These instructions govern the testing and operation of air brake and other equipment on Amtrak trains and must be observed by all employees whose duties are in any way affected by them.

These instructions apply to all Train and Engine service employees, QPs, QMPs, QMIIs, Mechanical employees, certain Engineering employees, Yardmasters, and Supervisors. Amtrak employees governed by these instructions are not governed by the air brake and train handling rules/instructions of Host Railroads. The Host Railroads listed below have additional rules and instructions, which modify Amtrak's AMT-3. These instructions are printed in text boxes included in the applicable AMT-3 rule or instruction and identified by the Host Railroad name.

- Burlington Northern Santa Fe
- CSX Transportation
- Norfolk Southern
- Union Pacific

Employees whose duties require that they understand and comply with these instructions must attend the required classes.

Employees who are governed by these instructions will be provided with a copy, must maintain same and have it with them while on duty.

This document is divided into five (5) major sections: (1) All Operations, (2) Passenger Operations, (3) Non-Passenger Operations, (4) Tables and Forms and (5) Mechanical Standards

Jonathan A. Hines
System General Road Foreman

Leon Trombecky
Senior Manager
Quality Management & Compliance

Effective July 3, 2017

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All Operations 07/03/2017
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NATIONAL RAILROAD
PASSENGER CORPORATION

AMTRAK®

ALL OPERATIONS
Section

The instructions in this section apply to BOTH PASSENGER and NON-PASSENGER OPERATIONS
1.0 GENERAL

1.1 Definitions

AAR: The Association of American Railroads.
ACTUATE: A term used to indicate the release of locomotive brake cylinder pressure that develops as a result of an automatic brake application.
AFTER COOLER: Radiating piping, which cools compressed air before it flows to the brake system.
AIR BRAKE: A combination of parts operated by compressed air and controlled manually, pneumatically or electronically, which will slow or stop a car or locomotive.
AIR BRAKE INSPECTION AND TEST RECORD:
This written record indicates that air brakes have been properly tested and inspected and must include the following information:

(1) All locomotives – including cab cars that will be used to operate train
(2) Number of cars inspected
(3) Date
(4) Time
(5) Location tested
(6) Name & Signature of Qualified Person who performed the test
(7) Selector volume handle position
(8) Interior/Exterior Inspection
(9) Communication signal status
(10) GRA/DIR release and ECP status
(11) EOT tested
(12) Total Train Weight and Length- Non-Passenger Only
(13) Any special weight distribution requiring special train handling- Non-Passenger Only
(14) 10C Summary portion

The MAP 1173/10C Summary is the form issued when a Class I brake test is performed at the originating point or a scheduled Class I brake test location for the train. When multiple MAP 1173 forms are issued only one will be used as the “Summary” form and will be indicated by writing the word “Summary” at the top of the form (see P4.1.4A.10). Engineer must list defective car number(s) on reverse side of Summary MAP 1173 indicating condition en route and initialize form.

The 10C Summary is used by the mechanical department to list cars in a passenger train consist that received a calendar day inspection. The 10C Summary is part of MAP 1173/10C Summary form. A train MUST not be delayed for missing or conflicting information on 10C summary or missing MAP 1173/10C Summary.
NOTE: When MAP 1173/10C Summary is referenced in the AMT-3, METROLINK may use SMP 1173 form, MARC may use ECR 1173 form.
AIR COMPRESSOR: A rotary or reciprocating device for compressing air.
AIR GAUGE: An instrument that indicates the amount of air pressure.
BRAKE CYLINDER RELEASE VALVE: A manually operated valve on freight brake equipment, which permits the brake cylinder to be released without draining the reservoirs.

BRAKE, EFFECTIVE: A brake that is capable of producing its required designed retarding force on the train. A car's air brake is not considered effective if it is not capable of producing its designed retarding force or if its piston travel exceeds: (a) 10 ½ inches for cars equipped with nominal 12-inch stroke brake cylinders; or (b) the piston travel limits indicated on the stencil, sticker, or badge plate for that brake cylinder.

BRAKE INDICATOR: A device actuated by brake cylinder pressure (light or plunger), which indicates whether brakes are applied or released.

BRAKE PIPE: The system of piping including branch pipes, angle cocks, cut-out cocks, dirt collectors, hose and hose couplings, used for connecting locomotives and cars for the passage of air to control the locomotive and car brakes.

BRAKE PIPE CUT-OFF (PILOT) VALVE/SWITCH: Manually operated device used to cut in or cut out the ABV on 26, 30 or E-Brake equipment.

BRAKE PIPE VENT VALVE: A device connected to the brake pipe, which propagates an emergency brake pipe reduction by rapidly venting the brake pipe pressure locally.

BRAKE, PRIMARY: Those components of the train brake system necessary to stop the train within the signal spacing distance without thermal damage to friction braking surfaces.

BRAKE, SECONDARY: Those components of the train brake system which develop supplemental brake retarding force that is not needed to stop the train within signal spacing distances or to prevent thermal damage to wheels.

BRAKE SYSTEM: Includes all brake apparatus such as air, electro-pneumatic, electronic brake, related piping, hand brake, foundation brake rigging and dynamic brake.

BRAKE TESTS, TYPES:

PASSENGER:

- Class I: Complete non-passenger train brake system test & inspection performed by a QP or QMI to determine brake pipe integrity and continuity from the controlling locomotive to the rear equipment of a non-passenger train.

- Class II: Test & inspection performed by QP or QMI to ensure that brakes apply and release on each car in a non-passenger train in response to train line commands. This test fulfills the requirements of a Non-Passenger-Class III brake test.

- Class III: Test & inspection performed by QP or QMI to determine brake pipe integrity and continuity from the controlling locomotive to the rear equipment of a non-passenger train.

- Transfer Train: Test & inspection performed by QP or QMI to ensure that brakes apply and release on each car in a non-passenger train which is a transfer train.

PASSENGER & NON-PASSENGER

- Running Brake Test: A test performed by a locomotive engineer while the train is in motion to verify that the brake system functions as intended.

BUFF FORCES: The forces caused by compression such as during dynamic or independent braking, helper locomotive on rear of train, back-up movements or run-in of slack.

CAB CONTROL CAR: A Passenger Carrying Car equipped with a control compartment from which a train can be operated while being pushed by a locomotive. A cab control car is considered a locomotive when it is the controlling locomotive.

CALENDAR DAY: A time period running from one midnight to the next midnight on a given date.

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CHARGING CUT-OFF PILOT VALVE (A-1): Provides the following features during an emergency application of brakes: automatic sanding, dynamic brake cut-off, power knock out (PCS) and cuts off brake pipe charging.

CHECK VALVE: A device so designed that it permits air to flow in one direction while preventing the air from flowing in the opposite direction.

CHOCK: A wedge or block of sufficient size used to block the movement of a wheel (holding a wheel motionless).

CLASP BRAKE: An arrangement of brake rigging in which two brake shoes per wheel are used to clasp the braking surface.
COMMUNICATING SIGNAL SYSTEM: A manually operated device used to transmit an electronic signal to the operating cab. If electronic communication signal system is inoperative or not equipped, operative two-way radio system may be substituted.

COMPRESSOR GOVERNOR: A device to automatically control the operation of an air compressor.

COMPUTER CONTROLLED BRAKE (CCB): Microprocessor locomotive air brake control system commonly referred to as E-Bake.

CONTROL VALVE: A device on locomotives and cars which charges reservoirs and acts to apply and release brake cylinder pressure in response to a reduction or increase of brake pipe pressure.

Direct Release:
A feature of the control valve that provides for the total release of brake cylinder pressure when brake pipe pressure is increased.

Graduated Release:
A feature of the control valve that provides for the incremental release of brake cylinder pressure proportionate to increases in brake pipe pressure.

CONTROLLING LOCOMOTIVE: The locomotive from which the engineer exercises control over the train.

CUT-OUT COCK: A device used to cut-in or cut-out certain air brake functions. To open or cut-in the cock, move the handle at a right angle (crosswise) to the pipe. To close or cut-out the cock, move the handle in line with the pipe. Note that these positions are the opposite of angle cock positions.

DEAD ENGINE FEATURE: A manually positioned device for charging the main reservoir on a locomotive from the brake pipe when main reservoir pressure is not available.

DEADMAN FOOT VALVE: A device which will initiate a penalty brake application on a locomotive after a short time delay, if foot pedal is released on locomotive and brake cylinder pressure is not at least 25 psi.

DECELSTAT: A wheel slide system that automatically releases brake cylinder pressure rapidly upon detection of wheel slide and restores brake cylinder pressure as soon as wheel begins to revolve. Wabtec versions currently in use are (3-AP, E-5 and E-7).

DEFECTS – RUNNING GEAR - Any condition not in compliance with CFR49 Part 238, which involves:
- Suspension.
- Draft System.
- Trucks.
- Wheels.

DEFECTS – NON RUNNING GEAR - Any condition not in compliance with CFR49 Part 238, which involves:
- Exhaust gases released outside cab or other compartments.
- Batteries properly vented.
- Jumper cables – May not hang free, no exposed wire, no broken plugs or receptacles.
- High voltage safety labels for exterior doors and cover plates marked
- Buffer plates in place.

• Diaphragms in place and aligned
• Exposed moving parts and electrical equipment both equipped with guards.
• Floors, etc. free from oil, water, waste, or any obstruction
• Manual door releases are in place.
• Emergency equipment... as applicable, in place.
• Safety related signage in place and legible.
• High voltage safety labels for interior doors and cover plates marked
• Emergency brake valves stenciled.
• Trap doors safely operate and securely latch.
• Vestibule steps are illuminated.
• End doors and side doors operate.
• Seats or attachments not broken or loose.

DISC BRAKES: An arrangement of brake cylinders and levers, which force brake pads against a disc fastened to the wheel or axle.

DISTRIBUTING VALVE: A device which applies and releases brakes and automatically maintains pressure in brake cylinders after a brake application.

DOUBLE CHECK VALVE: A valve with two seats arranged so that air flowing past either seat cannot flow out past the other seat but will flow through a third common delivery connection.

DRAFT FORCE: A term used to describe coupler forces in a state of tension.

DUAL PORTED CUT-OUT COCK: A device on some 26 equipment that cuts in or out the IBV and on 30CDW equipment that cuts in or out both the independent and ABVs.

DUPLEX RELEASE VALVE: An appliance permitting manual depletion of auxiliary reservoir pressure alone, or auxiliary and emergency reservoir pressure together.

DYNAMIC BRAKING: A means of using traction motors to create a braking effect.

ELECTRONIC EMAP 21A and MAP 21A: En route defect reporting.

ELECTRONICALLY CONTROLLED PNEUMATIC BRAKE (ECP BRAKE): A train powered braking system actuated by compressed air and controlled by electronic signals from the locomotive or an ECP-EOT to the cars in the consist for service and emergency brake applications in which the brake pipe is used to provide a constant supply of compressed air to the reservoirs on each car but does not convey braking signals to the car. ECP brake systems include dual mode and stand-alone ECP brake systems.

ELECTRO-PNEUMATIC BRAKE: A system consisting of an interface unit on a locomotive and magnet valves on each car, which vents or recharges the brake pipe on each car electrically, at the same time a pneumatic application or release is taking place.

EMERGENCY APPLICATION: A rate of brake pipe reduction fast enough to cause the control valves to move to emergency position.
**INSPECTION FORMS SMP**

**MAP 100** is referenced in the AMT MAP 100, METROLINK Locomotive calendar day and brake test inspection Amtrak EQUIPMENT CONDITION REPORT:

**brakes.** Operate air brakes on locomotive independently of train INDEPENDENT BRAKE VALVE (IBV): Equipment.

**HST DEPARTURE TEST**

That supplies electrical power to a train for air conditioning, HEAD END POWER (HEP)

The pressure between front and rear of train.

**HAND BRAKE**

Pressure during service brake application.

**FULL SERVICE REDUCTION**

The amount of brake pipe reduction necessary to obtain maximum brake cylinder pressure during service brake application.

**GRADIENT, BRAKE PIPE**

The difference in brake pipe pressure between front and rear of train.

**HAND BRAKE**

A brake apparatus used to manually apply the brakes on a car or locomotive, if so equipped.

**HEAD END POWER (HEP)**

The system on a locomotive that supplies electrical power to a train for air conditioning, heat, light, etc.

**HST DEPARTURE TEST**

Passenger-Class I Brake Test and Locomotive Departure Test equivalent for Tier II equipment.

**INDEPENDENT BRAKE VALVE (IBV):** A device to operate air brakes on locomotive independently of train brakes.

**INITIAL TERMINAL:** Place where train is originally made up or a locomotive receives its Calendar Day Inspection. If locomotive power is changed en route, the previous Initial Terminal location of the train does not change.

**INTERCOM SYSTEM:** A two way voice communication system

**INTERCOOLER:** Radiating piping which cools compressed air between stages of compression.

**LOCOMOTIVE:** On-track equipment, other than hi-rail, specialized maintenance, or other similar equipment, which may consist of one or more units operated from a single control stand with one or more propelling motors designed for moving other passenger equipment, with one or more propelling motors designed to transport freight or passenger traffic, or both, or without propelling motors but with one or more control stands.

**LOCOMOTIVE INSPECTION AND REPAIR REPORT (MAP 816 or “BLUE FORM”):** Federal form (FRA F6180-49A) that records the locomotive’s inspections and repairs for the calendar year.

**MAGNET VALVE:** A device for controlling the flow of air, which is dependent on a magnetic coil being energized or de-energized.

**MAIN RESERVOIRS:** One or more reservoirs on locomotives or cars for storing the main supply of compressed air.

**MAP 816:** See definition of Locomotive Inspection and Repair Report.

**MAP 1173/10C Summary:** See definition of AIR BRAKE INSPECTION AND TEST RECORD

**MINIMUM REDUCTION:** Handle position on 26, 30 and E-type ABVs that produces a brake pipe reduction of 6-8 psi at a service rate.

**MIXED CONSIST TRAIN:** A train consisting of passenger carrying cars and two or more non-passenger carrying cars.

**MU-2, MU-2A VALVE:** A two or three-position valve, which cuts the IBV IN or OUT.

**MU EQUIPMENT:** Self-propelled diesel or electric passenger equipment with one or more control stands and seating for carrying passengers. MU equipment may be operated as a single unit or coupled in multiples to provide added passenger capacity. MU equipment with a control stand is considered an MU locomotive.

**MU HOSES:** Air hoses that are only common to locomotives including: main reservoir equalizing, actuating (if equipped), and application and release.

**NON-PASSENGER CARRYING CAR:** A car designed to handle Mail, Baggage, and Express (MB&E) that is operated as part of a passenger train consist. e.g. Baggage car (BAG), Material Handling Car (MHC), Express (EXP), Auto Carriers.

**OFF AIR:** Not connected to a continuous source of compressed air of at least 60 pounds per square inch.

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**EMERGENCY BRAKE VALVE:** A valve for the purpose of initiating an emergency brake application on all locomotives and passenger carrying cars.

**EQUALIZING RESERVOIR:** Serves as reference volume for the brake pipe relay valve portion. The relay valve portion establishes a pressure in the brake pipe equal to the pressure in the equalizing reservoir.

**EQUIPMENT CONDITION REPORT:** Inspection record for locomotive calendar day and brake test inspection Amtrak.

**MAP 100** is referenced in the AMT-3, METROLINK Locomotives and Cab Cars may use Calendar Day Inspection Forms SMP 100. MARC Locomotives and Cab Cars may use the Calendar Day Inspection Form ECR 100.

**FACE-TO-FACE RELIEF:** The exchange of information between employees when taking charge of equipment. When any of the following occurs, it is considered FACE-TO-FACE RELIEF:

- When the inbound Engineer does not leave the equipment unattended and communicates with the outbound Engineer the condition of the brakes and the status (location) of the MAP 1173(s).
- When the inbound Conductor or Assistant Conductor does not leave the equipment unattended and communicates with the outbound Engineer the condition of the brakes and the status (location) of the MAP 1173(s).
- When a mechanical department employee who is a QMP or QP who participated in the required brake test does not leave the equipment unattended and communicates with the outbound Engineer the condition of the brakes and the status (location) of the MAP 1173(s).

When FACE-TO-FACE RELIEF does not occur as described above, a Passenger-Class II brake test is required.

**NOTE:** See definition of UNATTENDED EQUIPMENT

**FOUL:** Any condition which restricts the intended movement of one or more brake system components because the component is snagged, entangled, or twisted.

**FREIGHT EQUIPMENT:** Railroad locomotives and cars not included in the definition of Passenger Equipment.

**FULL SERVICE REDUCTION:**

The amount of brake pipe reduction necessary to obtain maximum brake cylinder pressure during service brake application.

**GRADIENT, BRAKE PIPE:** The difference in brake pipe pressure between front and rear of train.

**HANCE BRAKE VALVE:** A device to operate air brakes on locomotive independently of train

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All Operations 07/03/2017
ORIGINATING PASSENGER TERMINAL: The passenger terminal where a train first receives passengers, in the same city or terminal where it is initially made up. No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

PARKING BRAKE: A spring applied and air released brake found on certain cab control cars and locomotives.

PASSENGER CARRYING CAR: A car designed to carry passengers and/or to provide on-board services; e.g., coaches, sleepers, food service, or cars designed with a combination of passenger facilities. This definition includes Cab Control Cars and MU Equipment. This term does NOT include a Private Car.

PASSENGER EQUIPMENT: All Passenger Carrying Cars, Non-Passenger Carrying Cars, Private Cars and Passenger Locomotives in a Passenger Train. This definition does NOT include a freight locomotive when used to haul a passenger train due to failure of a Passenger Locomotive.

PASSENGER TRAIN: A train consisting of any combination of Passenger Equipment. A passenger train may transport passengers only when required passenger train brake tests and mechanical inspections have been performed. AMT-3 instructions for Passenger Operations apply to passenger trains.

PA SYSTEM (PUBLIC ADRESS SYSTEM): A one-way voice communication system.

PENALTY BRAKE APPLICATION: An automatic service application of air brakes caused by Overspeed Control, Train Control Systems or Alerter/Deadman.

PNEUMATIC CONTROL SWITCH (PCS): Indication on a locomotive control console that represents power loss/knockout. It displays whenever a penalty or emergency brake application occurs.

POWER CAR: Rail vehicle that propels a Tier II passenger train or is the lead vehicle in a Tier II passenger train or both. A POWER CAR is considered a locomotive.

PRESSURE MAINTAINING: A feature of certain types of ABVs which compensates brake pipe pressure against maximum permissible leakage during a service application.

PRESSURE RETAINING VALVE: A manually positioned valve found on freight, Non-Passenger Carrying Cars (MB&E), and Private Cars that will control release of brake cylinder pressure.

PRIVATE CAR: Rail rolling equipment that is used only for excursion, recreational or private transportation purposes. A Private Car is not a Passenger Carrying Car.

P-2-A APPLICATION VALVE: A valve which provides a full service penalty brake application when actuated by any one of the following features: Overspeed Control, Train Control Systems, or Alerter/Deadman.

QUALIFIED EMPLOYEE: An employee who is classified as a QMP or QMI.

QUALIFIED MAINTENANCE PERSON (QMP): A person who has received instruction and training that includes “hands-on” experience in one or more of the following functions:

- Troubleshooting
- Inspection
- Testing
- Maintenance or repair of specific train brake and other components and systems for which the person is assigned responsibility.

The person’s primary responsibility includes work in the functions listed above and is designated to:

- Conduct Class I brake tests
- Conduct exterior calendar day mechanical inspections
- Determine whether defective equipment may be moved

QMP qualifications are valid for three years. Employee’s qualifications may be revoked if he/she demonstrates insufficient knowledge or skills to perform assigned duties. It is the employee’s responsibility to attend required classes and maintain their qualifications.

NOTE: T & E employees are not considered QMP’s.

QUALIFIED MECHANICAL INSPECTOR (QMI): A ‘Qualified Person’ who has received instruction and training that includes “hands-on” experience in one or more of the following functions:

- Troubleshooting
- Inspection
- Testing
- Maintenance or repair of specific locomotive equipment/train brake components and systems for which the person is assigned responsibility.

Each QMI shall also possess a current understanding of what is required to properly repair and maintain the safety-critical brake components/locomotive equipment for which the person is assigned responsibility. The person’s primary responsibility includes work generally consistent with the functions listed above.

QMI qualifications are valid for three years. Employee’s qualifications may be revoked if he/she demonstrates insufficient knowledge or skills to perform assigned duties. It is the employee’s responsibility to attend required classes and maintain their qualifications.

NOTE: T & E employees are not considered QMIs.
QUALIFIED PERSON (QP): Person who has received instruction and training to perform various functions as determined by the railroad. Qualified Supervisors and T&E crews are considered QP’s. This individual may perform a/an:

- Interior Calendar Day Mechanical Inspection on Tier I Passenger Carrying Cars
- Class IA Brake Test for Passenger Trains
- Class II Brake Test for Passenger Trains
- Class I Brake Test for Non-Passenger Trains
- Class II Brake Test for Non-Passenger Trains
- Class III Brake Test for Non-Passenger Trains
- Transfer Train Brake Test for Non-Passenger Trains

QUICK SERVICE VALVE: A device connected to the brake pipe for the purpose of propagating quick service by making a brake pipe reduction on each car so equipped.

REDUCING VALVE: A valve designed to reduce and maintain air pressure to a predetermined amount.

REDUCTION RELAY VALVE: A device comprising a quick service valve and a vent or emergency valve mounted on a common pipe bracket. It is connected to the brake pipe to provide additional local venting of brake pipe air on each car so equipped, during both service and emergency brake applications. This device is auxiliary to the control valve and utilized on cars having a great amount of brake pipe volume.

REGULATING VALVE: A device which controls pressure and maintains it at a predetermined setting. The regulating valve is usually found within the automatic brake valve.

REPAIR POINT: Location designated by a railroad where inspections and/or repairs of the type necessary occur on a regular basis. A repair point has or should have the facilities, tools and personnel qualified to make the necessary repairs.

RESERVOIR RELEASE VALVE: An appliance permitting manual depletion of control reservoir pressure.

ROLL BY INSPECTION: An inspection performed while equipment is moving.

RUNNING BRAKE TEST: A test performed by a locomotive engineer while the train is in motion to verify that the brake system functions as intended.

SAFETY VALVE: A valve designed to open and close at a predetermined speed.

SERVICE APPLICATION: A brake application consisting of one or more brake pipe reductions at a service rate.

SERVICE RATE OF REDUCTION: A reduction of brake pipe pressure at a rate fast enough to cause control valves to move to the service position, but not fast enough to cause them to move to emergency.

SERVICE ZONE: That portion of the brake valve quadrant on 26, 30 and E-types ranging from minimum reduction position to full service position that produces a self-lapping brake pipe reduction at a service rate proportional to handle position.

SPEEDOMETER OVERSPEED: A device that initiates a penalty brake application when the speed indicated on the speed indicator exceeds maximum allowed.

SPLIT REDUCTION: An automatic brake application consisting of an initial reduction of 6-8 psi followed 20 to 30 seconds later with additional reductions to the desired amount.

SUMMARY MAP 1173: See AIR BRAKE INSPECTION AND TEST RECORD

SUPPRESSION POSITION: Handle position on 26, 30 and E-type ABVs used to forestall or recover from a penalty brake application.

SWITCHING (YARD) OPERATIONS: Assembling or changing the position of cars for train movements; for the purposes of loading, unloading or servicing; or placing of locomotives or cars for repair or storage. During switching operations, brake pipe must be charged, except when brake pipe is defective or damaged. SWITCHING is NOT considered a TRAIN MOVEMENT.

TERMINAL: Starting point or ending point of a single scheduled trip for a train, where passengers may get on or off a train. Normally, this location is a point where the train would reverse direction or change destinations.

TIER I TRAIN: Operating at speeds not exceeding 125 mph.

TIER II TRAIN: Operating at speeds exceeding 125 mph but not exceeding 150 mph.

TRAIN, COMMUTER: Passenger train providing commuter service within an urban, suburban or metropolitan area.

TRAIN CONTROL SYSTEMS:

- AUTOMATIC TRAIN CONTROL (ATC): A train control system which consists of Cab Signals, Speed Control and ATS. Engineer is required to maintain speed associated with each cab signal aspect. Any overspeed condition will require suppression within 8 seconds.

- Cab Signal: A signal that is located in the engine control compartment which indicates track occupancy or condition. The cab signal is used in conjunction with interlocking signals and with or in lieu of block signals.

- Speed Control: A device on an engine which will cause a penalty application of the brakes if the engineer fails to reduce the train’s speed to the speed required by the cab signal indication.

- AUTOMATIC TRAIN STOP (ATS)

  Continuous: A component of the Automatic Train Control (ATC) system. Any downward change in the cab signal aspect results in an audible alarm and requires acknowledgment within eight seconds to avoid a penalty brake application.

  Intermittent Inductive Train Stop (IITS): A system which enforces acknowledgment as a train passes over a wayside inductor. If the signal is clear no action is required. If the signal displays a more restrictive indication than clear, the audible alarm will sound and engineer is
required to acknowledge within 8 seconds to avoid a penalty brake application.

Inert Inductor Automatic Train Stop (IIATS): Wayside inductors not connected with a block signal system, positioned to provide advance warning to trains of certain permanent speed restrictions and designed to apply the brakes automatically until train stops.

- ADVANCED CIVIL SPEED ENFORCEMENT SYSTEM (ACSES): A transponder and data radio based train control system that supplements the ATC system by enforcing permanent speed restrictions, temporary speed restrictions, and a positive stop at interlocking and controlled point signals displaying Stop Signal.
- Interlocking Area: An interlocking or closely located group of interlockings served by a single Base Communication Package (BCP).
- INCREMENTAL TRAIN CONTROL SYSTEM (ITCS): A Differential Global Positioning Satellite (DGPS) and data radio based train control system that supplements the underlying method of operation and fixed signal system by enforcing permanent speed restrictions, temporary speed restrictions, entrance to out-of-service tracks, and speeds required by fixed signal indications.
- INTEROPERABLE ELECTRONIC TRAIN MANAGEMENT SYSTEM (I-ETMS): A Differential Global Positioning Satellite (DGPS) and data radio based positive train control system that supplements the underlying method of operation and fixed signal system by enforcing permanent speed restrictions, temporary speed restrictions, known highway crossing malfunctions, working limit authorities and speeds required by fixed signal indications.

TRAIN, LONG DISTANCE INTERCITY: Passenger train that provides service between large cities more than 125 miles apart and is not operated exclusively on Amtrak’s NEC.

TRAIN MOVEMENT: Movement of equipment BETWEEN yards and/or terminals on tracks which require:

- authority to occupy, or
- movement over public road crossings.

Before making any TRAIN MOVEMENT, applicable train brake tests are required.

A “Train Movement” is NOT considered switching.

TRAIN, PASSENGER: See PASSENGER TRAIN

TRAIN, SHORT DISTANCE INTERCITY: Passenger train that provides service exclusively on Amtrak’s NEC or between cities that are not more than 125 miles apart.

TRAIN CONTROL TIMING DEVICE: A device used to provide a six second warning whistle and delay time which, if not acknowledged within 8 seconds, will produce a penalty brake application.

TRANSFER TRAIN: A train that travels between a point of origin and a point of destination not exceeding 20 miles. Such trains may pick up or deliver freight equipment while en route to destination.

TWO-WAY END-OF-TRAIN DEVICE: A system consisting of a head end or locomotive control unit (LCU) and a rear end or end of train unit (EOT). This system monitors brake pipe pressure, motion, marker light status, and battery condition at the rear of the train and transmits this information to the locomotive cab for display. Activating an emergency toggle switch in the locomotive cab initiates an emergency brake application from the rear of the train.

UNATTENDED EQUIPMENT: Equipment left standing and unmanned in such a manner that would hinder immediate application of hand/parking brakes or air brakes by a qualified employee to prevent equipment from moving.

UNDESIREDA EMERGENCY (UDE): Emergency brake application on a train for which no apparent cause can be determined.

WHEEL SLIDE CONTROL SYSTEM: A system that automatically releases or reduces brake cylinder pressure rapidly upon detection of an impending wheel slide. Brake cylinder pressure is restored as soon as the wheel begins to revolve or after a preset safety timeout.

YARD: System of tracks within defined limits provided for the making up of trains, storing of cars, or other purposes.
1.2 Standard Air Pressures

Air pressure regulating devices on locomotives and cars must be adjusted to the standard pressures indicated in this instruction.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Pounds Pressure (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brake Pipe</td>
</tr>
<tr>
<td>1.2.1 LOCOMOTIVES</td>
<td></td>
</tr>
<tr>
<td>Passenger Service Tier I</td>
<td>110</td>
</tr>
<tr>
<td>Passenger Service – VIA</td>
<td>100</td>
</tr>
<tr>
<td>Passenger Service – Tier II (HST)</td>
<td>110</td>
</tr>
<tr>
<td>Non-Passenger Service</td>
<td>90</td>
</tr>
<tr>
<td>NEC Welded Rail Train</td>
<td>110</td>
</tr>
</tbody>
</table>

When train brake pipe pressure has been increased to other than standard pressure, the increased pressure will be carried to final destination of the train.

1.2.2 CAB CONTROL CARS

110 130 - 140

1.2.3 TALGO

110 130 - 140

1.2.4 ELECTRIC MU CARS

110 130 - 140

1.2.5 INDEPENDENT BRAKE

| Brake Cylinder Pressure       |            |
| ACS-64 Siemens Charger Diesel SC-44 | 72 - 75    |
| (3) HHP-8, P32BWH, P40, P42, F59PHI, P32ACDM, GP38, NPCU | 72        |

1.2.6 SAFETY VALVES

| Locomotive main reservoir     |            |
| Tier I                        | 150        |
| Tier II (HST)                 | 160        |

| Locomotive compressor         |            |
| 1. Intercooler                | 60         |
| 2. Discharge pipe (Where equipped) | 185     |

1.2.7 CONTROL AIR PRESSURE

| EMD Locomotives               |            |
| GE Locomotives                | 80         |

1.2.8 CAR WATER Raising SYSTEM

| Governor valve                | 80         |
| Reducing valve                | 45         |
| Safety valve                  | 50         |

1.2.9 TIMING RESERVOIR, SPEED CONTROL SYSTEM

|              |            |
| 45           |            |

1.2.10 BRAKE PIPE EQUALIZATION PRESSURE FOR FREIGHT TYPE CONTROL VALVES

<table>
<thead>
<tr>
<th>Brake Pipe Pressure (PSI)</th>
<th>Brake Pipe Full Service Reduction (PSI)</th>
<th>Service Equalization Pressure (PSI)</th>
<th>Emergency Equalization Pressure (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>26</td>
<td>64</td>
<td>76</td>
</tr>
<tr>
<td>100</td>
<td>29</td>
<td>71</td>
<td>84</td>
</tr>
<tr>
<td>110</td>
<td>32</td>
<td>78</td>
<td>93</td>
</tr>
</tbody>
</table>

1.2.11 FREIGHT LOCOMOTIVES IN PASSENGER SERVICE

When a freight locomotive is the only source of compressed air and will be used to haul a passenger train, brake pipe pressure must be increased to not more than 15 psi below the minimum main reservoir pressure of that locomotive before coupling to the train. Brake pipe pressure must not exceed 110 psi:

- If minimum main reservoir pressure is 120 psi, brake pipe pressure must be increased to 105 psi.
- If minimum main reservoir pressure is 130 psi, brake pipe pressure must be increased to 110 psi.

When a power unit, crane, or other piece of machinery will be used to haul non passenger cars with freight type brake equipment, the maximum brake pipe pressure shall not be greater than 15 psi less than the air compressor starting or loading pressure set on the power unit, crane, or other piece of machinery.

Union Pacific

When a Union Pacific locomotive is used to pull an Amtrak train, maximum brake pipe pressure will be 105psi. Train must be placed in emergency before adding UP unit ahead. After adding unit, brake system must then be recharged to 105psi ensuring that brakes are completely released. When brakes are released, a Passenger Class II / Non-Passenger Class III Brake Test must be performed.
2.0 LOCOMOTIVES

2.1 Employee Responsibility – Locomotive Inspection, Testing and Documentation

2.1.1 At the beginning of the tour of duty, Engineer will check that a MAP 100 is located on each locomotive in consist and determine that Locomotive Calendar Day Inspection remains valid.

NOTE: When MAP 100 or MAP 101 is referenced in the following instructions, METROLINK Locomotives and Cab Cars will use Calendar Day Inspection Forms SMP 100, SMP 1173 and SMP 101. MARC Locomotives and Cab Cars may use the Calendar Day Inspection Form ECR 100.

2.1.2 Locomotive Calendar Day Inspection Requirements

A. Each locomotive must receive a Locomotive Calendar Day Inspection each calendar day, regardless of whether delayed en route.

NOTE: This instruction also applies to non-complying locomotives.

B. The date on which a locomotive(s) receives the last calendar day inspection and test will be determined by the MAP 100 information entered in the “Signature Of Supervisor approving unit for service and all work complete”, “Occupation”, “Place”, “Date”, “Time” (boxes 24-28). The MAP 101 will have the same date, same location and approximate time as the above sections of the MAP 100. In the event the MAP 100 does not have the “Signature Of Supervisor approving unit for service and all work above”, “Occupation”, “Place”, “Date”, “Time” (boxes 24-28) section completed, the Engineer will use the most recent date on the MAP 101 to determine the date of the last calendar day inspection.

NOTE: MARC ECR 100 forms do not have a “Signature of Supervisor” line as outlined in AMT-3 2.1.2 C. Engineers must ensure that the Calendar Day Inspection is still valid using the “Locomotive Calendar Day Mechanical Inspection” and “Locomotive Air Brake Departure Test” date and time of the MARC ECR 100 form. If the train is scheduled to operate over Train Control territory, ensure the “Cab Signal / PTC Departure Test” section of the ECR 100 form is properly filled out and signed as outlined in AMT-3 7.1. Time of the inspection may be entered on the MARC ECR 100 form using the standard time format (AM/PM) or in the 24 hour format (Military Time).

C. If a locomotive has NOT been inspected today and will be in service past 11:59PM tonight, a Locomotive Calendar Day Inspection is required before 11:59PM tonight.

D. When Locomotive Calendar Day Inspection has expired and Mechanical Department personnel are not available, Engineer will perform inspection according to instruction 2.2, before placing locomotive in service.

E. When Locomotive Calendar Day Inspection will be required before 11:59PM tonight and Mechanical Department personnel are not available, engineer will perform inspection as per instruction 2.2 after:

1. contacting train dispatcher to arrange for location to perform inspection, OR
2. when communication is not available with train dispatcher, perform inspection at any point prior to 11:59PM tonight.

F. When Locomotive Calendar Day Inspection is not current on locomotive(s) within a Mechanical Facility, the locomotive(s) may be moved to a repair or servicing track in order to perform the inspection within the same mechanical facility. Before movement is made:

1. Determine that locomotive is safe to move,
2. Comply with AMT-3 Section 2.16.1,
3. Perform locomotive air brake tests as prescribed by AMT-3 Sections 2.5 and 2.6, and,
4. Movement must not exceed 5 mph.

2.1.3 Mechanical Department Employees

A. Mechanical department personnel who are employed to perform locomotive calendar day inspections, air brake daily inspections, and the locomotive departure brake test must perform the above mentioned inspections / tests in accordance with all applicable Standard Maintenance Procedures and the current edition of this AMT-3 instruction manual.

B. Mechanical Department personnel must perform the air brake daily inspection as outlined in section 2.4 and the locomotive air brake departure test as outlined in section 2.3 prior to dispatching the locomotive for service.

C. Mechanical Department personnel shall submit a written report of the air brake daily inspection and air brake departure test. Use appropriate MAP form(s) or WMS template.

2.1.4 Each locomotive placed in service must receive all required inspections to ensure compliance with the requirements listed in 49 CFR Part 229.

A. Each locomotive in service must receive the following inspections:

1. Periodic (Once each 92 days). (ACS-64 Locomotives—Once each 184 Days).
2. Annual (Does not exceed 368 calendar days).
3. Biennial (Does not exceed 736 calendar days).

2.1.5 All inspections, other than the daily inspection will be noted on Form F6180.49A (MAP 816 or “Blue Form”) and must be checked for proper dates.
2.1.6 Trains/Locomotives must not enter any Train Control System Territory with defective or cut out Train Control System or “Acknowledger” unless relieved by Rule, Special Instruction, General Order, Bulletin Order or other directive.

2.1.7 The “Acknowledger” must be tested prior to entering any Train Control System territory. Perform test by briefly depressing the “Acknowledger” to verify sounding of the audible alarm.

2.1.8 Engineer must verify that train control system has been tested as per instruction 7.1 prior to operation in any Train Control System Territory. Engineer will accept mechanical forces inspections and tests as documented by MAP 100 and MAP 101.

2.1.9 When train control system test(s) is required and Mechanical Department personnel are not available, engineer will perform test(s) according to instruction 7.0.

2.1.10 When a locomotive consist changes by coupling or uncoupling units (including push-pull equipment), a locomotive air brake test is required. Perform the air brake test from the controlling locomotive (controlling cab on dual cab locomotives) as indicated by the table below.

<table>
<thead>
<tr>
<th>Step</th>
<th>Determination</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Did your current controlling locomotive or cab change?</td>
<td>Proceed to Step 2.</td>
<td>After locomotive(s) are set out or picked up, perform brake test as per instruction 2.5 from controlling locomotive or cab.</td>
</tr>
<tr>
<td>2</td>
<td>Does MAP 101 on the new controlling locomotive indicate that Locomotive Calendar Day Inspection is current?</td>
<td>After locomotive(s) are set out or picked up, perform brake test as per instruction 2.5 from new controlling locomotive or cab.</td>
<td>After locomotive(s) are set out or picked up, perform Locomotive Calendar Day Inspection as per instruction 2.2 from new controlling locomotive or cab.</td>
</tr>
</tbody>
</table>

2.1.11 Any time a seal is broken the following information must be entered on MAP 100:
- Device cut out.
- Seal number if available.
- Reason for cutting out.
- Geographic location where cut out.
- To whom report was made.

2.1.12 Engineers must keep a supply of MAP 100’s available while on duty.

2.1.13 Engineers must, before going off duty, complete the bottom section (boxes 29-34) of the current MAP 100 by indicating any defects, signature, location and date. If a non-complying condition exists, comply with instruction 2.1.15.

2.1.14 Missing MAP 100 or MAP 101 Forms.
- **A. Missing MAP 100**
  1. Locomotives must not depart an initial terminal without a current MAP 100 on each locomotive.
  2. At other than initial terminal, locomotive may proceed without a MAP 100, provided it will not be used as controlling locomotive in train control system territory.
  3. At other than initial terminal, if locomotive will be used as controlling locomotive in train control system territory, comply with one of the following:
    a. Obtain a copy of the current MAP 100 that indicates train control system test(s) was performed, OR
    b. Perform required Train Control System test(s) and complete a new MAP 100 as per Instruction 7.0, OR
    c. Verify that the proper train control system test(s) was performed by contacting the mechanical desk at CNOC either directly at 1-800-424-0217 or through the train dispatcher. Record on the “Failures En Route / Equipment Condition” section of the current MAP 100 or a new MAP 100 the type of test, name of employee who performed test and place, date and time of test.

    **NOTE:** Every effort must be made to use the option which causes the least train delay.

- **B. Missing MAP 101**
  1. Locomotives must not depart an initial terminal without a current MAP 101 on each locomotive.
  2. At other than initial terminal, before proceeding, complying with one of the following:
    a. Obtain a copy of the current MAP 101, OR

**Locomotive Air Brake Tests When Consist Changes By Coupling Or Uncoupling Units En Route**

<table>
<thead>
<tr>
<th>Step</th>
<th>Determination</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Did your current controlling locomotive or cab change?</td>
<td>Proceed to Step 2.</td>
<td>After locomotive(s) are set out or picked up, perform brake test as per instruction 2.5 from controlling locomotive or cab.</td>
</tr>
<tr>
<td>2</td>
<td>Does MAP 101 on the new controlling locomotive indicate that Locomotive Calendar Day Inspection is current?</td>
<td>After locomotive(s) are set out or picked up, perform brake test as per instruction 2.5 from new controlling locomotive or cab.</td>
<td>After locomotive(s) are set out or picked up, perform Locomotive Calendar Day Inspection as per instruction 2.2 from new controlling locomotive or cab.</td>
</tr>
</tbody>
</table>
b. Use Date indicated in box 27 of MAP 100 as last Locomotive Calendar Day Inspection date. Note missing MAP 101 on “Failure En Route / Equipment Condition” section of MAP 100, OR
c. Verify place, date and time of last Locomotive Calendar Day Inspection by contacting the mechanical desk at CNOC either directly at 1-800-424-0217 or through the train dispatcher. Enter the place, date and time of the last inspection on the “Failure En Route / Equipment Condition” section of the current MAP 100, OR
d. Perform the Locomotive Calendar Day Inspection as per Instruction 2.2.

NOTE: Every effort must be made to use the option which causes the least train delay.

C. Locomotive Engineers must immediately report missing MAP 100 or MAP 101 by contacting the mechanical desk at CNOC either directly at 1-800-424-0217 or through the train dispatcher.

2.1.15 Any locomotive with a non-complying condition must be documented as follows:
A. Attach a completed Non-Complying tag to control stand, isolation switch or engine control panel.
B. Describe defect on MAP 100. If non-complying tag is not available, write “Non-Complying Locomotive” on “Failure En Route / Equipment Condition” section of MAP 100 in addition to describing defect and any restrictions.
C. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.
D. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: Non-Complying Locomotive tag SMP130 must be used when a non-complying condition exists on METROLINK locomotives.

2.1.16 Non-complying locomotives may be moved to the next Amtrak locomotive repair facility, if safe to do so, only as:
A. lite locomotives, OR
B. in a train either dead or with propelling motors cut out/isolated.

EXCEPTION: A locomotive that develops a non-complying condition en route may continue to utilize its propelling motors, provided instruction 2.7 is complied with.
2.2 Locomotive Calendar Day Inspection Procedure When Performed By Engineer

NOTE: If a defect (non-complying condition) is discovered at a location where locomotive cannot be repaired or replaced on a revenue passenger train, comply with Instruction 2.7.

NOTE: Any non-complying condition discovered during this inspection must be documented according to instruction 2.1.15.

NOTE: As indicated by instruction 2.2.40, the Locomotive Departure Test (instruction 2.3) is part of the Locomotive Calendar Day Inspection and MUST be performed in addition to instruction 2.2.

NOTE: No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerters, train control system and controlling locomotive radio.

NOTE: When CNOC mechanical desk is referenced in the following instructions, METROLINK T&E employees will contact Metrolink MOC at 909-593-0661.

2.2.1 Locomotive must be secured per instruction 3.5.

2.2.2 Hand/Parking brakes are in a safe and suitable condition for service. If found defective:
   A. Locomotive may continue in use to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15.
   C. Note defect on MAP 100, and
   D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.3 Verify that Locomotive Inspection and Repair Report, F6180.49A (Blue Form/MAP 816), is displayed on locomotive and complies with 2.1.4 and 2.1.5.

2.2.4 Cut-outs or enclosures for safety devices listed on MAP 100 are properly positioned and sealed, with numbers recorded on MAP 100 form:
   A. ACSES Cut-out Cock/Switch
   B. Cab Signal Cut-out Cock/Switch
   C. ITCS/XITCS Cut-out Cock/Switch
   D. IITS
   E. I-ETMS Penalty Brake Cut-out Cock/Switch
   F. I-ETMS Emergency Cut-out Cock/Switch
   G. Aлерter Cut-out Cock/Switch
   H. ATC/IITS Transfer Switch
   I. Speedometer (Locomotive) Overspeed (OS) Cut-out Cock/Switch
   J. Speed Control Cut-out Cock/Switch
   K. Door Bypass Switch
   L. Multiple Penalty Brake Device Switch
   M. Event Recorder

2.2.5 Cab seats properly secured to the floor or sides. If found defective:
   A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Note defect on MAP 100, and
   D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.6 Cab windows and wipers provide clear vision and windows are free of broken areas. If found defective:
   A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per Instruction 2.1.15,
   C. Repair or switch locomotive to trailing position,
   D. Note defect on MAP 100, and
   E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.7 Cab heaters and Air Conditioning (if equipped) function as intended. If found defective:
   A. If cannot be repaired and weather conditions create an unsafe environment switch to trailing position and continue in use until next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Note defect on MAP 100, and
   D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.8 Cab lights and gauge lights are operative and provide sufficient illumination. If found defective:
   A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Note defect on MAP 100, and
   D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.9 Speed indicator and related apparatus is undamaged. The performance and accuracy of the speed indicator can only be ascertained after departure (10 mph to 30 mph +3 mph; above 30 mph +5 mph). If found defective:
   A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.10 Air brake gauges register variations in pressure in relation to brake valve handle position. If found defective:
A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.11 Air compressor or compressors control main reservoir pressure, as indicated by cab gauges, within range specified for type locomotive. If found defective:
A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.12 Headlights operate properly, and can be dimmed as required. One defective bulb of a two-bulb incandescent or LED headlight is NOT considered non-compliant. If found non-compliant (defective):
A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.13 All auxiliary (ditch) lights operate as intended. If found defective:
A. If 1 defective auxiliary light is discovered at initial terminal of train, repair or switch locomotive to trailing position,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.14 Locomotive radio operates as intended. If found defective:
A. Repair, substitute another radio or use as trailing locomotive to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.15 Dynamic brake equipment is in place and cut in if locomotive is equipped. Locomotives with defective dynamic brake will proceed as follows:
A. Place tag on control stand or Engine Control panel indicating "Inoperative Dynamic Brakes", locomotive number, date, location and signature of person who discovered (see section P 6.1.7 or NP 6.1.7)
B. Note defect on MAP 100.
C. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that locomotive with inoperative dynamic brake is in consist or train.
D. Conventional locomotives must be repaired within 3 calendar days.
E. MU locomotives must be repaired by the next Locomotive Calendar Day Inspection.

2.2.16 Horn and bell operate as intended. If either found defective:
A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.17 Sanitation, Toilet Compartment and Toilet:
A. No significant amount of filth, trash, or human waste in toilet compartment.
B. No strong, persistent, chemical or human waste odor from toilet compartment
C. Adequate ventilation in toilet compartment.
D. Toilet not defective and flush mechanism functions as intended.
E. Toilet compartment door closes.
F. Toilet compartment door lock functions as intended.
G. Sufficient quantity of toilet paper and trash bags.
H. Sufficient quantity of antibacterial agents such as antibacterial soap and water or antibacterial towelettes and sufficient quantity of paper towels for employee sanitation needs.
I. If toilet or toilet compartment is unsanitary, complete non-complying tag per instruction 2.1.15 and comply with the following:
   1. Use locomotive as trailing unit in consist, or
   2. Locomotive can be used as a lead unit only until unsanitary condition can be corrected, replaced with another locomotive, or the
next Locomotive Calendar Day Inspection, provided all of the following are met:

a. No other locomotive is available (cannot switch to trail),

b. Toilet could not have been made sanitary since last Locomotive Calendar Day Inspection,

c. Toilet compartment door is closed and adequately ventilated so locomotive cab is habitable, and

d. Engineer is provided other toilet facilities upon reasonable request.

