

**Amtrak**  
Mechanical Department  
Rolling Stock Engineering

**SPECIFICATION**

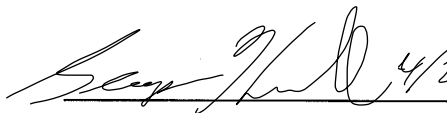
**for**  
Repower SW1000, SW1001, SW1500, SSB1200 to Gen Set

**SPECIFICATION No. 1027**

Rev 2.0


Issue Date: 4/18/2022

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

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## Specification Change Sheet

| Revision | Date    | Section(s)       | Description  | Approver  |
|----------|---------|------------------|--|-----------|
| 1.0      | 2/3/17  | ALL              | INITIAL RELEASE                                      | J FEDORA  |
| 2.0      | 4/7/22  | Cover and 3.1.2. | Added SW1500, SSB1200                                | J FEDORA  |
| 2.0      | 4/7/22  | 12.1.1           | Add Federal Specifications                           | J FEDORA  |
| 2.0      | 4/7/22  | 3.6.4.1          | Add air compressor type                              | J FEDORA  |
| 2.0      | 4/7/22  | 3.11.2           | Added Cab Signal/ACSES and event recorder Alerter    | J FEDORA  |
| 2.0      | 4/7/22  | 3.4.2.1          | Retention Tank                                       | J FEDORA  |
| 2.0      | 4/7/22  | 3.9.9.2          | Battery Charging                                     | J FEDORA  |
| 2.0      | 4/7/22  | 3.6.7.1          | Air Dryer  | J FEDORA  |
| 2.0      | 4/11/22 | 3.5.1.2          | Truck Center Bearing Fill                            | C WACHTER |
| 2.0      | 4/12/22 | 3.0 (ALL)        | Re-formatting section 3.0                            | C WACHTER |
| 2.0      | 4/13/22 | 1.3,1.5, 1.6     | Procurement entity, Legal Requirements, COTR         | D PARSONS |
| 2.0      | 4/15/22 | 3.4.4, 3.8, 3.9  | Updated walkway requirements; HVAC; fault monitoring | D PARSONS |

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## **1.0 Scope**

### **1.1 General**

As basic work under this Specification, each item produced must be completely functionally tested, cleaned, sanitized as required, properly packaged for shipment to Amtrak, and have documentation submitted. Amtrak will perform a series of First Article Inspections on the first item produced by a vendor, in order to verify that the process and materials used are in compliance with this Specification and drawings.

Whenever in this Specification an article or material is defined by using a trade name or the name and catalog number of a particular manufacturer or vendor, or a limited description, the term "or approved equal" if not written thereafter shall be implied. Any reference to a particular manufacturer's product, either by trade name or limited description, is only for the purpose of setting a standard of performance, quality, composition, construction or size. The term "or approved equal" means any other manufactured product or article which is equivalent in material, workmanship and service and is as efficient and economical in operation in the opinion of the Amtrak Engineer.

Any items of material or equipment, which are not fully described or are omitted in this Specification or the accepted vendor Technical Proposal but are necessary for the completion of the item being supplied, shall be considered a part of the scope of supply. In this Specification, all references to "number of days" shall mean calendar days unless otherwise stated.

Safety shall be of primary importance in the design of any items being supplied. They shall present a safe, hazard-free environment to the extent practical. No sharp edges or corners or pinch points shall occur where any personnel may come into contact with them. Smooth surfaces and avoidance of protrusions shall be used to minimize injury.

### **1.2 Amtrak Ownership Rights**

Unless specifically waived in writing by the Amtrak, Agent, all drawings, bills of materials, catalog lists, mockups, CAD models, documentation and all other engineering and design materials related to this Specification shall become the property of Amtrak and shall be delivered by the vendor in total as part of the First Article Inspection or other process. If any patented items are used, Amtrak must be granted an unrestricted license to use, copy or

otherwise manufacture the item by itself or a third party.

### **1.3 Vendor's Technical Proposal**

As a condition of contract award unless otherwise indicated in the Amtrak documentation, the vendor must submit a written and detailed Technical Proposal to the designated Procurement entity. This Technical Proposal must identify the vendor's interpretation of what it considers to be the scope of Basic Work to be performed, present a complete technical description of the components to be supplied, fully describe the operation and maintenance requirements of the components, include a copy of the vendor's Quality Assurance program, describe any Design Review process, present a step-by-step work plan for construction, include a project schedule by major events starting from the Notice to Proceed, and a Bill of Material of all components to be supplied.

