-1219HCCW	Sign, HPPL, Arrow, CCW, Int. Door Handles	2	Vestibule Doors
005103	B-1219HCW	Sign, HPPL, Arrow, CW, Int. Door Handles	2	Vestibule Doors
005109	INPSPC100	Sign, Emergency Access, White, Reflective	N/A	Ext Vest. Doors
005104	B-1219RCCW	Sign, Reflective Arrow, CCW, Ext. Door Handles	2	Vestibule Doors
005111	B-1219RCW	Sign, Reflective Arrow, CW, Ext. Door Handles	2	Vestibule Doors
000412	0360NS	Sign, Emerg. Window Instr. Int. Dbl. Top, 66 Seat/Combine	8	Emergency Window Panes
005581	0452NS	Sign, Emerg. Window Instr. Int. Single Pane, Top, 56 Seat Coaches	N/A	
003118	0314NS	Sign, Emerg. Window Instr. Int. Dbl. Bottom, Lounge	N/A	
005813	1400NS	Sign, Danger 480 Volts AC	1	Electrical Locker
005483		Sign, HPPL, "Door Not An Exit"	4	1-Elect. Locker 1-Restroom 1-Cond Sta. 1-Bag Door
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER COMBINE	LOCATION
003961		Sign, Ext. Handicap Accessible Icon	3	2-B-End Ext. Carbody 1-B-End Ext. End Door
005470	HERZOG100(RB)	Sign, Emerg. Window Instr. Ext. Reflective, Single, Top	N/A	
005442	HERZOG100A	Sign, Emerg. Window Instr. Ext. Reflective, Double, Top	4	Under Emerg. Windows Ext.
005789	0023NS	Sign, "Caution-Watch Your Step", Ext. Top Vestibule Step	2	Vest. Top Step
005806	0151NS	Sign, "Caution-Watch Your Step", Ext. Bottom Vest. Steps	6	Bottom Vest. Steps
005791		Sign, "B-Grounded", Battery Box	2	Battery Boxes
001144		Label, Danger, High Voltage Within, 4.5" W x 3.25" T	4	3-Transformers 1-Batt Chgr
N/S	0221NS	Sign, "Batteries"	2	Battery Boxes
N/S	1045NS	Sign, "Brake Cylinder Cut-Out"	2	Cut-Out Cocks
N/S		Sign, "Brake Indicator"	4	Brake Indicators
N/S		Sign, "Jacking Pad"	8	Jacking Pads
N/S		Sign, "Potable Water Fill"	2	Water Fills
		Sign, Car Number	4	Ext/Int End Doors
		Sign, Car Name	4	Ext/Int End Doors
004744		Decal, Roof Access Hatch, Combine	2	Combine