3. Note on MAP 100 date toilet or toilet compartment becomes unsanitary.

J. If toilet is defective but sanitary, complete non-complying tag as per instruction 2.1.15 and comply with the following:

1. When not in switching service, use locomotive as trailing unit in consist, or

2. When not in switching service, locomotive can be used as a lead unit only until defective condition can be corrected, replaced with another locomotive, or the next Locomotive Calendar Day Inspection, provided all of the following are met:

a. No other locomotive is available (cannot switch to trail),

b. Toilet could not have been repaired since last Locomotive Calendar Day Inspection, and

c. Engineer is provided other toilet facility upon reasonable request.

3. Locomotive can be used as a lead unit in switching service for 10 days after toilet becomes defective.

4. Note on MAP 100 date toilet becomes defective.

K. Inadequate ventilation of toilet compartment or defective toilet compartment door

1. If toilet compartment inadequately ventilated locomotive must be repaired, be used as a trailing unit or in switching service.

2. If toilet compartment door is defective or will not close locomotive must be repaired, used as a trailing unit or in switching service.

L. If toilet compartment door lock is defective, lock must be repaired on or before the next 92-day inspection. Note on MAP 100 date toilet compartment becomes defective.

M. If locomotive has insufficient quantity of toilet paper, trash bags or sanitary washing needs, obtain prior to use of locomotive.

2.2.18 Sanders function on each locomotive to deliver sand to each rail in front of the first power operated wheel set in the direction of movement. If found defective:

A. Repair if possible. If not, locomotive MUST be set up to prohibit propulsion (isolated), switch to trailing position and continue in use to next Amtrak locomotive repair facility.

B. Complete non-complying tag per instruction 2.1.15.

C. Note defect on MAP 100, and

D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.19 No traction motor is cut out. If traction motor is cut out:

A. Locomotive MUST be set up to prohibit propulsion (isolated), switch to trailing position and continue in use to next Amtrak locomotive repair facility.

B. Complete non-complying tag per instruction 2.1.15.

C. Note defect on MAP 100, and

D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

NOTE: This instruction does not apply to HHP-8, HST, ACS-64 and P32ACDM locomotives. However, when traction motor is cut out on this equipment note must be made on MAP 100.

2.2.20 Emergency brake valve (conductor valve) properly labeled and accessible. If defective:

A. Repair or use as trailing locomotive to next Amtrak locomotive repair facility,

B. Complete non-complying tag per instruction 2.1.15.

C. Note defect on MAP 100, and

D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.21 Doors and cover plates that are marked “Danger” and covering high voltage electrical apparatus must be secured in their proper locations. If found defective:

A. Repair if possible. If not, shut down locomotive, switch to trailing position and continue in use to next Amtrak locomotive repair facility,

B. Complete non-complying tag per instruction 2.1.15.

C. Note defect on MAP 100, and

D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.22 Fan openings, exposed gears and pinions, and exposed moving parts protected to prevent injury. If found defective:
A. Repair if possible. If not, shut down locomotive, switch to trailing position and continue to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.23 No bent/broken grab irons or accumulations of oil, water, fuel, debris and other items in passageways, walkways, cab control compartment floors and engine compartment floors which presents an unsafe condition such as a slipping hazard. If found defective:
A. Repair if possible. If not, shut down locomotive, switch to trailing position and continue to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.24 No battery gas leaks in cab or engine compartment.
If found defective:
A. Repair if possible. If not, shut down locomotive, switch to trailing position and continue to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.25 No obvious diesel engine exhaust gas leaks into the engine compartment. If found defective:
A. Repair if possible. If not, shut down locomotive, switch to trailing position and continue to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100, and
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.26 Water and oil drained from main reservoirs if not equipped with automatic drain valves.

2.2.27 Brake rigging properly secured. If found defective:
A. Determine any operating restrictions (rules or equipment) which apply,
B. Complete non-complying tag per instruction 2.1.15,
C. Set out locomotive immediately or move to the next point where it can be set out,
D. Note defect on MAP 100 of locomotive which was set out, and
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.2.28 No part of trucks, brake rigging and running gear, with the exception of the wheels and non-metallic sand hoses, are less than 2-1/2 inches above top of rail. Determination can be made by inspecting under side of the locomotive from outside the gauge of the rail. If found defective:
A. Determine any operating restrictions (rules or equipment) which apply,
B. Complete non-complying tag per instruction 2.1.15,
C. Set out locomotive immediately or move to the next point where it can be set out,
D. Note defect on MAP 100 of locomotive which was set out, and
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.2.29 Pilots, snowplows, end plates properly secured and not less than 3 inches nor more than 6 inches above top of rail. If found defective:
A. Determine any operating restrictions (rules or equipment) which apply,
B. Complete non-complying tag per instruction 2.1.15,
C. Set out locomotive immediately or move to the next point where it can be set out,
D. Note defect on MAP 100 of locomotive which was set out, and
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.2.30 Draft gear and uncoupling mechanisms secure and not bent, cracked, broken or missing parts. If found defective:
A. Determine any operating restrictions (rules or equipment) which apply,
B. Complete non-complying tag per instruction 2.1.15,
C. Set out locomotive immediately or move to the next point where it can be set out,
D. Note defect on MAP 100 of locomotive which was set out, and
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.2.31 Jumper cables are properly stored (ends of cables should not be hanging free) and do not create a tripping hazard.

2.2.32 Brake shoes are properly applied and aligned with tread of wheels or other braking surfaces. If found defective:
   A. Determine any operating restrictions (rules or equipment) which apply,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Set out locomotive immediately or move to the next point where it can be set out,
   D. Note defect on MAP 100 of locomotive which was set out, and
   E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.2.33 Visible traction motor, HEP cables and cable connections are free from damage. If found defective:
   A. Repair if possible. If not, locomotive MUST be set up to prohibit propulsion (isolated), switched to trailing position and continue in use to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Note defect on MAP 100, and
   D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.34 Trucks, shocks, spring rigging and associated parts in proper position and free of cracks and breaks. If found defective:
   A. Determine any operating restrictions (rules or equipment) which apply,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Set out locomotive immediately or move to the next point where it can be set out,
   D. Note defect on MAP 100 of locomotive which was set out, and
   E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.2.35 Any wheel does not have a single flat or shelled spot 2 ½ inches or more in length. Any wheel does not have adjoining flat or shelled spots 2 inches or more in length. Any wheel does not have defects such as broken, gouged, chipped or cracked rim or flange. When more restrictive railroad rules or instructions are in effect concerning wheel defects, those instructions will apply. If found defective:
   A. Determine any operating restrictions (rules or equipment) which apply,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Set out locomotive immediately or move to the next point where it can be set out,
   D. Note defect on MAP 100 of locomotive which was set out, and
   E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.2.36 Emergency fuel cut-off devices and pantograph down devices are properly marked and free of any impediment which could prevent their operation. If found defective:
   A. Repair if possible. If not, shut down locomotive, switch to trailing position and continue to next Amtrak locomotive repair facility,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Note defect on MAP 100, and
   D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.2.37 Fuel tank (transformer on electric locomotives) is not leaking. If found defective:
   A. Determine any operating restrictions (rules or equipment) which apply,
   B. Complete non-complying tag per instruction 2.1.15,
   C. Set out locomotive immediately or move to the next point where it can be set out,
   D. Note defect on MAP 100 of locomotive which was set out, and
   E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.2.38 Brake cylinder travel must provide proper clearance when the brakes are released. Piston travel, if applicable, may not exceed 1 ½ inches less than total piston travel as indicated on Blue Form/MAP 816. If found defective:
A. Determine any operating restrictions (rules or equipment) which apply,
B. Complete non-complying tag per instruction 2.1.15,
C. Set out locomotive immediately or move to the next point where it can be set out,
D. Note defect on MAP 100 of locomotive which was set out, and
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

**2.2.39** Pantograph/carbon strip on electric locomotives and 3rd rail shoe on dual mode locomotives not broken or damaged. If found defective:
A. Locomotive may be moved to next Amtrak locomotive repair facility,
B. Change to undamaged pantograph on electric locomotives, and
C. Note defect on MAP 100.

**2.2.40** Perform a Locomotive Departure Test, as per instruction 2.3, from the controlling locomotive.

**2.2.41** Complete MAP 101 on each locomotive and complete a new MAP 100 to be left on each locomotive, as follows:
A. MAP 100 (See sample MAP 100 in back of AMT-3)
   1. Complete the first line, locomotive number (box 1).
   2. Enter your signature, occupation, place, date, time of the inspection in the boxes on the line with the heading "Daily Mechanical Inspection" (boxes 2-6).
   3. On the MAP 100 of the CONTROLLING locomotive, check the applicable space for "F-End" or "R-End" under heading "Locomotive Calendar Day Air Brake Test" (box 7 or 8). **NOTE:** Only complete box 7 or 8 on the MAP 100 of the controlling locomotive.
   4. On the MAP 100 of the CONTROLLING locomotive, check Box 9 if the ECP brake equipment has been inspected and tested.
   5. On the MAP 100 of the CONTROLLING locomotive, enter your signature, occupation, place, date, time of the brake test in the boxes on the line with the heading "Locomotive Calendar Day Air Brake Test" (boxes 10-14). **NOTE:** Only complete boxes 10-14 on the MAP 100 of the controlling locomotive.

**6.** Enter a description of any defective or non-complying condition in the "Failure En route / Equipment Condition" section.

**B.** MAP 101
   1. Enter date, time and location of the inspection on next available line of MAP 101.
   2. Contact CNOC mechanical desk at 1-800-424-0217 before going off duty to report that inspection has been performed and whether any defects were noted.

### 2.3 Locomotive Departure Test

#### 2.3.1 Preparation
A. Apply Blue Signal protection when required.
B. Secure equipment per instruction 3.5.
C. All MU, main reservoir and brake pipe hoses properly coupled between locomotive(s) and/or car(s) or on end of locomotives placed in proper receptacles or dummy couplings.
D. All angle cocks, cut-out cocks and end cocks properly positioned, including truck cut-out cocks.
E. Charge system to required pressure.

#### 2.3.2 Independent Brake Test
A. Release independent brake.
B. Full application in 10 psi increments.
C. Full release in 10 psi increments.
D. Note that full independent brake cylinder pressure is correct and holds in 10 psi increments.

#### 2.3.3 Brake Pipe Leakage Test
A. Make a 20 psi brake pipe reduction.
   1. Cut out pressure maintaining feature: move brake pipe cut off pilot valve/switch to "TEST" or "OUT" position.
   **NOTE:** Brake pipe leakage must not exceed 3 psi /minute.
   B. Move ABV handle to "Release" position.
   **NOTE:** Brake pipe pressure must not increase for one minute.
   C. Cut in pressure maintaining feature: move brake pipe cut off pilot valve/switch to "PASS, "FRT", or "IN" position.

#### 2.3.4 Emergency Brake Test
**NOTE:** On locomotives equipped with dynamic brake interlock (DBI), proceed to instruction 2.3.5. If locomotive is NOT equipped with DBI, proceed with the following:
A. Make emergency brake application with ABV handle. PCS light must illuminate.
B. Emergency brake cylinder pressure is obtained within 4 seconds and determine that brakes have applied.
C. Recover from emergency brake application.
2.3.8 Emergency Brake Valve Test
A. Open emergency brake valve. PCS light must illuminate.

B. Activate independent quick release feature and note that brake cylinder pressure drops to zero.

C. Release independent quick release feature.

D. Recover from emergency brake application.

E. Ensure all emergency brake valves operate as intended.

2.3.9 Graduated Release
A. Charge brake system to required pressure.

B. Make a full service brake application.

C. Move ABV handle to “RELEASE” position in 6 psi increments.

D. Recover from penalty application.

E. Move ABV handle to “SUPPRESSION” position in 4 seconds.

NOTE: Brake pipe and Equalizing reservoir should increase and hold at each increment. Brake cylinder pressure must decrease and hold at each increment. At least three brake cylinder pressure decreases must be observed.

2.3.10 Direct Release
A. Charge brake system to required pressure.

B. Make a 20 psi brake pipe reduction.

C. Move ABV handle towards “RELEASE” position and stop movement within the “SERVICE ZONE”.

D. Check for one minute and ensure equalizing pressure does not change.

E. Move ABV handle to “RELEASE” position and note that equalizing reservoir and brake pipe pressures recharge.

2.3.11 Determine That Brakes Apply/Release:
A. Place ABV handle in “FULL SERVICE” position. Independent brake must be in “RELEASE” position. Brake must apply. It must be observed that all brake shoes/disc pads are firmly seated against the wheels or discs.

B. Place reverser handle in forward or reverse.

C. Place ABV handle in “TRANSFER” position. Brake must release and sufficient shoe/pad clearance must be achieved.

D. Fully apply independent brake. Brake must apply. It must be observed that all brake shoes/disc pads are firmly seated against the wheels or discs.

2.3.12 If any of the test procedures in instructions 2.3.1 thru 2.3.11 fail, retest the procedure which failed.

2.3.13 If any of the test procedures in instructions 2.3.1 thru 2.3.11 fail after retesting, locomotive must not be used until repaired, except as noted in instructions 2.3.14 and 2.3.15.

NOTE: Any non-complying condition discovered during this test must be documented per instruction 2.1.15.

2.3.14 If the procedures in instruction 2.3.6 fail after retesting, the following will govern:
A. If the Deadman/Alerter test fails procedure per instruction 2.3.6 at an Amtrak locomotive repair facility, locomotive must be repaired before being used.

B. If the Deadman/Alerter test fails procedure per instruction 2.3.6 at other than an Amtrak locomotive repair facility:
   1. Unit must not be used as controlling locomotive,
   2. Place tag on control stand or engine control panel indicating “Defective Alerter”,
   3. Note defect on MAP 100, and
   4. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that locomotive with defective alerter is in consist or train.

### 2.3.15 If the procedures in instruction 2.3.7 fail after retesting, the following will govern:
A. If the Train Control test fails per instruction 2.3.7 at an Amtrak locomotive repair facility, locomotive must be repaired before being used in Train Control System territory.
B. If the Train Control test fails per instruction 2.3.7 at other than an Amtrak locomotive repair facility and unit is destined for Train Control System territory:
   1. Unit must not be used as controlling locomotive,
   2. Note defect on MAP 100, and
   3. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that locomotive with defective Train Control System acknowledger is in consist or train.

### 2.4 Mechanical Department Locomotive Air Brake Daily Inspection

#### 2.4.1 General Information
A. Air brake and signal equipment on locomotives and cab cars must be inspected, maintained, and tested in accordance with current federal regulations, and Amtrak maintenance procedures.
B. Locomotives and cab cars must be inspected at least once each calendar day that the unit is in service.
C. Locomotives / cab cars must not depart a location where a unit received a Locomotive Air Brake Inspection (see instruction 2.4) and/or Locomotive Departure test (see instruction 2.3) without a current, signed MAP 00 and MAP101.

#### 2.4.2 Preparation
A. During the inspection, if a defect is found and this defect cannot be corrected in a timely manner by the employee performing the inspection, it must be reported immediately to your supervisor.

B. Apply proper Blue Signal Protection.
C. Secure equipment per instruction 3.5
D. Apply handbrake.
E. Fully apply independent brake or make full service brake application.

#### 2.4.3 Air Compressors
A. Check compressor oil level. Ensure oil is up to full mark or with in operating range.
B. Compressor must not produce undue vibration or pounding, or otherwise make unusual noises that could indicate compressor damage or malfunction.
C. Compressor must operate to control main reservoir pressure 5 pounds above or below standard operating pressure.
D. Main reservoir pressure must increase 10 psi during the compressor loading cycle.
E. Compressor governor shall be adjusted so that the compressor will start when the main reservoir pressure is not less than 15 psi above the maximum brake pipe pressure fixed by the carrier.
F. Water and oil must be drained from the compressor inter-cooler and after-cooler, if possible.
G. Each air compressor on passenger equipment so equipped must be in effective and operative condition. MU passenger equipment found with an inoperative or ineffective air compressor at the time of its exterior calendar day inspection must be removed from service unless the railway company has in place procedures designed to protect the integrity of the air brake system as outlined in CFR Title 49, Part 238.303.e (17).

#### 2.4.4 Water and oil must be drained from all main reservoirs.

#### 2.4.5 Automatic main reservoir drain valves and air dryers are functioning properly.

#### 2.4.6 Condensation is blown from end brake pipe, main reservoir, and MU hoses before coupling to another hose or attaching to dummy couplings.

**NOTE:** No chemicals, which are known to degrade or harm brake system components, shall be placed in the train air brake system.

#### 2.4.7 All MU, main reservoir, and brake pipe hoses must be properly coupled between locomotives, stored in proper receptacles, or attached to their proper dummy couplings.

#### 2.4.8 All angle cocks, end cocks and cut-out-cocks must be properly positioned for service.

#### 2.4.9 Air regulating devices must function properly and be adjusted to the prescribed pressures.

#### 2.4.10 Air pressure gauges must not be in error more than 3 psi or 5% whichever is less.

#### 2.4.11 Equalizing reservoir pressure must be within 3 psi of brake pipe pressure.
2.4.12 Cut outs for various safety devices and/or enclosures to such devices must be properly positioned and sealed, with numbers recorded on MAP 100.

2.4.13 Brake shoes and pads are properly applied and aligned with tread of wheel or brake disc.

2.4.14 Ensure brake shoes have adequate service material.

2.4.15 Piston travel is properly adjusted.
   A. Piston travel must provide proper brake shoe clearance when the brakes are released.
   B. Piston may not exceed limits posted in Section MS.1.0. If locomotive is not listed travel may not exceed 1.5 inches less than the total possible piston travel. Total possible travel is recorded on Blue Form/MAP 816 in cab of locomotive.

2.4.16 Brake equipment and safety supports, where used, are in a safe and suitable condition for service, with no part of foundation rigging or safety supports less than 2-1/2” above the rail.

2.4.17 Brake rigging:
   A. Ensure that brake levers, rods, beams, hangers, and pins do not bind or foul.
   B. All pins are properly applied and secured.
   C. Brake levers, rods, or pins may not be cracked or broken.
   D. Brake levers, rods, or pins may not be worn more than 30%.

2.4.18 Brake disc must be inspected per current Mechanical Department instructions.

2.4.19 Hand/parking brakes are in a safe and suitable condition for service.
   A. At each daily inspection the hand/parking brake assembly and all of its associated parts shall be inspected and tested (applied and released) to determine that it functions as intended.
   B. Locomotives operating in non-passenger service must have hand/parking brake stenciled with date of last annual inspection, as outlined in CFR Title 49 Part 232.105c. Locomotives subject to this regulation shall also have the hand/parking brake assembly inspected, tested and stenciled every 368 days.
   C. Except for MU locomotives, locomotives operating in passenger service must have the hand/parking brake assembly (including all of its parts and connections) inspected and tested as often as the service requires but not less frequently than every 368 days. The date of the last inspection shall be entered on Blue Form/MAP 816, suitably stenciled or tagged on the equipment or maintained electronically provided the FRA has access to the record upon request. Amtrak locomotives shall have the handbrake inspection dates entered and tracked in the corporation’s Work Management System (WMS).

2.4.20 Communicating signal system on passenger locomotives must be tested and known to be in a safe suitable condition for service before each trip.

2.4.21 Ensure the words “Emergency Brake Valve” are legibly stenciled or marked near each brake pipe vent valve or adjacent badge plate.

2.4.22 FRA / Amtrak leakage limits.
   A. Main Reservoir: Average of 3 pounds per minute over a period of 3 minutes.
   B. Brake Pipe: 3 pounds per minute.
   C. Brake Cylinder: Brakes must remain applied for 5 minutes with a full service brake application in effect, and communication to the brake cylinders closed.
   D. Control Air System: Average of 3 pounds per minute over a period of 3 minutes.

2.4.23 Main Reservoir Safety Valve: Must not allow pressure to rise more than 15 psi above maximum standard main reservoir pressure.

2.5 Locomotive Air Brake Test

2.5.1 Refer to instruction 2.1.10 to determine when this test is required.

2.5.2 Secure equipment per instruction 3.5.

2.5.3 If equipped with an independent brake:
   A. Fully apply independent brake.
   B. Observe that brakes apply on each locomotive unit in consist.
   C. Fully release independent brake.
   D. Observe that brakes release on each locomotive unit in consist.

2.5.4 Make a 10 psi automatic brake reduction.

2.5.5 Observe that brakes apply on each locomotive unit in consist.

2.5.6 If equipped with an independent brake:
   A. Activate the independent quick release feature (bail off).
   B. Observe that brakes release on each locomotive unit in consist.

2.5.7 Make an additional 10 psi automatic brake reduction (total 20 psi reduction)

2.5.8 Observe that brakes apply on each locomotive unit in consist.

2.5.9 Move ABV handle to “RELEASE”.

2.5.10 Observe that brakes release on each locomotive unit in consist.

2.5.11 Fully apply independent brake.

2.5.12 Perform required train brake test(s).
2.6 Locomotive Running Brake Test

2.6.1 Required on locomotives operated lite, or multiple lite upon:
A. Initial movement.
B. Change in consist of lite locomotives.
C. Changing control stations.
D. Frequently, with sufficient force, when snow or ice conditions exist.
E. Any point where a brake pipe angle cock or end cock has been turned.

2.6.2 To determine effectiveness of brakes while locomotive is moving, as soon as speed permits but not exceeding 20 mph:
A. Apply independent brake sufficiently to develop noticeable brake cylinder pressure and retarding force.
B. Release independent brake and make service application with automatic brake. Check brake cylinder pressure/dynamic brake effort and retarding force.
C. Actuate independent brake handle.
D. Check that brake cylinder pressure releases / dynamic brake effort drops and locomotive rolls freely.

2.7 Locomotive Defects Discovered En route At Other Than Calendar Day Inspection Point

NOTE: Any non-complying condition discovered en route must be documented per instruction 2.1.15.
CNOC mechanical desk: 1-800-424-0217
Siemens mechanical desk at CNOC: 1-302-683-2753

NOTE: No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

2.7.1 Hand/parking brakes are in a safe and suitable condition for service. If found defective:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.2 Cab seats properly secured to the floor or sides. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Verbaly notify all crew members of defect. Switch locomotive to trailing position if unsafe to continue as lead unit. At next Calendar Day Inspection location, repair or switch to trailing position,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.3 Cab windows and wipers provide clear vision and windows are free of broken areas. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Verbally notify all crew members of defect. Switch locomotive to trailing position if unsafe to continue as lead unit. At next Calendar Day Inspection location, repair or switch to trailing position,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.4 Cab heaters and Air Conditioning (if equipped) function as intended. If found defective:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Switch locomotive to trailing position if unsafe to continue as lead unit. At next Calendar Day Inspection location, repair or switch to trailing position,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train.

2.7.5 Cab lights and gauge lights are operative and provide sufficient illumination. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. At next Calendar Day Inspection location, repair or switch to trailing position,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.6 Speed indicator and related apparatus is undamaged. The performance and accuracy of the speed indicator can only be ascertained after departure (10 mph to 30 mph +3 mph; above 30 mph +5 mph). If found defective or out of limits as indicated above:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100.
D. At next Calendar Day Inspection location, repair or switch to trailing position,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.7 Deadman/Alerter functions as intended. An alerter will be considered as having failed only when it will not acknowledge by pressing the “Alerter Acknowledge Button/Switch”.

Exception: When ATC is cut out on High Speed Trainset or HHP-8 Locomotive the alerter cannot be acknowledged using the alerter switch or foot pedal. In this case the alerter will not be considered as having failed.

NOTE: Alerter cycle times vary by equipment. Alerter which seem to cycle with short or long times must be reported on the MAP 100.

If deadman/alerner fails en route, locomotive may continue in use to next Amtrak locomotive repair facility when the following is complied with:

A. In a "single engineer" operation:
   1. An employee trained to apply the emergency brake MUST be IMMEDIATELY positioned in the operating control compartment with the Engineer.
   2. When qualified employee, as described above, is not available to position in operating control compartment, the Engineer shall be in constant communication with a second crew member as follows:

   a. Engineer will communicate with a designated train crew member, either verbally or by radio, the name of all block/interlocking signals, the approach to the limits of authority (DTC blocks, Track Warrants, Form D, etc.) and temporary speed restrictions.
   b. A designated train crew member will be alert for and acknowledge these communications. If the Engineer does not remain in communication as described above, the designated train crew member must determine the cause and if necessary, take action to stop the train.

   NOTE: The Conductor will designate the train crew member who will be positioned in the operating control compartment with the Engineer.

B. Alerter may be cut out electronically or pneumatically,
C. Place non-complying tag on control stand or engine control panel indicating “Defective Alerter”
D. Note defect on MAP 100,
E. At next Calendar Day Inspection location, repair or switch to trailing position,
F. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
G. Notify CNOC mechanical desk at 1-800-424-0217 and train dispatcher as soon as possible without delaying train.

2.7.8 Air brake gauges register variations in pressure when brake valves are manipulated. If found defective, locomotive may continue in use to next Amtrak locomotive repair facility and comply with the following:
A. Complete non-complying tag per instruction 2.1.15
B. Note defect on MAP 100.
C. At next Calendar Day Inspection location, repair or switch to trailing position,
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.9 Air compressor or compressors control main reservoir pressure, as indicated by cab gauges, within range specified for type locomotive. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. At next Calendar Day Inspection location, repair or switch to trailing position,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.10 Headlights operate properly, and can be dimmed as required. One defective bulb of an Incandescent or LED IS NOT considered non-compliant. If found non-compliant (defective):
A. Locomotive may continue in use until next calendar day inspection,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. At next Calendar Day Inspection location repair or switch to trailing position,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.11 All auxiliary (ditch) lights operate as intended. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. If 1 defective auxiliary light is discovered at initial terminal of train, repair or switch locomotive to trailing position and repair no later than next Locomotive Calendar Day Inspection,
C. If 1 auxiliary light is defective, proceed and repair no later than next Locomotive Calendar Day Inspection,
D. If 2 auxiliary lights are defective:
   1. Proceed, not exceeding 20 mph over public road crossings, to the next point where repairs can be made or the next Locomotive Calendar Day Inspection, whichever occurs first, or
   2. Switch locomotive to the trailing position,
E. Complete non-complying tag per instruction 2.1.15,
F. Note defect on MAP 100,
G. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
H. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.12 Locomotive radio operates as intended. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Repair, or replace with another operative radio if available,
D. At next Calendar Day Inspection location, repair, replace radio or switch to trailing position,
E. Note defect on MAP 100,
F. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
G. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.13 Dynamic brake equipment is in place and cut in if locomotive is equipped. Locomotives with defective dynamic brake will proceed as follows:
A. Place inoperative dynamic brakes (NRPC 3129) tag on control stand or Engine Control panel indicating locomotive number, date, location and signature of person who discovered (see P 6.1.7 or NP 6.1.7)
B. Note defect on MAP 100,
C. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that locomotive with inoperative dynamic brake is in consist or train,
D. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.
E. Conventional locomotives must be repaired within 3 calendar days.
F. MU locomotives must be repaired by the next Locomotive Calendar Day Inspection.

2.7.14 Horn and bell operate as intended. If either found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. At next Calendar Day Inspection location, repair or switch to trailing position,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.15 Sanitation, Toilet Compartment and Toilet:
A. If toilet or toilet compartment is unsanitary or defective, complete non-complying tag per instruction 2.1.15,
B. Locomotive can be used as a lead unit only until unsanitary condition can be corrected, replaced with another locomotive, or the next Locomotive Calendar Day Inspection.
C. Note on MAP 100 date toilet or toilet compartment becomes unsanitary or defective.
D. If toilet compartment door lock is defective, lock must be repaired on or before the next 92-day inspection. Note on MAP 100 date toilet compartment becomes defective.

2.7.16 Sanders function on each locomotive to deliver sand to each rail in front of the first power operated wheel set in the direction of movement. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.17 No traction motor is cut out. If traction motor is cut out:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: This instruction does not apply to HHP-8, HST, ACS-64 and P32ACDM locomotives. However, when traction motor is cut out on this equipment note must be made on MAP 100.

2.7.18 Emergency Brake Valve (Conductor’s Valve) properly labeled and accessible. If defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.19 Doors and cover plates that are marked “Danger” and covering high voltage electrical apparatus must be secured in their proper locations. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Verbally notify all crew members of defect.
C. Complete non-complying tag per instruction 2.1.15,
D. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.20 Fan openings, exposed gears and pinions, and exposed moving parts protected to prevent injury. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Verbally notify all crew members of defect.
C. Complete non-complying tag per instruction 2.1.15,
D. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.21 No accumulations of oil, water, fuel, debris and other items in passageways, walkways, cab control compartment floors and engine compartment floors which presents an unsafe condition such as a slipping hazard. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Verbally notify all crew members of defect.
C. Complete non-complying tag if unsafe to continue as lead unit,
D. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.
2.7.22 No battery gas leaks in cab or engine compartment. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Verbally notify all crew members of defect. Switch locomotive to trailing position if unsafe to continue as lead unit,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.23 No obvious diesel engine exhaust gas leaks into the engine compartment. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Verbally notify all crew members of defect. Switch locomotive to trailing position if unsafe to continue as lead unit,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.24 Brake rigging properly secured. If found defective en route:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.7.25 No part of trucks, brake rigging and running gear, with the exception of the wheels and non-metallic sand hoses, are less than 2-1/2 inches above top of rail. Determination can be made by inspecting under side of the locomotive from outside the gage of the rail. If found defective en route:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.7.26 Pilots, snowplows, end plates properly secured and not less than 3 inches nor more than 6 inches above top of rail. If found defective en route:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.27 Draft gear and uncoupling mechanisms properly secured and not bent, cracked, broken or missing parts. If found defective en route:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.
2.7.28 Brake shoes are properly applied and aligned with tread of wheels or other braking surfaces. If found defective en route:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.7.29 Visible traction motor, HEP cables and cable connections are free from damage. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. If unsafe to continue under power, locomotive MUST be set up to prohibit propulsion (isolated),
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.30 Trucks, shocks, spring rigging and associated parts in proper position and free of cracks and breaks. If found defective:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

**NOTE:** When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.7.31 Any wheel does not have a single flat or shelled spot 2½ inches or more in length. Any wheel does not have adjoining flat or shelled spots that are each 2 inches or more in length. Any wheel does not have defects such as broken, gouged, chipped or cracked rim or flange. When more restrictive railroad rules or instructions are in effect concerning wheel defects, those instructions will apply. If found defective:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.32 Emergency fuel cut-off devices and pantograph down devices are properly marked and free of any impediment which could prevent their operation. If found defective en route:
A. Locomotive may continue in use to next Amtrak locomotive repair facility,
B. Complete non-complying tag per instruction 2.1.15,
C. Note defect on MAP 100,
D. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
E. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

2.7.33 Fuel tank is not leaking. If found defective en route:
A. If leak is severe, stop train and notify train dispatcher and CNOC mechanical desk at 1-800-424-0217 as soon as possible,
B. Determine actions to be taken from train dispatcher and/or CNOC mechanical desk, setting out locomotive if necessary,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.
2.7.34 Brake cylinder travel must provide proper clearance when the brakes are released. Piston travel, if applicable, may not exceed 1 1/2 inches less than total piston travel as indicated on Blue Form/MAP 816. If found defective en route:
A. Set out locomotive if unsafe to continue,
B. Determine any operating restrictions (rules or equipment) which apply,
C. Complete non-complying tag per instruction 2.1.15,
D. Note defect on MAP 100,
E. In multiple unit consists or push/pull operations, note on MAP 100 of lead unit that non-complying locomotive is in consist or train,
F. Notify CNOC mechanical desk at 1-800-424-0217 as soon as possible without delaying train.

NOTE: When locomotive is in passenger service, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.

2.8 Independent Brake Operation

2.8.1 Independent brake must NOT be used in conjunction with blended brake operation.

2.8.2 Quick Release Feature
A. Hold handle in quick release (actuating) position until brake cylinder pressure is zero psi.
B. After brake cylinder pressure reaches zero psi, allow three seconds for each additional unit in consist.
C. Tampering with any device or appliance, introducing any object or means to create or maintain any locomotive in a condition to constantly bail off brake cylinder pressure is prohibited.

2.9 Double Heading And Helper Locomotives

2.9.1 When more than one locomotive is attached to a train, Engineer on leading locomotive in direction of movement will operate train air brakes.

2.9.2 All brake valve cut-out cocks and handles shall be positioned as specified in instruction 2.14 and Table A (Air Brake Handle Positions & Cut-outs).

2.9.3 When necessary for leading locomotive to give up control of air brakes, perform a brake test per instruction P4.2.3 or NP4.2.3 from new controlling locomotive.

2.9.4 In case of emergency, brakes can be applied by moving the ABV handle or Emergency Brake Valve on any unit in the consist to “EMERGENCY” position.

2.9.5 Before detaching power, train must be brought to a complete stop.

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2.8.6 Shoving Passenger Trains – DO NOT assist a passenger train carrying passengers by pushing from the rear of the train.

2.10 Dead Locomotive(s) In A Train

2.10.1 If main reservoir supply is available, make up hoses and set up brake valves per instruction 2.14 and Table A (Air Brake Handle Positions & Cut-outs); OR

2.10.2 If NO main reservoir supply is available, drain main reservoir pressure to 0 psi and cut out automatic drain valves (stem is recessed in knob); cut in dead engine feature and set up brake valves per instruction 2.14 and Table A (Air Brake Handle Positions & Cut-outs); AND

2.10.3 Automatic and independent brake handles must be removed or secured in proper position per instruction 2.14 and Table A (Air Brake Handle Positions & Cut-outs).

2.11 Charging A Train

2.11.1 Before air hoses are coupled, condensation must be blown from brake pipe and main reservoir supply hoses of locomotive.

2.11.2 No chemicals, which are known to degrade or harm brake system components, shall be placed in the train air brake system.

2.11.3 While charging train, independent brake must remain fully applied.

2.11.4 Charge train using “RELEASE” position of ABV handle. Pressure maintaining feature must be cut in.

2.12 Use Of Sand / Handling Of Wheel Slip

2.12.1 When necessary to use sand, number 1 truck or lead axle sand switch, if equipped, should be used to prevent slipping of locomotive wheels.

2.12.2 Slipping of locomotive wheels causes severe stress to draft systems and damage to rails and should be avoided.

2.12.3 Do not apply sand while wheels are slipping. Throttle must be reduced to stop wheel slip, and then start sanding and advance throttle slowly (Does NOT apply on ACS-64 Locomotives).

2.12.4 Where conditions require, sand should be used as the train is stopping to avoid slipping when starting.

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2.14.5 P-42DC and P-32ACDM locomotives are not equipped with MU2, MU2A or Dual Ported Cut-out Cocks.

2.14.6 Complete the following procedure to prevent trapped air in the independent brake system when setting up the air brakes on a P-42DC or a P-32ACDM to be used:

- In Push Service.
- In Double Heading (Helper) Service, or
- In a train consist, with MU hoses NOT connected to the unit controlling the air brakes.

A. Secure equipment per instruction 3.5.
B. Make a full service brake application with the ABV handle.
C. Wait for air exhaust to stop.
D. Place the Independent Brake handle in the “RELEASE” position (DO NOT BAIL OFF BRAKE CYLINDER PRESSURE)
E. Move the brake pipe cut-off pilot switch to the “TEST” position for 10 seconds.
F. Move the brake pipe cut-off pilot switch to “TRL” position.
G. Move the ABV handle to the “HANDLE OFF” position.
H. Ascertain, that brake cylinder pressure fully releases on the Push, Double Heading or In-Train locomotive when train brakes are released. If brake cylinder pressure does not fully release, perform the following from the Push, Double Heading or In-Train locomotive brake valve:
   1. Move brake pipe cut-off pilot switch to “TEST” position
   2. Bail off brake cylinder pressure.
   3. Return brake pipe cut-off pilot switch to “TRL” position.
I. If a P-32ACDM or P-42DC locomotive is Double Headed (Helper) Service or in a train consist with no MU cables connected, an employee must immediately take position in the operating control compartment to observe for a locked axle indication.

2.15 Sealing Of Protective Devices On Locomotives

2.15.1 Mechanical forces will apply seals on the following and record their numbers on the MAP 100:

A. ACSES Cut-out Cock/Switch
B. Cab Signal Cut-out Cock/Switch
C. ITCS/XITCS Cut-out Cock/Switch
D. IITS
E. I-ETMS Penalty Brake Cut-out Cock/Switch
F. I-ETMS Emergency Cut-out Cock/Switch
G. Alerter Cut-out Cock/Switch
H. ATC/IITS Transfer Switch
I. Speedometer (Locomotive) Overspeed (OS) Cut-out Cock/Switch
2.16 Lite & Multiple Lite Locomotive Movements

2.16.1 Before initial movement of any lite or multiple lite locomotive consist, engineers (QP may assist engineer) and mechanical department employees must determine that:

A. All locomotive brakes are cut in by visually observing brake cylinders applied, brake shoes against wheels, brake indicators applied or any other device for the purpose of determining that truck brakes are cut in and applied.

B. Locomotive is secured and that brakes respond as intended to application and release of automatic and independent brake valves.

C. Before movement, hand/parking brakes are released and all chocks, skates or chains are removed.

2.16.2 Lite and Multiple Lite Movements Over-The-Road

A. All brake hoses between multiple lite locomotives must be properly connected with associated air cut-out cocks OPEN.

B. When main reservoir supply is not available, the locomotive(s) without main reservoir connections MU'ed MUST:

1. Be the rear-most unit(s) of the multiple lite consist.
2. Have all brake pipe hoses connected and cut in.
3. Have all main reservoirs drained to 0 psi then close main reservoir drains and cut out automatic drain valves (stem recessed in knob).
4. Have dead engine feature cut in (OPENED).

C. ABV and IBV handles and cut-out cocks must be positioned per instruction 2.14 and Table A (Air Brake Handle Positions & Cutouts).

D. Reverser handles on all non-operating control stations must be removed. Those that cannot be removed must be properly secured.

E. 27-point control cables must be inserted and secured in their proper receptacles between live compatible units coupled in multiple.

F. When Mechanical Department employees are responsible for make-up, inspection and testing of lite and multiple lite locomotive consist, the make-up, inspection and testing will be performed in accordance with Amtrak Standard Maintenance procedures, inspections and AMT-3.

G. Locomotive Engineers must inspect all lite and multiple lite locomotives per instruction 2.2.

H. Lite and multiple lite locomotive consist must be tested per instruction 2.3 from controlling locomotive, prior to departure.

NOTE: QP, QMP or QMI assistance will be required during the locomotive departure test.

1. During departure test, brakes on all MU'ed locomotives in multiple lite consist must apply and release in response to independent and automatic brake movements.

2. During departure test, brakes on locomotives with only brake pipe connected in multiple lite consist must apply and release in response to automatic brake movements.

3. Main Reservoir gauge on rear unit of multiple lite consist must be observed to determine that air pressure is being restored prior to being dispatched.

I. MAP 100 must be placed, along with prescribed inspection records, in the cab of each unit in the consist.

J. A MAP 1173/10 C Summary must be filled out upon completion of the multiple lite locomotive departure test and placed in the locomotive cab from which the consist will be operated. "Lite Loco Move per 2.16" box must be checked.

K. Lite and multiple lite locomotives must not depart without completed MAP 100, MAP 101 and MAP 1173/10 C Summary.

L. Without Face-to-Face relief, perform a Non-Passenger Class III brake test on lite and multiple lite locomotive movements, prior to departure.

M. Lite and multiple lite locomotive movements require a locomotive Running Brake Test per instruction 2.6
2.16.3 Lite and Multiple Lite Movements Within Yards or Terminals
A. Lite and multiple lite locomotives may be moved within the confines of a yard or terminal without connecting the MU hoses, as long as the brake pipe and main reservoir hoses are connected with associated angle and main reservoir cocks open.

2.17 Failure of Locomotive Air Brakes
2.17.1 All locomotives must leave terminal points with air brakes in operative condition.
2.17.2 In the event that locomotive brakes become inoperative while locomotive is moving lite, the following procedure applies:
A. Locomotives with dynamic braking should be stopped by use of dynamic brake and hand/parking brake.
B. Locomotives without dynamic braking, rail cars and other equipment must be stopped with hand/parking brake, if practicable.
C. It not practicable to stop with hand/parking brake, locomotives may be stopped by “plugging the motors”.
   CAUTION: THIS MUST ONLY BE USED AS A LAST RESORT. THE RETARDING FORCE WILL BE SEVERE WHEN POWER IS APPLIED IN REVERSE ON A MOVING LOCOMOTIVE. CREWS MUST ANTICIPATE THIS FORCE AND PROTECT THEMSELVES FROM INJURY.
D. To “plug the motors”: place throttle lever in “IDLE” position; place reverse lever in position opposite direction of movement; move throttle lever to first notch; locomotive must be secured with hand/parking brakes immediately after movement is stopped, secure equipment per instruction 3.5.
   NOTE: PLUGGING MOTORS ON CERTAIN AMTRAK LOCOMOTIVES MAY NOT BE EFFECTIVE DUE TO PROTECTION BY ELECTRICAL INTERLOCKS.

2.18 Emergency Brake Application - Locomotive
2.18.1 ABV initiated
A. Full emergency brake effort must be allowed to apply.
B. Leave handle in “EMERGENCY” position until stopped.
C. Ensure throttle/controller is in “IDLE” or “OFF” position.
   NOTE: It is acceptable to regulate locomotive brake cylinder pressure from an undesired emergency (UDE) brake application.

2.18.2 When equipped with Two-Way End-Of-Train device, engineer or other train crewmembers must activate the two-way end-of-train device using the “EMERGENCY” toggle switch when any emergency application occurs.
2.18.3 Recovery from emergency after stopping
A. Move ABV handle to “RELEASE” position.
B. Inspect ENTIRE train for derailed cars, shifted loads, etc.
C. Perform a Class II brake test per instruction P4.2.3 for Passenger Operations.
D. Perform a Class III brake test per instruction NP4.2.3 for Non-Passenger Operations.
2.18.4 After proceeding, a Running Brake Test must be made.

3.0 TRAIN MAKE UP
3.1 General
3.1.1 A safety stop must be made just (approximately 50 feet) prior to coupling to any equipment. A safety stop is not required when distance, between standing equipment to be coupled, is less than 50 feet.
   NOTE: This instruction applies to “Butted Knuckles” or contacting equipment as if coupling.
3.1.2 When coupling equipment, care must be taken to prevent injury or damage. Coupling must be made at the minimum speed required to complete the coupling but not exceeding 4 mph.
   NOTE: This instruction applies to “Butted Knuckles” or contacting equipment as if coupling.
   “Butted Knuckles”

3.1.3 After coupling locomotive(s) to train, couplers between locomotive and train must be DOUBLE stretched to insure that proper coupling is made. This applies to all subsequent couplings between cars and/or locomotives. Telltale hole or recess MUST be fully visible.
3.1.4 Before air hoses are coupled, condensation must be blown from brake pipe and main reservoir supply hoses of locomotive.
3.1.5 Connect all brake pipe and main reservoir air hoses.
3.1.6 Cut in main reservoir supply by opening cut-out cocks slowly.
3.1.7 Cut in brake pipe by opening angle cocks slowly, beginning with cock closest to locomotive.
3.1.8 Connect required HEP cables, MU and communication jumpers.
3.1.9 Release all hand/parking brakes unless required.
3.1.10 Cars equipped with pressure retaining valves must be set in “DIRECT EXHAUST” position or as specified in Timetable Special Instructions.
3.1.11 Passenger Equipment in a freight train must have the DIR/GRA cap on the control valve set in “DIRECT RELEASE”.
3.1.12 All locomotive control valve service portions are to be set in “GRADUATED RELEASE”.
3.1.13 Train blocking for mixed consist trains
   A. Express cars (70000, 71000 or 74000 series) must be blocked on the rear of the train consist. EXCEPTION: Private Cars may be blocked behind Express cars.
   B. Private Cars may be blocked anywhere in train consist. Private Cars ARE NOT classified as Passenger Carrying Cars (See Definition for “Passenger Carrying Car”). Private Cars are classified as Passenger Equipment (See Definition for “Passenger Equipment”).
   C. Passenger Carrying Cars must be blocked ahead of Express cars.
   D. When EOT is required, rear car of train consist must be capable of accepting the device in the proper location on the coupler.
   NOTE: Items B, C, D and E do not apply to Non-Passenger train movements (e.g. switching, shop moves).
3.1.14 Superliner, High-Level and other cars with high diaphragms MUST NOT be coupled to cars with low diaphragms except:
   A. When coupling the low diaphragm end of a Transition car to any car with low diaphragm(s).
   B. When coupling the high diaphragm end of a car to a low-level car equipped with tubular type diaphragm(s).
   C. When permission is received from person in charge of train and engine movements AND coupling/movement will not be made on curves or diverging movements through switches.
3.1.15 Set equipment to Graduated or Direct Release according to the table below.

<table>
<thead>
<tr>
<th>Train Consist (excluding Locomotives)</th>
<th># of Direct Release Cars in Train</th>
<th>Set-Up Balance of train in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-56 cars</td>
<td>Always Direct Release</td>
<td></td>
</tr>
<tr>
<td>7-24 cars</td>
<td>3 or more cars</td>
<td>Direct Release</td>
</tr>
<tr>
<td>7-24 cars</td>
<td>2 or less cars</td>
<td>Graduated *</td>
</tr>
<tr>
<td>1-6 cars</td>
<td>1 or more cars</td>
<td>Direct Release</td>
</tr>
<tr>
<td>1-6 cars</td>
<td>None</td>
<td>Graduated *</td>
</tr>
</tbody>
</table>

* Train may be set up in Direct Release if additional direct release cars will be added later.
NOTE: Train consists in Passenger service must not exceed 56 cars.

3.1.16 Car(s) set in “DIRECT RELEASE” may be positioned anywhere in the consist, subject to the train blocking requirements provided in instruction 3.1.13 and compatibility with cars with high diaphragms prescribed in instruction 3.1.14.