### **1.4 Exceptions**

The vendor shall explicitly identify to the Amtrak any exceptions being taken to this Specification, referencing the Specification Section number and the exact wording in question. It will otherwise be assumed by Amtrak that the vendor takes no exception to this Specification and is completely compliant with all Specification requirements.

### **1.5 Legal Requirements**

All items being provided under this Specification shall comply with in all respects with the applicable standards and recommended practices of the Federal Railroad Administration (FRA), Association of American Railroads (AAR), American Public Transportation Association (APTA), NRPC (Amtrak) and all applicable Federal and State laws, rules and regulations and industry recommended practices in effect at the time of the signing of the Contract.

If a conflict is discovered or arises among any of the above requirements, it shall be resolved in accordance with the order of precedence in the general provisions to the Contract.

The Contractor shall be responsible for full compliance with all regulatory, industry and Specification requirements regardless of any un-intentional omission from this document.

### **1.6 Engineer**

The Contracting Officer Technical Representative (COTR) or Amtrak Engineering, as referenced in this Specification or any drawings, is defined as the Director of Rolling Stock Engineering within its Mechanical Department, or its written designee. The vendor may be submitting items for the COTR's approval as required by the Specification. The vendor shall not interpret this process to mean that the Engineer will function as an arm of the vendor's Project Management or Engineering staff. Submissions shall be structured to show how the vendor is responding to all of the requirements of the Specification, and not on the basis of requiring the COTR to discover how the vendor is not meeting those requirements. Submissions shall

contain sufficient detail to confirm that Specification requirements are being met. However, the vendor shall use judgment as to what level is appropriate and shall communicate with the COTR when guidance is needed on a case-by-case basis. Submittals requiring the COTR's approval prior to implementation shall be reviewed and classified by the COTR within 30 days from the day the submittal is received based on a rate of submittal that is reflective of the pace of an orderly, properly managed program. Priorities will be given to special cases when possible.

### **1.7 Cost Items**

Any individual extra work items regarding the items being supplied shall be handled in accordance with the purchase order and other contractual documents issued to the vendor by the Amtrak Procurement Department. The vendor must contact the Amtrak Contracting Agent, and not solely the Engineer, regarding all such issues. The vendor agrees that no payment will be made by Amtrak for any additional work outside the basic work scope of the contract documents unless such work is first preapproved in writing by the Amtrak Contracting Agent in accordance with the contract documents.

### **1.8 Vendor Quality Assurance Program**

The vendor is required to have in place a documented Quality Assurance Program that is modeled after an established industry quality standard, such as the ISO, AAR, or other organization. The vendor's facility is required to be equipped with equipment, personnel and management completely sufficient to assemble, inspect and test each item being supplied under this Specification. The vendor shall have suitable equipment to diagnose any failure mode, and perform all adjustments and tests required to confirm proper operation. The vendor's Quality Assurance staff shall be active participants in the assembly, inspection, testing and documentation phases of the work. The vendor is required to submit a copy of its Quality Assurance Program as part of its Technical Proposal, as explained in Section 1.3. While it not a mandatory requirement under this Specification, it is highly desirable that the vendor's quality assurance program be certified under ISO 9001:2000 or an equivalent recognized standard.

Amtrak Quality Assurance personnel may conduct random audits of the vendor's quality assurance program to verify that these Specification requirements are being achieved. The vendor shall fully cooperate in such audits. Specific attention shall be paid to the areas of management responsibility, quality system, contract review, design control, document control (including drawings), purchasing, purchaser-supplied product, product traceability and identification, process control (including procedures, testing and equipment), inspection and testing, measuring and test equipment (including calibration programs), control of nonconforming products (applied controls), corrective and preventative actions, handling, storage, packaging and delivery, quality records, internal quality audits, training, servicing and statistical techniques.