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8.2.4 Lounge 400201-400202

NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER LOUNGE	LOCATION
005777	0298NS	Sign, "Fully Equipped FRA..."	2	1-Vestibule 1-A-End Wall
005785	0078NS	Sign, "No Smoking"	6	1-A-End Wall 2-Booth Walls 2-B-End Walls 1-Over Surveillance Sign
005800	0005NS	Sign, Emergency Tools	1	Galley (Sledge & Pry Bar Only)
005801	0026NS	Sign, "Rest Room" Unisex, w/Braille	1	Unisex Restroom Ext Door
005783	0174NS	Sign, Sliding Door Open"	1	Handicap Restroom Ext Door
005784	0019NS	Sign, "Trash" w/Braille	2	2-A End Trash Doors
005802	0027NS	Sign, "Towels" w/Braille	2	1-Handicap 1-Unisex
005803	0184NS	Sign, "Flush" w/Braille	2	1-Handicap 1-Unisex
005804	0002NS	Sign, "Do Not Throw Trash Into Toilet"	2	1-Handicap 1-Unisex
005776	0310NS	Sign, "Reserved For Passengers..."	1	B-End Wheelchair Section
005805	0032NS	Sign, "Caution-Do Not Sit Or Lean..."	14	All Tables
005786	0185NS	Sign, "First Aid Kit", Red	1	A-End Compartment
005787	0154NS	Sign, Fire Extinguisher", Red	1	A-End Compartment
005782	0646NS	Sign, "Crew Storage"	3	A-End Lockers
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER LOUNGE	LOCATION
005807	0561NS	Sign, "Restroom", Handicap w/Braille	1	Handicap Restroom Ext Door
005808	0024NS	Sign, "Toilet Paper" Restrooms, w/Braille	2	1-Handicap 1-Unisex
005809	0335NS	Sign, "Emergency Blower Shut Off"	2	A & B End Switches
005810	0153NS	Sign, "Caution-For Your Safety..." Vestibule	2	Vestibule-End Walls
005790	0045NS	Sign, "Do Not Enter...", w/Braille	1	Electrical Locker (large sign)
005778	0007NS1	Sign, Seat Number Set, w/Braille (1-8)	4	Seat Aisles
005779	0007NS3	Sign, Seat Number Set, w/Braille (33-48)	20	Seat Aisles
005780	0007NS4	Sign, Seat Number Set, w/Braille (49-66)	N/A	
005781	0007NS5	Sign, Seat Number Set, w/Braille (67-84)	N/A	
005792	0039NS	Sign, "Unlock/Lock" w/Braille, Handicap Restroom	2	1-Handicap 1 Unisex Int Doors
005793	0614NS	Sign, "Push Gently to Close Door", Restrooms	N/A	
005794	0528NS	Sign, "Changing Table", Handicap Restroom, 56 Seat Coach	1	Handicap Restroom
005795	0146NS	Sign, "Lighting & A/C Controls", Electric Locker	1	Electrical Locker
005796	0062NS	Sign, "Soap", w/Braille, Restrooms	2	1-Handicap 1-Unisex
005797	0239NS	Sign, "Brake For Emerg. Use Only", Red	2	A & B End Pulls
005798	0320NS	Sign, "Caution-Max. 25 Lbs.", Baby Changing Table	1	Handicap Restroom
005811	0615NS	Sign, "120 Volts", 1/4" x 2", Elect. Outlet, 56 Seat Coach	50	48-Int. Electrical Outlets 2-Ext
005107	0427NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, One Arrow	N/A	
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER LOUNGE	LOCATION
	0618NS	Sign, HPPL, "Emerg. Exit", Dbl Sided, Ceiling Mt, Two Arrows	3	Emerg. Window Aisles-Centered
000283	0428NS	Sign, HPPL, "Emerg. Exit", Emergency Window Handle	12	Emerg. Pull Handles
005101	0309NS	Sign, HPPL, "Exit", w/Braille, Hor., Int., End Doors, Top	3	End/Vest. Doors (Except A-End)
005102	0305NS	Sign, HPPL, "Exit", Vert., Int., End Doors, Bottom	3	End/Vest. Doors (Except A-End)
005106	N/A	Tape, HPPL, 1" Wide, Int. Ext Doors (30 Ft Roll)		End/Vest. Doors
005108	210-96	Sign, Holder Only, Emerg. Exit Decal (005107)	N/A	Emergency Windows



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005110	B-1219HCCW	Sign, HPPL, Arrow, CCW, Int. Door Handles	2	Vestibule Doors
005103	B-1219HCW	Sign, HPPL, Arrow, CW, Int. Door Handles	2	Vestibule Doors
005109	INPSPC100	Sign, Emergency Access, White, Reflective	2	Ext Vest. Doors
005104	B-1219RCCW	Sign, Reflective Arrow, CCW, Ext. Door Handles	2	Vestibule Doors
005111	B-1219RCW	Sign, Reflective Arrow, CW, Ext. Door Handles	2	Vestibule Doors
000412	0360NS	Sign, Emerg. Window Instr. Int. Dbl. Top, 66 Seat Coaches	N/A	66 Seat Coaches
005581	0452NS	Sign, Emerg. Window Instr. Int. Single Pane, Top, 56 Seat Coaches	N/A	56 Seat Coaches
003118	0314NS	Sign, Emerg. Window Instr. Int. Dbl. Bottom, Lounge	N/A	
005813	1400NS	Sign, Danger 480 Volts AC	2	Electrical Lockers
005483		Sign, HPPL, "Door Not An Exit"	2	Electrical Lockers
NCDOT P/N	INPS P/N	DESCRIPTION	QTY PER LOUNGE	LOCATION
003961		Sign, Ext. Handicap Accessible Icon	3	2-B-End Ext. Carbody 1-B-End Ext. End Door
005470	HERZOG100(RB)	Sign, Emerg. Window Instr. Ext. Reflective, Single, Top	N/A	56 Seat Coaches
005442	HERZOG100A	Sign, Emerg. Window Instr. Ext. Reflective, Double, Top	N/A	66 Seat Coaches
005789	0023NS	Sign, "Caution-Watch Your Step", Ext. Top Vestibule Step	2	Vest. Top Step
005806	0151NS	Sign, "Caution-Watch Your Step", Ext. Bottom Vest. Steps	6	Bottom Vest. Steps
005791		Sign, "B-Grounded", Battery Box	2	Battery Boxes
001144		Label, Danger, High Voltage Within, 4.5" W x 3.25" T	4	3-Transformers 1-Battery Charger
N/S	0221NS	Sign, "Batteries"	2	Battery Boxes
N/S	1045NS	Sign, "Brake Cylinder Cut-Out"	2	Cut-Out Cocks
N/S		Sign, "Brake Indicator"	4	Brake Indicators
N/S		Sign, "Jacking Pad"	8	Jacking Pads
N/S		Sign, "Potable Water Fill"	2	Water Fills
		Sign, Car Number	4	Ext/Int End Doors
		Sign, Car Name	4	Ext/Int End Doors