3.2 Graduated Release Operation

3.2.1 Brake pipe cut-off pilot valve/switch on controlling locomotive must be set to “PASS” position.
   EXCEPTION: When a passenger train which is set to graduated release is assisted by a controlling locomotive not equipped with a “PASS” position on the brake pipe cut-off pilot valve/switch (or IFD/locomotive screen) comply with the following:
   1. Leave the train consist set to graduated release.
   2. Place the brake pipe cut-off pilot valve/switch (or IFD/locomotive screen) in the “FRT” or “IN” position.
   3. Note on “Conditions En Route” portion of MAP 1173/10C Summary that “brake pipe cut-off pilot valve/switch is set to FRT position with train consist set to graduated release.
   NOTE: When operating in the above configuration, the train will function as a direct release train even though the train consist is set to graduated release (“Graduating off” will have no effect; a brake release will only occur in the “RELEASE” position of the ABV handle).

3.2.2 When operating train consists in graduated release, all cars equipped with “GRADUATED RELEASE” brake systems must have the DIR/GRA cap on the control valve set in “GRADUATED RELEASE”.

3.2.3 All cars (including private cars) equipped with a supplemental selector volume must have selector volume cock cut out.

3.2.4 If assistance is needed to verify car brake equipment, contact CNOC mechanical desk via:
   A. 1-800-424-0217 and follow voice prompts;
   B. TMU communication system, or;
   C. Train Dispatcher
3.3 Direct Release

3.3.1 Train consists in Passenger service must not exceed 56 cars.
3.3.2 Train consists exceeding 30 cars will comply with the following:
   A. All cars (including private cars) that are equipped with 26-C control valves must also be equipped with a supplemental selector volume reservoir.
   B. Must have supplemental selector volume reservoir “cut in”.
   C. Viewliners and Superliner II cars must have the badge plate located on the air brake rack set to “EXPRESS” position.

3.3.3 Brake pipe cut-off pilot valve/switch on controlling locomotive must be set to “FRT” position.
3.3.4 When operating trains in direct release, all cars equipped with “GRADUATED RELEASE” brake system must have the DIR/GRA caps on the control valves set in “DIRECT RELEASE”.
3.3.5 Auto Train consists, with cars so equipped, must have the brake plate located on the air brake rack set to “AUTO TRAIN” position.
3.3.6 All train consists operating on the Northeast Corridor are limited to a maximum of 24 cars.
3.3.7 If assistance is needed to verify car brake equipment, contact CNOC mechanical desk via:
   A. 1-800-424-0217 and follow voice prompts;
   B. TMU Communication system, or,
   C. Train Dispatcher.

3.4 Cutting Off Car(s) Or Locomotive(s)

3.4.1 SHUT DOWN AND ISOLATE HEP, IF EQUIPPED.
3.4.2 Cutting off locomotives ONLY:
   A. Secure equipment per instruction 3.5.
   B. Locomotives must be set up per instruction 2.14.
   C. Mechanical Employees MUST reference SMP 50403 “Winterization of Locomotives” for freeze protection.
3.4.3 Cutting off cars ONLY:
   A. Secure equipment per instruction 3.5.
   B. Mechanical Employees MUST reference SMP 50601 “Winter Protection – Freeze Damage Prevention” for freeze protection.
   C. Make a 20 psi brake pipe reduction; and 30 seconds after application is completed, signal crew member to close angle cock and main reservoir cut-out cock on equipment to be moved.
   D. Leave brake pipe angle cock open on equipment left standing. Close main reservoir cut-out cock (if equipped).

3.4.4 Cutting off locomotives coupled to cars with locomotive supplying compressed air.
   A. Locomotives must be set up per instruction 2.14.
   B. Secure equipment per instruction 3.5.
   C. Lift uncoupling lever and turn away from equipment in order to avoid flying debris during hose separation. Stop equipment to be moved after separation and secure hose(s).
   D. On locomotive left standing
      1. Make a Full Service automatic brake reduction.
      2. Place independent brake in “FULL APPLICATION” position, if equipped.
      3. Throttle/controller in “IDLE” or “OFF” position.
      4. Place reverser in “NEUTRAL” and remove. If not removable, place in “OFF” position.
      5. Place generator field switch/breaker in “Off/DOWN” position (if equipped).
      6. Isolate all locomotives.

3.4.5 When cutting off locomotives coupled to cars with locomotive DEAD or NOT supplying compressed air, instruction 3.4.3. will apply.

E. Disconnect all jumpers, cables and other connections (vestibule curtains, chains, etc.) between cars to be uncoupled.
F. When equipment is fitted with a Two-Way End of Train Device (EOT), place equipment left standing in “EMERGENCY” using this device before uncoupling.
G. When not equipped with an EOT device and equipment to be left standing is equipped with an accessible emergency brake valve on the first or second car, use this valve to place the equipment to be left standing in “EMERGENCY” before uncoupling. After emergency brake application, return emergency brake valve to “CLOSED” position.
H. When emergency brake application cannot be attained with the EOT or emergency brake valve on the first or second car, then emergency application on equipment left standing must take place during the uncoupling process.
I. Before lifting uncoupling lever, ensure coupler is not pinned per instruction 9.4.5
J. Lift uncoupling lever and turn away from equipment in order to avoid flying debris during hose separation. Stop equipment to be moved after separation and secure hose(s).
3.5 Securing Equipment

ALL EMPLOYEES ARE RESPONSIBLE FOR PROPERLY SECURING EQUIPMENT

UNATTENDED EQUIPMENT: Equipment left standing and unmanned in such a manner that would hinder immediate application of hand/parking brakes or air brakes by a qualified employee to prevent equipment from moving.

3.5.1 Unattended equipment must be secured according to the applicable part of instruction 3.5. Dependence must never be placed on air brakes to hold equipment left unattended.

Proper chock placement: Chock both sides of at least one truck or one wheel and to additional wheels as necessary to prevent movement.

3.5.2 Attended equipment must be secured per instruction 3.5 when required by Rule, Special instruction, General Order, Bulletin Order, other Directive or when physical characteristics require.

3.5.3 During continuous switching operations in a yard or terminal, chocks, blocks or skates may be used to secure unattended equipment instead of hand/parking brakes, but only when directed by Rule, Special Instruction, General Order, Bulletin Order or other Directive. When continuous switching operations stop, unattended equipment must be secured according to the applicable part of instruction 3.5.

3.5.4 Unattended cars placed in a car repair facility must be secured per instruction 3.5 unless hand/parking brakes are defective. When hand/parking brakes are defective, chocks, blocks or skates may be used to secure equipment in a car repair facility.

3.5.5 Securing Locomotives Coupled To Cars Left Unattended.

NOTE: For the purpose of securing equipment, Cab Control Cars and NPCU’s are considered as locomotives when position in train would allow use as a controlling unit.

A. Apply all hand/parking brakes on all locomotives.

B. Two or more cars and/or locomotives – No less than a total of two hand/parking brakes must be applied (locomotives+ cars=total hand/parking brakes). If two hand/parking brakes are not sufficient, apply the necessary number of hand/parking brakes to prevent movement.

EXAMPLE 1: Unattended consist is 2 locomotives and 3 cars.

EXAMPLE 2: Unattended consist is 1 locomotive and 4 cars.

EXAMPLE 3: Unattended Push/Pull 2 locos; 3 cars consist.
EXAMPLE 4:
Unattended Push/Pull 1 loco;3 cars;1 Cab Car consist

Apply hand/parking brakes on locomotive and Cab Car. If this is sufficient to prevent movement, no other hand/parking brakes are required.

EXAMPLE 5:
Unattended Push/Pull 1 loco;2 cars;2 Cab Cars consist

Apply hand/parking brakes on locomotive and Cab Car on end of train (2nd cab car cannot be used as controlling unit). If this is sufficient to prevent movement, no other hand/parking brakes are required.

EXAMPLE 6:
Unattended Push/Pull 2 locos;2 cars;1 NPCU consist

Apply hand/parking brakes on both locomotives and NPCU. If this is sufficient to prevent movement, no other hand/parking brakes are required.

C. After the required number of hand/parking brakes are applied, test the effectiveness as follows:

1. Fully release the automatic and independent brake (if equipped). (Release parking brake on Cab Control Cars).
   a. ON A GRADE - If equipment does not move when on a grade, it is secure.
   b. ON LEVEL TRACK - If on level track, apply a minimum amount of traction power for a few seconds then remove power. If equipment does not move it is secure.

NOTE: When securing P-32ACDM, P-40 and P-42 locomotives on level track, do not apply traction power to determine if equipment is secure. The equipment will be considered secure when the parking brake handle is in the applied position, the brake shoes are against the wheels.

NOTE: When securing High Speed Trainsets on level track, do not apply traction power to determine if equipment is secure. The equipment will be considered secured when the parking brake switch has been applied, MFD-1 indicates the parking brake is applied and MFD-2 or MFD-B indicates that the parking brakes are applied on both power cars and the trailer cars.

2. If the equipment moves apply additional hand/parking brakes and re-test.
3. If the hand/parking brakes will not secure equipment, apply chocks to both sides of at least one truck or one wheel and to additional wheels as necessary to prevent movement.

NOTE: When securing P-32ACDM, P-40 and P-42 locomotives on level track, do not apply traction power to determine if equipment is secure. The equipment will be considered secure when the parking brake handle is in the applied position, the brake shoes are against the wheels.

D. Make a Full Service automatic brake reduction.
E. Place independent brake in full application position, if equipped.
F. Throttle/controller in “IDLE” or “OFF” position.
G. Place reverser in neutral and remove. If not removable, place in “OFF” position.
H. Place generator field switch/breaker in “Off/DOWN” position (if equipped).
I. Isolate all locomotives.

3.5.6 Securing Locomotives Left Unattended

NOTE: For the purpose of securing equipment, Cab Control Cars and NPCU’s are considered as locomotives when position in train would allow use as a controlling unit.

NOTE: When Cab Control Cars are set up as Lead, both hand brake and parking brake, if equipped, must be applied when securing equipment. When Cab Control Cars are set up as Trail, apply only the hand brake when securing equipment.

A. Apply all hand/parking brakes on all locomotives.
B. After all hand/parking brakes are applied, test the effectiveness as follows:

1. Fully release the automatic and independent brake (if equipped). (Release parking brake on Cab Control Cars).
   a. ON A GRADE - If equipment does not move when on a grade, it is secure.
   b. ON LEVEL TRACK - If on level track, apply a minimum amount of traction power for a few seconds then remove power. If equipment does not move it is secure.

NOTE: When securing P-32ACDM, P-40 and P-42 locomotives on level track, do not apply traction power to determine if equipment is secure. The equipment will be considered secure when the parking brake handle is in the applied position, the brake shoes are against the wheels.

NOTE: When securing P-32ACDM, P-40 and P-42 locomotives on level track, do not apply traction power to determine if equipment is secure. The equipment will be considered secure when the parking brake switch has been applied, MFD-1 indicates the parking brake is applied and MFD-2 or MFD-B indicates that the parking brakes are applied on both power cars and the trailer cars.
track, do not apply traction power to determine if equipment is secure. The equipment will be considered secure when the parking brake handle is in the applied position, the parking brake indicator light is illuminated and the brake shoes are against the wheels.

NOTE: When securing High Speed Trainsets on level track, do not apply traction power to determine if equipment is secure. The equipment will be considered secure when the parking brake handle is in the applied position, the parking brake indicator light is illuminated and the brake shoes are against the wheels.

2. If the equipment moves, apply chocks to both sides of at least one truck or one wheel and to additional wheels as necessary to prevent movement.

NOTE: Report defective hand/parking brake per instruction 9.1.1

C. When a single locomotive is left unattended, chock both sides of one truck or one wheel.
D. Make a Full Service automatic brake reduction.
E. Place independent brake in “FULL APPLICATION” position, if equipped.
F. Throttle/controller in “IDLE” or “OFF” position.
G. Place reverser in “NEUTRAL” and remove. If not removable, place in “OFF” position.
H. Place generator field switch/breaker in Off/Down position (if equipped).
I. Isolate all locomotives equipped with an isolation switch.

NOTE: GE P32-BWH, P-40BH and P-42BH locomotives will be considered isolated when unit is providing Standby HEP.

3.5.7 Securing Cars Left Unattended

NOTE: For the purpose of securing equipment, Cab Control Cars and NPCU's are considered as locomotives when position in train would allow use as a controlling unit.

A. One car – apply one (1) hand/parking brake. Chock both sides of one truck or one wheel and additional wheels / trucks as necessary to prevent movement.
B. Two or more cars – apply at least two hand/parking brakes. If two hand/parking brakes are not sufficient, apply the necessary number of hand/parking brakes to prevent movement.
C. After the required number of hand/parking brakes are applied, test the effectiveness as follows:

1. Fully release the automatic and independent brake (if equipped). (Release parking brake on Cab Control Cars).
   a. If equipment does not move when on a grade, it is secure.
   b. If on level track, apply a minimum amount of traction power for a few seconds then remove power. If equipment does not move it is secure.
2. If the equipment moves, apply additional hand/parking brakes and re-test.
3. If the hand/parking brakes will not secure equipment or hand/parking brake cannot be tested, apply chocks to both sides of at least one truck or one wheel and to additional wheels as necessary to prevent movement.

NOTE: Report defective hand/parking brake per instruction 9.1.1

3.5.8 When uncoupling equipment which is already secured, ensure remaining equipment is secured according to the requirements of this instruction (3.5).

3.5.9 Hand/parking brake(s) must not be released and chocks removed until air brake system is properly charged.

3.5.10 Securing equipment on a grade:
A. Hand/parking brakes must be applied starting at lowest level of grade.
B. When ready to proceed, hand/parking brakes remain applied until air brake system is charged and required test made.
C. Hand/parking brakes are to be released starting at highest level of grade.

3.5.11 Securing Equipment During Brake Tests
A. Lite Locomotives
   1. Apply hand/parking brake on lead locomotive and chock wheels as necessary to prevent movement during testing of Lite locomotives.
   2. After chocking wheels, test that lite locomotive(s) are secure by releasing the air brakes on the locomotive(s). No movement should occur.
3. If necessary, in addition to chocking wheels, apply enough hand/parking brake(s) to secure lite locomotives during test.

4. After testing, a full service reduction must be made and independent brake applied in full application (if equipped).

5. If lite locomotive(s) will be left unattended, secure per instruction 3.5.

B. Locomotives Attached To Other Equipment

1. When locomotive(s) are to be tested, two or more cars must always have a minimum of two hand/parking brakes applied and thereafter sufficient numbers to prevent movement.

2. When train/equipment is to be tested:
   a. Fully apply locomotive independent brake if equipped.
   b. If locomotive is not equipped with independent brake or independent brake is not sufficient to secure train/equipment during test, apply a minimum of two hand/parking brakes and thereafter sufficient numbers to prevent movement.

3. After testing, a full service reduction must be made and independent brake applied in full application (if equipped).

4. If locomotive(s) and/or cars will be left unattended, secure according to the applicable part of Instruction 3.5.

3.5.12 Locking Locomotive Doors

A. Locomotives and Cab Cars, including multiple unit consists, that are left unattended on a mainline track or mainline siding must have all doors locked to protect against unauthorized entry. This instruction applies even if Locomotives and/or Cab Cars are coupled to other equipment.

B. If Locomotive or Cab Car Doors will not lock due to a defect, note defect on MAP 100 and notify CNOC mechanical desk at 1-800-424-0217.

4.0 BRAKE TESTS / EQUIPMENT INSPECTIONS

See appropriate Passenger Operations or Non-Passenger Operations Section 4.0 for instructions.

5.0 TRAIN HANDLING

5.1 General

5.1.1 This instruction is intended to provide engineers with approved standards for operating Amtrak trains. It is designed for the Engineer to use these acceptable train handling techniques to maximize smooth handling, safe operation and conserve energy on our trains.

NOTE: Conductor must, at once, inform the Engineer when train handling is not smooth in order that technique may be changed.

5.1.2 The following are some actions which will cause the most severe slack action at slow speeds and should be avoided except when absolutely necessary.

A. Sudden heavy brake application.

B. Sudden movement of throttle/controller to “IDLE”, “OFF” or “ZERO”.

5.1.3 Engineer must handle train in a safe and fuel/energy efficient manner, taking full advantage of throttle modulation and dynamic braking where conditions permit.

5.1.4 Engineer must be familiar with physical characteristics of the territory and plan ahead for action to be taken.

5.1.5 The following factors will affect the slowing and stopping ability of trains: speed, weight, length of train, grade, weather conditions, brake pipe leakage, brake pipe gradient and operative brakes.

5.1.6 Where conditions permit, slowdowns or stops should be made with not more than 15 psi total brake pipe reduction. This reduces in-train forces and provides reserve braking capability in the event that additional retardation is required.

5.1.7 Prolonged use of locomotive air brakes or excessive brake cylinder pressure, especially at high speeds, is prohibited. Such action will cause burned and damaged brake shoes/pads and overheated wheels.

5.1.8 During switching operations, throttle and independent brake must be handled in a manner that will permit slack to be adjusted smoothly.

5.1.9 Dynamic Braking

A. Engineers must utilize dynamic brake on descending grades to control train speed when conditions permit. Engineers will carefully consider other locations where dynamic brake may be used without sacrificing schedule time or causing excessive buff or draft forces.

B. Dynamic brake must be used with consideration given to locomotive dynamic brake capability, train consist and physical characteristics of territory involved.
C. Exercise care by applying and releasing dynamic brake gradually to avoid unnecessary slack action.
D. When operating through turnouts and crossovers with more than 3 units in consist with effective dynamic brake, limit dynamic brake effort to 50% of maximum (dynamic controller position 4). Limit dynamic brake effort until one-third of train is through turnout or crossover.
E. Automatic brake may be used during dynamic braking. Ensure that locomotive brake cylinder pressure does not develop during the use of dynamic brake except as provided in 5.1.9 F.
F. Independent brake must NOT be applied during dynamic braking. If speed is less than 15 mph and dynamic brake effort is insufficient, the independent brake may be used to supplement dynamic braking effort. **Locomotive brake cylinder pressure must never exceed 15 psi while manual dynamic brake is applied.**

5.1.10 Train Braking
A. Train braking must be handled in a manner that will ensure passenger safety and prevent damage to cars and lading, keeping brake shoe/pad, wheel wear, and fuel/energy consumption to a minimum.
B. Trains Other Than Mixed Consist - The procedures outlined in instruction 5.2 will be used to slow or stop Trains Other Than Mixed Consist. When operating electric locomotives, do not use the procedures in instruction 5.2 unless dynamic brake is inoperative.
C. Mixed Consist - The procedures outlined in instruction 5.3 will be used to slow or stop Mixed Consist trains. In order to conserve fuel/energy, do not use the procedures in instruction 5.3 unless train handling using other procedures in instruction 5.3 cannot be done smoothly.
D. When equipped, Slow Speed Backing may be used in conjunction with the automatic brake when backing a train.

5.2 Trains Other Than Mixed Consist

5.2.1 Starting Passenger Trains
A. With slack bunched, on level track, slowly open throttle until entire train is moving; on descending grade, release brakes, allow train to start moving, advance throttle to run 1 until train is stretched, then accelerate.
B. With slack stretched, advance throttle to the lowest throttle position necessary to start the train, release brakes and accelerate smoothly, avoiding high draft forces.

5.2.2 Slowing or Stopping Using Blended Brake
A. Move throttle/controller to "Idle", "Off" or "Zero".
B. Allow slack to adjust.
C. Make a minimum reduction.
D. Gradually increase brake application as required.
E. When stopping, gradually reduce brake application as train is stopping. Leave a minimum 12 psi reduction on train while stopped and apply independent brake.

5.2.3 Slowing or Stopping Using Dynamic Brake
A. Move throttle/controller to "Idle", "Off" or "Zero".
B. Wait 10 seconds before going into dynamic brake mode.
C. Move dynamic brake controller to setup and allow train slack to bunch.
D. When slack is bunched gradually move dynamic brake controller to obtain the desired braking effort.
E. If dynamic brake effort is not sufficient, supplement it by making the necessary brake pipe reductions to obtain the required braking effort. DO NOT allow locomotive brake cylinder pressure to develop except as provided in 5.2.3 G.
F. As speed decreases, dynamic brake effort decreases which may require additional brake pipe reductions to maintain the desired braking effort.
G. At very low speeds (less than 15 mph), the independent brake may be used to supplement dynamic braking effort and to prevent locomotive slack run-out. **Locomotive brake cylinder pressure must never exceed 15 psi while manual dynamic brake is applied.**
H. When releasing brakes, release air brakes and allow time to release before releasing the dynamic brake.

5.2.4 Slowing or Stopping Using Air Brakes
A. Move throttle/controller to no greater than Notch 2.
B. Make an initial automatic brake reduction (when in direct release, no less than 8 psi.)
C. Reduce throttle to Idle within 10 seconds after the initial automatic brake reduction.
**NOTE:** When speed is less than 20 mph, the throttle may remain in Notch 1 or 2 in order to spot station stops.
D. Brake cylinder pressure may be actuated (bail off) or Blended Brake may be allowed to apply.
E. Make further reductions as needed.
F. Leave a minimum 12 psi reduction on train while stopped and independent brake to full application, if equipped.
5.3 Mixed Consist (Including Work, Wreck, and Wire Trains)

5.3.1 Starting
A. Power must not be applied until minimum time required for braking system to recharge has elapsed to insure release of brakes.
B. Train must be started in lowest throttle position possible.
C. If train does not start after applying reasonable power, throttle must be returned to idle and cause determined. Further advancement of throttle may cause train separation, damage to traction motors, or rail burn.
D. While train is being started, locomotive speed must be kept slow and uniform until entire train is moving.
E. When starting a train on a curve, avoid high throttle/controller settings.
F. With slack bunched, on level track, slowly open throttle until entire train is moving; on descending grade, release brakes, allow train to start moving, advance throttle to run 1 until train is stretched, then accelerate.
G. With slack stretched, advance throttle to the lowest throttle position necessary to start the train, allow amperage to increase, release brakes, and accelerate.

5.3.2 Accelerating
A. Throttle must be advanced one position at a time.
B. Ample time should be allowed between each increase in throttle to prevent high draft forces.

5.3.3 Slowing or Stopping Using Blended Brake
A. Move throttle/controller to “IDLE”, “OFF” or “ZERO”.
B. Allow slack to adjust.
C. Make a minimum reduction.
D. Gradually increase brake application as required.
E. When stopping, gradually reduce brake application as train is stopping. Leave a minimum 12 psi brake pipe reduction on train while stopped and apply independent brake.

5.3.4 Slowing or Stopping Using Dynamic Brake
A. Move throttle/controller to “IDLE”, “OFF” or “ZERO”.
B. Wait 10 seconds before going into dynamic brake mode.
C. Move dynamic brake controller to setup and allow train slack to bunch.
D. When slack is bunched gradually move dynamic brake controller to obtain the desired braking effort.
E. If dynamic brake effort is not sufficient, supplement it by making the necessary brake pipe reductions to obtain the required braking effort. DO NOT allow locomotive brake cylinder pressure to develop except as provided in instruction 5.3.4 G.
F. As speed decreases, dynamic brake effort decreases which may require additional brake pipe reductions to maintain the desired braking effort.
G. At very low speeds (less than 15 mph), the independent brake may be used to supplement dynamic braking effort and to prevent locomotive slack run-out. **Locomotive brake cylinder pressure must never exceed 15 psi while manual dynamic brake is applied.**
H. When releasing brakes, release air brakes and allow time to release before releasing the dynamic brake.

5.3.5 Slowing or Stopping Using Air Brakes
A. Move throttle/controller to no greater than Notch 2.
B. Make an initial automatic brake reduction (when in direct release, no less than 8 psi.)
C. Reduce throttle to idle within 10 seconds after the initial automatic brake reduction.

**NOTE:** When speed is less than 20 mph, the throttle may remain in Notch 1 or 2 in order to spot station stops.
D. Brake cylinder pressure may be actuated (bail off) or Blended Brake may be allowed to apply.
E. Make further reductions as needed.
F. Leave a minimum 12 psi brake pipe reduction on train while stopped and independent brake to full application, if equipped.

5.3.6 Slowing or Stopping Using Braking With Power Applied
A. In order to conserve fuel/energy, do not use the procedures in this section unless train handling using other procedures in instruction 5.3 cannot be done smoothly.
B. Where conditions permit, dynamic brake and/or throttle reductions must be used in lieu of braking with power applied to reduce train speed.
C. WHEN IN DIRECT RELEASE INITIAL BRAKE PIPE REDUCTIONS OF LESS THAN 8 PSI MUST NOT BE ATTEMPTED.

D. Braking should be started at a sufficient distance from objective point to allow use of a split reduction.

E. Reduce throttle to no greater than Notch 2. Exception: Autotrain may use throttle notches greater than 2. When braking with power applied, Autotrain engineers must use the lowest throttle position necessary to control slack and conserve fuel.

F. When conditions permit, the minimum reduction position should be used for the initial brake pipe reduction.

G. When conditions permit, wait 20 seconds after the brake pipe exhaust stops blowing from initial reduction, then follow with additional reductions as required.

H. Locomotive brakes should not be permitted to apply. After initial reduction, maintain only enough power to control slack.

I. Leave a minimum 12 psi brake pipe reduction on train while stopped, and independent brake to full application.

5.3.7 Releasing Brakes

A. Brake applications must not be released while brake pipe exhaust is blowing.

B. After desired braking has been accomplished, brakes may be released. In the event of sticking brakes, not less than a 12 psi brake pipe reduction must be made, and brakes on entire train will be released before train speed is reduced to 10 mph.

C. If train slack is bunched when brake valve is moved to “RELEASE” position, dynamic brake or independent brake must be used to prevent run out of slack until train brakes are fully released.

D. If power is applied when ABV handle is moved to “RELEASE” position, engineer must not increase throttle/controller until train brakes are completely released.

5.3.8 Stopping Immediately After Starting

A. Make an initial automatic brake reduction (when in direct release, no less than 8 psi).

B. Maintain only enough power to control slack.

C. Gradually increase reduction until train stops.

D. DO NOT allow locomotive brakes to apply until train stops.

E. Leave a minimum 12 psi reduction on train while stopped, and independent brake to full application.

5.4 Back-Up Moves

5.4.1 Backing/Shoving Train Movements

A. When shoving or backing trains, no more than two locomotives may be working in a consist. Isolate any excess locomotives before starting a shoving or backing move unless additional power is necessary due to an ascending grade.

B. Air brakes must be controlled by the Locomotive Engineer at all times except when testing the back-up hose or when conditions require an emergency application of air brakes.

C. Start smoothly, avoid high buff forces by using lower throttle/controller settings; giving consideration to physical characteristics, train consist, prescribed speed and distance involved.

D. All crew members involved with movement must remain alert for any indication of unusual conditions such as: sudden, harsh slack action or loss of communication and take immediate action(s) at once, using good judgment, to ensure safe movement.

E. Back-up movements adjacent to station platforms must not exceed 5 mph until leading end of movement is clear of platform. EXCEPTION: When operating P-32AC-DM Locomotives in Penn Station New York, back-up movements adjacent to station platforms must not exceed 15 mph.

F. When backing onto stub end tracks, a preliminary stop must be made 250 feet from bumping post/ end of track. After making the preliminary stop, do not exceed 2 mph until the final stop.

G. When preliminary stop is required, Conductors and Assistant Conductors must, before arrival in station, advise passengers and attendants not to detrain until final stop is made.

5.4.2 Back-Up Hose

A. After installing a back-up hose on equipment, it must be tested in EMERGENCY as described in instruction 5.4.2C.

B. A Back-Up Hose must be used for back up movements at locations required by Rule, Special Instruction, General Order, Bulletin Order or other directive.

1. Back-up hose MUST be applied to leading end of lead car at locations where back-up hose is required.
1. Trains handling occupied passenger, private or business cars must be equipped with a back-up hose or back-up valve on the leading end of the equipment when making back-up moves within the following stations and between locations as noted:
   - Grand Rapids, MI between Amtrak Station and Layover Facility
   - Hialeah, FL (Miami) between Hialeah Coach Yard and Station
   - Indianapolis, IN
   - Jacksonville, FL between Grand Junction Wye and Station
   - Newport News, VA between Amtrak Siding and Station
   - Niagara Falls, NY between Tuscarora Wye and Station
   - Raleigh, NC between NCDOT Facility and Station
   - Richmond, VA between Wye at Acca Yard and Station
   - Springfield, MA between Wye and Station
   - Syracuse, NY between Wye and Station
   - Tampa, FL between Neve Wye and Station

2. When required to use a back-up hose for back up movements, it must be tested in EMERGENCY at locations where back up movements will be made as described in instruction 5.4.2C.
   **NOTE:** Once tested, additional back-up hose tests are not required in the same city or terminal unless the crew changes, equipment changes or back-up hose is replaced or moved to other equipment.

3. Test the back-up hose whistle prior to making back up move. Back-up whistle must be sounded to give warning as prescribed by applicable rules. In addition, it must be sounded when passing bridge abutments, walls and when entering or moving on station tracks. If back-up hose whistle is found defective, it alone will not cause the back-up hose to be considered defective. However, this defect must be reported.

4. Before commencing back-up move, employee handling back-up hose will communicate with Engineer to determine signaling method to be used to start back-up movement.

5. Back-up hose or emergency brake valve must be used to apply air brakes in EMERGENCY should conditions require.

C. Back-Up Hose EMERGENCY Test
   1. Equipment must be stopped.
   2. QP or QMP will initiate an emergency brake application using the back-up hose.
   3. Locomotive Engineer will inform QP or QMP when locomotive is in emergency.
   4. QP or QMP will close back-up hose.
   5. Locomotive Engineer will recover from the emergency brake application when signal is given.
   6. If back-up hose does not place train in emergency, determine cause.
   7. If back-up hose is defective (will not place train in emergency) and no replacement back-up hose is readily available, comply with instruction 5.4.3.
   8. When testing the back-up hose, train inspection and standing train brake test requirements per instruction P 4.2.3 A5 or NP 4.2.3 A3 do not apply.
   9. Locomotive Engineer will make a Running Brake Test per instruction P4.2.4 or NP4.2.5.

5.4.3 Defective Back-Up Hose, No Back-Up Hose Available or Locomotive leading the back-up movement.

A. If back-up hose is defective, no back-up hose is available or locomotive is leading the back-up movement and the use of a back-up hose is required, the following will apply:
   1. Conductor will inform Engineer that back-up hose is defective, that no back-up hose is available or locomotive is leading back up movement.
   2. When properly pointed Locomotive (including Cab Control Car or NPCU) is on the leading end of the back up movement, the emergency brake valve on that equipment will be used to apply the air brakes in EMERGENCY should conditions require.
   3. When a Passenger Carrying Car or Private Car is on the leading end of the back up movement, the emergency brake valve on that equipment will be used to apply the air brakes in EMERGENCY should conditions require.
NOTE: A test of the emergency brake valve on a car or locomotive is not required prior to making a back up move.

CSX Transportation

5.5 Operating Through Temporary Speed Restrictions

5.5.1 When possible, while operating through an area with a temporary speed restriction:
   A. Release train air brakes before entering the restriction.
   B. Use the lowest possible throttle position for starting or moving the train.
   C. Do not exceed dynamic brake position #4.
   D. Minimize changes in train speed or slack action.
   E. Limit locomotive brake cylinder pressure.

6.0 EN ROUTE CONDITIONS

See appropriate Passenger Operations or Non-Passenger Operations Section 6.0 for instructions.
7.0 TRAIN CONTROL SYSTEMS

7.1 General

NOTE: No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

NOTE: When MAP 100 is referenced in the following instructions, METROLINK Locomotives and Cab Cars will use METROLINK Calendar Day Inspection Form SMP 100.

NOTE: When CNOC mechanical desk is referenced in the following instructions, METROLINK T&E employees will contact METROLINK MOC at 1-909-593-0661.

7.1.1 Trains/Locomotives must not enter any Train Control System Territory with defective or cut out Train Control System or “Acknowledger” unless relieved by Rule, Special Instruction, General Order, Bulletin Order or other directive.

7.1.2 The “Acknowledger” must be tested prior to entering any Train Control System territory. Perform test by briefly depressing the “Acknowledger” to verify sounding of the audible alarm.

NOTE: On locomotives equipped with ACSES, the alarm has 2 distinct tones. The first tone is the ACSES alarm. The second tone is the ATC alarm. If ACSES is cut out, the alarm will be silent for approximately 6 seconds before sounding.

7.1.3 Valid Train Control System test(s) is required on all locomotives which will enter train control system territory. Test(s) will be verified by reviewing completed MAP 100 (boxes 18-23).

7.1.4 Applicable Train Control System test (ATC, ATS(IITS), ACSES, ITCS, X-ITCS, I-ETMS) is required 24 hours or less before locomotive departs its initial terminal. Once locomotive departs initial terminal, Train Control System test (ATC, ATS(IITS), ACSES, ITCS, X-ITCS, I-ETMS) is valid until the final destination of the train unless failure en route occurs.

A. Mechanical forces will perform ATC, ATS(IITS), ACSES, ITCS, X-ITCS and I-ETMS test at locations where mechanical forces are available.

B. Engineer will perform test when mechanical forces are not available.

C. If the initial terminal for the train, check each MAP 100 in locomotive consist to determine that test has been completed within 24 hours.

D. If a test has NOT been made within 24 hours, a new Train Control System test (ATC, ATS(IITS), ACSES, ITCS, X-ITCS, I-ETMS) is required.

E. When engineer is required to perform test, proceed as outlined in appropriate Instruction.

F. When engineer performs Train Control System test (ATC, ATS(IITS), ACSES, ITCS, X-ITCS, I-ETMS), complete a new MAP 100 to be left on each locomotive tested.

NOTE: When ATC, ATS(IITS), ACSES, ITCS or I-ETMS test is performed at the same time as the Locomotive Calendar Day Inspection, record the required information on the same MAP 100 used for the Locomotive Calendar Day Inspection.

G. When engineer performs Train Control System test (ATC, ATS(IITS), ACSES, ITCS, X-ITCS, I-ETMS), as soon as possible but before end of tour of duty, contact Train Dispatcher and CNOC mechanical desk at 1-800-424-0217 to report that test has been performed and whether any defects were noted.

H. Trains which will operate through ITCS territory must, prior to departing originating passenger terminal, ensure that correct train type is selected by observing the CLD. Change train type by using the SCROLL button on the CLD. A new departure test is NOT required provided previous departure test remains valid. Train type is selected based on maximum allowed consist train speed.

1. ITCS: PSGR110, PSGR100, PSGR 90.
7.1.5 Locomotive and Train Control Device Cut-out Locations
<table>
<thead>
<tr>
<th>Function</th>
<th>TERRITORY SWITCH</th>
<th>SPEED CONTROL CUT-OUT SWITCH</th>
<th>ATC ELECTRIC CUT-OUT SWITCH</th>
<th>ATC PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>Speed Control Failure</th>
<th>ATC (Cab Signal or ATS) Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>Cut out ATC ELECTRIC CUT-OUT SWITCH “ATSCO”. If penalty cannot be recovered, then cut out ATC PNEUMATIC CUT-OUT COCK.</td>
<td>Cut out ATC ELECTRIC CUT-OUT SWITCH “ATC”. If penalty cannot be recovered, then cut out ATC PNEUMATIC CUT-OUT COCK.</td>
<td>Cut out ATC ELECTRIC CUT-OUT SWITCH “ATC”. If penalty cannot be recovered, then cut out ATC PNEUMATIC CUT-OUT COCK.</td>
</tr>
<tr>
<td>ACS-64</td>
<td>Not Equipped With A Separate Cut-Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# TABLE 1 – ATC DEVICES & CUT-OUTS

<table>
<thead>
<tr>
<th>Function</th>
<th>TERRITORY SWITCH</th>
<th>SPEED CONTROL CUT-OUT SWITCH</th>
<th>ATC ELECTRIC CUT-OUT SWITCH</th>
<th>ATC PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>Speed Control Failure</th>
<th>ATC (Cab Signal or ATS) Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td><strong>GE P-40DC</strong></td>
<td>Territory Switch Label: “Cab Signal”</td>
<td>Not Accessible By Engineer</td>
<td>Not Equipped With A Separate Cut-Out</td>
<td>ATC Pneumatic Cut Out Labeled: “CSMV”</td>
<td>Cut out ATC PNEUMATIC CUT-OUT COCK “CSMV” then cut out CAB SIGNAL circuit breaker.</td>
<td>Cut out ATC PNEUMATIC CUT-OUT COCK “CSMV” then cut out CAB SIGNAL circuit breaker.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cab Signal Circuit Breaker</td>
<td>ADU Status= DARK</td>
<td>ADU Status= DARK</td>
</tr>
<tr>
<td><strong>GE P-42DC</strong></td>
<td>Territory Switch Label: “Cab Signal”</td>
<td>Not Accessible By Engineer</td>
<td>Not Equipped With A Separate Cut Out</td>
<td>ATC Pneumatic Cut Out Labeled: “Cab Signal”</td>
<td>Cut out ATC PNEUMATIC CUT OUT SWITCH “CAB SIGNAL” then turn off CAB SIGNAL circuit breaker.</td>
<td>Cut out ATC PNEUMATIC CUT OUT SWITCH “CAB SIGNAL” then turn off CAB SIGNAL circuit breaker.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cab Signal Circuit Breaker</td>
<td>ADU Status= DARK</td>
<td>ADU Status= DARK</td>
</tr>
</tbody>
</table>
## TABLE 1 – ATC DEVICES & CUT-OUTS

<table>
<thead>
<tr>
<th>Function</th>
<th>Territory Switch</th>
<th>Speed Control Cut-Out Switch</th>
<th>ATC Electric Cut-Out Switch</th>
<th>ATC Pneumatic Cut-Out Cock/Switch</th>
<th>Speed Control Failure</th>
<th>ATC (Cab Signal or ATS) Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>Cut out ATC cut-out switch</td>
<td>Cut out ATC cut-out switch</td>
<td></td>
</tr>
<tr>
<td><strong>GE P-42DC (with ACSES only)</strong></td>
<td><img src="image" alt="Territory Switch Labeled: “Cab Signal Mode” and Test Buttons" /></td>
<td><img src="image" alt="Not Accessible By Engineer" /></td>
<td><img src="image" alt="Cab Signal cut out labeled: “ATC cut out”" /></td>
<td><img src="image" alt="ATC Pneumatic Cut Out Labeled: “Cab Signal” Cuts out both Cab Signal and ACSES; ADU will go dark" /></td>
<td><img src="image" alt="ADU Status= DARK" /></td>
<td><img src="image" alt="ADU Status= DARK" /></td>
</tr>
<tr>
<td><img src="image" alt="Territory Switch Labeled: “Cab Signal”" /></td>
<td><img src="image" alt="Not Accessible By Engineer" /></td>
<td><img src="image" alt="Not Equipped With A Separate Cut-Out" /></td>
<td><img src="image" alt="ATC Pneumatic Cut Out Labeled: “CSVCO”" /></td>
<td><img src="image" alt="Cut out ATC PNEUMATIC CUT OUT SWITCH “CSVCO” then turn off IFC/CAB SIGNAL circuit breaker." /></td>
<td><img src="image" alt="ADU Status= DARK" /></td>
<td><img src="image" alt="ADU Status= DARK" /></td>
</tr>
</tbody>
</table>

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All Operations 07/03/2017
<table>
<thead>
<tr>
<th>Function</th>
<th>TERRITORY SWITCH</th>
<th>SPEED CONTROL CUT-OUT SWITCH</th>
<th>ATC ELECTRIC CUT-OUT SWITCH</th>
<th>ATC PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>Speed Control Failure</th>
<th>ATC (Cab Signal or ATS) Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GE P-32 ACDM 710-717</strong></td>
<td>Territory Switch Labeled: “Cab Signal”</td>
<td>Not Accessible By Engineer</td>
<td>Not Equipped With A Separate Cut-Out</td>
<td>ATC Pneumatic Cut Out Labeled: “Cab Signal”</td>
<td>If cut out ATC PNEUMATIC CUT OUT SWITCH “CAB SIGNAL” then turn off IFC/CAB SIGNAL circuit breaker.</td>
<td>If cut out ATC PNEUMATIC CUT OUT SWITCH “CAB SIGNAL” then turn off IFC/CAB SIGNAL circuit breaker.</td>
</tr>
<tr>
<td></td>
<td>GE P-32 ACDM</td>
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</tbody>
</table>

All Operations 07/03/2017
### TABLE 1 – ATC DEVICES & CUT-OUTS

<table>
<thead>
<tr>
<th>Function</th>
<th>Territory Switch</th>
<th>Speed Control Cut-Out Switch</th>
<th>ATC Electric Cut-Out Switch</th>
<th>ATC Pneumatic Cut-Out Cock/Switch</th>
<th>Sealed</th>
<th>ATC (Cab Signal or ATS) Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GP38 H3</strong></td>
<td>Territory Switch</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td><strong>9600 CAB CAR</strong></td>
<td>Territory Switch</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

- **Function**: Sets locomotive onboard equipment to operate inside (IN) or outside (OUT) ATC territory.
- **ATC Electric Cut-Out Switch**: Cut out Automatic Train Control System Electrically. ADU Status = Cab Signals Displayed
- **ATC Pneumatic Cut-Out Cock/Switch**: Cut out Automatic Train Control System Pneumatically. ADU Status = Cab Signals Displayed
- **Sealed**: YES
- **ATC (Cab Signal or ATS) Failure**: Cut out ATC ELECTRIC CUT-OUT SWITCH “ATC”. If penalty cannot be recovered, then cut out ATC PNEUMATIC CUT-OUT COCK. ADU Status = DARK
**TABLE 1 – ATC DEVICES & CUT-OUTS**

<table>
<thead>
<tr>
<th>Function</th>
<th>TERRITORY SWITCH</th>
<th>SPEED CONTROL CUT-OUT SWITCH</th>
<th>ATC ELECTRIC CUT-OUT SWITCH</th>
<th>ATC PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>Sealed</th>
<th>ADU Status= Shielding Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets locomotive onboard equipment to operate inside (IN) or outside (OUT) ATC territory.</td>
<td>Cuts out Speed Control Portion of Automatic Train Control System</td>
<td>Cuts out Automatic Train Control System Electrically</td>
<td>Cuts out Automatic Train Control System Pneumatically</td>
<td>Speed Control Failure</td>
<td>YES</td>
<td>ATC (Cab Signal or ATS) Failure</td>
</tr>
</tbody>
</table>

**GP15**

- Territory Switch: Labeled “OVERSPEED”
- Speed Control Cut Out Switch
- ATC Electric Cut-Out Switch Labeled: “ATC”
- ATC Pneumatic Cut-Out
- ADU Status= Cab Signals Displayed
- ADU Status= DARK

**MP15**

- Territory Switch: Not Equipped With A Separate Cut-Out
- Not Equipped With A Separate Cut-Out
- ATC Pneumatic Cut-Out
- Cut out ATC PNEUMATIC CUT-OUT COCK
- ADU Status= DARK
- ADU Status= DARK

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All Operations 07/03/2017
<table>
<thead>
<tr>
<th>Function</th>
<th>TERRITORY SWITCH</th>
<th>SPEED CONTROL CUT-OUT SWITCH</th>
<th>ATC ELECTRIC CUT-OUT SWITCH</th>
<th>ATC PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>Speed Control Failure</th>
<th>ATC (Cab Signal or ATS) Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>ATC Pneumatic Cut-Out</td>
<td>Cut out ATC PNEUMATIC CUT-OUT COCK</td>
<td>Cut out ATC PNEUMATIC CUT-OUT COCK</td>
</tr>
<tr>
<td>GP38-2</td>
<td></td>
<td></td>
<td></td>
<td>ADU Status= DARD</td>
<td>ADU Status= DARD</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 1 – ATC DEVICES & CUT-OUTS

Function:
Sets locomotive onboard equipment to operate inside (IN) or outside (OUT) ATC territory.
Cuts out Speed Control Portion of Automatic Train Control System
Cuts out Automatic Train Control System Electrically
Cuts out Automatic Train Control System Pneumatically
Sealed

GP38-2 Territory Switch
<table>
<thead>
<tr>
<th>TERRITORY SWITCH</th>
<th>ATS RESET BUTTON</th>
<th>ATS PNEUMATIC CUT-OUT COCK/SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sets locomotive onboard equipment to operate inside (IN) or outside (OUT) ATS (IITS) territory.</td>
<td>Resets ATS (IITS) after Penalty brake application</td>
<td>Cuts out Automatic Train Stop (IITS) System Pneumatically</td>
</tr>
<tr>
<td><strong>Sealed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geophone P-32 BWH</strong></td>
<td><strong>Territory Switch Labeled: &quot;Cab Signal&quot;</strong></td>
<td><strong>YES</strong></td>
</tr>
<tr>
<td><strong>Territory Switch Labeled: &quot;Cab Signal&quot;</strong></td>
<td><strong>ATS Reset Button</strong></td>
<td><strong>ATS Pneumatic Cut-Out</strong></td>
</tr>
<tr>
<td><strong>Geophone P-42DC</strong></td>
<td><strong>Territory Switch Labeled: &quot;Cab Signal&quot;</strong></td>
<td><strong>ATS Reset Button</strong></td>
</tr>
<tr>
<td>Function</td>
<td>TERRITORY SWITCH</td>
<td>ATS RESET BUTTON</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sealed</td>
<td>Sets locomotive onboard equipment to operate inside (IN) or outside (OUT) ATS (IITS) territory.</td>
<td>Resets ATS (IITS) after Penalty brake application</td>
</tr>
<tr>
<td>F59-PHI</td>
<td>Not Equipped With A Territory Switch</td>
<td>ATS Reset Button</td>
</tr>
<tr>
<td>Surfliner Cab Car</td>
<td>Not Equipped With A Territory Switch</td>
<td>ATS Reset Button</td>
</tr>
</tbody>
</table>
## TABLE 3 – ACSES DEVICES & CUT-OUTS

<table>
<thead>
<tr>
<th>Function</th>
<th>TRAIN TYPE SELECTOR SWITCH</th>
<th>ACSES ELECTRIC CUT-OUT SWITCH</th>
<th>ACSES PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>ACSES Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td></td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>HST</td>
<td>Not Equipped With A Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out</td>
<td>ACSES Pneumatic Cut-Out</td>
<td>Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHP-8</td>
<td>Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out</td>
<td>ACSES Pneumatic Cut-Out</td>
<td>Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>TRAIN TYPE SELECTOR SWITCH</td>
<td>ACSES ELECTRIC CUT-OUT SWITCH</td>
<td>ACSES PNEUMATIC CUT-OUT COCK/SWITCH</td>
<td>ACSES Failure</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------</td>
<td>-------------------------------</td>
<td>--------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Sealed</td>
<td>Selects one of either train type B, C, D or E</td>
<td>Cuts out ACSES System Electrically</td>
<td>Cuts out ACSES System Pneumatically</td>
<td>YES</td>
</tr>
<tr>
<td>Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out In Radiator Cab</td>
<td>ACSES Pneumatic Cut-Out Labeled: “Train Control CCB Airbrake Interface Cut-Out Switch”</td>
<td>Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT SWITCH.</td>
<td>YES</td>
</tr>
<tr>
<td>GE P-42DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Train Type Selector Switch Located on Engineer Control Panel</td>
<td>ACSES Electric Cut-Out Located on Engineer Control Panel</td>
<td>ACSES Pneumatic Cut-Out Labeled: “Cab Signal” Cuts out both Cab Signal and ACSES; ADU will go dark</td>
<td>Cut out ACSES cut-out switch If unable to recover form Penalty Brake, use ACSES PNEUMATIC CUT OUT: both Cab Signal and ACSES are cut out</td>
<td></td>
</tr>
<tr>
<td>GE P-42DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ADU Status= ACSES portion “▬ ▬”

ADU Status= DARK
## TABLE 3 – ACSES DEVICES & CUT-OUTS

<table>
<thead>
<tr>
<th>Train Type Selector Switch</th>
<th>ACSES Electric Cut-Out Switch</th>
<th>ACSES Pneumatic Cut-Out Cock/Switch</th>
<th>ACSES Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selects one of either train type B, C, D or E</td>
<td>Cuts out ACSES System Electrically</td>
<td>Cuts out ACSES System Pneumatically</td>
<td></td>
</tr>
<tr>
<td><strong>Sealed</strong></td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

### GE P-40DC
- **Train Type Selector Switch**
- **ACSES Electric Cut-Out Switch**
  - In Radiator Cab
  - In Cab
- **ACSES Pneumatic Cut-Out**
- **ADU Status** = ACSES portion “▬ ▬”
- Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK.

### GP38 H3
- **Train Type Selector Switch**
- **ACSES Electric Cut-Out**
- **ACSES Pneumatic Cut-Out**
- **Cut out ACSES ELECTRIC CUT OUT SWITCH.** If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK.
- **ADU Status** = ACSES portion “▬ ▬”

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**TABLE 3 – ACSES DEVICES & CUT-OUTS**

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All Operations 07/03/2017
<table>
<thead>
<tr>
<th></th>
<th>TRAIN TYPE SELECTOR SWITCH</th>
<th>ACSES ELECTRIC CUT OUT SWITCH</th>
<th>ACSES PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>ACSES Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Selects one of either train type B,C, D or E</td>
<td>Cuts out ACSES System electrically</td>
<td>Cuts out ACSES System pneumatically</td>
<td></td>
</tr>
<tr>
<td>GP38-2</td>
<td><img src="image1" alt="Train Type Selector Switch" /></td>
<td><img src="image2" alt="ACSES Electric Cut-Out" /></td>
<td><img src="image3" alt="ACSES Pneumatic Cut-Out Cock/Switch" /></td>
<td>ACSES Failure</td>
</tr>
<tr>
<td></td>
<td>Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out</td>
<td>ACSES Pneumatic Cut-Out Cock Switch</td>
<td>Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK. ADU Status= ACSES portion “▬ ▬”</td>
</tr>
<tr>
<td>GP15</td>
<td><img src="image4" alt="Train Type Selector Switch" /></td>
<td><img src="image5" alt="ACSES Electric Cut-Out" /></td>
<td><img src="image6" alt="ACSES Pneumatic Cut-Out Cock/Switch" /></td>
<td>Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK. ADU Status= ACSES portion “▬ ▬”</td>
</tr>
<tr>
<td>Function</td>
<td>TRAIN TYPE SELECTOR SWITCH</td>
<td>ACSES ELECTRIC CUT-OUT SWITCH</td>
<td>ACSES PNEUMATIC CUT-OUT COCK/SWITCH</td>
<td>ACSES Failure</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Sealed</td>
<td>Selects one of either train type B, C, D or E</td>
<td>Cuts out ACSES System Electrically</td>
<td>Cuts out ACSES System Pneumatically</td>
<td>Cut out ACSES ELECTRIC CUT OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK. ADU Status= ACSES portion “▬ ▬”</td>
</tr>
<tr>
<td>MP15</td>
<td>Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out</td>
<td>ACSES Pneumatic Cut-Out</td>
<td></td>
</tr>
<tr>
<td>9600 CAB CAR</td>
<td>Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out</td>
<td>ACSES Pneumatic Cut-Out</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 3 – ACSES DEVICES & CUT-OUTS

<table>
<thead>
<tr>
<th>Function</th>
<th>TRAIN TYPE SELECTOR SWITCH</th>
<th>ACSES ELECTRIC CUT-OUT SWITCH</th>
<th>ACSES PNEUMATIC CUT-OUT COCK/SWITCH</th>
<th>ACSES Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>YES</td>
<td>Cut out ACSES ELECTRIC CUT-OUT SWITCH. If penalty cannot be recovered, then cut out ACSES PNEUMATIC CUT-OUT COCK. ADU Status= ACSES portion “▬ ▬”</td>
<td></td>
</tr>
<tr>
<td>ACS-64</td>
<td>Train Type Selector Switch</td>
<td>ACSES Electric Cut-Out</td>
<td>ACSES Pneumatic Cut-Out</td>
<td></td>
</tr>
<tr>
<td>GE P-32 ACDM</td>
<td>Train Type Selector Switch Located on Engineer Control Panel</td>
<td>ACSES Electric Cut-Out on Engineer Control Panel</td>
<td>ACSES Pneumatic Cut-Out Labeled: “Cab Signal” Cuts out both Cab Signal and ACSES; ADU will go dark</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cut out ACSES cut-out switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If unable to recover form Penalty Brake, use ACSES PNEUMATIC CUT OUT; both Cab Signal and ACSES are cut out</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ADU Status= DARK</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>ITCS IN/OUT SWITCH</td>
<td>ITCS PNEUMATIC CUT-OUT COCK/SWITCH</td>
<td>ITCS CIRCUIT BREAKER</td>
<td>Sealed</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>----------------------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>Sets locomotive onboard equipment to operate inside (IN) or outside (OUT) ITCS territory.</td>
<td>Cuts out ITCS System Pneumatically</td>
<td>Turns off ITCS System Electrically</td>
<td>YES</td>
</tr>
<tr>
<td>GE P-42DC</td>
<td>ITCS Pneumatic Cut-Out Labeled: “Cab Signal”</td>
<td>ITCS Circuit Breaker</td>
<td>Cut out ITCS PNEUMATIC CUT-OUT SWITCH, then turn off ITCS CIRCUIT BREAKER.</td>
<td>YES</td>
</tr>
<tr>
<td>NPCU</td>
<td>ITCS In/Out Switch</td>
<td>ITCS Pneumatic Cut-Out Labeled: “Train Control”</td>
<td>ITCS Circuit Breaker</td>
<td>Cut out ITCS PNEUMATIC CUT-OUT COCK, then turn off ITCS CIRCUIT BREAKER.</td>
</tr>
<tr>
<td>TABLE 5 – I-ETMS DEVICES &amp; CUT-OUTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I-ETMS PNEUMATIC CUT OUT SWITCHES</strong></td>
<td><strong>I-ETMS CDU Soft Key Cut Out</strong></td>
<td><strong>I-ETMS CIRCUIT BREAKER</strong></td>
<td><strong>I-ETMS Failure</strong></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Pneumatically cuts out I-ETMS Emergency, Penalty Brake application functions, and Automatic horn functions</td>
<td>Cuts out I-ETMS enforcement/transitions system to “Cut Out” state</td>
<td>Powers off the I-ETMS System</td>
<td></td>
</tr>
<tr>
<td>Sealed</td>
<td>YES</td>
<td>N/A</td>
<td>YES</td>
<td>Applicable railroad operating rules will govern I-ETMS system failure and Cut Out requirements.</td>
</tr>
</tbody>
</table>

I-ETMS Cut Out Soft Key

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All Operations 07/03/2017
7.2 Automatic Train Control System (ATC)

7.2.1 ATC Equipment
A. Acknowledger
   1. Switch/Button used by the engineer to acknowledge a more restrictive ATC condition.
B. Audible Alarm – Sounds when ATC operating conditions change.
C. Territory Switch
   1. Locomotives are equipped with a two position Territory Switch with “OUT” and “IN” positions.
   2. “OUT” Position is used:
      a. In non-ATC territory
      b. In ATC territory, when running against the current of traffic.
      c. In ATC territory, when ATC rules are out of service (suspended).
      d. In ATC territory, when wayside signals are out of service (signal suspension).
      NOTE: When entering ATC territory and cab signal aspect is more favorable than restricting, switch must be moved from “OUT” to “IN” position within 8 seconds to prevent a penalty brake application.
      NOTE: When Cab Territory Switch is in the “OUT” position with ATC cut in, equipment overspeed is enforced at 79mph.
      NOTE: When Cab Territory Switch is in the “OUT” position, some Aspect Display Units will be extinguished as indicated in TABLE 1
   3. “IN” POSITION is used in ATC territory for normal operation.
   4. An ATC system test IS NOT required when the Cab Territory switch is moved from “OUT” to “IN” position.
D. ATC Cut-Out Switches/Cocks
   1. Speed Control cut out switch
      a. Cuts out the ATC speed control system.
      b. Some Amtrak locomotives are not equipped with a Speed Control cut-out switch.
      c. An ATC system test IS NOT required when the Speed Control cut-out switch is cut in after being cut out.
   2. ATC Electric cut-out switch
      a. Cuts out the ATC system electrically
      b. Some Amtrak locomotives are not equipped with an ATC Electric cut-out switch.
      c. An ATC system test IS required when the switch is cut in after being cut out due to system failure. Otherwise, ATC system test IS NOT required.
   3. ATC Pneumatic cut-out cock/switch
      a. Cuts out the ATC system pneumatically
      b. All Amtrak locomotives which operate in ATC territory are equipped an ATC Pneumatic cut-out cock/switch.
      c. An ATC system test IS required when the ATC Pneumatic cut-out switch/cock is cut in after being cut out.
   4. Cab Signal Transfer Switch (If equipped)
      a. Selects the Train Control System to be used on the locomotive (either ATC or IITS).
      b. An ATC system test IS required when the switch is moved to the “CAB SIGNAL” position after having been in the “IITS” position and equipment will be operated in ATC territory.
E. Aspect Display Unit (ADU)
1. Amtrak locomotives are equipped with either four (4) aspect, nine (9) aspect or Intelligent display units (all cab signal aspects must be tested).
2. ADU displays cab signal aspect corresponding to code from receiver bars.

4 ASPECT DISPLAY UNIT

9 ASPECT DISPLAY UNIT

9 ASPECT DISPLAY UNIT

INTELLIGENT ADU
7.2.2 ATC Operation

A. Leading locomotive or unit of consist must be set up in the following manner:
   1. Cab Signal Transfer switch, if equipped, must be in the “CAB SIGNAL” position whenever operating in ATC territory.
   2. Territory Switch must be in the “IN” position on both ends, if so equipped, at all times while on track where ATC (cab signal) rules are in effect for direction of movement.
   3. Speed Control Cut-Out Switch, if equipped, must be sealed in the “IN” position.
   4. ATC Cut-Out Cock/Switch must be sealed in the “IN” position.

B. Speed Limits
   1. Speed control imposes limits according to cab signal indication.
   2. When cab signal changes to a more restrictive indication, corresponding speed is enforced.

C. Suppression Of Penalty Application
   1. Acknowledgement is required when cab signal changes more restrictive aspect and speed is at or below limit imposed by cab signal indication and audible alarm sounds.
   2. Sounding of alarm when speed is above limit imposed by cab signal requires acknowledgment and positioning ABV handle to “SUPPRESSION” within 8 seconds.
   3. Brakes may be released when cab signal speed is achieved and overspeed light goes out.

D. Recovery From Penalty Application
   1. When a penalty application occurs, acknowledge and place ABV handle in “LAP” or “SUPPRESSION” position.

2. Ensure throttle/controller is in “IDLE” or “OFF” position.
3. When PCS/Penalty indication turns off, penalty application may be recovered.
4. Penalty application may be recovered while moving provided there is sufficient time to recharge train before next brake application is required.

7.2.3 ATC (Cab Signal) Test

A. ATC (Cab Signal) Self-Tester
   1. Test must be performed in non-coded territory.
   2. Locomotive must be stopped.
   3. Apply independent brake if equipped. If not, apply hand/parking brake (HHP-8/HST parking brake must be applied).
   4. The velocity zero (VZ) light must be illuminated on the ADU. EXCEPTION: On HST power cars, HHP-8 locomotives and 9800 Series cab cars the POD must display a “No Motion” indication, or the MFD-2 status of the ATC, Speed Sensing, and ACSES “No Motion” light must be illuminated.
   5. If equipped, inspect that the Cab Signal Transfer Switch is in the “CAB SIGNAL” position and sealed.
   6. Inspect to determine that the following devices are cut in and sealed:
      a. ATC Pneumatic cut-out cock/switch
      b. ATC Electric cut-out switch
      c. Speed Control cut-out switch or Speedometer (Overspeed) cut-out pneumatic cock/switch
   7. Visually inspect cab signal receiver (pickup) bars for proper alignment. Also inspect for exposed wires and junction box damage.
   8. Position reverser in “FORWARD” or “REVERSE” for corresponding cab signal receiver bars to be tested.

NOTE: If locomotive will be used in both directions or is dual ended, both F-End and R-end receivers must be tested.

9. Territory switch must be cut in.
10. Move ABV handle to “RELEASE”.
11. Activate self-test with toggle switch, button or display screen soft keys.
12. Audible alarm will sound and aspect display unit will go through self test of ADU lamps. No action is required.
13. The self-test will then progress upward through the cab signal aspects, checking overspeed setting and alarm for each aspect. No acknowledgment is required.
14. When the least restrictive aspect ("CLEAR" on 4 ADU; "CLEAR, 150" on 9 ADU and Intelligent ADU) is displayed, cab signal audible alarm will sound and a penalty application will occur. The penalty brake application must occur less than eight (8) seconds after audible alarm begins. PCS/Penalty indication will illuminate and brake pipe will reduce at a service rate at least 26 psi.

15. Move ABV handle to the "SUPPRESSION" or "LAP" position. Penalty will reset and PCS/Penalty indication will turn off.

16. MOVE ABV handle to "RELEASE".

17. ATC (Cab Signal) test continues with downward aspect changes.

18. Acknowledge each downward change, except for change from "Approach" to "Restricting".

19. On downward change from "Approach" to "Restricting", without acknowledging, move ABV handle to "SUPPRESSION" position to forestall penalty application. Penalty must not occur.

**NOTE:** On GP38H-3, GP38-2 and GP-15 locomotives the cab signal self-test toggle switch must be held in the "UP" position during the entire cab signal self-test with one exception, when the cab signal changes from "Approach" to "Restricting", the cab signal self-test toggle switch must be released.

20. Without acknowledging, move ABV handle to "RELEASE" position. Penalty brake application must occur with PCS/Penalty indication illuminated and a service brake pipe reduction of at least 26 psi will occur.

21. Acknowledge and move ABV handle to "SUPPRESSION" position. Penalty will reset and PCS/Penalty indication will turn off.

22. Move ABV handle to "RELEASE" position to ensure that brakes release.

23. When ATC (Cab Signal) test is successful complete MAP 100 as follows:

   a. Enter seal numbers (boxes 17) for electrical switch and pneumatic cut-out.
   b. Enter "Date" and "Time" of test (boxes 18)
   c. Complete "Train Control Test" portion of the MAP 100; fill out "Signature" "Occupation", "Location", "Date" and "Time" boxes. (boxes 19-23)
   d. Check the end(s) that were successfully tested (boxes 15 and 16).

**B. ATC (Cab Signal) Test will be considered as failed when any of the following conditions/faults are discovered during the test.**

**NOTE:** ATC (Cab Signal) may be re-tested no more than 2 times to ensure test passed.

1. Visible damage to cab signal track receivers.
2. Audible alert does not function.
3. Acknowledger does not function.
4. All lamps not functioning on Aspect Display Unit.

5. Test overspeed condition at "Clear 150" on 9 Aspect/Intelligent Display Unit does not initiate a penalty application of the brakes within 8 seconds.

6. Test overspeed condition at "Clear" on 4 Aspect Display Unit does not initiate a penalty application of the brakes within 8 seconds.

7. Penalty application cannot be suppressed using the ABV handle in "SUPPRESSION" position.

8. Penalty application does not occur within 8 seconds during step 7.2.3A.20 above.

9. Penalty application cannot be recovered after 7.2.3A.20 above.

10. Velocity Zero Light or No Motion light is not illuminated after test is complete.

**7.2.4** Criteria for Determining ATC (Cab Signal) en route Failure

A. Damage or fault occurs to any part of the ATC system

B. Cab Signal Failure

1. Cab Signal fails to conform at 2 fixed signal locations in succession.
2. When approaching a fixed signal displaying "Approach" or more favorable aspect in ATC territory without fixed automatic block signals, the cab signal displays "Restricting" and fails to conform after passing the fixed signal.
3. When approaching a fixed signal displaying "Slow Clear", "Slow Approach", "Stop and Proceed", "Restricting" or "Stop Signal", and the cab signal displays an aspect more favorable than "Approach". EXCEPTION: This procedure does not apply when fixed signal being approached is imperfectly displayed.

C. Speed Control Failure

1. Cab signal aspect allows a greater speed than aspect authorizes.
2. Cab signal aspect enforces a lower speed than aspect authorizes.
3. Overspeed indication remains illuminated and penalty application occurs on a
downward change of cab signal aspect when engineer fulfills the following:
a. Acknowledge within 8 seconds
b. “SUPPRESSION” position of ABV handle
c. Authorized speed achieved
4. Unrecoverable penalty brake application.
5. Velocity Zero (VZ) Light remains illuminated when speed is above 12MPH.
6. “NO MOTION” light on HST power cars and HHP-8 locomotives remains illuminated when locomotive speed is above 3MPH.

D. Automatic Train Stop (ATS) Failure
1. The audible indicator fails to sound when the cab signal changes to more restrictive aspect.
2. The audible indicator continues to sound even though the cab signal change was acknowledged and the speed of the train was reduced to the speed required by the cab signal indication.

NOTE: When necessary to correct a fault by opening the battery switch, the ATC (cab signal) system DOES NOT have to be retested.

7.2.5 Automatic Train Control (ATC) Cut-Out Procedures
A. Follow instructions in TABLE 1.
B. If ATC Pneumatic cut-out cock is cut out, or the electric circuit breaker (on the 72 volt DC panel) is turned off, the ATC system MUST BE RETESTED.
C. Record on MAP 100.
D. Notify Train Dispatcher promptly and CNOC mechanical desk at 1-800-424-0217 as soon as possible but before end of tour of duty.
E. Proceed according to applicable operating rule(s).

---

Union Pacific

E. Permission MUST be obtained from Train Dispatcher BEFORE cutting out any portion of the ATC system.

7.3 Automatic Train Stop (ATS), Intermittent Inductive Train Stop (IITS)

7.3.1 ATS (IITS) Equipment
A. Acknowledger
   1. Switch/Button used by the engineer to acknowledge a more restrictive ATS (IITS) condition.
B. Audible Alarm – Sounds when ATS operating conditions change.
C. Territory Switch

1. Some locomotives are equipped with a two position Territory Switch with “OUT” and “IN” positions.
2. “OUT” Position is used in non-ATS (IITS) territory. Territory Switch must remain in the “OUT” position until the train enters ATS (IITS) territory.
3. “IN” Position is used in ATS (IITS) territory for normal operation
4. An ATS (IITS) system test IS NOT required when the Cab Territory switch is moved from “OUT” to “IN” position.

D. ATS (IITS) Cut-Out Switches/Cocks
1. ATS Pneumatic cut-out cock/switch
   a. Cuts out the ATS system pneumatically
   b. All Amtrak locomotives which operate in ATS (IITS) territory are equipped an ATS Pneumatic cut-out cock/switch.
   c. An ATS (IITS) system test IS required when the ATS Pneumatic cut-out switch/cock is cut in after being cut out.
2. Cab Signal Transfer Switch (If equipped)
   a. Selects the Train Control System to be used on the locomotive (Either ATC or IITS).
   b. An ATS (IITS) system test IS required when the switch is moved to the “IITS” position after having been in the “CAB SIGNAL” position and equipment will be operated in ATS(IITS) territory.

E. ATS (IITS) Indicator Light
1. Illuminates when an ATS (IITS) operating condition exists which requires acknowledgement.

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P-42 IITS Indicator Light
F. ATS (IITS) Receiver Bar
   1. Receiver Bar is attached to the right front of the locomotive close to the rail in order to be activated when passing over a wayside inductor.

7.3.2 ATS (IITS) Operation
A. Leading Locomotive MUST be set up in the following manner:
   1. Cab Signal Transfer switch, if equipped, must be in the “IITS” position whenever operating in ATS (IITS) territory.
   2. Cab Territory Switch must be in the “IN” position, if so equipped, at all times while on track where ATS (IITS) rules are in effect.
   3. ATS (IITS) Pneumatic Cut-Out Cock/Switch must be sealed in the “IN” position.
B. Suppression of Penalty Application
   1. After passing signal or wayside inductor, the audible alarm will sound and visual indication lights.
   2. Acknowledgment must be made within 8 seconds or ABV handle moved to “SUPPRESSION” position to prevent a penalty application.

C. Recovery From Penalty Application
   1. Ensure combined power handle/throttle is in “IDLE” or “OFF”.

2. Place ABV handle to “SUPPRESSION” or “LAP” position.

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3. Attempting to acknowledge IITS in advance of alarm sounding is prohibited.

C. Recovery From Penalty Application
1. Throttle to “Idle” or dynamic brake controller to “Off”.

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2. Place ABV handle to “SUPPRESSION” position until train is STOPPED.

3. Depress and hold the acknowledgment button for approximately 2 seconds.
4. Depress and hold the ATS reset button for approximately 2 seconds.
5. Release the brakes after penalty messages clear and the PCS light goes out.

7.3.3 ATS (IITS) Test
A. On Board Self-tester
   1. Test must be performed in non-coded territory.
   2. Locomotive must be stopped.
   3. If equipped, inspect that the Cab Signal Transfer Switch is in the “IITS” position and sealed.
   4. Inspect to determine that the ATS (IITS) Pneumatic Cut-Out Cock/Switch is cut in and sealed.
   5. Visually inspect ATS (IITS) receiver (pickup) bars for proper alignment and height. Also inspect for exposed wires and junction box damage.
   6. Equipped with two buttons marked “90” and “60” located on right-hand side of the box.
   7. Push and release the “90” button. System simulates train passing inductor. No action is required.
   8. Push and release the “60” button. Alarm will sound.
   9. Without acknowledging, move the ABV handle to “Suppression” position within 8 seconds in order to forestall the penalty.
10. Without acknowledging, move the ABV handle to “RELEASE”. A penalty brake application must occur.
11. Recover from penalty application. Acknowledge and move ABV handle to “SUPPRESSION” position. Penalty will reset and penalty indication will turn off.
12. When ATS(IITS) departure test is successful, complete MAP 100 as follows:
   a. Enter seal numbers (boxes 17) for electrical switch and pneumatic cut-out.
   b. Enter “Date” and “Time” of test (boxes 18).
c. Complete “Train Control Test” portion of the MAP 100; fill out “Signature” “Occupation”, “Location”, “Date” and “Time” boxes. (boxes 19-23)
d. Check the End(s) that were successfully inspected and tested. (boxes 15 and 16).

B. ATS (IITS) Test Using Wayside Inductors
1. If equipped, inspect that the Cab Signal Transfer Switch is in the “IITS” position and sealed.
2. Inspect to determine that the ATS (IITS) Pneumatic Cut-Out Cock/Switch is cut in and sealed.
3. Pass over the first inductor. Acknowledge audible alarm within 8 seconds. No penalty should occur.
4. Pass over second inductor. When alarm sounds move ABV handle to “SUPPRESSION” position within 8 seconds without acknowledging, avoiding penalty application.
5. Without acknowledging, move the ABV handle to “RELEASE”. A penalty brake application must occur.
6. Recover from penalty application. Acknowledge and move ABV handle to “SUPPRESSION” position. Penalty will reset and penalty indication will turn off.

C When ATS(IITS) departure test is successful, complete MAP 100 as follows:
1. Enter seal numbers (boxes 17) for electrical switch and pneumatic cut-out.
2. Enter “Date” and “Time” of test (boxes 18)
3. Complete “Train Control Test” portion of the MAP 100; fill out “Signature” “Occupation”, “Location”, “Date” and “Time” boxes. (boxes 19-23)
4. Check the End(s) that were successfully inspected and tested. (boxes 15 and 16).

7.3.4 Criteria For ATS (IITS) En Route Failure
1. ATS (IITS) will be considered as having failed with two (2) consecutive malfunctions when passing over inert inductors, or
2. When passing a signal within ATS (IITS) limits whose aspect requires acknowledging and any one of the following occurs:
   a. ATS (IITS) alarm light does not illuminate.
   b. Audible alarm does not sound.
   c. Failure to acknowledge warning results in no penalty application.
3. When operating rule or special instruction defines failure other than that listed above.

7.3.5 Cut Out Procedure
A. Follow instructions in TABLE 2
B. Record on MAP 100.
C. Notify Train Dispatcher promptly and CNOC mechanical desk at 1-800-424-0217 as soon as possible but before end of tour of duty.
D. Proceed according to applicable operating rule(s).

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E. Proceed according to General Code of Operating Rules number 12.2.

7.4 Advanced Civil Speed Enforcement System (ACSES)

7.4.1 ACSES Equipment
A. Acknowledger
1. Switch/Button used by the engineer to acknowledge a more restrictive ACSES condition.
B. Audible Alarm – Sounds when ACSES operating conditions change.
C. ACSES Cut-Out Switches/Cocks
1. ACSES Electric cut out switch
   a. Cuts out the ACSES system electrically
   b. An ACSES system test IS required when the switch is cut in after being cut out due to system failure. Otherwise, ACSES system test IS NOT required.
2. ACSES Pneumatic cut-out cock/switch
   a. Cuts out the ATC system pneumatically
b. An ACSES system test IS required when the ACSES Pneumatic cock/switch is cut in after being cut out.

3. Train Type Selector Switch (If Equipped)
   a. Selects one of either train type B, C, D or E as defined by Rule, Special Instruction, General Order, Bulletin Order or other directive.
   b. An ACSES system test IS required when different train type is selected and equipment will be operated in ACSES territory.

D. Aspect Display Unit (ADU)
   1. Amtrak locomotives are equipped with either four (4) aspect or nine (9) aspect display units.
   2. The ACSES civil and temporary speed restrictions are displayed in the ACSES portion of the ADU.

E. ACSES Antenna
   1. Antenna is attached under the front or both ends of the locomotive between the rails.
   2. The antenna receives speed and location information from transponders located between the rails.

F. Data Radio Equipment
   1. Wayside and on-board equipment which transmits and receives speed and signal information.

7.4.2 ACSES Operation
A. All trains operating in ACSES territory must be equipped with ACSES apparatus unless authorized by Special Instructions to operate non-equipped.
B. ACSES must be cut in before entering ACSES territory.
C. When ACSES is cut IN and ATC is cut OUT:
   1. The cab signal portion of the Aspect Display Unit is dark.
   2. The ACSES portion of the Aspect Display Unit indicates “– –”.
D. Speed Limits
   1. ACSES enforces speed and speed restrictions, both temporary and permanent, according to timetable speed limits.
   2. ACSES is direction dependent and requires the reverser to be in forward or reverse. If the reverser is centered in ACSES territory, a penalty application will occur.
   3. ACSES determines direction of travel by passing transponders. If direction of reverser is changed, the ACSES portion of the Aspect Display Unit will indicate “– –”. After the change of direction, the first set of transponders passed will cause the ACSES portion of the Aspect Display Unit to change from “– –” to the current track speed.

G. ACSES may not indicate current track speed when:
   1. Entering ACSES territory at a hand operated switch until passing over the next set of transponders.
   2. Diverting at an interlocking until passing over the next set of transponders on the exit track from the interlocking.
   3. A locomotive passes over transponders at less than 3 mph (missing transponder indication is displayed “– –”).

H. Permanent (Civil) Speed Restriction Enforcement
   1. ACSES will enforce all permanent speeds based on the train type as set by the Train Type Selector Switch.
   2. When approaching a speed restriction and train speed is less than the restriction, the audible alert sounds and the ACSES portion of the Aspect Display Unit changes to the lower speed at the location where the speed changes. Engineer must acknowledge the audible alert within 8 seconds to avoid a penalty.
   3. When approaching a speed restriction and train speed exceeds that allowed by the braking curve, the audible alert sounds and the ACSES portion of the Aspect Display Unit changes to the lower speed prior to reaching the restriction. Engineer must acknowledge and initiate braking with the ABV handle within 8 seconds to avoid a penalty.

NOTE: When ATC is cut out, the ACSES portion of the ADU displays “– –” instead of the enforced speed.

4. When enforced speed increases after a permanent or temporary restriction, a short audible alert sounds to inform the engineer of the speed increase. Acknowledgement is not required.

NOTE: The ACSES audible tone is different from the ATC audible tone.

I. Temporary Speed Restriction (TSR) Enforcement
   1. Except when Temporary Transponders are used, ACSES enforces Temporary Speed Restrictions in the same manner as Permanent Speed Restrictions described in instruction 7.4.2H.
   2. When Temporary Transponders are used and train speed is less than the temporary...
restriction, at the Approach Speed Limit sign (temporary transponders):
  a. the audible alert sounds,
  b. the ACSES speed changes to the temporary speed as soon as the Temporary Transponders are passed, and
  c. the engineer must acknowledge the audible alert within 8 seconds to avoid a penalty.
3. When Temporary Transponders are used and train speed is greater than the temporary restriction at the Approach Speed Limit sign (temporary transponders):
   a. ACSES speed changes to the temporary speed, the audible alert sounds and a penalty application is initiated.
   b. Engineer must move controller/throttle to “IDLE” or “OFF”. Acknowledge and move ABV handle to “SUPPRESSION” position.
   c. Remain in “SUPPRESSION” until temporary speed is achieved.
4. At the Resume Speed sign the transponders will release the temporary restriction.
5. If temporary speed restriction does not release after passing the Approach Speed Limit sign for the opposite direction, ACSES must be recycled as follows:
   a. Stop train.
   b. Place ABV handle in “SUPPRESSION”.
   c. Open ACSES circuit breaker and wait 30 seconds.
   d. Close ACSES circuit breaker. (An ACSES Retest is required)
   e. If the temporary speed restriction does not clear after recycling as described above, declare an ACSES failure and cut out ACSES. Notify Train Dispatcher.
J. When the locomotive’s on-board equipment does not receive TSR information from the Data Radio, the Aspect Display Unit repeats the “Missing TSR Information” sequence below until valid TSR information is received:
   • “– –” (audible alarm sounds on first sequence and must be acknowledged within 8 seconds to avoid a penalty).
   • permanent (normal) track speed.
NOTE: When the “Missing TSR Information” sequence is displayed, the maximum authorized speed must not exceed 125 mph (125 mph is displayed and enforced by on-board equipment). Trains operating between New Haven and Boston must not exceed 110 mph (125 mph is displayed but 110 mph NOT enforced by on-board equipment).

NOTE: When the “Missing TSR Information” sequence is displayed, there is NO TSR ENFORCEMENT (When Temporary Transponder are used, Temporary Speed Restrictions will continue to be enforced).
K. If reverser position is changed, the Aspect Display Unit will display “– –” continuously.
L. When direction of travel is changed, the current TSR information is no longer enforced and the Aspect Display Unit will continue “Missing TSR Information” sequence as described in instruction D above. As soon as new TSR information is received for the current direction of travel, (usually in the vicinity of the next interlocking) the Aspect Display Unit will again display and enforce TSR speeds normally.
M. If data radio communication is lost approaching an Interlocking Area, TSR’s on adjacent tracks may be displayed and enforced.
N. Interlocking Route Speed Enforcement.
   1. ACSES will enforce route speeds through the entire interlocking in the same manner as Permanent Speed Restrictions described in instruction 7.4.2H.
   EXCEPTION: When Data Radio is not functioning or when not equipped with Data Radio, ACSES will not enforce route speeds at interlockings (ATC will continue to enforce route speeds at interlockings).
   NOTE: When ATC is cut out, the ACSES portion of the Aspect Display Unit remains at “– –”.
O. ACSES Positive Stop
   1. Positive Stop Enforcement
      a. ACSES will enforce a positive stop at Interlocking and CP signals displaying STOP SIGNAL.
      EXCEPTION: When Data Radio is not functioning or when not equipped with Data Radio, a positive stop may be enforced at signals displaying other than STOP SIGNAL.
      b. When train speed is greater than allowed by the braking curve, the audible alert sounds, the cab signal immediately changes to STOP SIGNAL and a penalty application is applied.
NOTE: When speed is reduced below the braking curve, the cab signal MAY change to a more favorable aspect, allowing recovery of the penalty.

b. An ACSES Positive Stop penalty application cannot be recovered until:
   (1) Cab Signal changes to a more favorable aspect, or
   (2) The Stop Bypass button is pressed.

NOTE: If a cab signal flip occurs while approaching an interlocking/CP, an ACSES Positive Stop may be enforced with a penalty brake application. These occurrences must be reported to the Train Dispatcher and note on MAP 100.

2. When the Stop Bypass button is pressed:
   a. Cab Signal will change to RESTRICTING, and
   b. ACSES enforces 15 mph speed until locomotive clears interlocking or CP.

P. Suppression Of Penalty Application
   1. Sounding of alarm when speed is above limit imposed by ACSES requires acknowledgement and positioning ABV handle to “SUPPRESSION” position within 8 seconds.
   2. Brakes may be released when target speed is achieved and overspeed indication goes out.

Q. Recovery From Penalty Application
   1. When a penalty application occurs, acknowledge and place ABV handle in “LAP” or “SUPPRESSION” position.
   2. Ensure throttle/controller is in “IDLE” or “OFF” position.
   3. When PCS/Penalty indication turns off, penalty application may be recovered.
   4. Penalty application may be recovered while moving provided there is sufficient time to recharge train before next brake application is required.

7.4.3 ACSES Self-Test
A. Once initial departure test has been performed, ACSES system must remain cut in, unless train does not enter ACSES territory or is exempt per Special Instruction.
B. The independent brake must be fully applied, the automatic brake must be released, and the ADU must display a Restricting aspect. On the HST power car, the parking brake must be applied.
C. Visually inspect the ACSES antenna for exposed wires and junction box damage.
D. Inspect that the ACSES Pneumatic cut-out cock in cut in and sealed.
E. On a locomotive equipped with a train type selector switch, verify that the blinking light on the switch panel represents the proper train type (B, C, D, or E). If not, move the selector knob to the train type required. Completing the ACSES test will lock in the type of train selected.
F. On a locomotive equipped with a train type selector switch, recycle the ACSES circuit breaker.
G. Activate the ACSES self-test by using either a push-button or spring-loaded toggle switch.
H. On the ACSES part of the Aspect Display Unit (ADU), a letter B, C, D, or E will appear. This letter verifies the train type your locomotive is set up for. On HHP-8 locomotives or HST power cars, no train type is illuminated on the ADU.
I. Actuate the cab signal acknowledger.
J. Observe that all LED segments are lit on the ACSES ADU, and that the number “188” is illuminated. NOTE: HHP-8 locomotives do not perform this function.
K. In four to five seconds, the audible alarm for ACSES will sound. This will result in a penalty application of the brakes.
L. Move the ABV handle to “SUPPRESSION” position.
M. Acknowledge.
N. This will silence the alarm.
O. Wait for PCS to reset. On HHP-8 locomotive and HST power car, wait for penalty application light to reset.
P. Move ABV handle to “RELEASE” position.
Q. Acknowledge.
R. In two to three seconds a penalty application will occur. This will change the cab signal aspect from “RESTRICTING” to “STOP SIGNAL”. This is applicable only where a combined cab signal and ACSES ADU is used.
S. Move the ABV handle to “SUPPRESSION” position.
T. Acknowledge and silence the audible alarm.
U. Observe that the ACSES ADU is indicating “— —” This completes the test.
V. When ACSES test is successful complete MAP 100 as follows:
   a) Circle ACSES Train Type (A B C D E)
   b) Enter seal numbers (boxes 17) for electrical switch and pneumatic cut-out.
c) Enter “Date” and “Time” of test (boxes 18)
d) Complete “Train Control Test” section of the MAP 100; fill out “Signature” “Occupation”, “Location”, “Date” and “Time” blocks. (boxes 19-23)
e) Check the ends that were successfully tested (boxes 15 and 16).

7.4.4 Criteria for determining ACSES failure
A. ACSES will be considered failed if any of the following conditions occur:
1. The audible indicator fails to sound when ACSES portion of the Aspect Display Unit changes to a more restrictive speed.
2. The audible indicator continues to sound even though the ACSES speed restriction was acknowledged and speed was reduced to that required by the restriction.
3. The ACSES portion of the Aspect Display Unit fails to conform to three (3) consecutive permanent speed changes.
4. Damage or fault occurs to any part of the ACSES on-board apparatus.
5. A penalty brake application which cannot be recovered AND at the same time, a flashing red “CUT OUT” light on the ACSES Track Speed portion of the Aspect Display Unit.
6. If self-test stops and does not continue during the test, the ACSES self-test will be considered as failed.
7. On HHP-8 locomotives and HST power cars, a penalty brake application which cannot be recovered AND at the same time, a speed sensor fault on #4 speed sensor.  Determine faulty speed sensor by using MFD-2.

NOTE: On 9 Aspect ADU the presence of a flashing red “CUT OUT” light on the ACSES Track Speed portion of the Aspect Display Unit WITHOUT a penalty brake application IS NOT considered an ACSES failure.  However, this condition must be noted on the MAP 100.

7.4.5 ACSES Cut Out Procedures
A. If ACSES Pneumatic cut-out cock is cut out, or the electric circuit breaker (on the 72-volt DC panel) is turned off, the ACSES system MUST BE RETESTED.
B. If ACSES displays anything other than the Missing Transponder Symbol in territory where ACSES is not in effect, the ACSES electric cut-out switch located on the side of the ACSES equipment box must be placed in the “cut out” position. Once ACSES has been electrically cut out in this manner, HST’s and HHP-8’s will display “ACSES Cut Out” in the alarm box of the MFD1 screen. On other ACSES equipped engines, the red “Track Speed Cut Out” light will illuminate. Prior to entering ACSES equipped territory, ACSES must be cut back in without delay to the train. Re-testing the on-board ACSES apparatus is not required when the system is cut out and cut in electrically, as described above.
C. Follow instructions in TABLE 3.
D. Record on MAP 100.
E. Notify train dispatcher promptly.
F. Proceed per applicable operating rule(s).

7.5 Incremental Train Control System (ITCS)

7.5.1 ITCS Equipment
A. Acknowledger
1. Switch/Button used by the engineer to acknowledge a more restrictive ITCS condition.
B. Audible Alarm – Sounds when ITCS operating conditions change.
C. ITCS In/Out Switch
1. Locomotives are equipped with a two position ICTS In/Out Switch with “OUT” and “IN” positions.
2. “OUT” position is used in ITCS territory. Switch must remain in the “OUT” position until the train enters ITCS territory.
3. “IN” Position is used in ITCS territory for normal operation
4. An ITCS system test IS NOT required when the Cab Territory switch is moved from “OUT” to “IN” position.
D. ITCS Cut-Out Switches/Cocks
1. ITCS Pneumatic cut-out cock/switch
   a. Cuts out the ITCS system pneumatically
   b. All Amtrak locomotives which operate in ITCS territory are equipped an ITCS Pneumatic cut-out cock/switch.
c. An ITCS system test is required when the ITCS pneumatic cut out switch/cock is cut in after being cut out.

E. ITCS Compact Locomotive Display (CLD)
1. ITCS speed restrictions, time to penalty and distance to target are displayed by the CLD.

D. Suppression Of Penalty Application
1. Sounding of alarm when speed is above limit imposed by ITCS requires acknowledgement.
2. Speed must be reduced prior to “Time-To-Penalty” indication reaching “0” using the ABV handle.

E. Recovery From Penalty Application
1. When a penalty application occurs, acknowledge and place ABV handle in “LAP” or “SUPPRESSION” position.
2. Ensure throttle/controller is in “IDLE” or “OFF” position.
3. When PCS/Penalty indication turns off, penalty application may be recovered.
4. Penalty application may be recovered while moving provided there is sufficient time to recharge train before next brake application is required.

7.5.2 ITCS Operation
A. Prior to entering ITCS territory, Engineer must verify that correct engine type has been selected on ITCS Compact Locomotive Display (CLD).
B. Leading locomotive must be set up in the following manner:
   1. ITCS “IN/OUT” switch must be placed in the “IN” position when prompted.
   2. Automatic Train Control (ATC/CSMV) Cut-out Cock or Cab Signal cut-out switch must be sealed in the “IN” position.
C. Entering and Leaving ITCS Territory
   1. When entering a track on which ITCS rules are in effect for the direction of movement, ITCS “IN/OUT” switch must be moved to the “IN” position within 8 seconds after prompt.
   2. In ITCS territory, after CLD (Compact Locomotive Display) indicates “ITCS OUT”, move ITCS “IN/OUT” switch to the “OUT” position within 8 seconds to avoid a penalty application.

7.5.3 ITCS Departure Test
A. Prior to initiating ITCS departure test, ensure that:
   1. Lead locomotive is at zero speed.
   2. Reverser handle is centered.
   3. Independent brake is fully applied.
   4. On-Board Computer (OBC) power is ON.
   5. Generator field switch/breaker is ON.
   6. Automatic brake valve is cut-in.
NOTE: If ITCS departure test is to be performed during a station stop, no more than a 15 psi reduction is to be maintained on equipment. If ITCS departure test fails to initiate a brake application, contact the conductor to determine if safe to release train brakes. If safe to release train brakes, move ABV handle to “RELEASE” position and restart departure test.
   7. Engine isolation switch is in RUN position.
B. Initiate the departure test by pressing and releasing the Departure Test button on the ITCS Display unit. The departure test will consist of an ITCS Display Unit Verification test, Operational verification tests, MCP Radio tests, GPS Location test and Transfer Data Recorder Log.
C. ITCS Display Unit Verification Test – Verify and indicate individual ITCS display unit tests passed or failed by pressing and releasing either the:
   • SELECT Pushbutton for PASS, or
   • SCROLL Pushbutton for FAIL
   1. Verify and indicate the LED TEST / passed or failed.
   2. Verify and indicate the LED DIMMING TEST / passed or failed.
   3. Verify and indicate the LCD TEST / passed or failed.
4. Verify alerter sounds for 1 second / passed or failed.

5. PUSHBUTTON TEST / press and release each pushbutton when prompted.

D. Operational Verification Tests
1. Verify and indicate software version / passed or failed.

2. Enter and/or verify the engine type. (Press and release the SCROLL button to change engine type. Press and release the SELECT button to enter engine type. Press and release SELECT button again to save.)

3. Enter and/or verify the train type. (Press and release the SCROLL button to change train type. Press and release the SELECT button to enter train type. Press and release SELECT button again to save.)

4. Move the reverser handle when prompted to confirm hood selection. (This portion of the test is only available if freight locomotive type is selected.)

5. Enter and/or verify the vehicle unit number (VUN). (Press and release the SELECT button to set the VUN. Press and release the SCROLL button to change the assigned digits.)

**NOTE:** On NPCU’s, use “9” and last three numbers of the unit.

6. Observe speed sensor tests.

7. Observe speed simulation tests.

8. Observe speed warning tests.

9. Observe over-speed tests.

10. BRK ON test - When prompted, press and release Acknowledge button.

11. SIGNAL downgrade test - When prompted, press and release Acknowledge button.

12. Observe HOME signal test.

13. When prompted, place ITCS switch in the “IN” position.

14. When prompted, place ITCS switch in the “OUT” position.

15. When prompted, move reverser handle to proper position.

E. MCP Radio Tests
1. Observe MCP radio tests. While the test is processing, the LCD indicator displays ***TESTING*** and the target type displays MCPTEST.

2. Observe the target type display change from MCPTEST to TRMRCV to DBLOAD to WAY REV.

3. If the departure test is being performed in an area that the MCP radio cannot communicate with a local departure test device, the target type will display F-XXXX or LOOPBAK. If no loop back signal is received, the target type display changes to TIMEOUT and after a short time, the departure test proceeds to the next test.

F. GPS Location Tests
1. Observe test of A and B GPS receivers.

G. Transfer Data Recorder Log
1. If the TRMRCV passes, the target type indicator displays SENDLOG and the OBC transmits the data recorder log to the terminal server. When SENDLOG is completed the system advances to the last step in the process.

H. ITCS Departure Test – PASSED
1. Record successful completion of the departure test on the MAP 100 as follows:
   a. Enter seal numbers (boxes 17) for electrical switch and pneumatic cut-out.
   b. Enter “date” and “Time” of test (boxes 18)
   c. Complete “Train Control Test” portion of the MAP 100; fill out “Signature”, “Occupation”, “Location”, “Date” and “Time” blocks. (boxes 19-23)
   d. Check the ends that were successfully tested (boxes 15 and 16).

2. Report time departure test performed and results to the Train Dispatcher.

I. ITCS Departure Test – FAILED
1. Press SCROLL to identify failure(s).

2. Record departure test failure(s) on MAP 100.

3. Report time departure test performed and failure(s) to the Train Dispatcher.

7.5.4 Criteria for Determining ITCS On-Board Apparatus Failure

A. The ITCS on-board apparatus will be considered as having failed if any of the following conditions occur:
1. The audible indicator fails to sound when the ITCS display changes to a more restrictive speed.

2. The audible indicator continues to sound even though the ITCS change was acknowledged and the speed of the train was reduced to the speed required by ITCS.

3. The ITCS fails to conform with two fixed signals in succession.

4. Damage or fault occurs to any part of the ITCS on-board apparatus.
5. Speed limit or target speed displays “0” (zero) and fails to upgrade after pressing Stop Override button.

6. ITCS displays error codes (e.g., “F-XXXX”, “C-XXXX” or “I-XXXX”) resulting in a penalty; and fails to reset after the train has stopped, and the reverser handle has been moved in and out of the neutral position.

7. ITCS displays “FAILCAL,” resulting in a penalty.

8. ITCS mode light goes out and ITCS fails to change to “ITCSOUT” when the IN/OUT switch is moved to the “OUT” position (See ITCS Operating Rules).

9. ITCS displays “NO MAP” and ITCS fails to change to “ITCSOUT” when the IN/OUT switch is moved to the “OUT” position (Refer to ITCS Operating Rules).

7.5.5 ITCS Cut-Out Procedures
A. Follow instructions in TABLE 4.
B. Record on MAP 100.
C. Notify Train Dispatcher promptly and CNOC mechanical desk at 1-800-424-0217 as soon as possible but before end of tour of duty.
D. Proceed per applicable ITCS operating rule(s).

7.6 SPEEDOMETER OVERSPEED SYSTEM
A. Some Amtrak locomotives are equipped with a speedometer overspeed system used outside of Train Control System territory.
B. These locomotives are equipped with a pneumatic cut-out to be used in the event that the system becomes defective.
C. The system will be considered defective when an overspeed condition is enforced more than 5 mph less than the maximum authorized speed. (Example: enforcement at 73 mph when maximum speed is 79 mph).
D. Speedometer overspeed equipped locomotives include: P-32BWH, P-32ACDM, P-40, P-42, F-59PHI, GP-38-2, GP-38-3, MP15, NPCU and Surfline Cab Cars.
E. Refer to diagrams in instruction 7.1.5 for speedometer overspeed pneumatic cut-out locations.

7.7 Interoperable – Electronic Train Management System (I-ETMS)

7.7.1 I-ETMS Equipment
A. Audible Alarm – Sounds when I-ETMS operating conditions change.
B. I-ETMS Cut Out Switch and Breaker
1. I-ETMS Pneumatic Cut-out switch/valve
   a. Pneumatically cuts out the I-ETMS system.
   b. All Amtrak locomotives which operate in I-ETMS territory are equipped an I-ETMS Pneumatic Cut-Out switch/valve.
   c. An I-ETMS departure test IS required when the I-ETMS Pneumatic Cut-Out switch is transitioned from the cut-out position to the cut-in position.
2. I-ETMS Circuit Breaker
   a. Turns power off to the I-ETMS System.
   b. All Amtrak locomotives which operate in I-ETMS territory are equipped an I-ETMS Circuit Breaker.
   c. An I-ETMS departure test IS required when the I-ETMS Circuit Breaker is transitioned from the “OFF” position to the “ON” position.
3. I-ETMS System Cut-out Toggle Switches
   a. Emergency Cut-Out – Cuts out the emergency brake application function.
   b. Penalty Cut-Out – Cuts out the penalty brake application function.
   c. Horn Cut-Out – Cuts out the automatic horn actuation function.

I-ETMS System Cut-out Switches

C. I-ETMS Departure Test – PASSED
1. Record successful completion of the departure test on the MAP 100 as follows:
   a) Enter seal numbers (boxes 17) for electrical switch and pneumatic cut-out.
7.7.2 I-ETMS Operation

A. Leading locomotive must be set up in the following manner:
   1. I-ETMS Pneumatic Cut-Out switch/valve must be sealed in the IN position.
   2. I-ETMS Circuit Breaker must be positioned to the ON position.
   3. I-ETMS System Cut-out switches:
      a. Emergency Cut-out – Cut “IN” and sealed
      b. Penalty Cut-out – Cut “IN” and sealed
      c. Horn Cut-out – Cut “OUT” and sealed

B. Entering and Leaving I-ETMS Territory
   1. I-ETMS territory must not be entered without I-ETMS in ACTIVE state unless system has failed and authority to proceed has been received in accordance the rules.
   2. When approaching “PTC Entry” track to I-ETMS territory, engineer must select the track on which the train is operating using the CDU.
   3. When leaving I-ETMS territory, engineer must acknowledge the “Leaving System Coverage” prompt using the CDU.

C. Suppression of Penalty Application
   1. Sounding of alarm when speed is above limit imposed by I-ETMS DOES NOT require acknowledgement.
   2. Speed must be reduced prior to WARNING: BRAKING IN XX SEC indication reaching “0” seconds using the automatic brake valve.

D. Recovery from Penalty Application
   1. When a penalty application occurs, place ABV handle in “IDLE” position.
   2. Ensure throttle is in “IDLE” position.
   3. When PCS/Penalty indication turns off and train has stopped, penalty application may be recovered.

8.0 TWO-WAY END-OF-TRAIN DEVICE
See appropriate Passenger Operations or Non-Passenger Operations Section 8.0 for instructions.

9.0 EQUIPMENT INSTRUCTIONS

9.1 General Instructions

NOTE: When CNOC mechanical desk is referenced in the following instructions, METROLINK T&E employees will contact METROLINK MOC at 1-909-593-0661.

9.1.1 Reporting Defects
   A. Engineer must report any known locomotive defects per instruction 2.1.13.
   B. Conductor must report any known car defects on EMAP 21\text{A} and CNOC mechanical desk at 1-800-424-0217.
   C. Communication of defects Inbound
      1. Inbound Engineers will inform relieving Engineers of any known defects in their train either personally or on prescribed form.
      2. With Face-to-Face relief, inbound Conductors will personally inform relieving Conductors of any known defect in their train.
      3. Without Face-to-Face relief, outbound Conductors must check with outbound Engineer for any defects noted on MAP 1173/10C Summary and, during the performance of their duties, must check each car of their train for any Out Of Service tags. If an Out Of Service tag is found, Conductors must verify that the
defect is been documented on the EMAP 21A. If the defect is not documented on the EMAP 21A, add the defect on the EMAP 21A and contact CNOC mechanical desk at 1-800-424-0217.

D. Engineers and Conductors are jointly responsible for reporting all cases of undesired emergency brake application.

E. The conductor or engineer must immediately notify the train dispatcher after any train parting with the following information:
   1. Location where parting occurred.
   2. Position in train and identification of equipment involved.
   3. Position of knuckles at parting, if determinable.
   4. Distance between parted sections and whether or not any run-in occurred following parting.
   5. Throttle position, speed, type/amount of air applied, if any.
   6. Apparent reason for parting.
   7. Any other unusual conditions.
   8. Notify CNOC Mechanical Desk (1-800-424-0217) as soon as possible without delaying train.

9.1.2 No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

9.1.3 Safety Alert Regarding Class P-40BH, P-42BH and P32AC-DM Locomotives
A. The bottom rung of the F-end ladder on Amtrak Class P-42BH, Class P-40BH and Class P32AC-DM locomotives is in close proximity to F-end truck components. To avoid personal injury, employees MUST NOT use this rung while the locomotive is in motion. This rung is only for mounting or dismounting the locomotive while the train is stopped.

9.1.4 Safety Alert Regarding Class HHP-8 Locomotives and HST Power Cars
A. Cab Door - In the application of AMT-5, “Safety Instruction for Transportation Employees”, employees must be aware of pinch-point when using the door handle to the cab.
B. Carbody Entrance Door Ladders Bottom Step - In the application of AMT-5, “Safety Instruction for Transportation Employees”, employees must not ride on entrance door ladders while HHP-8 Locomotive or HST Power Car is in motion. The bottom rung of the ladder is not designed to stand on while the train is in motion. The bottom rung is for mounting and dismounting equipment only.

9.1.5 Flat Spots
A. All flat spots must be reported to CNOC mechanical desk at 1-800-424-0217 and on MAP 100 for locomotives and EMAP 21A for cars.
   NOTE: When more restrictive railroad rules or instructions are in effect concerning flat spots, those instructions will apply.
B. Wheels must not have a single flat or shelled spot 2 ½ inches or more in length. When these dimensions are exceeded, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning flat spots.
C. Wheels must not have two adjoining flat or shelled spots that are each 2 inches or more in length. When these dimensions are exceeded, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect.
D. Wheels must not have defects such as broken, gouged, chipped or cracked rim or flange. When these conditions exist, a QMP must be contacted before equipment is moved. Communicate to QMP any host railroad rules or instructions concerning the defect. Contact QMP at CNOC mechanical desk at 1-800-424-0217.

9.1.6 Sticking Brakes
A. See instruction P6.1.3 or NP6.1.3.

Example:
Flat Spot measures 2 ½ inches or more:
• QMP must be contacted before equipment is moved.
9.2 Equipment Speeds

9.2.1 Freight Locomotive in Passenger train Consist

A. Unless otherwise restricted, passenger trains with a freight locomotive in the locomotive consist will operate at passenger speeds, not exceeding the maximum speed of the freight locomotive. Prior to movement of a passenger train with a freight locomotive, the maximum authorized speed of the freight locomotive must be determined by contacting the train dispatcher or appropriate supervisor.

9.2.2 Speed Table

<table>
<thead>
<tr>
<th>TIME PER MILE</th>
<th>SPEED</th>
<th>TIME PER MILE</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINS</td>
<td>SECS</td>
<td>MPH</td>
<td>MINS</td>
</tr>
<tr>
<td>0</td>
<td>22.5</td>
<td>160</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>23.2</td>
<td>155</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>24.0</td>
<td>150</td>
<td>0</td>
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<td>0</td>
<td>24.8</td>
<td>145</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>25.7</td>
<td>140</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>26.6</td>
<td>135</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>28.8</td>
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<td>0</td>
<td>30.0</td>
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<td>0</td>
<td>31.3</td>
<td>115</td>
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<td>0</td>
<td>32.8</td>
<td>110</td>
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<td>0</td>
<td>34.3</td>
<td>105</td>
<td>2</td>
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<td>0</td>
<td>36.0</td>
<td>100</td>
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<td>37.9</td>
<td>95</td>
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<td>0</td>
<td>40.0</td>
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<td>0</td>
<td>42.4</td>
<td>85</td>
<td>12</td>
</tr>
<tr>
<td>0</td>
<td>45</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

9.2.3 Locomotive & Equipment Maximum Speeds

<table>
<thead>
<tr>
<th>Engine No.</th>
<th>Bldr. Model</th>
<th>Speed MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lite</td>
<td>Mtp</td>
</tr>
<tr>
<td>1 – 207</td>
<td>P42BH</td>
<td>50</td>
</tr>
<tr>
<td>401, 405, 407,409</td>
<td>F40PH</td>
<td>50</td>
</tr>
<tr>
<td>450 – 470</td>
<td>F59PH</td>
<td>50</td>
</tr>
<tr>
<td>500 – 519</td>
<td>P32WH</td>
<td>50</td>
</tr>
<tr>
<td>520 - 527</td>
<td>GP38H-3</td>
<td>50</td>
</tr>
<tr>
<td>530 – 539</td>
<td>MP15</td>
<td>30</td>
</tr>
<tr>
<td>540 - 541</td>
<td>SW1500</td>
<td>30</td>
</tr>
<tr>
<td>550-567</td>
<td>SW1200</td>
<td>30</td>
</tr>
<tr>
<td>569</td>
<td>SW1001</td>
<td>30</td>
</tr>
<tr>
<td>570 – 579</td>
<td>GP15</td>
<td>50</td>
</tr>
<tr>
<td>590, 592, 593</td>
<td>MP14B</td>
<td>50</td>
</tr>
<tr>
<td>591</td>
<td>MP21B</td>
<td>50</td>
</tr>
<tr>
<td>597, 599</td>
<td>2GS12B</td>
<td>30</td>
</tr>
<tr>
<td>600-670 **</td>
<td>ACS-64</td>
<td>50</td>
</tr>
<tr>
<td>680-694 **</td>
<td>HHP8</td>
<td>50</td>
</tr>
<tr>
<td>4910-4915 **</td>
<td>HST Pwr Car</td>
<td>50</td>
</tr>
<tr>
<td>700 – 717 *</td>
<td>P32ACDM</td>
<td>50</td>
</tr>
<tr>
<td>720 – 724</td>
<td>GP38-2</td>
<td>30</td>
</tr>
<tr>
<td>737</td>
<td>SW1</td>
<td>30</td>
</tr>
<tr>
<td>790 – 799</td>
<td>SW1000</td>
<td>30</td>
</tr>
<tr>
<td>800 – 843</td>
<td>P40BH</td>
<td>50</td>
</tr>
<tr>
<td>2000-2039**</td>
<td>HST Pwr Car</td>
<td>50</td>
</tr>
<tr>
<td>90200-90415-406</td>
<td>NPCU</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>SC-44</td>
<td>50</td>
</tr>
<tr>
<td>SLRG 4135,4137,4144</td>
<td>GP40FH-2</td>
<td>50</td>
</tr>
</tbody>
</table>

** Indicates Electric Locomotives
* Indicates 3rd rail - diesel locomotives

NOTE: Locomotives may be further restricted by Timetable and/or Special Instructions. When locomotive is not listed in the above table, the maximum speed must be determined by contacting the appropriate supervisor, train dispatcher and/or CNOC mechanical desk.
### EQUIPMENT

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Speed Trainset (HST) 2000-2039 (Power Cars), 3200-3219, 3300-3319, 3400-3419, 3500-3559 and Instrumented Car 10003. With deflated air bags (springs)</td>
<td>150</td>
</tr>
<tr>
<td>High-Speed Trainset (HST) 2000-2039 (Power Cars), 3200-3219, 3300-3319, 3400-3419, 3500-3559 and Instrumented Car 10003. With over-inflated air bags (springs)</td>
<td>90</td>
</tr>
<tr>
<td>Non-diverting routes</td>
<td>30</td>
</tr>
<tr>
<td>Diverting routes</td>
<td>15</td>
</tr>
<tr>
<td>RTL II Turboliner Power Cars Nos. 2131, 2139</td>
<td>125</td>
</tr>
<tr>
<td>All classes of Turboliner equipment must not be left unattended unless wheels are chocked. Prior to moving equipment, remove chocks.</td>
<td></td>
</tr>
<tr>
<td>Heritage Passenger Carrying Car series 1000 through 10613</td>
<td>110</td>
</tr>
<tr>
<td>Dome lounge 10031</td>
<td>110</td>
</tr>
<tr>
<td>IPH Dome Car 800136</td>
<td>90</td>
</tr>
<tr>
<td>IPH Coaches 800748, 800651 &amp; 800880</td>
<td>110</td>
</tr>
<tr>
<td>Express Baggage Cars series 1701 - 1763</td>
<td>110</td>
</tr>
<tr>
<td>Material Handling Cars (M.H.C.) series AMTK 1400 - 1569</td>
<td>60</td>
</tr>
<tr>
<td>Exception: series 1500-1569 NEC Only</td>
<td>110</td>
</tr>
<tr>
<td>Series 16800 - 16808</td>
<td>50</td>
</tr>
<tr>
<td>Capitoliner Cab Control Cars Series 9600, 9700, 9800</td>
<td>125</td>
</tr>
<tr>
<td>Inspection cars 10001, 10002 and 10005</td>
<td>125</td>
</tr>
<tr>
<td>Inspection car 10004</td>
<td>110</td>
</tr>
<tr>
<td>AMTRAK cabooses series 14000-14037, 18581</td>
<td>45</td>
</tr>
<tr>
<td>AMTRAK wheel cars series 15011, 15012-15214</td>
<td>45</td>
</tr>
<tr>
<td>Office cars 15400-15477</td>
<td>35</td>
</tr>
<tr>
<td>MW cars 16700-16722</td>
<td>45</td>
</tr>
<tr>
<td>Amfleet car series 20000-22999, 25000-26999, 28000-28999, 43000-44999, 48000-48999, 81000-82999, 85000-85999</td>
<td>125</td>
</tr>
<tr>
<td>With under-inflated air bellows (air springs), car may operate at maximum authorized speed.</td>
<td></td>
</tr>
<tr>
<td>With over-inflated air bellows (air springs):</td>
<td></td>
</tr>
<tr>
<td>Diverting movements over crossovers and turnouts</td>
<td>15</td>
</tr>
<tr>
<td>Non-diverting routes</td>
<td>30</td>
</tr>
<tr>
<td>Superliner car series 31005-31592, 32000-32505, 33000-33104, 34000-34515, 35002-35011, 38000-38068, 39000-39046</td>
<td>100</td>
</tr>
<tr>
<td>High Level Car Series 39940 - 39975</td>
<td>90</td>
</tr>
<tr>
<td>Horizon passenger carrying car series 51000-51599, 53000-53509, 54000-54067, 54500-54584, 58000-58109</td>
<td>125</td>
</tr>
<tr>
<td>Viewliner I Cars 62000-62090, 8400</td>
<td>110</td>
</tr>
<tr>
<td>Viewliner II Cars (LDSL) Baggage (61000-61084), Sleeper (62500-62634), Diner (68000-68039), Bag-Dorm (69000-69039)</td>
<td>125</td>
</tr>
<tr>
<td>Movements with defective bolster anchor/radius rod</td>
<td>30</td>
</tr>
</tbody>
</table>

### Overriding buffer plates:

- (a) through crossovers and turnouts: 5
- (b) all other movements: 15

- Pacific Surfliner Bi-level Cars 6300-6352, 6400-6453, 6800-6852, 6900-6953 | 90 |
- Talgo Cars (Cascades) 7100-7105, 7300-7305, 7400-7425, 7500-7544, 7500-7504, 7520-7522, 7520-7554, 7800-7804, 7900-7905 | 80 |
- Express (EXP) car series 70000-74366 | 90 |
- Non Powered Control Units (NPCU) 90200 - 90415 | 100 |
- Auto Carrier Bi-Level 9200-9279 | 70 |
- Passenger train assisted by an engine on the rear and air brake controlled from leading engine. | 30 |
- Passenger trains being controlled from other than leading engine. | 30 |

### 9.3 Locomotive And Car Bearings

#### 9.3.1 Locomotives And Cars - Checking for Hot Journal Bearings

- A. Carry and use a 219 degree tempilstick to check for hot bearings.

#### CSX Transportation

- **A.** Carry and use a 200 degree tempilstick to check for hot bearings.

- B. Use the tempilstick to mark the surface of the bearing housing/adapter.

- C. Make a visible mark with the tip of the tempilstick on or as close to the bearing cup as possible. If the roller bearing cup is not accessible, use the tempilstick on the top surface of the adapter where the heat is concentrated.

![Roller Bearing Cup]

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D. With the exception of Amfleet cars, all Amtrak passenger carrying cars currently in use have rotating end caps on the journals. Should you encounter equipment not described above, such as a locomotive or private car without a rotating end cap, place the tempilstick on both the roller bearing adapter and the roller bearing end cap or bearing housing cover.

E. If the surface marked with the tempilstick exceeds 219 degrees, the end of the tempilstick will melt on the surface.

CSX Transportation

E. If the surface marked with the tempilstick exceeds 200 degrees, the end of the tempilstick will melt on the surface.

F. When tempilstick melts, indicating a hot or failed journal bearing, comply with the following:
   1. QP or QMP must visually inspect equipment.
   2. Train must not move until QMP determines if safe for movement. Communicate to QMP any host railroad rules, speed restrictions or any other instructions concerning the defect. If communication with QMP not immediately available, contact QMP at CNOC mechanical desk at 1-800-424-0217.
   3. QMP will determine whether car is to be set out, maximum speed and any other restrictions necessary for safe movement

G. Journal Bearing Illustrations:

Amtrak Heritage Car With Timken EE Roller Bearing on GSI style truck.

Reach in through adapter and end cap to touch bearing cup.

Amtrak Heritage Car With Timken EE Roller Bearings And Decelostat Housing Bolted To Roller Bearing Adapter.

Place tempilstick on top of adapter just above bearing location

GSI Truck Used On Auto-Train Auto Carriers, Material Handling Cars, Viewliner, Superliner II And Some Types Of Baggage Cars.

Reach in behind roller bearing end cap to place tip of tempilstick on roller bearing cup.

MD-76 Truck Used On Amtrak Superliner I Cars.

Reach in behind roller bearing end cap to place tip of tempilstick on roller bearing cup.
9.3.2 Amfleet On-Board Hot Bearing Detection System

A. Amfleet cars are equipped with an On-Board Hot Bearing Detection (OBHBD) system, which is designed to give the crew an audible and visual alarm if the system detects an overheated journal bearing. The system operates with the following components:

1. Journal bearing heat sensor probes that are mounted on each of the car's bearings, and connected by cables to a Main Indicator Panel.
2. Trainline connection to enable equipped locomotives to indicate when a hot bearing or problem with the detection system is detected.
3. An alarm panel that is located above the electric locker door. This panel contains a red alarm light and an audible alarm device.
4. Main Indicator Panel (black box) is located on the wall inside the electric locker.

B. Actions Employees Must Take In Response To All Alarms

1. Stop the train as soon as safe handling will permit.
2. Open the electric locker door on the car with the alarm actuation.
3. Press the "ALARM RESET" button to silence the audible alarm in the car. This will also extinguish the "Hot Journal" warning light on the locomotive.
4. Look at the detector's Main Indicator Panel to determine which alarm light is illuminated (e.g., Wheel 5 Sensor Failure light).
5. Record alarm light information on EMAP 21A, indicating specific location and car number, then verbally report it to the Dispatcher and CNOC mechanical desk at 1-800-424-0217.
6. Take the specific actions listed below, based on the alarm light type.

NOTE: Before going under equipment to inspect bearings, employees must obtain “Three Point Protection”. Employees must ensure that they apply Tempilstik to proper location on roller bearing adaptor or seal, as illustrated in the “Tempilstik Application” diagram.

7. Notify the Dispatcher and the Engineer of the results of any inspections.
8. When an alarm occurs before a crew change location, the incoming crew must be advised of any alarm light that remains illuminated, any speed restriction that is in effect, and whether a mechanical inspection is required. If the outgoing crew cannot personally give this information to the incoming crew, they must ask the Dispatcher to relay it.

C. Actions Employees Must Take Based On Alarm Light Type

1. Red "Hot Bearing" Alarm Light:
   a. Inspect all bearings on the affected truck with a 219 degree Tempilstik, starting with the bearing that actuated the alarm.
Place Tempilstik on either:
- the adapter on the side of the roller bearing housing facing the disc brake rotor, or
- the roller bearing seal ring next to the adapter.

CAUTION: Use care, as the disc brake rotor and the area around the journal bearing may be very hot.

b. Take the following additional actions while performing bearing inspections:
   (1) Look for signs of a hot bearing smoke bomb actuation (i.e., violet colored smoke or dye, and rotten egg smell).
   (2) Look for damage to the heat sensor probe cable that is connected to the bearing, and to the wiring that runs from the heat sensor probe cable to the car body.
   (3) Hand tighten the connectors on the heat sensor probe cable, and the connector on the Main Indicator Panel located in the electric locker.

c. When tempilstick melts, indicating a hot or failed journal bearing, comply with the following:
   (1) QP or QMP must visually inspect equipment.
   (2) Train must not move until QMP determines if safe for movement.
   (3) If communication with QMP not immediately available, contact QMP at CNOC mechanical desk at 1-800-424-0217.
   (4) QMP will determine whether car is to be set out, maximum speed and any other restrictions necessary for safe movement.

d. If no hot bearing is found, try to reset the detector by pressing the “SYSTEM RESET” button on the Main Indicator Panel.

e. If the red “Hot Bearing” alarm light goes out, proceed at NORMAL SPEED. Defect must be recorded on EMAP 21A, noting location and car number.
   (1) If a red “Hot Bearing” alarm light comes on again at the same bearing location, reduce train speed to not exceeding 80 MPH to the next location where mechanical forces are available to inspect car.
   (2) If at this mechanical inspection location, mechanical forces determine there is no hot bearing, and that the On-Board Hot Bearing Detection (OBHBD) system is defective, train may proceed at NORMAL SPEED.
   (3) If mechanical forces determine that bearing is hot, train will be terminated.

f. If the red “Hot Bearing” alarm light remains illuminated after pressing the “SYSTEM RESET” button on the Main Indicator Panel:
   (1) Proceed not exceeding 80 MPH to the next location where mechanical forces are available to inspect the car.
   (2) If at this mechanical inspection location, mechanical forces determine there is no hot bearing, and that the On-Board Hot Bearing Detection (OBHBD) system is defective, train may proceed at NORMAL SPEED.
   (3) If mechanical forces determine that bearing is hot, train will be terminated.

g. When a “Hot Bearing” alarm occurs before a crew change location, the incoming crew must be advised of any alarm light that remains illuminated, any speed restriction that is in effect, and whether a mechanical inspection is required. If the outgoing crew cannot personally give this information to the incoming crew, they must ask the Dispatcher to relay it.
2. Yellow “Sensor Failure” Alarm Light:
   a. **Proceed at NORMAL SPEED.** The Main Indicator Panel displays a yellow “Sensor Failure” alarm light when an electrical fault is detected, such as a loose connection in the detector wiring, or a shorted or grounded sensor probe. Since yellow “Sensor Failure” alarms do not indicate that there is a hot bearing, all cars have been modified so that a yellow “Sensor Failure” alarm will not actuate the audible and visual alarm outside the car’s electric locker door, or the red “Hot Journal” light on equipped engines. The yellow “Sensor Failure” light is simply an indication that the OBHBD system needs to be repaired.
   b. Crew members discovering an illuminated yellow “Sensor Failure” alarm light must notify the Train Dispatcher, Engineer and CNOC mechanical desk at 1-800-424-0217 of the defect, and record it on EMAP 21A, indicating specific location and car number.

3. Yellow “Warning System Failure” Alarm Light:
   a. Check for a problem with the detector’s computer system by pressing the “SYSTEM RESET” button (bottom center).
   b. If the “WARNING SYSTEM FAILURE” light goes out, proceed at NORMAL SPEED.
   c. If “WARNING SYSTEM FAILURE” light remains illuminated, proceed not exceeding 80 MPH to the next location where mechanical forces are available to repair the detector.
   d. If mechanical forces cannot repair the detector, proceed not exceeding 80 MPH to the final terminal.
   e. Crew members discovering an illuminated “Warning System Failure” alarm light must notify the Train Dispatcher, Engineer and CNOC mechanical desk at 1-800-424-0217 of the defect, and record it on EMAP 21A, indicating location and car number.

4. No Lights Illuminated on Main Indicator Panel:
   a. The following instructions apply when an OBHBD alarm actuation has occurred on the alarm panel outside the electric locker door, and no lights are illuminated on the Main Indicator Panel inside the electric locker.
   b. Check for a circuit breaker trip on the detector by pressing the “PUSH TO RESET” button. (bottom left corner)
   c. If the green “SYSTEM READY” light illuminates, check all lamps by pressing the “LAMP TEST” button. If no sensor or bearing lights illuminate, proceed at NORMAL SPEED.
   d. If the “SYSTEM READY” light remains out, check all lamps by pressing the “LAMP TEST” button:
      (1) If all lamps illuminate except the “SYSTEM READY”, proceed at NORMAL SPEED.
      (2) If all lamps illuminate except the “SYSTEM READY” light and one of the hot bearing lights, follow the instructions for a Red “Hot Bearing” alarm light.
      (3) If all lamps illuminate except the “SYSTEM READY” light and one of the sensor failure lights, follow the instructions in 9.3.2C.2.
      (4) If NO lamps illuminate, proceed not exceeding 80 MPH to the next location where mechanical forces are available to repair the detector. If mechanical forces cannot repair the detector, proceed not exceeding 80 MPH to the final terminal.
   e. Crew members discovering defective OBHBD lamp(s) must record the defect on EMAP21A, indicating location(s) and car number.
9.3.3 Diesel Locomotive Traction Motor Support Bearing Monitor System

A. The following instructions will be used to correct Traction Motor Support Bearing Faults on diesel locomotives equipped with the system.

B. Hot Support Bearing Detection System

1. The traction motor support bearing detector system consists of a Hot Support Bearing Detector Box and an IFD screen (GE), DID panel (GE) or DDS panel (EMD).

2. In the event of an overheated TRACTION MOTOR SUPPORT BEARING, the locomotive screen or panel (IFD/DID/DDS) will display one of the following messages:
   a. “WARNING! Hot Axle Bearing On This Loco”
   b. “WARNING! Hot Journal On This Loco”
   c. “WARNING! Hot Support Bearing On This Loco”
   d. “Hot TM Support Bearings On This Locomotive”
   e. “WARNING! Axle Problem On Other Loco”
   f. “Axle Problem On Other Locomotive”

NOTE: The messages above DO NOT pertain to the journal bearings on the locomotive; only the traction motor support bearings.

NOTE: Letter e. and f. above would be displayed on the LEAD unit in the event of an overheated traction motor support bearing or other axle problem on a TRAILING unit in the consist.

3. When a hot traction motor support bearing is detected, the message must be reset on the screen or panel (IFD/DID/DDS) AND the Hot Support Bearing Detector Box must be checked and reset. IF BOTH are not reset, and the locomotive is moved, an alarm bell will ring and a continuous wheel slip light will be displayed.

4. Location of the Hot Support Bearing Detector Box
   a. GE P-32BWH, GE P-32ACDM, P-40DC, P-42DC - Inside the electrical cabinet door (CA1) on the rear cab wall. It is connected to the 8 traction motor support bearing sensors and to the locomotive computer. Flashing red LED’s indicate the location of a suspected hot support bearing.
   b. EMD F-59 - Inside the upper right door of the electrical control cabinet in the locomotive cab.

C. Inspection Procedure

1. Safely stop the train and determine which locomotive is causing the alarm.
2. Determine which support bearing is hot by observing the LED’s on the detector box to see which is illuminated and flashing red.
3. Perform a visual inspection of the identified support bearing for failure. If the support bearing is moist from water or oil and vapor or mist is not observed, the temperature is not critical. If a failure is indicated by smoke, burnt odor, discoloration and/or flames originating from the bearing area – SET LOCOMOTIVE OUT.
4. If no obvious signs of overheating are present and a question still remains as to the condition of the support bearing, a “FEEL” test may be conducted. Using only your hand, protected with a glove, reach out to lightly brush the support bearing area. If heat is radiating from the support bearing area– set locomotive out.

D. Failure Found – Setting Locomotive Out

1. Isolate locomotives with evidence of a failed support bearing and cutout the traction motor circuit to the effected motor. Follow reset procedures shown below to silence alarm and allow unit to load. The locomotive should then be moved not to exceed 10 MPH to the next point where the locomotive can be set out. Defect must be noted on the MAP 100.

E. Reset Procedure

1. Press the “Alarm Reset” button located at the bottom of the detector box. This will cause the LED which is indicating the hot support bearing to stop flashing and illuminate continuously. The “Alarm Hot Bearing” light will also turn off.
2. Press the “System Reset” button located at the bottom of the detector box. This will cause all detector box LED’s to reset (turn off).
3. If the Bearing Indicator LED’s do not reset (turn off) and the system will not reset after completing steps 1 and 2 above, proceed with the following steps.
4. Press the “Sequence Test” button located at the bottom of the detector box. This will begin a system sequence test.
5. As soon as the sequence test begins (all LED’s will be lit), press the “System Reset” button. This will stop the sequence test and reset all LED’s and related circuitry.
6. Reset the fault on the screen or panel (IFD/DID/DDS).
7. **GE locomotives** - If, after resetting the Hot Support Bearing Detector Box AND the screen or panel (IFD/DID), the alarm continues to sound and/or a continuous wheel slip light is displayed, separate the cable from the bottom of the Hot Support Bearing Box by unscrewing and removing it from the receptacle. Notify Train Dispatcher and CNOC mechanical desk. **NOTATION MUST BE MADE ON MAP 100 (Failure En route / Equipment Condition).**

8. **EMD F-59 locomotives** - If, after resetting the Hot Support Bearing Detector Box AND DDS panel, the alarm continues to sound and/or a continuous wheel slip light is displayed, shut off power to the system by opening the “HOT BEARING” circuit breaker in the electrical control cabinet. Notify Train Dispatcher and CNOC mechanical desk. **NOTATION MUST BE MADE ON MAP 100.**

F. **No Failure Found – Further Movement**
1. Upon inspection, if nothing is found to indicate a failed support bearing:
   a. Follow the reset procedures above to silence alarm, extinguish LED’s and allow unit to load.
   b. Verify that all wheels are seen to be rolling freely.
   c. The locomotive may then proceed not exceeding 50 MPH for a distance of at least 10 miles. The support bearing must then be reinspected.
   d. After reinspecting, if nothing is found to indicate a hot or failed traction motor support bearing, movement may continue at **normal speed.**
   e. All faults must be noted on MAP 100.

---

**Example: P-42 Traction Motor Support Bearing**

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### 9.4 Locomotives, Cars and Other Equipment

#### 9.4.1 Amfleet Cars – Air Bellows
A. **When Under Inflated – No action necessary except to report on EMAP 21-A.**
B. **When Over-Inflated – Speed of train reduced per instruction 9.2.3 and bellows deflated as soon as practicable.**
C. **Deflating Air Bellows**
   1. Locate “Air Spring Cut-Out” badge plate on car side sill (each end of car).
   2. Close both “Air Supply Cocks” on affected end. (Located near badge plate, have yellow handles and are tagged.)
   3. Open “Deflate Air Spring Valve”. (Located near air spring supply cocks and has a red handle.)
   4. After bellows are deflated resume normal speed.
D. **Cars Not Equipped With “Deflate Air Spring Valve”**
   1. Follow instructions in 9.4.1.C.1 and 9.4.1.C.2.
   2. Operate at speeds per instruction 9.2.3 to next terminal.
   3. Notify Train Dispatcher as soon as possible.

#### 9.4.2 Amfleet Cars – Main Reservoir
A. If M/R hose or pipe is damaged en route, close M/R cock ahead of damaged car.
B. If M/R tank is damaged and cannot readily be repaired
   1. Close M/R cock ahead of damaged car.
   2. Cut out control valve cutout cock on damaged car.
   3. Cut out brake cylinders on each truck on damaged car.
   4. Report car number and incident to train dispatcher.

#### 9.4.3 Defective Bolster Anchor/Radius Rod En Route
A. Train must not exceed 30 MPH.
B. Notify Train Dispatcher as soon as possible.
C. Train Dispatcher will designate where car is to be set off.

#### 9.4.4 Overriding Buffer Plates – Action To Be Taken
A. Notify Train Dispatcher immediately.
B. Train must not exceed 15 MPH and when moving through crossovers and turnouts, 5 MPH.
C. Employees and passengers must not occupy or pass through vestibule area while train is in motion.
9.4.5 Coupler Locking Pins  
A. To preclude the unintentional uncoupling of automatic couplers of Amtrak locomotives and cars during winter conditions, certain Amtrak trains are equipped with locking pins (see list, below). These pins are located in the "rotary lock lift" mechanism underneath the coupler and are secured with a "hair pin" which is placed through a hole drilled in the end of the bolt. This "hair pin" should be visible from the operating side of the cut lever.

B. These locking pins are normally inserted and removed by mechanical department employees at initial and final terminals of these trains. Requirements for HEP shutdown and blue signal protection are in effect during this procedure.

C. If it becomes necessary to uncouple any cars from these trains en route, employees must:
   1. Visually check for locking pins before attempting to operate the cut lever. If none are visible, carefully operate cut lever to avoid injury if lever does not fully rotate.
   2. If locking pin is visible, ensure that protection against equipment moving is provided, then remove "hair pin" from end of locking pin. Locking pin may be removed by pulling it out from opposite side of coupler. DO NOT USE FINGER TO PUSH PIN OUT OF THE ROTARY LOCK LIFT.

D. When MAP1173/ 10C Summary is available, mechanical department employees will write, "coupler pinned" on the bottom of the 10C Summary. However, employees must expect the following trains to be pinned and take precautions to avoid injury when uncoupling locomotives and cars.
   1. All cars on trains operating into Canada are pinned throughout the entire year (the Maple Leaf, New York – Toronto, trains 63/64; the Adirondack, New York – Montreal, trains 68/69; the Cascades, Seattle – Vancouver, trains 500/517).
   2. In addition, the following trains have been approved for coupler pinning during winter operation from December through the end of April.

<table>
<thead>
<tr>
<th>Train</th>
<th>Train Name</th>
<th>Between</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 and 4</td>
<td>Southwest Chief</td>
<td>Chicago – Los Angeles</td>
</tr>
<tr>
<td>5 and 6</td>
<td>California Zephyr</td>
<td>Chicago – Emeryville</td>
</tr>
<tr>
<td>7 and 8</td>
<td>Empire Builder</td>
<td>Chicago – Seattle</td>
</tr>
<tr>
<td>27 and 28</td>
<td>Empire Builder (Portland)</td>
<td>Portland - Spokane</td>
</tr>
<tr>
<td>21 and 22</td>
<td>Texas Eagle</td>
<td>Chicago – Los Angeles</td>
</tr>
<tr>
<td>29 and 30</td>
<td>Capitol Limited</td>
<td>Chicago – Washington</td>
</tr>
<tr>
<td>42 and 43</td>
<td>Pennsylvanian</td>
<td>New York - Pittsburgh</td>
</tr>
<tr>
<td>48 and 49</td>
<td>Lake Shore Limited</td>
<td>Chicago – New York</td>
</tr>
<tr>
<td>448 and 449</td>
<td>Lake Shore Limited (Boston)</td>
<td>Albany - Boston</td>
</tr>
<tr>
<td>50 and 51</td>
<td>Cardinal</td>
<td>Chicago – New York</td>
</tr>
<tr>
<td>58 and 59</td>
<td>City of New Orleans</td>
<td>Chicago – New Orleans</td>
</tr>
<tr>
<td>63 and 64</td>
<td>Maple Leaf</td>
<td>New York – Toronto (pinned all year)</td>
</tr>
<tr>
<td>68 and 69</td>
<td>Adirondack</td>
<td>New York – Montreal (pinned all year)</td>
</tr>
<tr>
<td>500 through 517</td>
<td>Amtrak Cascades</td>
<td>Seattle – Vancouver (pinned all year)</td>
</tr>
</tbody>
</table>

NOTE: All Metrolink trains are pinned.
9.4.6 High-Speed Trainset (HST) Tilting Fault “Car Not Centered”
A. If a High-Speed Trainset (HST) receives a Level 1 fault on the Primary Operating Display (POD) indicating a “Car Not Centered” accompanied by an audible alarm, the following instructions must be followed:
1. The alarm block on Multi Function Display (MFD-1) will display the fault “Car Not Centered” car number XXXX.
2. Engineer will acknowledge the alarm with the soft keys (F-7 or F-8) and notify the Conductor of the “Car Not Centered” fault.
3. A 20 mph maximum speed restriction will be enforced.
4. Crew must go to the electric locker on the affected car, break the seal on the Centering Detection Switch, and move it to the "CUTOUT" position. This will release the train speed restriction of 20 MPH.
5. Engineer will continue at Train Type C speeds.
6. The sub system status of the tilting system on the affected car must be checked to ensure that the centering detection C/O block is highlighted. The Conductor must check on MFD-B as soon as practical, and the Engineer must check on MFD-2 at next location where the train is stopped.
7. Engineer will also have a message on the MFD-1 Alarm section that centering detection is cut out on the affected car.
8. If the car is not centered and seating capacity permits, the Conductor will offer passengers seating in another car to avoid discomfort related to off center car condition.
9. Report the condition to the Dispatcher and operate at Train Type “C” speeds with the centering detection switch cut-out.
10. Engineer must report these conditions on the Equipment Condition Report - MAP 100, and Conductors are required to report the conditions on the Record of Defect and Repair - EMAP 21A.
B. If the “Car Not Centered” fault can be reset with the “Portable Test Equipment” the train may proceed at Train Type A speeds. Centering switch must be cut back in. Notify Dispatcher that “Car Not Centered” fault is reset.
C. If the “Car Not Centered” fault is not reset en route by a Mechanical Technician or Road Foreman the train may proceed at Train Type C Speeds to its final destination, unless directed by a QMP to inspect the affected car. If so directed, perform the inspection as follows:
1. The “Car Not Centered” tools are stored on each Power Car in the tool locker directly behind the Engineer on the cab rear wall.
2. After notifying the Dispatcher of the “Car Not Centered” fault, and receiving the required protection if required, a member of the train crew will go to the affected Trailer Car (Coach) that triggered the “Car Not Centered” alarm and check either side of the truck with both the Must Fit (GO) Gauge and the Must Not Fit (NO GO) Gauge.

3. On the affected Trailer Car (Coach) place the Must Fit (GO) Gauge between the truck frame and bolster. If the Must Fit (GO) Gauge does not fit, the car is NOT Centered. Proceed at train type C Speeds.

4. Take the Must Not Fit (NO GO) Gauge and place between the truck frame and bolster. If the gauge fits, this also confirms that the car is NOT centered. Both gauges must be used in the vertical position. It will be visible to the eye that the car is NOT centered and is slightly tilted, compared to the rest of the cars in the Trainset.

5. Check both trucks on the affected car with the (GO/NO GO) gauges.

6. If car is centered (GO) gauge fits, proceed at train type B speeds.

9.5 HEP

9.5.1 Locomotive HEP Operation Trouble Shooting Guidelines

NOTE: BEFORE PERFORMING ANY WORK ON HEP AND/OR TRAINLINE, REVIEW ALL APPLICABLE SAFETY INSTRUCTIONS AND REQUEST THREE POINT PROTECTION.

A. If a train loses HEP on the road, the train electrical system will shut down. Head End Power loss can be caused by many different problems. The first step is to determine whether to troubleshoot the HEP source in the locomotive, or the 480v cable system.

1. Indicator(s) show 480v HEP trainline circuit IS complete.
   a. Possible Cause: HEP Failure
   b. Action: Refer to HEP troubleshooting section of appropriate locomotive operator’s manual for DC units.

   NOTE: AC locomotives will automatically use a traction inverter to provide HEP when the HEP inverter has a fault condition.

2. No Trainline Complete Indication
   a. Possible Cause: A loose or defective 480v cable or receptacle.
   b. Action:
      (1) SHUT DOWN AND ISOLATE HEP
      (2) Visually inspect each 480v receptacle for an unseated or loose cable.
      (3) If no defective cables can be seen, the fault may be corrected by “short looping” one side of the train. Short loop behind the locomotive when practical, unless conditions require short looping in another location.
      (4) Report any troubleshooting steps taken, and note where the fault is located on the appropriate MAP 100.

CAUTION: Amtrak locomotives are equipped with a 5 mph trainline complete function. This will allow HEP output to continue at train speeds above 5 mph even though trainline complete is lost. At train speeds below 5 mph, HEP will shut down. Any time trainline complete is lost, visually inspect each 480v receptacle for an unseated, loose or dragging cable.
NOTE: On GE locomotives, if train speed is below 5 mph for more than 20 minutes without trainline complete, HEP will NOT restart. Cause of no trainline complete must be corrected before HEP can be restarted.

9.5.2 HEP Short Looping Procedures
A. A train must not depart its initial terminal with HEP cables short looped when qualified mechanical forces are on duty to make the necessary repairs.
B. A train may be short looped en route only:
   1. When other corrective actions have failed to restore HEP to train consist.
   2. After it is determined that there are no damaged or dragging cables.
C. Short Looping Procedure
   1. Short loop behind locomotive on side which trainline complete indication is not displayed.
   2. Be sure to short loop cable back into remaining receptacle on car.
   3. Ensure that locking ring on receptacle is engaged if equipped.
   4. Notify CNOC mechanical desk at 1-800-424-0217 that train is short looped.
   5. Notify relieving Engineer and Conductor that train is short looped and location.

10.0 SWITCHING (YARD SERVICE)

10.1 Switching
10.1.1 Ensure Blue Signal protection is removed per operating rules.
10.1.2 Brake pipe must be charged on entire train when switching, except when brake pipe is defective or damaged.
10.1.3 Ensure all derails are down necessary to safely make the required movements.
10.1.4 Ensure hand/parking brakes are released before moving equipment.
10.1.5 Ensure chocks and/or skates are removed before moving equipment.
10.1.6 Before placing car in a track, determine if there is sufficient room to hold the cars.
10.1.7 Watch for close clearance. Stop movement if unsure whether equipment will clear.
10.1.8 Before coupling to standing equipment, verify that equipment is properly secured per instruction 3.5 to prevent rolling, if coupling is not made. Chocks must not be removed until coupling is made.
10.1.9 When possible, cars must be uncoupled on straight track instead of curves or in turnouts.
10.1.10 When coupling equipment, especially in curves and turnouts, ensure that couplers are properly positioned to prevent damage.

10.1.11 Before coupling or moving passenger equipment, occupants of such cars must be notified that movement will be made.
10.1.12 A safety stop must be made just (approximately 50 feet) prior to coupling to any equipment. A safety stop is not required when distance between standing equipment to be coupled is less than 50 feet.
10.1.13 When coupling equipment, care must be taken to prevent injury or damage. Coupling must be made at the minimum speed required to complete the coupling but not exceeding 4 mph. ACS-64 and HHP-8 Locomotives, HST Power Cars and equipment with spear type couplers must be coupled at a speed NOT to exceed 2 MPH.

NOTE: This instruction applies to “Butted Knuckles” or contacting equipment as if coupling.

10.1.14 After coupling locomotive(s) to cars, couplers between locomotive and cars must be DOUBLE stretched to insure that proper coupling is made. This applies to all subsequent couplings between cars and/or locomotives. After equipment has been stretched a visual inspection of the telltale hole or recess must be performed to ensure proper coupling is made. Telltale hole or recess MUST be fully visible.

10.1.15 Prior to uncoupling equipment, disconnect all cables, chains, and curtains between equipment that is to be uncoupled.

10.1.16 Prior to shoving or pulling equipment, crews must ensure that all cables and air hoses have been disconnected from 480V, Yard Plant (ground air), Telephone, Ground Power etc...

10.1.17 When switching, equipment must not be placed in the foul until switch / switches are properly aligned.

10.1.18 Secure unattended equipment per instruction 3.5.
11.0 Mechanical Department Periodic Brake Maintenance Requirements

11.1 Periodic Brake Maintenance Requirements for Equipment in Passenger Service

11.1.1 Single Car Test Requirements

A. A Single Car Brake test may only be performed by a Qualified Maintenance Person (QMP).

B. A Single Car Brake Test is required when any of the conditions listed below are discovered:

1. A car found with one of the following defects:
   a. Build up tread
   b. Slid flat wheel
   c. Thermal crack
   d. Overheated wheel
   e. Shelling

NOTE: A railroad need not perform the single car test required in this paragraph if the wheel defect is other than a built up tread and is due to a cause other than a defective brake system on the car.

2. One or more of the following conventional air brake equipment items is removed, replaced or repaired.
   a. Service Portion
   b. Pipe Bracket
   c. Emergency Portion or,
   d. Relay Valve

3. A car or vehicle is placed in service after having been out of service for 30 days or more. (Private cars are exempt except for private cars leased by Amtrak).

C. If one or more of the following conventional air brake equipment items is removed, replaced or repaired, only that portion which is renewed or replaced must be tested:

   1. Brake Reservoir
   2. Brake Cylinder
   3. Piston Assembly
   4. Vent Valve
   5. Quick service valve
   6. Brake cylinder release valve
   7. Modulating valve or slack adjuster
   8. Angle cock or cut-out cock

D. If the single car test cannot be made at the point where repairs are made, the car may be moved in passenger service to the next forward location where the test can be made. A railroad may move a car in this fashion only after visually verifying an application and release of the brakes on both sides of the car that was repaired, and provided that the car is appropriately tagged to indicate the need to perform a single car test. The single car test shall be completed prior to, or as a part of, the car’s next calendar day mechanical inspection.


### Passenger coaches and other un-powered vehicles

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Test Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB Type Equipment</td>
<td>2,208 days</td>
</tr>
<tr>
<td>26C Type Equipment or equivalent</td>
<td>1,476 days</td>
</tr>
<tr>
<td>Equipment other than AB, ABD, ABDW, ABDX, 26C or equivalent systems</td>
<td>1,104 days</td>
</tr>
</tbody>
</table>

### Conventional Locomotives

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Test Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>26L or equivalent systems</td>
<td>1,104 days</td>
</tr>
<tr>
<td>26L or equivalent systems equipped with air dryer</td>
<td>1,472 days</td>
</tr>
<tr>
<td>Other than 26L or equivalent</td>
<td>736 days</td>
</tr>
<tr>
<td>CCB (Amtrak Owned)</td>
<td>3,128 days</td>
</tr>
<tr>
<td>HHP-8 Locomotives</td>
<td>Age Exploration Waiver</td>
</tr>
<tr>
<td>CCB-1 and CCB-2 (except Amtrak locomotives), CCB-26, EPIC 1, EPIC 3102D2, EPIC 2, KB-HS1 and Fast Brake Systems</td>
<td>1,840 days</td>
</tr>
</tbody>
</table>

### Cab Cars

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Test Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>That portion of the brake system that uses brake valves identical to the 26C passenger coach brake system.</td>
<td>1,476 days</td>
</tr>
<tr>
<td>That portion of the brake system that uses brake valves identical to the 26L locomotive brake system.</td>
<td>1,104 days</td>
</tr>
<tr>
<td>That portion of the brake system that uses brake valves identical to the 26L locomotive brake system and is operated with locomotives equipped with Air Dryers</td>
<td>1,472 days</td>
</tr>
<tr>
<td>CCB-1 and CCB-2 (except Amtrak Cab Cars), CCB-26, EPIC 1, EPIC 3102D2, EPIC 2, KB-HS1 and Fast Brake Systems</td>
<td>1,840 Days</td>
</tr>
<tr>
<td>CCB-2 (Amtrak owned) except truck brake equipment.</td>
<td>2,920 Days</td>
</tr>
<tr>
<td>CCB-2 (Amtrak owned) / truck brake equipment only.</td>
<td>1,476 Days</td>
</tr>
<tr>
<td>All other types of cab car brake valves.</td>
<td>736 days</td>
</tr>
</tbody>
</table>
### 11.1.3 Records of Periodic Maintenance

A. The date and place of the cleaning, repairing, and testing required by this section shall be recorded on Blue Form/MAP 816 or a similar form developed by the railroad containing the same information, and the person performing the work and that person's supervisor shall sign the form, if possible. Alternatively, the railroad may stencil the vehicle with the date and place of the cleaning, repairing, and testing and maintain an electronic record of the person performing the work and that person's supervisor.

B. A record of the parts of the air brake system that are cleaned, repaired, and tested shall be kept in the railroad's files, the cab of the locomotive, or a designated location in the passenger car until the next such periodic test is performed.

<table>
<thead>
<tr>
<th>MU Locomotives</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locomotive is part of a fleet that is not 100 percent equipped with air dryers.</td>
<td>736</td>
</tr>
<tr>
<td>Locomotive is part of a fleet that is 100 percent equipped with air dryers and equipped with PS-68, 26C, 26L, PS-90, CS-1, RT-2, RT-5A, GRB-1, CS-2, or 26R brake systems.</td>
<td>1,104</td>
</tr>
<tr>
<td>Locomotive is part of a fleet that is 100 percent equipped with air dryers and equipped with KB-HL1, KB-HS1 and KBCT1 brake systems</td>
<td>1840</td>
</tr>
<tr>
<td>All other MU locomotives.</td>
<td>736</td>
</tr>
</tbody>
</table>

### 11.2 Periodic Brake Maintenance

#### Requirements for Equipment in Freight or Non Passenger Service

11.2.1 Repair Track Brake Test (CFR 49 Part 232.305)

A. A [Repair Track Brake Test](#) may only be performed by a Qualified Person (QP).

B. A Repair Track Air Brake Test is required anytime a car is on a shop or repair track.

C. Any car that fails the repair track brake test must receive a single car test (CFR 49 Part 232.305).

D. [Repair Track Test Procedure](#).

**NOTE:** An approved test device maintained in accordance with CFR 49 Part 232.309 must be used.

1. Apply proper Blue Signal protection.
2. Secure equipment per instruction 3.5.
3. Inspect the following components on the car:
   a. The brake pipe and any other pneumatic trainlines must be securely clamped.
   b. Angle cocks are properly located with suitable clearance and properly positioned to allow maximum airflow.
   c. Valves, reservoirs and cylinders are tight on supports and securely attached to the car.
   d. Hand brakes are tested, inspected and operate as intended.
   e. Brake indicators on cars so equipped are accurate and operate as intended.
4. Charge air brake system to 90 psi.
5. Release hand brake.
6. Reduce brake pipe pressure 30 psi.
7. Reduction must not result in an emergency brake application. Brake must apply. Inspect car to make sure all brake shoes are firmly seated against their braking surfaces. Brake rigging must not bind or foul.
8. Check piston travel.
   a. Cars with 8.5 inch or 10 inch diameter brake cylinders; piston travel shall be within 6 to 9 inches. If travel is less than 6 inches or more than 9 inches, piston travel must be adjusted to nominally 7.5 inches.
   b. For cars not equipped with 8.5 inch or 10 inch diameter brake cylinders, piston travel must be adjusted to the limits stenciled on the car or badge plate marking.
   a. Brake must fully release. There must be adequate clearance between all brake shoes and their braking surfaces. Brake rigging must not bind or foul.

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All Operations 07/03/2017
11.2.2 Single Car Brake Test Requirements
A. A Single Car Brake Test may only be performed by a Qualified Person (QP).
B. A single car brake test is required when any of the conditions listed below are discovered:
   1. A car is found with one of the following wheel defects:
      a. Thermal cracks
      b. Slid flat wheel (unless known to be caused by hand brake left applied).
      c. Built up tread (unless known to be caused by hand brake left applied).
   2. One or more of the following conventional air brake equipment items is removed, repaired, or replaced:
      a. Brake reservoir
      b. Control valve mounting gasket
      c. Pipe bracket stud
      d. Service portion
      e. Emergency portion or;
      f. Pipe bracket
   3. A car has its brakes cut out or inoperative when removed from a train or when placed on a shop or repair track.
   4. A car is on a shop or repair track for any reason and has not received a single car test within the previous 12 month period.
   5. Each car (except for cars subject to paragraph 6) shall receive a single car test no less than every five years.
   6. New or rebuilt cars shall receive a single car test no less than eight years from the date the car was built or rebuilt.
   7. New or rebuilt cars shall receive a single car test before the car is placed in revenue service.
   8. A car is found with missing or incomplete single car test information.

Freight Type Single Car Test Device
The instructions in this section apply to all TRAIN MOVEMENTS, EXCEPT the following:

- Freight trains, including work trains, wreck trains and wire trains
- Equipment not in a passenger train which is being moved to or from a repair shop.

**NOTE:** When a train consists of ONLY Non-Passenger Carrying cars, either Passenger Operations OR Non-Passenger Operations instructions MAY be applied. However, Passenger Operations instructions must be complied with before Non-Passenger Carrying cars are used in Passenger Service.
P1.0 GENERAL
See All Operations, Section 1.0 for instructions.

P2.0 LOCOMOTIVES
See All Operations, Section 2.0 for instructions.

P3.0 TRAIN MAKE UP
See All Operations, Section 3.0 for instructions.

P4.0 BRAKE TESTS / EQUIPMENT INSPECTIONS

P4.1 General

P4.1.1 Responsibility
A. Only a Qualified Maintenance Person (QMP) may perform:
1. A Class I brake test or HST Departure Test. A locomotive engineer may participate in Class I brake test by manipulating the ABV handle, checking leakage and testing alerter.
2. An Exterior Calendar Day Mechanical Inspection.
3. Interior Calendar Day Mechanical Inspection on High Speed Trainsets.
B. Either a Qualified Maintenance Person (QMP) or a Qualified Person (QP) may perform:
1. A Class IA brake test.
2. A Class II brake test.
3. An Interior Calendar Day Mechanical Inspection on other than High Speed Trainsets.
C. Supervisors are jointly responsible with Inspectors, Engineers, Conductors and Assistant Conductors for:
1. Performing Class IA brake tests and detecting defects determined by these tests,
2. Performing Class II brake tests and detecting defects determined by these tests; and
3. Performing Interior Calendar Day mechanical inspections on other than High Speed Trainsets and detecting defects determined by these inspections.
D. A Running brake test may only be performed by a Locomotive Engineer.
NOTE: Conductor MUST have knowledge that Running Brake Test has been performed.

P4.1.2 Signal For Brake Application
A. During standing tests, brake must not be applied or released until proper signal is given or a clear understanding is obtained.

P4.1.3 Condition Of Brakes
A. Passenger trains must have 100% operative brakes on all cars and locomotives at any point where a Class I, HST Departure or Class IA brake test is performed.
B. Passenger trains must not depart a terminal or yard, which is a repair point, where a Class II brake test has been performed with brakes cutout, inoperative or defective.
C. Passenger trains MUST HAVE at least 85% operative brakes, unless the provisions of Instruction P6.2.3C are complied with.
D. Passenger trains in passenger service must not leave a designated Amtrak repair point with less than 100% operative brakes.
NOTE: No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

P4.1.4 MAP 1173/10C Summary Documentation for Brake Tests and Mechanical Inspections.

NOTE: A train must not be delayed for missing or conflicting information on 10C Summary portion.

NOTE: When MAP 1173/10C Summary is referenced in these instructions, METROLINK T&E employees will use METROLINK Form SMP 1173.
A. MAP 1173/10C Summary Requirements
1. The QMP that completed the Class I brake test or HST departure test must document and complete the MAP 1173 portion of the MAP 1173/10C Summary.
2. The QMP that completed the exterior and interior daily passenger car inspection must document and complete the 10C Summary portion of the MAP 1173/10C Summary.
3. QMP must enter total number of cars in “Number of Cars” box and other required information on MAP 1173/10C Summary.
4. Passenger trains must not leave any point where a Class I brake test or HST Departure test was performed without MAP 1173/10C Summary for equipment tested at that point, except per Instruction P4.1.4D.1
5. Commuter / Short-Distance Intercity Passenger Trains - MAP 1173/10C
Summary, once completed, is valid until the next scheduled Class I Brake Test, which is required once each calendar day.

6. Long-Distance Intercity Passenger Trains – MAP 1173/10C Summary, once completed, is valid until the next scheduled Class I Brake Test, which is required every 1500 miles or once each calendar day whichever occurs first.

7. High Speed Trainsets - MAP 1173/10C Summary, once completed, is valid until the next scheduled HST Departure Test, which is required every 1500 miles or once each calendar day whichever occurs first.

8. The MAP 1173/10C Summary remains valid if any one, or more than one, of the following train consist changes occur:
   a. Adding or removing a block of cars from the train.
   b. Changing motive power, changing controlling cabs with M.U.'ed locomotives, changing cabs on locomotives with double end control, changing ends on push-pull trains or running around train with locomotive(s).

9. If the controlling locomotive changes and MAP 1173/10C Summary otherwise remains valid, a QMP or OP will draw a line through (Line Out) the previous controlling locomotive number and write in the new controlling locomotive number.

10. Summary MAP 1173
    a. The Summary MAP 1173 is the one issued when a Class I brake test is performed at the originating point or a scheduled Class I brake test location for the train.
    b. Additional MAP 1173/10C Summary forms may be issued at other locations when cars are added between the originating point and scheduled Class I brake test locations.
    c. When multiple MAP 1173/10C Summary forms are issued, only one will be used as the Summary Form. The Engineer must write the word “Summary” at the top of the form that was issued at the originating point or a scheduled

NOTE: When MAP 1173/10C Summaries are issued for both ends of commuter/turnaround service, the requirement to write “Summary” at the top does not apply.

d. The Summary MAP 1173 will be used by Locomotive Engineers to summarize the train consist/brake information as required by Instruction P4.1.5.

e. All additional MAP 1173/10C Summary forms must remain with the Summary MAP 1173.

f. When another Class I brake test is performed at a scheduled Class I brake test location, QMP will issue a new MAP 1173/10C Summary which will become the new Summary MAP 1173.

B. 10C Summary Portion.

1. The 10C Summary portion is part of MAP 1173/10C Summary and is used by the mechanical department to list cars in a passenger train consist that received a Class I brake test and calendar day interior/exterior inspection without any operational restrictions.

2. Cars with defective side doors, end doors and/or PA/Intercom will be listed by car number.

3. Locomotives with a defective dynamic brake and/or air compressor will be listed by Locomotive number.

4. Train and Engine crews are not responsible for information on 10C Summary portion and must not delay departure of a train with missing or conflicting information on 10C Summary portion.

C. Location of MAP 1173/10C Summary forms.

1. The MAP 1173/10C Summary must remain in cab of controlling locomotive (also refers to cab cars in this instruction).

2. When Conductor is in possession of MAP 1173/10C Summary, the forms must be placed in cab of the controlling locomotive at earliest point, without delaying train.

3. When controlling locomotive changes, MAP 1173/10C Summary forms must be moved to cab of controlling locomotive.
In commuter/turnaround service, when MAP 1173/10C Summary is placed on both ends of equipment, forms need not be moved to controlling end.

4. When inbound engineer is unable to move MAP 1173/10C Summary forms to cab of controlling locomotive due to crew and locomotive change, forms will be moved to required location by terminal services, mechanical foreman or designated representative.

D. Missing MAP 1173/10C Summary Forms.

1. Passenger trains must not leave any point where a Class I brake test or HST Departure test was performed without MAP 1173/10C Summary for equipment tested at that point except as follows:
   a. Movement may be made between maintenance facility where the train was assembled and the originating passenger terminal of the train after performing a Passenger Class IA brake test. Passenger train must not depart initial terminal without required inspections, brake test and MAP 1173/10C Summary.

   NOTE: No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

   b. When adding cars en route per Instruction P6.2.1E, and MAP 1173/10C Summary is not available.

2. If Summary MAP 1173 is lost or missing after leaving a point where a Class I brake test or HST Departure test was performed, another available MAP 1173/10C Summary may be used as the Summary MAP 1173.

3. With Face-To-Face relief, if MAP 1173/10C Summary is not available, report missing form to CNOC mechanical desk either directly at 1-800-424-0217 or through the train dispatcher at earliest point, without delaying train.

4. Without Face-To-Face relief, if MAP 1173/10C Summary is not available, verify condition of brakes (whether any brakes are cut out):
   a. By contacting CNOC mechanical desk either directly at 1-800-424-0217 or through the train dispatcher, or
   b. When CNOC cannot be contacted, by performing a walking inspection of a brake application.

P4.1.5 Change Of Crew - Determining Condition of Brakes

A. Prior to change of engine crews, inbound engineer will complete the appropriate portion of Summary MAP 1173, adjusting for any equipment added (multiple MAP 1173/10C Summary forms may exist) or removed as follows:
   1. Locomotive/Cab Car numbers.
   2. Date.
   3. Time.
   4. Number of Cars – Total number of cars in the train.

5. Condition of Brakes:
   a. Acceptable – at least 85% operative brakes.
   b. Unacceptable - less than 85% operative brakes – trains in passenger service proceed per Instruction P6.2.3C.

6. Communication Signal
   a. Operative – An operative 2-way radio is considered as an operative communication signal
   b. Inoperative

7. Engineer’s Signature.

B. Whenever a Class IA Brake Test is performed, the following information must be noted on “Condition En Route” section of the Summary MAP 1173: Class IA Brake Test Performed, Date, Time, Location and Initials of QP or QMP.

C. Prior to change of engine crew, inbound engineer will indicate on “Condition En Route” section of Summary MAP 1173 the car numbers and number of axles cut out of any equipment with brakes cut out.

D. After change of engine crew, outbound engineer will review “Condition En Route” portion of ALL MAP 1173/10C Summary forms to determine whether any brakes are cut out. If it is determined that any brakes have been cut out, notify the train dispatcher and CNOC mechanical desk as soon as possible without delaying train, communicating car number/s and number of axles cut out. CNOC may be contacted either directly at 1-800-424-0217 or through the train dispatcher.
E. With Face-to-Face relief, outbound engineer will ascertain condition of brakes and perform a Running Brake Test.

F. Without Face-to-Face relief, outbound engineer will determine condition of brakes by reviewing Summary MAP 1173, perform a Class II Brake Test and perform a Running Brake Test.

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**G.** On relay trains, Engineer must pass along air brake slip to outbound Engineer.

H. After change of engine crew, outbound engineer will review “Conditions En Route” portion of ALL MAP 1173/10C Summary forms to determine if brake pipe cut-off valve/switch on the controlling locomotive is in the “FRT” position per Instruction 3.2.1 “Exception”.

### P4.2 Train Brake Tests & Inspection

**P4.2.1 Class I Brake Test / HST Departure Test**

**A.** Class I Brake Test Requirements

1. Commuter & Short-Distance Intercity Passenger Trains:
   a. Once each calendar day that the train is placed or continues in passenger service.
   b. If a train has not been inspected today and will be in passenger service past 11:59pm tonight a Class I brake test and mechanical inspections are required before 11:59pm tonight.

2. Long-Distance Intercity Passenger Train:
   a. Prior to train's departure from originating/initial terminal, and
   b. Every 1,500 miles or once each calendar day, whichever occurs first, that the train remains in continuous passenger service.

3. When Class I brake test has expired proceed per Instruction P6.2.3E

**B.** Class I Brake Test Procedure (Engineer may participate in test by manipulating ABV handle, performing leakage and alerter test.

1. Apply proper Blue Signal protection.
2. Secure equipment per Instruction 3.5.

3. Fully apply locomotive independent brake.
4. Electro-pneumatic brake disabled/turned off, if equipped.
5. Angle cocks / cut-out cocks, and retaining valve handles must be properly positioned.
6. Each brake disc is free of any condemnable defect.
7. Charge train to required pressure. Check state of charge by cutting out the pressure-maintaining feature. If brake pipe pressure drops within 5 seconds, the train is not fully charged or excessive leakage exists. Find and correct any source of leakage. Before proceeding with test, be sure to cut in the pressure-maintaining feature.
8. Await signal to apply.
9. When signal is given to apply, make 20 psi brake pipe reduction.
10. After exhaust has stopped, cut out pressure-maintaining feature.
11. Wait 30 seconds. On longer trains such as Auto Train, wait 45 seconds.
12. Check brake pipe leakage must not exceed 5 psi per minute.
13. Determine that brakes are applied on each car and all brake shoes / pads are firmly seated against the wheel or disc.
14. Each brake shoe or pad is not below the minimum thickness (varies depending on length of trip).
15. Each brake shoe or pad is securely fastened and correctly aligned in relation to the wheel / disc.
16. Brake rigging does not bind or foul.
17. Piston travel is within prescribed limits.
18. Brake indicators operate as intended (indicate brakes applied).
19. The communication of brake pipe pressure changes at the rear of the train is verified (by an application and release of the brakes on the last car in the train).
20. Await signal to release automatic brake.
21. When signal to release is given, release automatic brake.
22. Cut in pressure-maintaining.
23. Determine that all brakes release on each car. Ensure proper shoe / pad clearance exists.
24. Brake rigging must not bind or foul.
25. Brake indicators must operate as intended. (indicate brakes released)
26. Await signal to enable / turn on electro-pneumatic brake, if equipped.
27. When signal is given enable / turn on electro-pneumatic brake.
28. Test EP brake in accordance with local railroad procedures.
29. Make a walking inspection of electro-pneumatic application and release.
30. Communicating (Conductor's) Signal System must be tested and known to be operating as intended. A tested and operating two-way radio system meets this requirement.
31. MU equipment - emergency brake application and alerter must be tested if necessary.

C. HST Departure Test Requirements

**NOTE:** The High-Speed trainset Class I Brake Test is a combination of a Class I and Locomotive Brake Test.

1. Prior to train's departure from originating/initial terminal, and
2. Every 1,500 miles or once each calendar day, whichever occurs first, that the train remains in continuous passenger service.
3. A High Speed Trainset that misses a scheduled HST Departure test due to delay en route may continue in service to the location where the inspection was scheduled to be performed.

**NOTE:** Locomotives, including Power Cars must be inspected and tested per Instructions 2.1 and 2.2 each calendar day, regardless if train was delayed en route.

D. HST Departure Test Procedure

1. HST Departure Test will be performed by a Tier II QMP in accordance with Amtrak Standard Maintenance Procedure and Inspections.

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**P4.2.2 Class IA Brake Test**

**NOTE:** This test does not apply to High Speed Trainsets

A. Test Requirements

1. When adding Passenger Equipment En Route per Instruction P6.2.1.
2. When Commuter or Short-Distance Intercity Passenger Train equipment has not been used in passenger service for more than 12 hours since the last Class I brake test, unless MAP 1173/10C Summary indicates that Class IA brake test has been performed.
3. When equipment has been off a source of compressed air for more than four hours since the last Class I brake test.
4. When equipment will be moved between the maintenance facility and originating passenger terminal without a MAP 1173/10C Summary per Definition “Passenger Equipment” and Instruction P4.1.4D.
5. When required by Instruction P6.2.3E.
6. Whenever a Class IA brake test is performed, the following information must be noted on “Condition En Route” section of the Summary MAP 1173/10C Summary: Class IA Brake Test Performed, Date, Time, Location and Initials of QP or QMP.

B. Class IA Test Procedure.

1. Fully apply locomotive independent brake.
2. Angle cocks, cut-out cocks, and retaining valve handles must be properly positioned.
3. Charge train to required pressure. Check state of charge by cutting out the pressure-maintaining feature. If brake pipe pressure drops within 5 seconds, the train is not fully charged or excessive leakage exists. Find and correct any source of leakage. Before proceeding with test, be sure to cut in the pressure-maintaining feature.
4. Await signal to apply.
5. Make 20 psi automatic brake reduction.
6. After exhaust has stopped, cut out pressure-maintaining feature.
7. Wait 30 seconds. On longer trains such as Auto Train, wait 45 seconds.
8. Check brake pipe leakage – must not exceed 5 psi per minute.
9. Determine that brakes are applied on each car and all brake shoes/pads are firmly seated against the wheel or disc.
10. Brake indicators may be used instead of directly observing the brake application/release at each car ONLY if a QP determines that direct observation poses a safety hazard. See definition of Brake Indicator.
   a. When using brake indicators, employees must position themselves in each car or as close as possible to each car to accurately observe each indicator.
b. When using brake indicators to determine application/release at each car, indicators must change during application and release (plungers-in/out; lights-amber/green).

11. Await signal to release.
14. Verify that brakes release on each car by walking train to directly observe release.
15. Communicating (conductor’s) signal system must be tested and known to be operating as intended. A tested and operating two-way radio system meets this requirement.
16. MU equipment – Perform a pneumatic emergency brake application from the ABV handle. Ensure that emergency brake application is transmitted through the entire train. Recover from emergency brake application.
17. Verify communication of brake pipe pressure changes at the rear of the train by use of gauge, Two-Way End of Train Device or observe application and release of brakes on rear unit.

P4.2.3 Class II Brake Test

A. Test Requirements

1. Whenever control stand is changed or air brake computer is de-energized (circuit breaker turned off).
2. When previously tested and inspected cars/locomotives that received a Class I brake test within the previous calendar day and have not been removed from a source of compressed air for more than 4 hours are added to a passenger train.
3. When cars or equipment are removed from the train.
4. When Engineer first takes charge of train except for Face-to-Face relief.

NOTE: When any of the following occurs, it is considered FACE-TO-FACE RELIEF:

- When the inbound Engineer does not leave the equipment unattended and communicates with the outbound Engineer the condition of the brakes and the status (location) of the MAP 1173/10C Summary.
- When a mechanical department employee who is a QMP or QP who participated in the required brake test does not leave the equipment unattended and communicates with the outbound Engineer the condition of the brakes and the status of the MAP 1173/10C Summary (located on the locomotive, or in possession of conductor, etc.).

5. After any emergency brake application.
6. Where indicated by rule or special instructions.
7. When control valve or brakes are cut out.
8. After determining cause for brake pipe continuity loss (per Instruction P8.1.2F), make Class II brake test using Two-Way End-of-Train device.
9. Any point where a brake pipe angle cock has been turned except when performing the Two-Way-End-Of-Train device emergency function test or when adding a Back-up hose per Instruction 5.4.2 A.

NOTE: Passenger trains must not depart a terminal or yard, which is a repair point, where a Class II brake test has been performed with brakes cutout, inoperative or defective. To determine a repair point for a particular train, contact CNOC mechanical desk either directly at 1-800-424-0217 or through the train dispatcher.

B. Class II Test Procedure For Other Than High Speed Trainsets

1. Charge system to required pressure
2. Await signal to apply
3. 20 psi automatic brake reduction
4. Brakes apply on rear passenger equipment. It is permissible to verify application at the rear most wheel set/axle. Brake shoe/pad must be firmly seated against the wheel or disc.
5. Await signal to release
6. Brakes release on rear passenger equipment. It is permissible to verify release at the rear most wheel set/axle. Brake shoe/pad clearance must be observed.
7. MU equipment – Perform a pneumatic emergency brake application from the ABV handle. Ensure that emergency brake application is transmitted through
the entire train. Recover from emergency brake application.
8. When rear passenger equipment is equipped with a device (gauge or EOT unit) capable of indicating/displaying brake pipe pressure, device must be used to determine application and release of brakes on rear passenger equipment.
9. When rear passenger equipment is not equipped with a device (gauge or EOT unit) capable of indicating/displaying brake pipe pressure, brake indicators may be used instead of directly observing the brake application/release at rear car ONLY if a QP determines that direct observation poses a safety hazard. See definition of Brake Indicator.
   a. When using brake indicators, employees must position themselves in the rear car or as close as possible to the rear car to accurately observe each indicator.
   b. When using brake indicators to determine application/release at the rear car, indicators must change state during application and release (plungers-in/out; lights-amber/green).
10. Communicating signal and/or two-way radio system tested and operating.

C. Test Procedure For High Speed Trainsets
1. Engineer or QMP will apply Parking Brake.
2. Engineer or QMP will charge system to required pressure.
3. Engineer or QMP will open CB74 “EP Assist” circuit breaker on lead power car located on electrical locker No. 3.
4. Conductor, Assistant Conductor, QP or QMP will give signal to apply air brakes.
5. Engineer, QP or QMP will make a 20 psi automatic brake reduction.
6. Conductor, Assistant Conductor, QP or QMP observes 20 psi brake pipe pressure drop on MFD-2 of rear power car.
7. Conductor, Assistant Conductor, QP or QMP will give signal to release air brakes.
8. Conductor, Assistant Conductor, QP or QMP observes brake pipe pressure restored on MFD-2 of rear power car.
9. Engineer, or QMP will close CB74 “EP Assist” circuit breaker on lead power car located on electrical locker No. 3.
10. Conductor, Assistant Conductor, QP or QMP will give signal to apply air brakes.
11. Engineer, QP or QMP will make a 20 psi automatic brake reduction.
12. Conductor, Assistant Conductor, QP or QMP observes 20 psi brake pipe pressure drop on MFD-2 of rear power car.
13. Conductor, Assistant Conductor, QP or QMP will give signal to release air brakes.
14. Conductor, Assistant Conductor, QP or QMP observes brake pipe pressure restored on MFD-2 of rear power car.
15. Engineer, Conductor, Assistant Conductor, QP or QMP will ensure that two-way radio system is tested and operating.

NOTE: When MFD-2 on the rear power car is inoperative, Conductor, Assistant Conductor, QP, or QMP will go to the MFDB screen in the Conductor’s office to observe the rear Power Car brake application and release. Simultaneously, a second employee assisting with the brake test (Conductor, Assistant Conductor, QP, or QMP) must observe the brake indicators (RED) on the rear Power Car for application and release of the brakes.

P4.2.4 Running Brake Test
A. Test Requirements
1. After leaving initial terminal.
2. Any point where motive power, engine crew or train crew has been changed.
3. Any point where a brake pipe angle cock or end cock has been turned.
4. After any standing brake test has been made.
5. After striking debris on tracks.
6. Electro-pneumatic brake circuit cables between power units and/or cars are disconnected.
7. Periodically, when communication of the two-way end of train device fails en route.
8. When indicated by special instructions.
8. A running test of train air brakes must be made not more than three (3) miles before descending grades of 1.8% or greater.

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8. A running test of train air brakes must be made before descending grades listed in the "GRADE TABLE" below.

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cajon</td>
<td>MP 56.6 to MP 80, both tracks</td>
</tr>
<tr>
<td>Raton</td>
<td>MP 639 to MP 660</td>
</tr>
<tr>
<td>Glorieta</td>
<td>MP 775 to MP 810 &amp; MP 818 to MP 842</td>
</tr>
<tr>
<td>Pikes Peak</td>
<td>MP 52 to MP 66</td>
</tr>
<tr>
<td>Hi Line</td>
<td>MP 1151 to MP 1166, both tracks</td>
</tr>
<tr>
<td>Midway</td>
<td>MP 0.5 to MP 5, both tracks</td>
</tr>
<tr>
<td>St. Paul</td>
<td>MP 430 to MP 5, both tracks</td>
</tr>
<tr>
<td>Scenic</td>
<td>MP 1694.5 to MP 1731.3</td>
</tr>
<tr>
<td>Stampede</td>
<td>MP 41.0 to MP 58.5</td>
</tr>
<tr>
<td>Gateway</td>
<td>MP 178.0 to MP 188.0</td>
</tr>
</tbody>
</table>

9. When inadequate brake performance is detected per Instruction P6.1.1.

10. After test of back-up hose/valve.

**Running Brake Test Procedure**

1. Must be made as soon as speed of train permits but not exceeding 20 mph. A Running Brake Test may be made at speeds greater than 20 mph after striking debris, when communication of two-way end of train device fails en route or indicated by special instruction.

2. During test, locomotive and/or dynamic brake MUST NOT be permitted to apply except when locomotive and/or dynamic brake cannot be released due to equipment configuration.

3. Apply train air brakes with sufficient force to ascertain whether or not brakes are operating correctly.

4. If air brakes do not operate properly, train must be stopped, perform walking inspection of a brake application, cause of failure ascertained, corrected, Class II and Running Brake test repeated.

**NOTE:** Conductors and Engineers must communicate that each running brake test per Instruction P 4.2.4 A has been performed.

**P4.2.5 Test from Yard Plant**

A. Engineer’s brake valve or standard test device must be used.

B. Test device must be connected to end which will be nearest controlling locomotive.

C. Brake system must be charged, tested, and inspected per Class I brake test requirements listed in Instruction P4.2.1.

D. When road power is coupled, make a Class II brake test before proceeding.

E. If air supply is disconnected for more than 4 hours, train must again be given a Class I brake test per Instruction P4.2.1.

F. Yard test device must charge the brake pipe / train brake system to the pressure listed in Instruction 1.2 (Standard Air Pressures).

G. Mechanical yard air test devices and gauges must be calibrated every 92 days.

H. Electronic yard air test devices and gauges must be calibrated annually.

I. If used to test a train, a yard air test device and any yard air test equipment shall be accurate and function as intended.

**P4.2.6 Exterior Calendar Day Mechanical Inspection**

A. Inspection Requirements

1. Performed by a QMP once each calendar day on passenger equipment in accordance with Amtrak’s Standard Maintenance Procedures and inspections.

2. A Long-Distance Intercity passenger train that misses a scheduled Exterior Calendar Day Mechanical Inspection due to delay en route may continue in service to the location where the inspection was scheduled to be performed.

3. A High Speed Trainset that misses a scheduled Exterior Calendar Day Mechanical Inspection due to delay en route may continue in service to the location where the inspection was scheduled to be performed.
B. Inspection Procedure
1. Use table below to determine Running gear and/or Non-Running gear defects and necessary action to be taken.

**EXTERIOR CALENDAR DAY MECHANICAL INSPECTION DEFECT/ACTION AT TIME OF INSPECTION**

<table>
<thead>
<tr>
<th>TYPE DEFECT</th>
<th>DEFECT DESCRIPTION</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Gear</td>
<td>• Suspension Components (including Air Bellows)</td>
<td>1. Repair</td>
</tr>
<tr>
<td></td>
<td>• Draft System Components</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Trucks and Components (including Bolster Anchor Radius Rods)</td>
<td>2. Move for repair in a non-revenue train not in passenger service, or</td>
</tr>
<tr>
<td></td>
<td>• Wheels and Components (including hot journals and locomotive support bearings)</td>
<td>3. Set Out</td>
</tr>
<tr>
<td>Non-Running</td>
<td>• Exhaust gases released inside cab or other compartments.</td>
<td>May be moved for repair, in passenger service provided:</td>
</tr>
<tr>
<td>Gear</td>
<td>• Batteries not properly vented.</td>
<td>1. QMP determines that it is safe to do so including all movement restrictions, and</td>
</tr>
<tr>
<td></td>
<td>• Jumper cables – hanging free, exposed wire, broken plugs or receptacles.</td>
<td>2. Car is locked out and empty.</td>
</tr>
<tr>
<td></td>
<td>• High voltage safety labels for exterior doors and cover plates missing</td>
<td>3. Car may be occupied by crew member only in the performance of duty</td>
</tr>
<tr>
<td></td>
<td>• Buffer plates not in place.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Diaphragms not in place or not aligned</td>
<td></td>
</tr>
</tbody>
</table>

3. A Long-Distance Intercity passenger train that misses a scheduled Interior Calendar Day Mechanical Inspection due to delay en route may continue in service to the location where the inspection was scheduled to be performed.

4. A High Speed Trainset that misses a scheduled Interior Calendar Day Mechanical Inspection due to delay en route may continue in service to the location where the inspection was scheduled to be performed.

B. Inspection Procedure For Other Than High Speed Trainsets.

1. Use the following table to determine Non-Running gear defects and necessary action to be taken.

P4.2.7 Interior Calendar Day Mechanical Inspection

A. Inspection Requirements
1. Other than High Speed Trainsets - Performed by QMP or QP once each calendar day on passenger carrying cars in accordance with Amtrak’s Standard Maintenance Procedures and Inspections.

2. High-Speed Trainsets - Performed by QMP once each calendar day in accordance with Amtrak Standard Maintenance Procedures and inspections.

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Passenger Operations 07/03/2017
### Non-Running Gear

- Exposed moving parts and electrical equipment not equipped with guards.
- Floors that contain oil, water, waste, or any obstruction
- Manual door releases not in place.
- Emergency equipment... as applicable, missing.

**ACTION**

May be moved for repair, in passenger service provided:

1. QP or QMP determines that it is safe to do so, and
2. Car is locked out and empty.
3. Car may be occupied by crew member only in the performance of duty

### Safety related signage missing or not legible.

- High voltage safety labels for interior doors and cover plates missing
- Emergency brake valves not stenciled.

**ACTION**

May remain in passenger service until the next interior calendar day inspection, provided QP or QMP determines:

1. that the repairs cannot be made, and
2. equipment is safe to move.

### Trap doors that do not safely operate or securely latch.

**ACTION**

May remain in passenger service until the next interior calendar day inspection, provided QP or QMP determines:

1. that the repairs cannot be made, and
2. equipment is safe to move.
3. Defective trap doors must be secured by locking out door for which it is used.

### Vestibule steps that are not illuminated.

**ACTION**

May remain in passenger service until the next interior calendar day inspection, provided QP or QMP determines:

1. that the repairs cannot be made, and
2. equipment is safe to move.
3. Vestibule may be used solely at high platforms when steps are non-illuminated.

### End doors and side doors that do not operate safely or as intended.

**ACTION**

May remain in passenger service until the next interior calendar day inspection, provided QP or QMP determines:

1. that the repairs cannot be made, and
2. equipment is safe to move.
3. At least one operative and accessible door must be available on each side of car. A notice must be displayed directly on each defective door.

### Seats or attachments broken or loose.

**ACTION**

May remain in passenger service until the next interior calendar day inspection, provided QP or QMP determines:

1. that the repairs cannot be made, and
2. equipment is safe to move.
3. Broken or loose seats or seat attachments must be rendered unusable and display a notice indicating defect directly on seat.

---

C. Inspection Procedure For High-Speed Trainsets

1. Performed by QMP in accordance with Amtrak’s Standard Maintenance Procedures and Inspections.
P5.0  TRAIN HANDLING
   See All Operations, Section 5.0 for instructions.

P6.0  EN ROUTE CONDITIONS

P6.1  General

P6.1.1 Inadequate Performance of Train Brakes
   A. If brake performance is found to be inadequate for the brake application made, train must be stopped and a walking inspection of a brake application must be performed to determine cause.
   B. If no defects are found, train may proceed, making periodic running brake tests.
   C. When equipped with Two-Way End of Train Device, verify changes in brake pipe pressure at rear of train during running brake tests.

P6.1.2 Failure To Maintain Required Pressure
   A. If pressure required for safe handling of train cannot be maintained, train must be stopped, secured and train dispatcher notified.
   B. If main reservoir pressure falls below 100 psi, immediately bring train to a safe stop.
   C. NOTE: If brake pipe pressure falls below 50 psi, you will not be able to transmit a emergency brake application.

P6.1.3 Sticking Brakes
   A. Train and engine crews must keep a lookout for brakes sticking on their train and on trains being met or passed.
   B. They must advise one another of location in train of cars with sticking brakes.
   C. Probable causes of sticking brakes:
      1. Hand/parking brake not fully released.
      2. Overcharged brake system.
      3. Binding or fouling brake rigging.
      4. Retaining valve not in “Release” position.
      5. Defective control valve.
      6. Excessive brake pipe leakage.
      7. Improper handling of ABV.
   D. If brakes are stuck from improper handling of ABV, usually an additional heavy automatic brake reduction and release will correct condition.

P6.1.4 If Train Breaks In Two
   A. SHUT DOWN AND ISOLATE HEP, IF EQUIPPED, AS SOON AS POSSIBLE.
   B. After train is re-coupled and brake system has been recharged, perform a Class II brake test.
   C. After proceeding, as soon as speed of train permits, a Running Brake Test must be made.

P6.1.5 Reporting Defects – Report defects per Instruction 9.1.1

P6.1.6 Emergency Brake Application
   A. ABV handle initiated
      1. Full emergency brake effort must be allowed to apply.
      2. Leave handle in “EMERGENCY” until stopped.
      3. Ensure throttle is in “IDLE” or “OFF” position.
   NOTE: It is acceptable to regulate locomotive brake cylinder pressure from an undesired emergency (UDE) brake application.
   B. When equipped with Two-Way End-Of-Train device, engineer or other train crew members must activate the Two-Way End-Of-Train device using the “EMERGENCY” toggle switch when any emergency brake application occurs.
   C. Conductor’s valve or back-up hose
      1. Open valve quickly.
      2. Leave valve open until stopped.
      3. Do not attempt to release brakes until stopped.
   D. Recovery from emergency brake application after stopping
      1. If conditions required use of conductor’s valve, caboose valve or back-up hose, reset it.
      2. Move ABV handle to “RELEASE”.
      3. Inspect ENTIRE train for derailed cars, shifted loads, etc.
      4. Perform a Class II brake test.
   E. After proceeding, a Running Brake Test must be made.

P6.1.7 Inoperative Locomotive Dynamic Brake
   A. On locomotive so equipped, Engineer will be informed of the operational status of the dynamic brake when first taking charge of the train.
   B. If the locomotive is found to have an inoperative dynamic brake, see Instruction 2.7.13.
P6.2 Movement Restrictions

P6.2.1 Adding Passenger Equipment En Route.
A. Crews must not add Passenger Equipment unless instructions are received to do so.
B. Instructions will not be given to crew unless required inspections and Class I brake test are completed. Inspections and Class I brake test will be valid until next scheduled inspection.
C. Instructions can be conveyed verbally, electronically or in writing.
D. When QMP participates in adding equipment:
   1. QMP will perform required test and inspections.
   2. QMP will perform Class I or Class IA brake test on Passenger Equipment added to the train when these cars have been off compressed air for more than 4 hours prior to being added.
   3. QMP will issue an additional MAP 1173/10C Summary covering the equipment added.
   4. Engineer will enter required information on Summary MAP 1173 per instruction P4.1.5.
E. When QMP does NOT participate in adding equipment:
   1. Perform Class IA brake test on Passenger Equipment added when these cars have been off compressed air for more than 4 hours prior to being added (date and time shown on MAP 1173/10C Summary may be used for this purpose).
   2. Perform Class II brake test.
   3. Class II brake test may be made at same time added equipment is tested.
   4. Engineer will enter required information on Summary MAP 1173 per instruction P4.1.5.

P6.2.2 Non-Air Brake - En Route Movement Restrictions
A. Running Gear Defects
   Use following table to determine Running Gear Defects and necessary action to be taken.

<table>
<thead>
<tr>
<th>DEFECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspension Components (includes Air Bellows)</td>
</tr>
<tr>
<td>Draft System Components</td>
</tr>
<tr>
<td>Trucks and Components (includes Bolster Anchor Radius Rods)</td>
</tr>
<tr>
<td>Wheels and Components (includes hot journals and locomotive support bearings)</td>
</tr>
</tbody>
</table>

**ACTION**
1. Stop train, QP or QMP must visually inspect equipment to determine nature of defect.
2. If communication with QMP not immediately available, contact QMP at CNOC mechanical desk via 1-800-424-0217 following voice prompts, Qualcomm communication system or Train Dispatcher with description of running gear defect. Additional numbers: 1-302-683-2082 or 2083, ATS 734-2082 or 2083.
3. Train must not move until QMP determines it is safe for movement in passenger service.
4. QMP will determine maximum speed and any other restrictions necessary for safe movement. Alert QMP to any host railroad rules, speed restrictions or any other instructions concerning the defect.
5. Whenever a Running gear defect occurs en route, equipment may continue to next calendar day mechanical inspection point, provided QMP determines that it is safe to remain in passenger service.
6. Comply with instructions 9.1.1, 9.1.5, 9.2.3 and 9.3.
7. As clarification, the following conditions are NOT considered defects which require a QMP’s approval before the train can proceed:
   - Actuation of an on-board or wayside hot journal bearing detector. A QMP need only be contacted if the crew’s tempilstik inspection of affected engine(s) or car(s) indicates an overheated bearing.
   - Wheel flat spots of less than 2 ½ inches in length, or two adjoining flat spots of less than 2 inches each in length. A QMP need only be contacted if a flat spot exceeds these dimensions, or if the crew is not sure that they have measured the flat spot correctly.
   - Underinflated or overinflated air bellows on cars. Crew will be governed by applicable Timetable instructions and/or 9.4.1. In the case of overinflated air bellows on Amfleet cars, QMP must be contacted if crew is unable to manually deflate air bellows.
A. Non-Running Gear Defects

Use following table to determine Non-Running gear defects and necessary action to be taken.

<table>
<thead>
<tr>
<th>DEFECT DESCRIPTION</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust gases released inside cab or other compartments.</td>
<td>1.</td>
</tr>
<tr>
<td>Batteries not properly vented.</td>
<td>1.</td>
</tr>
<tr>
<td>Jumper cables – hanging free, exposed wire, broken plugs or receptacles.</td>
<td>1.</td>
</tr>
<tr>
<td>High voltage safety labels for exterior doors and cover plates missing</td>
<td>1.</td>
</tr>
<tr>
<td>Buffer plates not in place.</td>
<td>1.</td>
</tr>
<tr>
<td>Diaphragms not in place or not aligned</td>
<td>1.</td>
</tr>
<tr>
<td>Exposed moving parts and electrical equipment not equipped with guards.</td>
<td>1.</td>
</tr>
<tr>
<td>Floors that contain oil, water, waste, or any obstruction</td>
<td>1.</td>
</tr>
<tr>
<td>Manual door releases not in place.</td>
<td>1.</td>
</tr>
<tr>
<td>Emergency equipment... as applicable, missing.</td>
<td>1.</td>
</tr>
<tr>
<td>Safety related signage missing or not legible.</td>
<td>1.</td>
</tr>
<tr>
<td>High voltage safety labels for interior doors and cover plates missing</td>
<td>1.</td>
</tr>
<tr>
<td>Emergency brake valves not stenciled.</td>
<td>1.</td>
</tr>
<tr>
<td>Trap doors that do not safely operate or securely latch.</td>
<td>1.</td>
</tr>
<tr>
<td>Vestibule steps that are not illuminated.</td>
<td>1.</td>
</tr>
<tr>
<td>End doors and side doors that do not operate safely or as intended.</td>
<td>1.</td>
</tr>
<tr>
<td>Baggage car side doors or lighting does not function as intended.</td>
<td>1.</td>
</tr>
<tr>
<td>Seats or attachments broken or loose.</td>
<td>1.</td>
</tr>
<tr>
<td>Public Address/Intercom system inoperative</td>
<td>1.</td>
</tr>
</tbody>
</table>

1. QP or QMP must visually inspect equipment to determine nature of defect.
2. QP or QMP will determine if safe for movement in passenger service.
3. QP or QMP will determine maximum speed and any other restrictions necessary for safe movement.
4. Whenever a Non-Running gear defect occurs en route, equipment may continue to next calendar day mechanical inspection point, provided a QP or QMP determines that it is safe to remain in passenger service.
5. Report defects on EMAP 21A and notify CNOC Mechanical desk (1-800-424-0217) as soon as possible without delaying train.
6. The specific defects indicated below must be complied with as follows:
   - Defective trap door must be secured by locking out door for which it is used.
   - Vestibule must be used solely at high platforms when steps are non-illuminated.
   - At least one operative and accessible door must be available on each side of car. A notice must be displayed directly on each defective door (See Tables & Forms).
   - Broken or loose seats or seat attachments must be rendered unusable and display a notice indicating defect directly on seat(See Tables & Forms).
   - Whenever a Public Address/Intercom system is found defective, an out of service notice must be displayed directly on the defective Public Address/Intercom system(See Tables & Forms).
7. **Short Distance Intercity trains**: Cars may continue in service 4 calendar days until repaired or replaced. **Long Distance Intercity trains**: may continue in service 8 calendar days until repaired or replaced.
P6.2.3 Air Brake - En Route Movement Restrictions

NOTE: No train may depart from its originating passenger terminal with any safety critical devices inoperative. This would include air brake, alerter, train control system and controlling locomotive radio.

A. Passenger trains in passenger service must not leave a designated Amtrak repair point with less than 100% operative brakes.

B. Passenger trains MUST HAVE at least 85% operative brakes, unless the provisions of Instructions P6.2.3C are complied with.

C. When operative brakes become less than 85%, BEFORE PROCEEDING, notify train dispatcher and contact QMP at CNOC mechanical desk for instructions. CNOC may be contacted either directly at 1-800-424-0217 or through the train dispatcher.

1. Trains with 84%-75% operative brakes must comply with QMP instructions but not exceeding one-half the maximum timetable speed or 40 mph whichever is less.

2. Trains with 74%-50% operative brakes must comply with QMP instructions but not exceeding one-half the maximum timetable speed or 20 mph whichever is less.
   a. Every effort must be made to increase operative brake percentage above 74% by setting out the defective car(s).
   b. If not possible to increase operative brake percentage above 74% by setting out defective car(s):
      (1) Train may be moved in passenger service to the next location where passengers can be safely detrained.
      (2) After all passengers are discharged, the equipment will be moved to the nearest location where the necessary repairs can be made.

D. When brakes become completely inoperative (Brake is cut out / inoperative on all axles) on front or rear passenger equipment (including locomotives), proceed as follows:
   a. If occupied, passengers MUST be moved to another car.
   b. Car shall be locked out except for employees in the performance of duty.
   c. Speed must not exceed 20 mph.
   d. Proceed to first point where car can be:
      (1) Set out
      (2) Switched ahead of a car with operative brakes or
      (3) Repaired
   e. When hand/parking brake is located INSIDE equipment, proceed with hand/parking brake manned.

NOTE: Defective brakes on front or rear semi-permanently attached passenger equipment (i.e. High Speed Trainset or rear of Talgo) does not constitute defective brakes on front or rear passenger equipment.

E. When Class I brake test has expired and Mechanical Department personnel are not available to perform test, the following applies:

1. Commuter & Short Distance Intercity Passenger Trains which miss a scheduled Class I brake test due to delay en route.
   a. Train may be moved in passenger service to the next location where passengers can be safely detrained.
   b. After all passengers are discharged, perform a Class IA brake test. The equipment will then be moved to the nearest location where the required tests and inspections can be made.

2. Long-Distance Intercity Passenger Trains which miss a scheduled Class I brake test due to delay en route may continue in passenger service to the location where the next test and inspections were scheduled to be performed.

NOTE: Locomotives must be inspected and tested per Instructions 2.1 and 2.2 each calendar day.
F. Anytime brakes are cut out, comply with the following:
1. Notify the train dispatcher and CNOC mechanical desk, communicating car number/s and number of axles cut out. CNOC may be contacted either directly at 1-800-424-0217 or through the train dispatcher.
2. If locomotive brakes are cut out, **BEFORE PROCEEDING**, notify train dispatcher and contact QMP at CNOC mechanical desk for instructions (each cut out locomotive axle counts as two cut out axles). CNOC may be contacted either directly at 1-800-424-0217 or through the train dispatcher.

**NOTE:** Cab Control Cars and NPCU’s are considered cars (not locomotives) for the purpose of determining operative brakes. Therefore, count each cut out axle on this equipment as 1 cut out axle.
3. Passenger trains MUST NOT have two cars in succession with their control valves cut out. If control valve is cut out on front or rear passenger equipment, comply with Instruction P6.2.3D.
4. QP or QMP must determine percent of operative brakes (See Operative Brake Chart).
5. Confirm percent of operative brakes by performing a walking inspection of a brake application.
6. Perform Class II brake test.
7. Prior to change of engine crew, inbound engineer will indicate on “Condition En Route” section of Summary MAP 1173 the car numbers and number of axles cut out of any equipment with brakes cut out.

G. EP (Electro Pneumatic) Brake becomes inoperative.
1. No train may depart its originating passenger terminal with inoperative EP brake.
2. If EP brake fails en route train may continue in service until next calendar inspection point or when next class I brake test is required.

**P6.2.4 Determining Percent Operative Brakes.**
A. Divide the total number of axles with operative brakes by the total number of axles in the train, including locomotives.
B. Each cut out axle on a locomotive in passenger service counts as 2 cut out axles.

**NOTE:** Cab Control Cars and NPCU’s are considered cars (not locomotives) for the purpose of determining operative brakes. Therefore, count each cut out axle on this equipment as 1 cut out axle.
C. Each cut out axle on other than locomotives counts as 1 cut out axle.

**EXAMPLE 1:**
1 Locomotive (4 axles)
6 Cars (4 axles each=24 axles)
24 axles + 4 axles = 28 total axles

Cut out 1 truck on 1 Passenger Carrying Car (2 axles)
28 total axles – 2 cutout axles=26 axles with operative brakes.
26 axles with operative brakes divided by 28 total axles = .93 or 93% operative brakes.

**EXAMPLE 2:**
1 Locomotive (4 axles)
6 Cars (4 axles each=24 axles)
24 axles + 4 axles = 28 total axles

Cut out lead truck on locomotive (2 axles cut out = 4 axles cut out)
28 total axles – 4 cutout axles=24 axles with operative brakes.
24 axles with operative brakes divided by 28 total axles = .86 or 86% operative brakes.
### 85% OPERATIVE BRAKE CHART

**Maximum Number of Axles Cut-Out to Maintain at Least 85% Operative Brakes**

(Count Locos & Cars) (Each Cut-out Loco Axle Counts as 2)

<table>
<thead>
<tr>
<th>Total Axles (Including Locomotives)</th>
<th>Number of Axles Allowed Cut-Out to Maintain 85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 6</td>
<td>0</td>
</tr>
<tr>
<td>7 - 12</td>
<td>1</td>
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<tr>
<td>13 - 19</td>
<td>2</td>
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<tr>
<td>20 - 25</td>
<td>3</td>
</tr>
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<td>26 - 32</td>
<td>4</td>
</tr>
<tr>
<td>33 - 38</td>
<td>5</td>
</tr>
<tr>
<td>39 - 45</td>
<td>6</td>
</tr>
<tr>
<td>46 - 51</td>
<td>7</td>
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<td>52 - 58</td>
<td>8</td>
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<td>59 - 64</td>
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<td>65 - 70</td>
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<td>71 - 77</td>
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<td>78 - 83</td>
<td>12</td>
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<td>84 - 90</td>
<td>13</td>
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<td>91 - 96</td>
<td>14</td>
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<tr>
<td>97 - 103</td>
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<td>104 - 109</td>
<td>16</td>
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<tr>
<td>110 - 116</td>
<td>17</td>
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<tr>
<td>117 - 122</td>
<td>18</td>
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<td>123 - 129</td>
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<td>130 - 135</td>
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<td>136 - 141</td>
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<td>149 - 154</td>
<td>23</td>
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<td>155 - 161</td>
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<td>162 - 167</td>
<td>25</td>
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<tr>
<td>168 - 174</td>
<td>26</td>
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<tr>
<td>175 - 180</td>
<td>27</td>
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<tr>
<td>181 - 187</td>
<td>28</td>
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<tr>
<td>188 - 193</td>
<td>29</td>
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<tr>
<td>194 - 199</td>
<td>30</td>
</tr>
<tr>
<td>200 - 206</td>
<td>31</td>
</tr>
<tr>
<td>207 - 212</td>
<td>32</td>
</tr>
<tr>
<td>213 - 219</td>
<td>33</td>
</tr>
<tr>
<td>220</td>
<td>34</td>
</tr>
</tbody>
</table>

### 75% OPERATIVE BRAKE CHART

**Maximum Number of Axles Cut-Out to Maintain at Least 75% Operative Brakes**

(Count Locos & Cars) (Each Cut-out Loco Axle Counts as 2)

<table>
<thead>
<tr>
<th>Total Axles (Including Locomotives)</th>
<th>Number of Axles Allowed Cut-Out to Maintain 75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3</td>
<td>0</td>
</tr>
<tr>
<td>4 - 6</td>
<td>1</td>
</tr>
<tr>
<td>7 - 11</td>
<td>2</td>
</tr>
<tr>
<td>12 - 15</td>
<td>3</td>
</tr>
<tr>
<td>16 - 19</td>
<td>4</td>
</tr>
<tr>
<td>20 - 23</td>
<td>5</td>
</tr>
<tr>
<td>24 - 27</td>
<td>6</td>
</tr>
<tr>
<td>28 - 31</td>
<td>7</td>
</tr>
<tr>
<td>32 - 35</td>
<td>8</td>
</tr>
<tr>
<td>36 - 39</td>
<td>9</td>
</tr>
<tr>
<td>40 - 43</td>
<td>10</td>
</tr>
<tr>
<td>44 - 47</td>
<td>11</td>
</tr>
<tr>
<td>48 - 50</td>
<td>12</td>
</tr>
<tr>
<td>51 - 54</td>
<td>13</td>
</tr>
<tr>
<td>55 - 58</td>
<td>14</td>
</tr>
<tr>
<td>59 - 62</td>
<td>15</td>
</tr>
<tr>
<td>63 - 66</td>
<td>16</td>
</tr>
<tr>
<td>67 - 70</td>
<td>17</td>
</tr>
<tr>
<td>71 - 74</td>
<td>18</td>
</tr>
<tr>
<td>75 - 78</td>
<td>19</td>
</tr>
<tr>
<td>79 - 82</td>
<td>20</td>
</tr>
<tr>
<td>83 - 86</td>
<td>21</td>
</tr>
<tr>
<td>87 - 90</td>
<td>22</td>
</tr>
<tr>
<td>91 - 94</td>
<td>23</td>
</tr>
<tr>
<td>95 - 98</td>
<td>24</td>
</tr>
<tr>
<td>99 - 100</td>
<td>25</td>
</tr>
</tbody>
</table>
P7.0 TRAIN CONTROL SYSTEMS
See All Operations, Section 7.0 for instructions.

P8.0 TWO-WAY END-OF-TRAIN DEVICE
P8.1 Two-Way End-Of-Train Device

P8.1.1 Device Components
A. A two-way end-of-device consists of:
   1. A Locomotive Control Unit (LCU),
   2. An End-of-Train (EOT) Unit,
   3. The ability to use various train-related functions,
   4. The ability to initiate an emergency brake application from the rear of the train, and
   5. Satisfies the rear of train marker light requirement.
B. The LCU:
   1. Consists of a telemetry receiver/transmitter, provides displays and controls in the locomotive cab to monitor and communicate with the associated EOT, and,
   2. On G.E. locomotives so equipped, this information is displayed on the Integrated Function Display (IFD) screens.
C. The EOT:
   1. Consists of a telemetry transmitter/receiver attached to the rear of car coupler and brake pipe,
   2. Transmits information regarding brake pipe pressure, motion, battery condition and marker light status to the associated LCU, and,
   3. Responds to a radio signal command from the LCU to initiate an emergency brake application at the rear of the train.

P8.1.2 Device Requirements
A. Amtrak passenger trains are NOT required to have a two-way end-of-device, regardless of consist size, when:
   1. All cars in the train are equipped with an emergency brake valve readily accessible to a crew member, or,
   2. The rear car of the train is equipped with an emergency brake valve readily accessible to a crew member in radio contact with the engineer.
B. Amtrak passenger trains must have an operable two-way end-of-device whenever one or more of the following occurs:
   1. The train has 25 or more cars, and a crew member does not have access to an emergency brake valve on the last car of the front two-thirds (or further back) of the train consist.
   2. The train has 13 to 24 cars, and a crew member does not have access to an emergency brake valve on the last car of the front half (or further back) of the train consist.
   3. Use the following table to determine if a two-way end-of-device is required. If your train exceeds the maximum number of inaccessible cars on the rear, a two-way end-of-device is required.

<table>
<thead>
<tr>
<th>Number of Cars in Train</th>
<th>Two-Way End-of-Train Device is NOT Required If Crew Member Has Access to This Car</th>
<th>Maximum Number of Inaccessible Cars on Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
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<td>25 or more</td>
<td>Rear</td>
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</tbody>
</table>

NOTE: Count back from the locomotives (do not count any locomotive).
C. Location of Crew Members on Trains Not Equipped with a Two-Way End-of-Train Device:
Crew members must take the following actions when a train, that is not required to be equipped with a two-way end-of-train device (due to meeting the criteria shown in the previous table), will descend a section of track on which the average grade is 2% or greater for at least two continuous miles:
1. At least 10 minutes prior to descending the specified grade, the engineer must communicate with the conductor to ensure that a crew member with a working two-way radio is stationed in the rearmost car equipped with a readily accessible emergency brake valve when the train begins its descent.
2. The crew member must remain stationed at this location, and remain in constant radio communication with the engineer, until the train has completely traversed the grade.
3. EXCEPTION: This requirement does not apply to trains which have all cars in the train equipped with a readily accessible emergency brake valve, or to those in which the rear car has a readily accessible emergency brake valve.

D. EN ROUTE Failures:
1. An EN ROUTE failure of the two-way end-of-train device is defined as the inability to initiate an emergency brake application from the rear of the train due to a communication failure or other reasons.
2. A communication failure is considered a loss of communication between the LCU and EOT for a continuous period of 16 minutes and 30 seconds.
   NOTE: On G.E. locomotives so equipped, a communication failure is considered to have occurred when the “ONE WAY NO COMM” alarm light is displayed on the IFD screen for a ten minute duration.

E. Operating Restrictions EN ROUTE Failure - If a train which is required to have a two-way end-of-train device experiences an EN ROUTE failure, the train may proceed to the next location where repairs can be made, or where the next required train brake test is to be performed (whichever point is reached first) and must comply with all of the following:
1. Train must not descend a section of track on which the average grade is 2% or greater over a distance of two continuous miles until:
   a. An operable two-way end-of-train device is installed, or,
   b. An alternative method of initiating an emergency brake application from the rear of the train is achieved.
2. At locations other than those specified in item 1. above - A member of the crew equipped with an operable two-way radio that communicates with the engineer must occupy the rearmost passenger carrying car equipped with a readily accessible emergency brake valve.
3. The engineer must make periodic Running Brake Tests until the failure is corrected.

### Burlington Northern Santa Fe

<table>
<thead>
<tr>
<th>Subdivision</th>
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F. When brake pipe continuity is lost, as indicated by any of the following, stop train immediately and determine the cause:
1. Low air audible alarm and low air indicator light.
2. No increase or decrease in brake pipe pressure at rear of train in response to movement of the ABV handle.
3. "0" or "****" brake pipe pressure at rear of train.
4. After determining cause for brake pipe continuity loss and making necessary repairs if possible, perform a Passenger Class II Brake Test using two-way end-of-train device.

**NOTE:** Determine the cause of loss of continuity by inspecting train brake pipe for air loss and angle cocks/cut-out cocks for proper positioning.

G. Marker Light failure does not render the two-way end-of-device inoperative. If the EOT unit’s marker light fails, train may proceed to the next designated terminal for repair. If repairs cannot be made, a portable marker must be placed on rear of train.

H. Circumstances requiring emergency brake application using Two-Way End-Of-Train Device:
   1. Whenever it becomes necessary to place the train air brakes in emergency using either the ABV handle or the emergency brake valve, engineer or other train crew members must also activate the two-way end-of-train device on trains equipped with the device, using the “EMERGENCY” toggle switch.
   2. The two-way end-of-train device must also be activated whenever an undesired emergency brake application of the train air brakes occurs.

**P8.1.3 Set Up And Arming The System**

A. This procedure requires two individuals; one each positioned at the EOT unit and at the LCU/IFD.

B. Once the EOT Unit ID Code Number is communicated to the individual positioned at the LCU/IFD, it is entered either:
   1. On the LCU using the thumbwheel, or,
   2. On the IFD using the “F” keys by:
      a. Pressing F1-F5 selecting unit I.D. code, then,
      b. Pressing F6 “ENTER CODE” key, then,
      c. Pressing F7 “COMM TEST” key, and,
      d. Verifying “COMM TEST PASSED” message is displayed.
   3. Press “TEST” button on the EOT unit to effect “ARM NOW” message on the LCU/IFD display, then immediately press either the:
      a. “Communication Test/Arm” button on the LCU, or,
      b. F7 “Arm Two-Way” key on the IFD screen.

C. The device is ARMED when either the:
   a. LCU displays “ARMD” and the “EMERGENCY ENABLED” LED is lit, or,
   b. IFD screen displays “ARMED AND ENABLED”.

**P8.1.4 Two-Way End-Of-Train Device Emergency Function Test**

A. Test must be conducted at point of installation or whenever the LCU or EOT unit is changed.

B. Brake pipe readouts between the LCU and EOT unit must be compared for accuracy.

C. Brake pipe pressure indicated on LCU must be within 3 psi of that indicated on EOT unit or a properly calibrated air gauge.

D. Test Procedure:
   1. Charge train to within 15 psi of regulating valve setting.
   2. Close angle cock between the last car and the EOT unit.
   3. Initiate two-way end-of-train device emergency brake application from locomotive cab using emergency toggle switch.
   4. EOT unit must vent a brief exhaust of air.
   5. Press EOT unit test button to verify brake pipe pressure is "0".
   6. Allow approximately 60 seconds for EOT unit to reset.
   7. Slowly open angle cock between last car and EOT unit.
   8. If EOT unit fails to respond to an LCU-initiated emergency signal after two attempts, the two-way end-of-train device is considered inoperative, until repaired or replaced and retested.
   9. Add info to MAP 1173/10C Summary

**P8.1.5 Class II Brake Test Using Two-Way End-Of-Train Device**

A. The two-way end-of-train device must be utilized to perform the Class II Brake Test.

B. Test Procedure:
   1. Observe the display on the LCU/IFD for continuous readout of brake pipe pressure from the EOT unit.
   2. Charge system to required pressure.
   3. Make a 20 psi brake pipe reduction.
   4. Observe appropriate LCU/IFD indications for brake pipe reduction on last car of train.
5. Release brakes.
6. Observe appropriate LCU/IFD indications for brake pipe pressure increase on last car of train.
7. Notify conductor that test was successful.

P8.1.6 EOT Unit’s Battery

A. The following indications pertain to the condition of the EOT unit’s battery:
   1. LCU Messages:
      a. “DEAD BAT” (Dead Battery)
      b. “REPL BAT” (Replace Battery)
   2. IFD Screen:
      a. “EOT BATTERY” Yellow (Weak)
      b. “EOT BATTERY” Red (Dead)

B. Replacement procedure:
   1. Ensure EOT unit’s replacement battery is charged.
   2. Remove EOT unit’s battery hasp, securing device.
   3. Unlatch battery compartment door.
   4. Pull battery straight out.
   5. Fit replacement battery into the enclosure cavity, aligning the connectors.
   6. Push battery fully into the enclosure, then latch and secure battery compartment door.

P8.1.7 Disarming Two-Way End-Of-Train Device

A. Armed two-way end-of-train device must be disarmed when:
   1. Either the EOT unit or LCU is changed, and/or,
   2. When train arrives at its final terminal.
B. Disarming Procedure using LCU:
   1. Set all thumbwheel numbers to “0”, and,
   2. Press “Communications Test/Arm” button.
C. Disarming Procedure using IFD:
   1. From IFD EOT setup screen, press F6 “EOT 00000” key and,
   2. Immediately press F7 “DISARM TWO WAY” key.
D. The system is disarmed when either:
   1. LCU displays “DISARMD”, and “EMERG ENABLED” LED is off or,
   2. IFD screen displays “NOT ARMED AND DISABLED”.

P8.1.8 Mechanical Department Tracking and Annual Inspection

A. EOT Devices are tracked by the 5-digit ID number located on the dated ID sticker on each unit.
B. Locomotive Control Units (LCU) are tracked by their serial numbers located on the unit.
C. EOT Unit shall be removed from service and tested for accuracy at least every 368 days.

The 368 days shall not include a shelf life of up to 92 days.

1. Test and inspection of the EOT unit shall be conducted per CFR 49 Part 232.409, and Amtrak SMP 11004.
2. The date and location of the last calibration or test as well as the name of the person performing the calibration or test shall be legibly displayed on a weather resistant sticker or other marking device affixed to the outside of the EOT unit.
D. LCU shall be removed from service and tested for accuracy at least every 360 days.

1. Test and inspection of the LCU shall be conducted per CFR 49 Part 232.409, and Amtrak SMP 11004.
2. The date and location of the last calibration or test as well as the name of person performing the calibration or test shall be legibly displayed on weather resistant sticker or other marking device affixed to the outside of the front unit; however, if the front unit (LCU) is an integral part of the locomotive or is inaccessible, then the information may be recorded on Blue Form/MAP 816 provided that the serial number of the unit is recorded.

P9.0 EQUIPMENT INSTRUCTIONS

See All Operations, Section 9.0 for instructions.
The instructions in this section apply to the following TRAIN MOVEMENTS:

- Freight trains, including work trains, wreck trains and wire trains
- Equipment not in a passenger train which is being moved to or from a repair shop.
NP1.0 GENERAL

See All Operations, Section 1.0 for instructions.

NP2.0 LOCOMOTIVES

See All Operations, Section 2.0 for instructions.

NP3.0 TRAIN MAKE UP

See All Operations, Section 3.0 for instructions.

NP4.0 BRAKE TESTS / EQUIPMENT INSPECTIONS

NP4.1 General

NOTE: When MAP 1173/10C Summary is referenced in these instructions, METROLINK T&E employees will use METROLINK Form SMP 1173.

NP4.1.1 Responsibility

A. Supervisors are jointly responsible with Inspectors, Engineers, Conductors and Assistant Conductors for performing Class I, Class II, Class III and Transfer Train Brake Tests on locomotives and cars.

B. Supervisors are jointly responsible with Inspectors, Engineers, Conductors and Assistant Conductors for detecting defects that can be determined by the Class I, Class II and Class III and Transfer Train Brake Tests.

C. Completion of the Class I brake test must be documented by completion of the MAP 1173/10C Summary. When MAP 1173/10C Summary is not available, a written document must be provided to the engineer containing the information described in Instruction NP4.1.4C.

D. QMI or QP must enter number of cars in “Number of Cars” box and other required information on MAP 1173/10C Summary.

E. A Qualified Person (QP) or Qualified Mechanical Inspector (QMI) may perform a Class I, Class II, Class III and Transfer Train Brake Tests.

F. A Running brake test may only be performed by a Locomotive Engineer.

NP4.1.2 Signal For Brake Application

A. During standing tests, brake must not be applied or released until proper signal is given or a clear understanding is obtained.

NP4.1.3 Condition Of Brakes

A. Non-Passenger trains MUST HAVE at least 85% operative brakes.

B. Non-Passenger trains must have 100% operative brakes on all cars and locomotives at any point where a Class I brake test is performed.

NP4.1.4 Notification Of Completion Of Class I Air Brake Test

A. The Engineer and Conductor will be notified that required air brake test and inspection is complete.

B. Notification must be made by a QMI or QP who participated in the test and inspection.

C. Notification of Class I brake test must be provided to the locomotive engineer on the MAP 1173/10C Summary. When MAP 1173/10C Summary is not available, a written document must be provided to the engineer containing the following information concerning the Class I brake test:

1. All locomotives
2. Date.
3. Time.
4. Number of cars inspected.
5. Name of the Qualified Person who performed the test.
6. Location where test was performed.
7. Total Train Weight and Length.
8. Any special weight distribution requiring special train handling.
9. EOT Tested.

NOTE: Total Train Weight and Length; Any special weight distribution requiring special train handling must be entered in the “Conditions En Route” portion of the MAP 1173/10C Summary or other written document.

D. The notification of Class I brake test, (either MAP 1173/10C Summary or other written
document) once completed, is valid until a train completes its trip.

E. In no case will a train be started until Engineer and Conductor are notified that air brake test and inspection is complete.

F. The Air Brake Inspection and Test Certificate remains valid if any one, or more than one, of the following train consist changes occur:
   1. Adding or removing a block of cars from the head end or rear end of train.
   2. Changing motive power, changing controlling cabs with M.U.’ed locomotives, changing cabs on locomotives with double end control, changing ends on push-pull trains or running around train with locomotive(s).

G. If the controlling locomotive changes and Air Brake and Test Certificate otherwise remains valid, a QMI or QP will “Line Out” the previous controlling locomotive number and write in the new controlling locomotive number.

NP4.1.5 Change Of Crew - Determining Condition of Brakes

A. Prior to change of engine crews, inbound engineer will complete the appropriate portion of the MAP 1173/10C Summary, adjusting for any equipment added or removed:
   1. Locomotive/Cab Car numbers.
   2. Date.
   3. Time.
   4. Number of Cars.
   5. Total train weight and length.
   6. Any special weight distribution requiring special train handling.
   7. Condition of Brakes:
      a. Acceptable – at least 85% operative brakes.
      b. Unacceptable - less than 85% operative brakes - Non-Passenger trains must not proceed with less than 85% operative brakes.
   8. Communication Signal – An operative 2-way radio is considered as an operative communication signal:
      a. Operative
      b. Inoperative

9. Engineer’s Signature.

B. The outbound Engineer and Conductor taking charge of a train will ascertain from incoming engineer and conductor, either personally or by MAP 1173/10C Summary or written document, that the Class I brake test has been performed and the condition of the brakes.

C. Prior to change of engine crew, inbound Engineer will indicate on “Condition En Route” portion of MAP 1173/10C Summary or written document the car numbers and number of control valves/trucks cut out of any equipment with brakes cut out.

Union Pacific
C. On relay trains, Engineer must pass along air brake slip to outbound Engineer.

NP4.2 Train Brake Tests & Inspection

NP4.2.1 Class I Brake Test

A. Test Requirements
   1. Where train is originally assembled (initial terminal).
   2. Where train consist is changed except as indicated below (NP4.2.1A.3).
   3. Test is NOT required when:
      a. Adding previously tested solid block of cars that remains in the same relative order that has NOT been OFF AIR for more than 4 hours.
      b. Removing a car or solid block of cars.
      c. Changing motive power
      d. Removing or changing rear car.
      e. Removing car(s) with air brake defects (inoperative brakes or excessive piston travel).
      f. Any combination of the above occurs.
B. Charging And Inspection - Inspect train brake system to determine that:
1. Apply proper blue signal protection or roadway worker protection (RWP). Secure equipment per Instruction 3.5.
2. Charge system to the pressure which the train will be operated, and the pressure of the rear of the train shall be within 15 psi of the pressure the train will be operated but not less than 75 psi as indicated by an accurate gauge or EOT unit at the rear.
3. All air hoses are coupled and in suitable condition for service.
4. Angle cocks, cut-out cocks, retaining valves and retaining valve pipes (if equipped) are properly positioned and in proper condition for service. All retaining valves must be set in “Direct Exhaust” position during initial terminal brake test.
5. Reservoir drain cocks are closed.
6. Necessary repairs are made to reduce leakage to a minimum.
7. Brake rigging does not bind or foul and all parts of equipment are properly secured.
8. Hand/parking brakes are released unless required.
9. If equipped with operational electro-pneumatic brake, brake circuit cables are properly connected.
10. Each brake disc is free of condemnable defects.

C. Class I Train Brake Test
1. Charge system to the pressure which the train will be operated, and the pressure of the rear of the train shall be within 15 psi of the pressure the train will be operated but not less than 75 psi as indicated by an accurate gauge or EOT unit at the rear.
2. Brake test procedures.
   a. Await signal to apply.
   b. Make 20 psi brake pipe reduction.
   c. After exhaust has stopped, cut out pressure-maintaining feature.
   d. Wait 45 to 60 seconds.
   e. Check brake pipe leakage - not to exceed 5 psi per minute.
   f. Inspector (QP) shall take a position on each side of each car to examine and observe the functioning of all moving parts of the brake system of each car.
   g. Brake rigging shall be secure and not bind or foul.
   h. Determine that brakes apply on each car.
   i. Check piston travel on each car.
   j. Await signal to release.
   k. Release automatic brake.
   l. Cut in pressure maintaining.
   m. Determine that brakes release on each car. A “Roll By” inspection may be used to determine brake release but not exceeding 10 mph.
   n. Qualified Person performing “Roll By” must communicate results of inspection to the engineer.

D. Retest Procedure After Class I Brake Test
1. A car found to have brakes that do not apply during the Class I Brake Test may be retested.
2. Retest brakes per Instruction NP4.2.1C, except brakes must remain applied for no less than 3 minutes on cars being retested.
E. Piston Travel
1. Cars equipped with 8 ½ inch or 10 inch diameter brake cylinders, piston travel shall be within 6 to 9 inches. If piston travel is less than 6 inches or more than 9 inches, it must be adjusted to 7 ½ inches.
2. For cars not equipped with brake cylinders as described above, piston travel shall be within the piston travel stenciled or marked on the car or badge plate.
3. Truck mounted brake cylinders must provide sufficient brake shoe clearance when brakes are released.

F. Test From Yard Plant
1. Engineer's brake valve or standard test device must be used.
2. Test device must be connected to end, which will be nearest controlling locomotive.
3. Brake system charged, tested and inspected per Instructions NP4.2.1B, NP4.2.1C, NP4.2.1D and NP4.2.1E.
4. When road power is coupled, perform a Class III before proceeding.
5. If air supply is disconnected for more than 4 hours, train must again be tested per Instructions NP4.2.1B, NP4.2.1C, NP4.2.1D and NP4.2.1E.
6. If yard test device is less than 80 psi, then a brake pipe leakage test must be conducted when locomotive(s) are coupled per Instruction NP4.2.1C.2.

NP4.2.2 Class II Brake Test
A. Test Requirements
1. Other than where train is originally assembled (initial terminal).
2. Test is required when:
   a. Adding car or solid block of cars that has not previously received a Class I brake test, or
   b. Adding car or solid block of cars that has been OFF AIR for more than 4 hours.
B. Class II Train Brake Test
1. Charge system to the pressure which the train will be operated, and the pressure of the rear of the train shall be within 15 psi of the pressure the train will be operated but not less than 75 psi as indicated by an accurate gauge or EOT unit at the rear.
2. Brake test procedures.
   a. Await signal to apply.
   b. Make 20 psi automatic brake reduction.
   c. After exhaust has stopped, cut out pressure-maintaining feature.
   d. Wait 45-60 seconds.
   e. Check leakage-not to exceed 5 psi per minute.
   f. Determine that brakes apply on each added car.
   g. Await signal to release.
   h. Release automatic brake.
   i. Cut in pressure maintaining.
   j. Determine that brakes release on each added car. A “Roll By” inspection may be used to determine brake release but not exceeding 10 mph.
   k. Qualified Person performing “Roll By” must communicate results of inspection to the engineer.
   l. Ensure brake pipe pressure is being restored at rear of train.
C. Retest Procedure After Class II Brake Test
1. A car found to have brakes that do not apply during the Class II Brake Test may be retested.
2. Retest brakes per Instruction NP4.2.2B, except brakes must remain applied for no less than 3 minutes on cars being retested.
D. Class III brake test may be made at same time added cars are tested.
E. Cars added to the train which have not received a Class I brake test must receive a Class I brake test at the next forward location where facilities are available.

NP4.2.3 Class III Brake Test
A. Required
   1. When locomotive, control stand, caboose, or block of cars are cut off or changed.
   2. After coupling to a previously inspected and tested train which has not been off air for more than 4 hours.
   3. After any emergency brake application.
   4. When indicated by rule or Special Instruction.
   5. When control valve or brakes are cut out.
   6. After determining cause for brake pipe continuity loss (see Instruction NP8.1.2F), make a Class III brake test using Two-Way End-Of-Train device, if equipped.
   7. Any point where a brake pipe angle cock has been turned except when performing the Two-Way-End-Of-Train device emergency function tests.

B. Class III Brake Test Procedure
   1. Charge system to the pressure which the train will be operated, and the pressure of the rear of the train shall be within 15 psi of the pressure the train will be operated but not less than 75 psi as indicated by an accurate gauge or EOT unit at the rear.
   2. Await signal to apply.
   3. 20 psi automatic brake reduction.
   4. Brakes apply on rear car.
   5. Await signal to release.
   6. Brakes release on rear car.
   7. When rear car is equipped with a device (gauge or EOT unit) capable of indicating/displaying brake pipe pressure, device must be used to determine application & release on rear car.

NP4.2.4 Transfer Train Brake Test
A. Movements Not Exceeding 20 Miles
   1. Couple all hoses between all cars.
   2. Charge brake system to not less than 60 psi as indicated by a gauge or EOT unit at the rear.
   4. Determine that brakes apply on each car.
   5. Determine that brakes release on each car.

B. Retest Procedure After Transfer Train Brake Test
   1. A car found to have brakes that do not apply during the Transfer Train Brake Test may be retested.
   2. Retest brakes per Instruction NP4.2.4A, except brakes must remain applied for no less than 3 minutes on cars being retested.

C. Movements Exceeding 20 Miles
   1. Perform Class I brake test

NP4.2.5 Running Brake Test
A. Test Requirements
   1. After leaving initial terminal.
   2. Any point where motive power, engine crew or train crew has been changed.
   3. Any point where a brake pipe angle cock or end cock has been turned.
   4. After any standing air brake test has been made.
   5. After striking debris on tracks.
   6. Electro-pneumatic brake circuit cables between power units and/or cars are disconnected.
   7. Periodically, when communication of the two-way end of train device fails en route.
   8. After test of back-up hose/valve.
   9. When indicated by Special Instructions.
Union Pacific

9. A running test of train air brakes must be made not more than three (3) miles before descending grades of 1.8% or greater.

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9. A running test of train air brakes must be made before descending grades listed in the “GRADE TABLE” below.

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</table>

B. Running Brake Test Procedure

1. Must be made as soon as speed of train permits but not exceeding 20 mph. A Running Brake Test may be made at speeds greater than 20 mph after striking debris, when communication of two-way end of train device fails en route, or indicated by Special Instruction.

2. During test, locomotive and/or dynamic brake MUST NOT be permitted to apply except when locomotive and/or dynamic brake cannot be released due to equipment configuration.

3. Apply train air brakes with sufficient force to ascertain whether or not brakes are operating correctly.

4. If air brakes do not operate properly, train must be stopped, cause of failure ascertained, corrected, Class III and Running Brake Tests repeated.

NP4.2.6 Trainman Test Gauges

A. While on duty, train service, mechanical and engineering employees will have access to a trainman test gauge for determining brake pipe pressure at the rear of a train.

B. Use of trainman test gauge is required when rear car is not equipped with a device (gauge or EOT) capable of indicating/displaying brake pipe pressure.

C. Employees will verify the accuracy of trainman’s test gauge each day, prior to its use, by one of two methods as follows:

1. Locomotive method:
   a. Close angle cock between locomotive and train.
   b. Determine locomotive brake pipe pressure setting from employee operating the controls of the locomotive.
   c. Connect trainman test gauge to end of locomotive not coupled to train and slowly open angle cock.
   d. Verify that pressure indicated by trainman test gauge is within 3 psi of locomotive brake pipe pressure setting.
   e. When trainman test gauge does NOT indicate pressure within 3 psi of locomotive brake pipe pressure setting, gauge must be removed from service and replaced.
f. Accuracy of replacement trainman test gauge must be verified by either the Locomotive or Train Brake Test method.

2. Train Brake Test method:
   a. Determine locomotive brake pipe pressure setting from employee operating the controls of the locomotive prior to opening angle cock between controlling locomotive and train.
   b. Open angle cock between locomotive and train.
   c. Connect trainman test gauge to rear car of train and slowly open angle cock.
   d. **FULLY** charge train until pressure indicated by trainman test gauge is within 3 psi of locomotive brake pipe pressure setting.
   e. When train is **FULLY** charged and trainman test gauge does **NOT** indicate pressure within 3 psi of locomotive brake pipe pressure setting, retest gauge using Locomotive method above.
   f. When trainman test gauge is within 3 psi of locomotive brake pipe pressure setting, proceed with required train brake test.

D. Trainman test gauges that have been damaged must be replaced and verified for accuracy.

### NP4.2.7 Amtrak Car Data Table

<table>
<thead>
<tr>
<th>Car Numbers # Of Cars</th>
<th>Car Type/AMTK</th>
<th>Length (Feet)</th>
<th>Loaded Weight (Tons)</th>
<th>Empty Weight (Tons)</th>
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</thead>
<tbody>
<tr>
<td>11300-11399</td>
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<td>37</td>
<td>77</td>
<td>24</td>
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<tr>
<td>11500-11581</td>
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<td>100</td>
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<td>13028-13039</td>
<td>MAINT OF WAY reel, gons</td>
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<tr>
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<td>GOND. STL FIXED END</td>
<td>200</td>
<td>100</td>
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<td>13900-13904</td>
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<td>3</td>
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<td>13909-13914</td>
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<tr>
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<td>43</td>
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<td>37</td>
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<td>58</td>
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<td>15655-15699</td>
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<td>100</td>
<td>36</td>
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<td>15800-15824</td>
<td>MAINT OF WAY</td>
<td>25</td>
<td>100</td>
<td>36</td>
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<td>Refer to 9.2.3</td>
<td>Superliner I</td>
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<td>80</td>
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</tbody>
</table>

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**Non-Passenger Operations 07/03/2017**
### NP5.0 TRAIN HANDLING

See All Operations, Section 5.0 for Instructions.

### NP6.0 EN ROUTE CONDITIONS

#### NP6.1 General

**NP6.1.1 Inadequate Performance of Train Brakes**

A. If brake performance is found to be inadequate for the brake application made, train must be stopped and a walking inspection of a brake application must be performed to determine cause.

B. If no defects are found, train may proceed, making periodic running brake tests.

C. When equipped with Two-Way End of Train Device, verify changes in brake pipe pressure at rear of train during running brake tests.

#### NP6.1.2 Failure To Maintain Required Pressure

A. If pressure required for safe handling of train cannot be maintained, train must be stopped, secured per Instruction 3.5 and train dispatcher notified.

B. If main reservoir pressure falls below 100 psi, immediately bring train to a safe stop.

C. **NOTE:** If brake pipe pressure falls below 50 psi, you will not be able to transmit an emergency brake application.

#### NP6.1.3 Sticking Brakes

A. Train and engine crews must keep a lookout for brakes sticking on their train and on trains being met or passed.

B. They must advise one another of location in train of cars with sticking brakes.

C. Probable causes of sticking brakes:

1. Hand/parking brakes not fully released.
2. Overcharged brake system.
3. Binding or fouling brake rigging.
4. Retaining valve not in “Release” position.
5. Defective control valve.
6. Excessive brake pipe leakage.
7. Improper handling of ABV.

D. If brakes are stuck from improper handling of ABV, usually an additional heavy automatic brake reduction and release will correct condition.

#### NP6.1.4 If Train Breaks In Two

A. **SHUT DOWN AND ISOLATE HEP IF EQUIPPED, AS SOON AS POSSIBLE.**

B. After train is recoupled and brake system has been recharged, perform a Class III brake test.

C. After proceeding, as soon as speed of train permits, a Running Brake Test must be made.

#### NP6.1.5 Reporting Defects - Report defects per instruction 9.1.1
NP6.1.6 Emergency Brake Application
A. ABV handle initiated
1. Full emergency brake effort must be allowed to apply.
2. Leave handle in “EMERGENCY” until stopped.
3. Ensure throttle is in “IDLE” or “OFF” position.
NOTE: It is acceptable to regulate locomotive brake cylinder pressure from an undesired emergency (UDE) brake application.
B. When equipped with Two-Way End-Of-Train device, engineer or other train crew members must activate the two-way end-of-train device using the “EMERGENCY” toggle switch when any emergency application occurs.
C. Conductor’s valve or back-up hose
1. Open valve quickly.
2. Leave valve open until stopped.
3. Do not attempt to release brakes until stopped.
D. Recovery from emergency brake application after stopping
1. If conditions required use of conductor’s valve, caboose valve or back-up hose, reset it.
2. Move ABV handle to “RELEASE”.
3. Inspect ENTIRE train for derailed cars, shifted loads, etc.
4. Perform a Class III Brake Test.
E. After proceeding, a Running Brake Test must be made.
NP6.1.7 Inoperative Locomotive Dynamic Brake
A. On locomotive so equipped, Engineer will be informed of the operational status of the dynamic brake when first taking charge of the train.
B. If the locomotive is found to have an inoperative dynamic brake reference Instruction 2.2.15.

NP6.2 Movement Restrictions
NP6.2.1 Cars And Locomotives With Operative Brakes
A. Trains must have at least 85% operative air brakes.
B. Determine percent operative brakes by dividing the total number of OPERATIVE control valves in the train by the total number of control valves in the train (see table below).
C. The following table shows the maximum number of cut out control valves to maintain not less than 85% operative brake:
D. Cars with more than one control valve require each control valve to be counted when determining operative brakes.
E. For the purposes of determining operative brakes, a car/locomotive with either or both trucks cut out shall be counted as having its control valve cut out.

<table>
<thead>
<tr>
<th>Control Valves</th>
<th>Number of Control Valves Cut Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 control valves or less</td>
<td>0</td>
</tr>
<tr>
<td>7 - 13 control valves</td>
<td>1</td>
</tr>
<tr>
<td>14 - 19 control valves</td>
<td>2</td>
</tr>
<tr>
<td>20 - 26 control valves</td>
<td>3</td>
</tr>
<tr>
<td>27 - 33 control valves</td>
<td>4</td>
</tr>
<tr>
<td>34 - 39 control valves</td>
<td>5</td>
</tr>
<tr>
<td>40 - 46 control valves</td>
<td>6</td>
</tr>
<tr>
<td>47 - 53 control valves</td>
<td>7</td>
</tr>
<tr>
<td>54 - 59 control valves</td>
<td>8</td>
</tr>
</tbody>
</table>
NP6.2.2 Inoperative Brakes
   A. A car/locomotive with inoperative brakes must not be placed as the rear car of the train.
   B. A train that has air brakes that become inoperative EN ROUTE and complies with NP6.2.1 may proceed to the next repair point where repairs and brake test, if required, can be made. When air brakes become inoperative EN ROUTE, contact CNOC mechanical desk (1800-424-0217) for specific instructions and repair point.
   C. If air brake on rear car becomes totally inoperative (both trucks cut out or control valve cut out) EN ROUTE:
      1. Train may proceed with hand/parking brake manned, to a point where car can be repaired, switched ahead of a car with operative brakes or set out. Train dispatcher must be notified prior to movement of train.
   D. Trains must have NO MORE than two consecutive control valves cut out.
   E. A train must not leave maintenance location with air brakes inoperative on rear car.
   F. A car with an inoperative hand brake must never be the rear car of a train.
   G. Anytime brakes are cut out, perform a Class III brake test and note on MAP 1173/10C Summary or other written document.

NP7.0 TRAIN CONTROL SYSTEMS

See All Operations, Section 7.0 for instructions.

NP8.0 TWO-WAY END-OF-TRAIN DEVICE

NP8.1 Two-Way End-Of-Train Device

NP8.1.1 Device Components
   A. A two-way end-of-train device consists of:
      1. A Locomotive Control Unit (LCU),
      2. An End-of-Train (EOT) Unit,
      3. The ability to monitor various train-related functions,
      4. The ability to initiate an emergency brake application from the rear of the train, and
      5. Satisfies the rear of train marker light requirement.
   B. The LCU:
      1. Consists of a telemetry receiver/transmitter, provides displays and controls in the locomotive cab to monitor and communicate with the associated EOT unit, and,
      2. On G.E. locomotives so equipped, this information is displayed on the Integrated Function Display (IFD) screens.
   C. The EOT:
      1. Consists of a telemetry transmitter/receiver attached to the rear of car coupler and brake pipe,
      2. Transmits information regarding brake pipe pressure, motion, battery condition and marker light status to the associated LCU, and,
      3. Responds to a radio signal command from the LCU to initiate an emergency brake application at the rear of the train.
NP8.1.2 Device Requirements

A. Use the table below to determine when a Non-passenger train is required to be operated with a functioning Two-Way End-of-Train Device.

B. The alternative method to meet the requirement of a functioning Two-Way End-of-Train Device is a caboose, Passenger Carrying Car or other equipment with an emergency brake valve located at the rear of the train and manned by a crew member in radio communication with the controlling locomotive.

<table>
<thead>
<tr>
<th>Step</th>
<th>Determination</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is train weight greater than 4000 tons?</td>
<td>Proceed to Step 3.</td>
<td>Proceed to Step 2.</td>
</tr>
<tr>
<td>2</td>
<td>Will train operate over grade of 2% or more for a distance of 2 continuous miles?</td>
<td>Two-Way EOT or alternative method IS Required.</td>
<td>Proceed to Step 4.</td>
</tr>
<tr>
<td>3</td>
<td>Will train operate over grade of 1% or more for a distance of 3 continuous miles?</td>
<td>Two-Way EOT or alternative method IS Required.</td>
<td>Proceed to Step 5.</td>
</tr>
<tr>
<td>4</td>
<td>Is train classified as a Work Train?</td>
<td>Two-Way EOT or alternative method IS NOT Required.</td>
<td>Proceed to Step 5.</td>
</tr>
<tr>
<td>5</td>
<td>Will speed exceed 30 mph?</td>
<td>Two-Way EOT or alternative method IS Required.</td>
<td>Two-Way EOT or alternative method IS NOT Required.</td>
</tr>
</tbody>
</table>

C. Lite and multiple lite locomotive movements are not required to operate with a Two-Way End-of-Train Device.

D. EN ROUTE Failures:

1. An EN ROUTE failure of the two-way end-of-train device is defined as the inability to initiate an emergency brake application from the rear of the train due to a communication failure or other reasons.

2. A communication failure is considered a loss of communication between the LCU and EOT unit for a continuous period of 16 minutes and 30 seconds.

**NOTE:** On G.E. locomotives so equipped, a communication failure is considered to have occurred when the "ONE WAY NO COMM" alarm light is displayed on the IFD screen for a ten minute duration.

E. Operating Restrictions during EN ROUTE Failure - If a train which is required to have a two-way end-of-train device experiences an EN ROUTE failure:

1. The train may proceed, not exceeding 30 mph, to the next location where repairs can be made or an alternative method of operation is achieved (See Instruction NP8.1.2B), AND

2. Train must not descend a section of track on which the average grade is 2% or greater over a distance of two continuous miles until:
   a. An operable two-way end-of-train device is installed, or,
   b. An alternative method of initiating an emergency brake application from the rear of the train is achieved (See Instruction NP8.1.2B).
F. When brake pipe continuity is lost, as indicated by any of the following, stop train immediately and determine the cause:
1. Low air audible alarm and low air indicator light.
2. No increase or decrease in brake pipe pressure at rear of train in response to movement of the ABV handle.
3. “0” or “***” brake pipe pressure at rear of train.
4. After determining cause for brake pipe continuity loss, perform a Class III Brake Test using two-way end-of-train device.

NOTE: Determine the cause of loss of continuity by inspecting train brake pipe for air loss and angle cocks/cut-out cocks for proper positioning.

G. Marker Light failure does not render the two-way end-of-device inoperative. If the EOT marker light fails, train may proceed to the next designated terminal for repair. If repairs cannot be made, a portable marker must be placed on rear of train.

H. Circumstances requiring emergency application Using Two-Way End-Of-Train Device:
1. Whenever it becomes necessary to place the train air brakes in emergency using either the ABV handle or the emergency brake valve, engineer or other train crew members must also activate the two-way end-of-train device on trains equipped with the device, using the “emergency” toggle switch.
2. The two-way end-of-train device must also be activated whenever an undesired emergency application of the train air brakes occurs.

NP8.1.3 Set Up And Arming The System
A. This procedure requires two individuals; one each positioned at the EOT and the LCU/IFD.
B. Once the EOT Unit ID Code Number is communicated to the individual positioned at the LCU/IFD, it is entered either:
   1. On the LCU using the thumbwheel, or,
   2. On the IFD using the “F” keys by:
      a. Pressing F1-F5 selecting unit ID. code, then,
      b. Pressing F6 “ENTER CODE” key, then,
      c. Pressing F7 “COMM TEST” key, and,
      d. Verifying “COMM TEST PASSED” message is displayed.
3. Press “TEST” button on the EOT to effect “ARM NOW” message on the LCU/IFD display, then immediately press either the:
   a. “Communication Test/Arm” button on the LCU, or,
   b. F7 “Arm Two-Way” key on the IFD screen.
C. The device is ARMED when either the:
   a. LCU displays “ARMD” and the “EMERG ENABLED” LED is lit, or,
   b. IFD screen displays “ARMED AND ENABLED”.

NP8.1.4 Two-Way End-Of-Train Device
Emergency Function Test
A. Test must be conducted at point of installation or whenever the LCU or EOT is changed.
B. Brake pipe readouts between the LCU and EOT must be compared for accuracy.
C. Brake pipe pressure as indicated on LCU must be within 3 psi of that indicated on EOT device or a properly calibrated air gauge.
D. Test Procedure:
   1. Charge train to within 15 psi of regulating valve setting.
2. Close angle cock between the last car and the EOT.
3. Initiate two-way end-of-train device emergency brake application from locomotive cab using emergency toggle switch.
4. EOT must vent a brief exhaust of air.
5. Press EOT test button to verify brake pipe pressure is "0".
6. Allow approximately 60 seconds for EOT to reset.
7. Slowly open angle cock between last car and EOT.
8. If EOT fails to respond to an LCU-initiated emergency signal after two attempts, the two-way end-of-train device is considered inoperative, until repaired or replaced and retested.
9. Add info to MAP 1173/10C Summary.

NP8.1.5 Class III Brake Test Using Two-Way End-Of-Train Device
A. The two-way end-of-train device must be utilized to perform the Class III Test.
B. Test Procedure:
   1. Observe the display on the LCU/IFD for continuous readout of brake pipe pressure from the EOT unit.
   2. Charge system to required pressure.
   3. Make a 20 psi brake pipe reduction.
   4. Observe appropriate LCU/IFD indications for brake pipe reduction on last car of train.
   5. Release brakes.
   6. Observe appropriate LCU/IFD indications for brake pipe pressure increase on last car of train.
   7. Notify conductor that test was successful.

NP8.1.6 EOT Battery
A. The following indications pertain to the condition of the EOT battery:
   1. LCU Messages:
      a. "DEAD BAT" (Dead Battery)

   b. "REPL BAT" (Replace Battery)

   2. IFD Screen:
      a. "EOT BATTERY" Yellow (Weak)
      b. "EOT BATTERY" Red (Dead)

B. Replacement procedure:
   1. Ensure replacement EOT battery is charged.
   2. Remove EOT battery hasp securing device.
   3. Unlatch battery compartment door.
   4. Pull battery straight out.
   5. Fit replacement battery into the enclosure cavity, aligning the connectors.
   6. Push battery fully into the enclosure, then latch and secure battery compartment door.

NP8.1.7 Disarming Two-Way End-Of-Train Device
A. Armed two-way end-of-train device must be disarmed when:
   1. Either the EOT or LCU is changed, and/or,
   2. When train arrives at its final terminal.
B. Disarming Procedure using LCU:
   1. Set all thumbwheel numbers to "0", and,
   2. Press "Communications Test/Arm" button.
C. Disarming Procedure using IFD:
   1. From IFD EOT setup screen, press F6 "EOT 00000" key, and,
   2. Immediately press F7 "DISARM TWO WAY" key.
D. The system is disarmed when either:
   1. LCU displays "DISARMD", and "EMERG ENABLED" LED is off, or,
   2. IFD screen displays "NOT ARMED AND DISABLED".

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Non-Passenger Operations 07/03/2017
NP8.1.8 Mechanical Department Tracking and Annual Inspections

A. EOT Devices are tracked by the 5-digit ID number located on the dated ID sticker on each unit.

B. Locomotive Control Units (LCU) are tracked by their serial numbers located on the unit.

C. EOT Unit (Rear Unit) shall be removed from service and tested for accuracy at least every 368 days. The 368 days shall not include a shelf life of up to 92 days.
   1. Test and inspection of the Rear Unit shall be conducted per CFR 49 Part 232.409, and Amtrak SMP 11004.
   2. The date and location of the last calibration or test as well as the name of the person performing the calibration or test shall be legibly displayed on a weather resistant sticker or other marking device affixed to the outside of the rear unit.

D. LCU shall be removed from service and tested for accuracy at least every 360 days.
   1. Test and inspection of the LCU shall be conducted per CFR 49 Part 232.409, and Amtrak SMP 11004.
   2. The date and location of the last calibration or test as well as the name of person performing the calibration or test shall be legibly displayed on weather resistant sticker or other marking device affixed to the outside of the front unit; however, if the front unit (LCU) is an integral part of the locomotive or is inaccessible, then the information may be recorded on Blue Form/MAP 816 provided that the serial number of the unit is recorded.

NP9.0 EQUIPMENT INSTRUCTIONS

See All Operations, Section 9.0 for instructions.
# Tables and Forms

## Locomotive

<table>
<thead>
<tr>
<th>Form:</th>
<th>Description:</th>
<th>Example on: AMT-3 Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP 100 (NRPC 2947)</td>
<td>Equipment Condition Report</td>
<td>143,144</td>
</tr>
<tr>
<td>MAP 101 (NRPC 2961)</td>
<td>Daily Inspection Record</td>
<td>145</td>
</tr>
<tr>
<td>MAP 1171 (NRPC 2949)</td>
<td>Non-Complying Locomotive Tag</td>
<td>146</td>
</tr>
<tr>
<td>NRPC 3129</td>
<td>Inoperative Dynamic Brake Tag</td>
<td>146</td>
</tr>
<tr>
<td>MARC ECR 100</td>
<td>Equipment Condition Report</td>
<td>150</td>
</tr>
<tr>
<td>METROLINK SMP 100</td>
<td>Equipment Condition Report</td>
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<td>METROLINK SMP 101</td>
<td>Daily Inspection Record</td>
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<tr>
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<td>Non-Complying Locomotive Tag</td>
<td>154</td>
</tr>
<tr>
<td>Table A</td>
<td>Air Brake Handle Positions &amp; Cut-Outs</td>
<td>158</td>
</tr>
<tr>
<td>Table B</td>
<td>Locomotive M.U., Main Reservoir and Brake Pipe Hose Connections</td>
<td>159</td>
</tr>
</tbody>
</table>

## Car / Train

<table>
<thead>
<tr>
<th>Form:</th>
<th>Description:</th>
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<tr>
<td>MAP 1173/10C Summary (NRPC 3294)</td>
<td>Class I Brake Test and Calendar Day Inspection Report</td>
<td>147,148</td>
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<tr>
<td>MAP 21A (NRPC 2775)</td>
<td>Car Defect Report</td>
<td>151</td>
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<tr>
<td>NRPC 3128</td>
<td>Defective Seats, Doors &amp; Toilets Tag (Out Of Service Tag)</td>
<td>152</td>
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<tr>
<td>MARC ECR 1173/10C</td>
<td>Class I Brake Test and Calendar Day Inspection Report</td>
<td>149</td>
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<td>Class I Brake Test and Calendar Day Inspection Report</td>
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<td>Car Defect Report</td>
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<td>METROLINK SMP 175</td>
<td>Defective Door Tag</td>
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<td>Car Out Of Service Tag</td>
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<td>Table C</td>
<td>Passenger Standing Air Brake Test Table</td>
<td>160</td>
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</table>
## Locomotive Number:

Each Locomotive Unit and Cab Car shall be inspected in accordance with CFR 49 Part 229.21 and 236.587 and MAP 101 must be signed. Use separate form for each unit in consist.

### Daily Mechanical Inspection

<table>
<thead>
<tr>
<th>Signature</th>
<th>Occupation</th>
<th>Location</th>
<th>Date</th>
<th>Time</th>
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### Locomotive Calendar Day Air Brake Test

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### Train Control Test

<table>
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<th>Train Type</th>
<th>Switch</th>
<th>Cut-out cock</th>
<th>Date</th>
<th>Time</th>
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<table>
<thead>
<tr>
<th>ACSES</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<tr>
<td>Cab Signal</td>
<td>ITCS/XITCS</td>
<td>IITS</td>
<td>I-ETMS Penalty Brake</td>
<td>I-ETMS Emergency</td>
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### Supervisor approving unit for service and all work complete

<table>
<thead>
<tr>
<th>Signature</th>
<th>Occupation</th>
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<th>Time</th>
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### Failure En Route / Equipment Condition

<table>
<thead>
<tr>
<th>E Initial</th>
<th>Repaired by</th>
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</table>

### Signature of Locomotive Engineer

<table>
<thead>
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AMT-3 Page 143 of 165
Tables & Forms 07/03/2017
### Daily Mechanical Inspection

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### Locomotive Calendar Day Air Brake Test

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<th>R-End</th>
<th>ECP</th>
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### Train Control Test

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<table>
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<tr>
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### Train Type

- ACSES
- A
- B
- C
- D
- E

<table>
<thead>
<tr>
<th>Switch</th>
<th>Cut-out cock</th>
<th>Date</th>
<th>Time</th>
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### Failure En Route / Equipment Condition

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### Failure En Route

- Equipment Condition

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<tr>
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</table>

### Supervisor approving unit for service and all work complete

<table>
<thead>
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<th>Occupation</th>
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<th>Date</th>
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### Signature of Locomotive Engineer

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<tr>
<th>Location</th>
<th>Date</th>
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<td>32</td>
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<td>34</td>
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</table>
### MAP 101

**NATIONAL RAILROAD PASSENGER CORPORATION**
**FRA RULE NO. 229 INSPECTION RECORD**

**Unit No.**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>LOCATION</th>
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**DIESEL LOCOMOTIVES TAKE ENGINE LUBE OIL SAMPLE EVERY 15 DAYS**

**DIESEL LOCOMOTIVES TAKE ENGINE LUBE OIL SAMPLE EVERY 15 DAYS**

**DIESEL LOCOMOTIVES TAKE ENGINE LUBE OIL SAMPLE EVERY 15 DAYS AND GEARBOX AND AIR COMPRESSOR AT 45TH DAY**

**DIESEL LOCOMOTIVES TAKE ENGINE LUBE OIL SAMPLE EVERY 15 DAYS**

---

### MAP 101 (NRPC 2961B)

**FRA Rule No. 229 Inspection Record - MAP 101 - 184**

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Date and Time</th>
<th>Location</th>
<th>Signature</th>
<th>QMI</th>
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</tbody>
</table>

**Instructions:**
- A Locomotive must be inspected each calendar day it is used.
- After performing a daily inspection, enter the Date, Time, and Location in the next available space on the form.
- Sign the form legibly.
- The "QMI" column is for Mechanical Personnel Only. Transportation Department personnel should leave it blank.

---

NRPC 2961 B (Rev 8/2015)

Amtrak is a registered service mark of the National Railroad Passenger Corporation.

---

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Tables & Forms 07/03/2017
# MAP 1173/10C SUMMARY

## MAP 1173 - Class I Train Brake Test/Lite Locomotive Consist Brake Test

<table>
<thead>
<tr>
<th>Controlling Locomotive</th>
<th>Loco #</th>
<th>Loco #</th>
<th>Loco #</th>
<th>Cab Car #</th>
<th>Number of Cars</th>
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<tbody>
<tr>
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**Date**

<table>
<thead>
<tr>
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<th>AM/PM</th>
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**Location**

<table>
<thead>
<tr>
<th>AM/PM</th>
<th>AM/PM</th>
</tr>
</thead>
</table>

**Select Volume Position**

- Cab 1
- N/A
- Cab 2

**Communication Signal**

- Operative
- Inoperative

**Train Set For**

- Detachable
- Non-Detach

**EOTDN**

**Date of Test**

<table>
<thead>
<tr>
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**End of Train Device**

<table>
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<tr>
<th>AM/PM</th>
<th>AM/PM</th>
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</thead>
</table>

**Signature**

Class 1 Brake Test / Lite Locomotive Consist Brake Test has been performed in accordance with AMT-3 Instructions 2.16, P4.2.1, or NP 4.2.1.

## Tables & Forms

### 10C Summary - Passenger Car Daily Inspection

<table>
<thead>
<tr>
<th>Inspector/F/C-1:</th>
<th>Inspector/F/C-1:</th>
<th>Inspector/F/C-1:</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

### 1C-1 - Class I Brake Test

**Exterior Inspection (QP)**

**Interior Inspection (QP)**

Note: On specific with Train #, Car #, & Defects, listing location, e.g., "AA" and "BB" and Upper level, etc. Also try to identify exact problem defects. See examples below.

**State/Loc No.:**

- Won't open or close
- Blockard/lock

**End Doors:**

- Won't open or close
- Broken

**PA/Intercom Sys:**

- Inoperative
- Too loud/soft

**Air Compressor:**

- Inoperative
- Low Air Pressure

**Dynamic Brake:**

- Inoperative
- Cutout

**Car #/Loco #**

<table>
<thead>
<tr>
<th>Defects</th>
<th>Repairs Made</th>
<th>Date Repairs Completed</th>
<th>Signature</th>
</tr>
</thead>
</table>

Car(s) above Have No Operating Restrictions

Car(s) above Have Operating Restrictions. Continue listing on back of this form if more entries are required. Supervisor Signature

PRA Rule 207 requires that interior side doors, end doors, PA/Intercom systems, air compressors & dynamic brakes be repaired in writing to the train's crew. This form, MAP1173/10C Summary, and PRMC 3047

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Tables & Forms 07/03/2017
### Class I Brake Test and Calendar Day Inspection

**ECR 1173 – Class I Brake Test**

<table>
<thead>
<tr>
<th>Class I Brake Test has been satisfactorily completed as required by 49CFR§238.313 or Initial Terminal Test required by 49CFR§232.205</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlling Location:</td>
</tr>
<tr>
<td>Cab Car#:</td>
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<tr>
<td>Number of Cars:</td>
</tr>
<tr>
<td>Train set for:</td>
</tr>
<tr>
<td>Graduated Release</td>
</tr>
<tr>
<td>Location:</td>
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<td>Time (MM/DD/YY):</td>
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<td>Time (HH/MI):</td>
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</tbody>
</table>

**Class I Brake Test – Additional Inspection has been satisfactorily completed as required by 49CFR§238.313(b). This portion need only be filled out if the Additional (6 day) Inspection was performed, otherwise it should be left blank.**

| Location: |
| Time (MM/DD/YY): |
| Time (HH/MI): |

#### Condition of Equipment – To be completed by Engineer:

| Car # | Car # | Car # | Car # | Car # | Car # | Car # | Car # | Car # | Car # | Condition of Brakes | Date (MM/DD/YY) | Time (HH/MI) | Engineer’s Signature |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [ ] ACCEPTABLE | [ ] UNACCEPTABLE | [ ] OPERATIVE | [ ] IMPERATIVE |
| [ ] ACCEPTABLE | [ ] UNACCEPTABLE | [ ] OPERATIVE | [ ] IMPERATIVE |
| [ ] ACCEPTABLE | [ ] UNACCEPTABLE | [ ] OPERATIVE | [ ] IMPERATIVE |
| [ ] ACCEPTABLE | [ ] UNACCEPTABLE | [ ] OPERATIVE | [ ] IMPERATIVE |

#### ECR 10C Summary – Passenger Car Calendar Day Inspection

Following vehicles have received an Interior and Exterior Calendar Day Mechanical Inspection as required by 49CFR§238.303 and 238.305.

<table>
<thead>
<tr>
<th>Car #</th>
<th>Car #</th>
<th>Car #</th>
<th>Car #</th>
<th>Car #</th>
<th>Car #</th>
<th>Car #</th>
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</thead>
<tbody>
<tr>
<td>Location:</td>
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<td>Time (MM/DD/YY):</td>
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<tr>
<td>Time (HH/MI):</td>
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</tr>
</tbody>
</table>

**Interior Calendar Day Inspection**

**Exterior Calendar Day Inspection**

**Inspector:** I/E

**Inspector:** I/E

**Following vehicles were added after departing the consists originating terminal per 49CFR§238.303(a)(4) and 238.305:**

<table>
<thead>
<tr>
<th>Car #</th>
<th>Location of Trip</th>
<th>Date</th>
<th>Time</th>
<th>Inspection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/E/C-1/A4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/E/C-1/A4</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1/E/C-1/A4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/E/C-1/A4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Vehicle (s) were added; Number of Cars in Train Validated By:**

#### EDR - EQUIPMENT DEFECT REPORT

The Vehicles listed below have the following defects and May Cause Operating Restrictions, continue listing on back of this form if more entries are required.

<table>
<thead>
<tr>
<th>Prime Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR EQUIPMENT</td>
</tr>
<tr>
<td>AIR CONDITIONING</td>
</tr>
<tr>
<td>PRIME MOVER</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vehicle #</th>
<th>Prime Systems</th>
<th>Description of Defects</th>
<th>Reported By</th>
<th>Required By</th>
</tr>
</thead>
</table>

**White Copy – Retain in Cab**

**Yellow / Pink Copy – Retain in Location Performing the Inspection**

**Copy must be retained for a minimum of one year.**
### Locomotive Calendar Day Mechanical Inspection

Daily Inspection has been satisfactorily completed as required by 49CFR1230.21

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Location</th>
<th>Date (MM/DD/YY)</th>
<th>Time (H/M/M)</th>
</tr>
</thead>
</table>

### Locomotive Air Brake Departure Test

Locomotive Departure Test has been satisfactorily completed.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Location</th>
<th>Date (MM/DD/YY)</th>
<th>Time (H/M/M)</th>
</tr>
</thead>
</table>

## SEAL NUMBERS

<table>
<thead>
<tr>
<th>ATC Pneumatic</th>
<th>ATC Electric</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-ETMS / ACSES Pneumatic</td>
<td>I-ETMS / ACSES Electric</td>
</tr>
<tr>
<td>Overspeed Pneumatic</td>
<td>PTC Horn</td>
</tr>
<tr>
<td>Alerter Pneumatic</td>
<td>Alerter Electric</td>
</tr>
<tr>
<td>Door Override Switch</td>
<td>Speedometer</td>
</tr>
</tbody>
</table>

### Cab Signal / PTC Daily or After Trip Test

Cab Signal / PTC Daily or After Trip Test has been satisfactorily completed as required by 49CFR1230.586

<table>
<thead>
<tr>
<th>Cab Signal or After Trip Test</th>
<th>I-ETMS Daily or After Trip Test</th>
<th>ACSES Daily or After Trip Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] PASS</td>
<td>[ ] PASS</td>
<td>[ ] PASS</td>
</tr>
<tr>
<td>[ ] FAIL</td>
<td>[ ] FAIL</td>
<td>[ ] FAIL</td>
</tr>
<tr>
<td>[ ] N/A</td>
<td>[ ] N/A</td>
<td>[ ] N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Location</th>
<th>Date (MM/DD/YY)</th>
<th>Time (H/M/M)</th>
</tr>
</thead>
</table>

### Condition of Equipment – To be completed by Engineer

<table>
<thead>
<tr>
<th>Speed Indicator</th>
<th>Radio</th>
<th>Cab Signals</th>
<th>Brake Pipe Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEPI</td>
<td>Sanders</td>
<td>Spaced Control</td>
<td>PSI</td>
</tr>
<tr>
<td>Dynamic / Blended Brake</td>
<td>Crossing Roll</td>
<td>Deadman / Alerter</td>
<td>Main Reservoir Pressure</td>
</tr>
<tr>
<td>Brakes &amp; Filling</td>
<td>Horn</td>
<td>Wipers</td>
<td></td>
</tr>
</tbody>
</table>

### EDR – Equipment Defect Report

The vehicles listed below have the following defects and May Cause Operating Restrictions, continue listings on back of this form if more entries are required.

<table>
<thead>
<tr>
<th>Prime System</th>
<th>Defect Description</th>
<th>Reported By</th>
<th>Repaired By</th>
</tr>
</thead>
</table>

The above work has been performed, except as noted, the report is approved and the locomotive is available for service.

<table>
<thead>
<tr>
<th>Signature of Locomotive Engineer</th>
<th>Location</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

White Copy – Return in Cab  Yellow Copy – Return in Location Performing the Inspection

Copy must be retained for a minimum of one year.

ECR-100

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Tables & Forms 07/03/2017
## MAP 21A FORM

<table>
<thead>
<tr>
<th>Inbound Train #</th>
<th>Date</th>
<th>Defect Description</th>
<th>Action Taken</th>
<th>By (Initials)</th>
<th>WMS W.O.#</th>
<th>LOC</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

### Notes:
- White – Retained at Facility Completing Repair
- Yellow – Conductor
- Pink – Retain in Book

NRPC 2775 (03/03)

Amtrak is a registered service mark of the National Railroad Passenger Corporation.
Amtrak
OUT OF SERVICE
Do not use!

Date: / / Location:

Time: ☐ AM ☐ PM Train:

NRPC 3128
### METROLINK SMP 101

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>LOCATION</th>
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</table>

**Diesel Locomotives Take Engine Lube Oil Sample Every 15 Days**

**Diesel Locomotives Take Engine Lube Oil Sample Every 15 Days**

**Diesel Locomotives Take Engine Lube Oil Sample Every 15 Days and Gearbox and Air Compressor at 45th Day**

**Diesel Locomotives Take Engine Lube Oil Sample Every 15 Days**

**THIS RECORD CARD TO BE CARRIED IN LOCOMOTIVE**

---

### METROLINK SMP 130

**NON-COMPLYING LOCOMOTIVE**

Locomotive Number
Inspecting Carrier
Inspection Location
Date
Defect(s)

Movement Restrictions

Destination

Signature

Original - Engineer, 1st Copy - File, Hard Copy - Locomotive
FRA Rule 229.9
# Southern California Regional Rail Authority

## Class I Brake Test and Inspection Certificate

**SMP 1173**

<table>
<thead>
<tr>
<th>Locomotive Number: SCAX-</th>
<th>Position in Consist:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lead</td>
<td>Trail</td>
</tr>
</tbody>
</table>

Each locomotive unit shall be inspected in accordance with CFR title 49 parts 220.21 and 228.589.

Cab Card SMP 101 must be signed.

**Employee Making Daily Inspection**

<table>
<thead>
<tr>
<th>Employee #</th>
<th>Occupation</th>
<th>Place</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**Class 1 Brake Test**

Class 1 Brake Test has been satisfactorily performed as required by CFR 49 Part 228.313 or 252.42 for freight/work trains.

<table>
<thead>
<tr>
<th>Employee Performing Test</th>
<th>Employee #</th>
<th>Occupation</th>
<th>Place</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Loco#</th>
<th>Loco#</th>
<th>Loco#</th>
<th>Cab Car#</th>
<th>Number of Cars</th>
</tr>
</thead>
</table>

**Exterior & Interior Inspection**

Following equipment has received an Exterior and Interior Calendar Day Mechanical Inspection as required by CFR 49 Part 228.205 and 228.365.

<table>
<thead>
<tr>
<th>Cars#</th>
<th>Cars#</th>
<th>Cars#</th>
<th>Cars#</th>
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<th>Cars#</th>
<th>Cars#</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYEE PERFORMING EXTERIOR INSPECTION</td>
<td>EMPLOYEE #</td>
<td>Occupation</td>
<td>Place</td>
<td>Date</td>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMPLOYEE PERFORMING INTERIOR INSPECTION</td>
<td>EMPLOYEE #</td>
<td>Occupation</td>
<td>Place</td>
<td>Date</td>
<td>Time</td>
<td></td>
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</tr>
</tbody>
</table>

**Communications System:**

- [ ] Operative
- [ ] Inoperative

**Train Set For:**

- [ ] Graduated Release
- [ ] Direct Release

**Class 1A Brake Test**

Class 1A Brake Test has been satisfactorily performed as required by CFR 49 Part 228.313.

<table>
<thead>
<tr>
<th>Employee Performing Test</th>
<th>Employee #</th>
<th>Occupation</th>
<th>Place</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**ATS Departure Test**

<table>
<thead>
<tr>
<th>Employee Performing Test</th>
<th>Employee #</th>
<th>Occupation</th>
<th>Place</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**ATS Departure Test**

<table>
<thead>
<tr>
<th>Employee Performing Test</th>
<th>Employee #</th>
<th>Occupation</th>
<th>Place</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**PTC Departure Test**

<table>
<thead>
<tr>
<th>Employee Performing Test</th>
<th>Employee #</th>
<th>Occupation</th>
<th>Place</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**Seal Numbers**

- ATS
- ALERTOR
- PTC PNEUMATIC PENALTY
- PTC EMERGENCY
- PTC PENALTY
- PTC HORN
- EVENT RECORDER
- SPEEDOMETER OVERRIDE
- DOOR OVERRIDE
- ZERO SPREAD
- HORN

---

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Tables & Forms 07/03/2017
# CAR MAINTENANCE TASKS

| Car Number | 133975 |

<table>
<thead>
<tr>
<th>Date</th>
<th>Train Number</th>
<th>Task (Defect)</th>
<th>Corrective Action</th>
<th>Employee Signature</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Report all Defects and Corrective Action on SMP Form 101

SMP FORM 129
DOOR OUT OF SERVICE

PUERTA FUERA DE SERVICIO

CAR OUT OF SERVICE
DO NOT OCCUPY
FOR EMERGENCY EXIT ONLY

VEHICULO FUERA DE SERVICIO
FAVOR DE NO OCUPAR
PARA SALIDA DE EMERGENCIA SOLAMENTE
# TABLE A - AIR BRAKE HANDLE POSTIONS & CUT-OUTS

<table>
<thead>
<tr>
<th>Control Stand set up</th>
<th>ABV Handle</th>
<th>ABV Cut Off Valve</th>
<th>IBV Handle</th>
<th>MU 2 MU 2A</th>
<th>Dual Ported Cut-Out Cock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single / Leading</td>
<td>Full Service</td>
<td>FRT / Pass / In</td>
<td>Fully Applied</td>
<td>Lead/Dead</td>
<td>In/Open</td>
</tr>
<tr>
<td>Push</td>
<td>Handle Off</td>
<td>Out</td>
<td>Release</td>
<td>Lead/Dead</td>
<td>In/Open</td>
</tr>
<tr>
<td>Trailing a No. 24, No. 26 or No. 30 CDW</td>
<td>Handle Off</td>
<td>Out</td>
<td>Release</td>
<td>Trail 24/26 or Trail 26</td>
<td>Out/ Closed</td>
</tr>
<tr>
<td>Towed MU. Hoses Not Connected</td>
<td>Handle Off</td>
<td>Out</td>
<td>Release</td>
<td>Lead or Dead</td>
<td>In/Open</td>
</tr>
</tbody>
</table>

* - Locomotives equipped with CCB brake, this is a switch instead of a valve.
** - If equipped
Table B – Locomotive Air Hose Connections

Brake Pipe and Main Reservoir must always be connected and cut in between the equipment listed below.

<table>
<thead>
<tr>
<th>LEAD TRAIL</th>
<th>ACS-64 / SC-44</th>
<th>HHP-8</th>
<th>HST</th>
<th>P-42 / Diesel</th>
<th>CAB CAR</th>
<th>NPCU</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS-64 / SC-44</td>
<td>ALL</td>
<td>Actuating Application &amp; Release</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
</tr>
<tr>
<td>HHP-8</td>
<td>Actuating Application &amp; Release</td>
<td>ALL</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Actuating Application &amp; Release</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Actuating Application &amp; Release</td>
</tr>
<tr>
<td>HST</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Brake Pipe Main Reservoir only</td>
</tr>
<tr>
<td>P-42 / Diesel</td>
<td>ALL</td>
<td>Actuating Application &amp; Release</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
</tr>
<tr>
<td>CAB CAR</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Brake Pipe Main Reservoir only</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
<td>Brake Pipe Main Reservoir only</td>
</tr>
<tr>
<td>NPCU</td>
<td>ALL</td>
<td>Actuating Application &amp; Release</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
<td>Brake Pipe Main Reservoir only</td>
<td>ALL</td>
</tr>
</tbody>
</table>
### Table C - Passenger Standing Air Brake Test Table

<table>
<thead>
<tr>
<th>Train Air Brake Test instructions apply to all movements which are considered <strong>Train Movements (see definition)</strong></th>
<th>Class I</th>
<th>Class IA</th>
<th>Class II</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter and Short Distance Intercity passenger trains - Once each calendar day.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Distance Intercity passenger trains - Prior to departure at initial terminal.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Distance Intercity passenger trains - Every 1500 miles or once each calendar day, whichever occurs first.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter and Short Distance Intercity passenger trains which have not been used in passenger service for more than 12 hours since the last Passenger-Class I brake test, unless MAP 1173/10C Summary indicates that Class IA brake test has been performed.</td>
<td></td>
<td>X</td>
<td></td>
<td>Not necessary to perform Class IA test on entire train; only added equipment. Class II test is required on entire train. Both tests may be performed at the same time.</td>
</tr>
<tr>
<td>When instructed to add (pick up) Passenger Equipment without an accompanying MAP 1173/10C Summary.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When instructed to add (pick up) Passenger Equipment accompanied by a MAP 1173 and it cannot be determined whether equipment has been &quot;Off Air&quot; for more than 4 hours.</td>
<td>X</td>
<td></td>
<td></td>
<td>Not necessary to perform Class IA test on entire train; only added equipment. Class II test is required on entire train. Both tests may be performed at the same time.</td>
</tr>
<tr>
<td>When equipment will be moved between the maintenance facility and originating passenger terminal without a MAP 1173/10C Summary.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When Class I brake test has expired on a Commuter or Short Distance Intercity passenger train and Mechanical Department personnel are not available to perform test.</td>
<td>X</td>
<td></td>
<td></td>
<td>Train may only be moved in passenger service to the next location where passengers can be safely detrained.</td>
</tr>
<tr>
<td>When instructed to add (pick up) Passenger Equipment accompanied by a MAP 1173/10C Summary and it is known that equipment was connected to a source of compressed air within the last 4 hours.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whenever the control stand or controlling locomotive is changed.</td>
<td>X</td>
<td></td>
<td></td>
<td>When controlling locomotive is changed, perform required Locomotive Brake Test.</td>
</tr>
<tr>
<td>When the Engineer first takes charge of the train without face to face relief.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When cars or equipment are removed from a passenger train.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After any emergency application of the brakes on a passenger train, except when testing the back-up hose.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After determining cause for brake pipe continuity loss. Use EOT to perform test.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When control valve or brakes are cut out</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When indicated by rule or special instruction</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At any point where a brake pipe angle cock has been turned except when performing the two-way-end-of-train device emergency function test.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mechanical Standards

MS 1.0 Piston Travel - Shoe/Pad Clearances

NOTE: These instructions apply to mechanical employees only.

<table>
<thead>
<tr>
<th>MS1.1 Amtrak Required Piston Travel for Locomotives / NPCU Cab Cars:</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-40, GP-40, GP-15, GP-38, F-59, Dash - 8, NPCU.</td>
</tr>
<tr>
<td>2-1/2” – 3-1/2”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MS1.1A. Amtrak required tread brake unit and disc pad clearances for locomotives:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHP-8 and ACS-64 Disc Brake.</td>
</tr>
<tr>
<td>Approximately 1/32” to 3/16”</td>
</tr>
<tr>
<td>HHP-8 Tread Brake Units.</td>
</tr>
<tr>
<td>Approximately 1/4” to 1/2”</td>
</tr>
<tr>
<td>P40BH, P-42 and P32ACDM (Genesis Series)</td>
</tr>
<tr>
<td>Tread Brake Units.</td>
</tr>
<tr>
<td>1/4” to 3/8”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MS1.2 Piston Travel Shoe/Pad Clearances – All Cars:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS1.2A: For vehicles equipped with nominal 12 inch stroke (8-1/2 or 10 inch diameter) car body mounted brake cylinders, piston travel shall be within 6 to 9 inches. If piston travel is found to be less than 6 inches or more than 9 inches, it must be adjusted to nominally 7-1/2 inches.</td>
</tr>
<tr>
<td>MS1.2B: For vehicles equipped with other than nominal 12 inch stroke (8-1/2 or 10 inch diameter) car body mounted brake cylinders, piston travel shall be adjusted per the brake cylinder piston travel stencil, decal, badge plate, or sticker located on the car.</td>
</tr>
<tr>
<td>MS1.2C: Amtrak Required Piston Travel for Passenger Cars:</td>
</tr>
<tr>
<td>Heritage Fleet / Truck Mounted Tread Brakes</td>
</tr>
<tr>
<td>Bi - Level Auto Carriers</td>
</tr>
<tr>
<td>3-1/2” to 4”</td>
</tr>
<tr>
<td>7” to 7-1/2”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MS1.2D: Amtrak Required Tread Brake Unit Maximum Clearance for Passenger Cars:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amfleet I, II, 1500/16800 MHC with WABCO GB- 4-1/2 Tread Brake Unit. Viewliner II (LDSL) with WABCO GB- 12 Tread Brake Unit</td>
</tr>
<tr>
<td>3/4”</td>
</tr>
<tr>
<td>Capitoliner Cab Cars. with WABCO GJ - 5 Tread Brake Unit</td>
</tr>
<tr>
<td>3/4”</td>
</tr>
<tr>
<td>Superliner I, Knorr or SAB units</td>
</tr>
<tr>
<td>5/8”</td>
</tr>
<tr>
<td>Horizon, Viewliner I, and Superliner II with Knorr TBU-264-SPF Tread Brake Unit</td>
</tr>
<tr>
<td>3/8”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MS1.2E: Amtrak Required Disc Pad Clearance for Passenger Cars:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capitoliner Cab Cars, Amfleet, Viewliner I and II, Horizon, 1500 MHC, Superliner.</td>
</tr>
<tr>
<td>Approximately 1/4”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MS1.3: Inspection for Proper Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper release of the brakes can be determined by observation of the clearance between the brake shoe and the wheel or between the brake pad and the brake disc. (Manual inspection may be required).</td>
</tr>
</tbody>
</table>
MS 2.0 Passenger Car Tread Brake Unit Slack Adjuster Inspection Procedure.

MS2.1. This procedure is to be used upon replacement of brake shoes or upon excessive brake shoe clearance found on inbound inspection.

MS2.2 Apply proper Blue Signal Protection.

MS2.3 Secure Equipment per Instruction 3.5 before going under or fouling car and then release the handbrake. Insure brakes are released.

MS2.4 Visually inspect the following tread brake units for brake shoe clearance greater than listed in Table A. If necessary measure clearance at top of shoe and at bottom of shoe. Actual clearance will be the average of these two values.

**MS TABLE A**

<table>
<thead>
<tr>
<th>Car Type</th>
<th>Tread Brake Unit Type</th>
<th>Maximum Brake Shoe Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewliner II (LDSL)</td>
<td>WABCO GB - 12</td>
<td>3/4 “</td>
</tr>
<tr>
<td>Amfleet I, II, 1500 series MHC, MW 16800 - 16808</td>
<td>WABCO GB - 4 ½</td>
<td>3/4 “</td>
</tr>
<tr>
<td>Capitoliner Cab Cars (9600 series).</td>
<td>WABCO GJ - 5</td>
<td>3/4 “</td>
</tr>
<tr>
<td>Horizon, Viewliner I, Superliner II</td>
<td>KNORR 264 SPF</td>
<td>3/8 “</td>
</tr>
<tr>
<td>Superliner I (See Instruction MS2.8).</td>
<td>KNORR or SAB</td>
<td>5/8 “</td>
</tr>
</tbody>
</table>

MS2.5 If the tread brake units are in excess of the dimensions listed in MS Table A, perform the following inspection procedure:

MS2.5.1 Inspect brake rigging and handbrake for binding. Confirm loose play of the brake rigging by shaking the handbrake linkage on top of the tread brake unit.

MS2.5.2 This operation is performed using the following wrench/socket sizes as shown in MS Table B.

**MS Table B**

<table>
<thead>
<tr>
<th>Car Type</th>
<th>Tread Brake Unit Type</th>
<th>Wrench / Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewliner II (LDSL)</td>
<td>WABCO GB - 12</td>
<td>1 1/2”</td>
</tr>
<tr>
<td>Amfleet I, II, 1500 series MHC, MW 16800 - 16808</td>
<td>WABCO GB - 4 ½</td>
<td>1 1/8” &amp; 1 1/2”</td>
</tr>
<tr>
<td>Capitoliner Cab Cars (9600 series).</td>
<td>WABCO GJ - 5</td>
<td>9/16”</td>
</tr>
<tr>
<td>Horizon, Viewliner I, Superliner II</td>
<td>KNORR 264 SPF</td>
<td>1 5/8”</td>
</tr>
</tbody>
</table>
MS2.5.3 Rotate the slack adjuster nut clockwise and counterclockwise (You must depress to engage the adjuster nut on GJ-5 tread brake units before rotating the nut). (1) The nut should move freely with no binding. Counterclockwise rotation should move the brake head toward the wheel and clockwise rotation should retract the brake head away from the wheel.

MS2.5.4 Rotate the slack adjuster nut until the brake shoe fully contacts the wheel. Now rotate slack adjuster nut to obtain proper brake shoe clearance as listed in MS Table C.

MS2.5.5 If the slack adjuster nut does not rotate freely or adjustment cannot be made, then the unit is defective. Report defective unit to your supervisor.

### MS Table C

<table>
<thead>
<tr>
<th>Car Type</th>
<th>Tread Brake Unit Type</th>
<th>Brake Shoe Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewliner II (LDSL)</td>
<td>WABCO GB - 12</td>
<td>1/2&quot; to 5/8&quot;</td>
</tr>
<tr>
<td>Amfleet I, II, 1500 series MHC</td>
<td>WABCO GB - 4½</td>
<td>1/2&quot; to 5/8&quot;</td>
</tr>
<tr>
<td>Capitoliner Cab Cars (9600 series)</td>
<td>WABCO GJ - 5</td>
<td>1/2&quot; to 5/8&quot;</td>
</tr>
<tr>
<td>Horizon, Viewliner I, Superliner II</td>
<td>KNORR 264 SPF</td>
<td>1/4&quot; to 1/8&quot;</td>
</tr>
</tbody>
</table>

MS2.6 Once the unit is adjusted, apply the brake and insure effective brake shoe force by shaking the brake head or tapping on the wheel.

MS2.7 Release the brake and insure brake shoe clearance complies with MS Table C.

MS2.8 Superliner I Knorr and SAB tread brake units do not have manual adjustment nuts. Perform the following procedure:

- **MS2.8.1** Pry back the brake head.
- **MS2.8.2** Apply the brakes and insure effective brake shoe force by shaking the brake head or tapping on the wheel.
- **MS2.8.3** Release the brakes and inspect brake shoe clearance not to exceed 5/8" maximum.
## MS 3.0 Locomotive Air Brake Pressure Chart

### INDEPENDENT BRAKE

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>#24 and #26 Brake Equipment with J-1 Relay</td>
<td>45</td>
</tr>
<tr>
<td>HHP-8, F-59, GP Locomotives, DASH-8, Genesis Series, NPCU Cab Car</td>
<td>72</td>
</tr>
<tr>
<td>ACS-64 Locomotives</td>
<td>72-75</td>
</tr>
</tbody>
</table>

### PARKING BRAKE

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genesis Series</td>
<td>100</td>
</tr>
<tr>
<td>Capitoliner Cab Car (9600 series)</td>
<td>52-56</td>
</tr>
</tbody>
</table>

### SERVICE BRAKE CYLINDER

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCB Brake Equipment</td>
<td>58-62</td>
</tr>
<tr>
<td>26L and 26LIC Brake Equipment</td>
<td>58-62</td>
</tr>
<tr>
<td>HHP-8 Locomotive</td>
<td>58-62</td>
</tr>
<tr>
<td>ACS-64 Locomotive</td>
<td>61-69</td>
</tr>
<tr>
<td>Capitoliner Cab Cars (9600 Series)</td>
<td>36-42</td>
</tr>
<tr>
<td>NPCU Cab Cars (&quot;Cabbage Cars&quot;)</td>
<td>46-48</td>
</tr>
</tbody>
</table>

### EMERGENCY BRAKE CYLINDER

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCB Brake Equipment</td>
<td>88-94</td>
</tr>
<tr>
<td>26L Brake Equipment: 110 psi Brake Pipe or 130 – 140 psi Auxiliary reservoir.</td>
<td>88-94</td>
</tr>
<tr>
<td>26L Brake Equipment: 90 psi Brake Pipe with Brake Pipe Fed (90psi) Auxiliary Reservoir.</td>
<td>84-86</td>
</tr>
<tr>
<td>26LIC Brake Equipment</td>
<td>72-76</td>
</tr>
<tr>
<td>HHP-8 Locomotive</td>
<td>69-71</td>
</tr>
<tr>
<td>ACS-64 Locomotive</td>
<td>73-81</td>
</tr>
<tr>
<td>Capitoliner Cab Cars (9600 Series)</td>
<td>44-51</td>
</tr>
<tr>
<td>NPCU Cab Cars (&quot;Cabbage Cars&quot;)</td>
<td>68-70</td>
</tr>
</tbody>
</table>

### SAFETY VALVES

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Location</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control &amp; Distributing Valves</td>
<td>Control Valve</td>
<td>60</td>
</tr>
<tr>
<td>Locomotive Main Reservoir / Tier I Equipment</td>
<td>Under Loco with Main Reservoir piping / Equipment Room</td>
<td>150</td>
</tr>
<tr>
<td>Locomotive Main Reservoir / Tier II (HST) Equipment</td>
<td>Equipment Room</td>
<td>160</td>
</tr>
<tr>
<td>Locomotive Air Compressor Intercooler</td>
<td>On Locomotive Compressor</td>
<td>65</td>
</tr>
<tr>
<td>Discharge Pipe (where equipped)</td>
<td>On Locomotive Compressor</td>
<td>185</td>
</tr>
</tbody>
</table>

### Dead Engine Feature

**Service Portion must be in Direct Release**

<table>
<thead>
<tr>
<th>Engine</th>
<th>Pressure Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>26L Equipment</td>
<td>25 psi</td>
</tr>
<tr>
<td>DASH-8, Genesis</td>
<td>45 psi</td>
</tr>
<tr>
<td>HHP-8 and HST Power Cars</td>
<td>45 psi (adjustable)</td>
</tr>
<tr>
<td>ACS-64</td>
<td>84 psi</td>
</tr>
</tbody>
</table>

**Location of Dead Engine cut-out cocks.**

**F-59, GP-40, DASH-8, NPCU Cab Car, Switcher Type Locomotive:**
Located under the floor of the cab on engineer’s side.
Access from outside panel (engineer’s side).

**Genesis Locomotive:**
Located under the floor panel behind the engineer’s seat.
Access is through floor or outside panel (engineer’s side).

**ACS-64, HHP-8 Locomotives, HST Power Cars and 9600 Series Cab Car w/CCBII:**
Located in the equipment room on the air rack. **NOTE:** Dead Engine feature on 9600 Series Cab Car must remain sealed and in the “in” position per MB.
MS 4.0. Passenger Car Air Brake Pressure Chart.

**PASSENGER EQUIPMENT.**

All pressures listed are for equipment that has been charged to 110psi.

<table>
<thead>
<tr>
<th>Car Type</th>
<th>Brake Cylinder: Full Service</th>
<th>Brake Cylinder: Emergency</th>
<th>#16 pipe: Full Service</th>
<th>#16 pipe: Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amfleet</td>
<td>38-42</td>
<td>46-51</td>
<td>60-65</td>
<td>74-79</td>
</tr>
<tr>
<td>Superliner I</td>
<td>43-45</td>
<td>61-64</td>
<td>55-57</td>
<td>78-81</td>
</tr>
<tr>
<td>Superliner II Normal</td>
<td>42-46</td>
<td>55-60</td>
<td>55-57</td>
<td>78-81</td>
</tr>
<tr>
<td>Superliner II Auto-Train</td>
<td>28-30</td>
<td>35-39</td>
<td>55-57</td>
<td>78-81</td>
</tr>
<tr>
<td>Horizon</td>
<td>41-43</td>
<td>46-51</td>
<td>62-64</td>
<td>75-78</td>
</tr>
<tr>
<td>Viewliner I: Normal</td>
<td>47-51</td>
<td>58-62</td>
<td>62-64</td>
<td>75-78</td>
</tr>
<tr>
<td>Viewliner I: Auto-Train</td>
<td>28-30</td>
<td>33-36</td>
<td>62-64</td>
<td>75-78</td>
</tr>
<tr>
<td>Viewliner II:</td>
<td>59-66</td>
<td>73-80</td>
<td>60-65</td>
<td>74-79</td>
</tr>
<tr>
<td>Heritage / 60% Relay</td>
<td>34-37</td>
<td>54-56</td>
<td>58-62</td>
<td>88-94</td>
</tr>
<tr>
<td>Heritage / 80% Relay</td>
<td>46-50</td>
<td>72-74</td>
<td>58-62</td>
<td>88-94</td>
</tr>
<tr>
<td>Heritage / 40% Relay</td>
<td>22-35</td>
<td>35-37</td>
<td>58-62</td>
<td>88-94</td>
</tr>
<tr>
<td>Material Handling / 1500 or 16800 Series</td>
<td>29-33</td>
<td>35-39</td>
<td>60-65</td>
<td>74-79</td>
</tr>
</tbody>
</table>

MS 5.0. Freight Car Air Brake Pressure Chart.

**Cars with freight type brake equipment.**

<table>
<thead>
<tr>
<th>Brake Pipe Pressure:</th>
<th>Brake Pipe Pressure Reduction Needed to Achieve a Full Service Brake Application</th>
<th>Full Service Brake Cylinder Pressure:</th>
<th>Emergency Brake Cylinder Pressure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>90psi</td>
<td>26 psi</td>
<td>64 psi</td>
<td>76 psi</td>
</tr>
<tr>
<td>100psi</td>
<td>29 psi</td>
<td>71 psi</td>
<td>84 psi</td>
</tr>
<tr>
<td>110 psi</td>
<td>32 psi</td>
<td>78 psi</td>
<td>93 psi</td>
</tr>
</tbody>
</table>