### **1.9 Critical to Quality (CTQ) Part Criteria**

It is mandatory that the vendor comply with Amtrak procedure PD 3.7.4.02, Critical to Quality (CTQ) Part Criteria, which applies to all products identified by either the Engineer or the designated Amtrak Contracting Agent that Amtrak considers to have aspects identified that are

Critical To Quality (CTQ). CTQs shall be Critical to Quality (CTQ) characteristic are defined as "Those characteristics of an item which, if non-conforming, may prevent or seriously affect the unit performance, reliability, producibility, or customer satisfaction of a component." This procedure defines the methodology when qualifying parts or processes to assure that the critical to quality product criteria meet Amtrak requirements by:

- Implementing a rigorous Part/Process qualification to ensure the participation, communications of all related departments and the quality acceptance.
- Support the Quality process by involving the vendor early in the project/design process.
- Assure that the vendor is supplying materials that meet the quality, cost, delivery and reliability requirements.

### **1.10 Components**

The vendor shall use only new parts for all components, unless called out in section 3, unless otherwise specified on the drawings or contract documents. It is Amtrak's desire that all materials, to the greatest extent possible, be of commonly available commercial items and hardware. The vendor shall maintain drawings for each component, and where necessary, patterns, jigs and fixtures, to assure identical manufacture. All elastomers used shall have a design life of 10 years in service unless otherwise approved by the Engineer.

### **1.11 Conducting Tests**

The vendor shall be equipped to fully test the items being supplied in accordance with this Specification and any referenced drawings as part of basic work. All testing apparatus shall be calibrated on a periodic basis as recommended by the apparatus supplier, and the vendor shall maintain documentation of such calibrations.

### **1.12 Workmanship**

All workmanship shall be of high grade and shall conform to the best of manufacturing practices. Skilled, qualified, well motivated personnel, with appropriate experience, training and aptitude shall be utilized to assure high quality of workmanship at all levels. Foremen, supervisors, inspectors, and shop managers shall be well integrated within the project team and be fully experienced and capable in their fields. They shall manage their teams in a competent and professional manner. The vendor is required to have on hand in its facility this Specification, and all other referenced drawings and documents.

### **1.13 Documentation Records**

The vendor shall maintain an electronic database and/or approved logbook of information regarding all components supplied to Amtrak under this Specification.

### **1.14 Referenced Documents**



The latest revision level of all referenced drawings and documents are to be considered to be the applicable version.

- Amtrak Procedure PD 3.7.3.01, Design Review and Control Procedure
- Amtrak Procedure PD 3.7.4.02, Critical to Quality (CTQ) Part Criteria
- Amtrak Specification 323, Wire and Cable
- Amtrak Specification 328, Materials and Workmanship
- Amtrak Specification 429, Environmental and Operating Conditions
- Amtrak Specification 531, Freeze Protection Systems
- Amtrak Specification 866, CAD Model Standards
- Amtrak Specification 867, Amtrak Drawing Standards for CAD
- Code of Federal Regulations 49 CFR Parts 223, 229 and 238
- ISO 9001:2000, Quality Management Systems - Requirements
- Amtrak drawings and models provided with the bidding and contract documents.

## **2.0 General Requirements**

### **2.1 Design Considerations**

The work shall also be designed and constructed in compliance with the standards and recommendations of the Contractor who shall be solely responsible for control of the design of the repowering.

Any components being supplied under this Specification shall be designed and manufactured to perform satisfactorily for a minimum design life of 10 years, unless otherwise specified. To the extent possible, only readily available components, hardware and fasteners shall be used. Any assembly hardware visible to passengers shall be recess mounted stainless steel.

As appropriate, the overheating of apparatus and overall fire safety design shall be addressed by use of thermal cutouts, selection and use of materials meeting flammability, smoke generation and toxicity requirements, and by means of fire detection and suppression. All food service galley systems and auxiliary equipment shall be equipped with overheat sensors and thermal cutouts.

Any items being supplied under this Specification for use either by passengers or train crew staff shall be designed to provide maximum comfort and safety as dictated by ergonomic requirements. All items shall be designed utilizing Universal or Transgenerational design, considering the needs of a broad range of users and citizens. This is particularly critical for the very young and the elderly who, while not considered "disabled" are often less stable or lack strength in situations considered "normal" by manufacturers. Applying these concepts need not complicate or add expense to the component but insure its continued utility and safety over time regardless of the demographics of the service area. Special attention shall be given to passengers with reduced visual acuity by providing them with visual cues as required. Floor support surfaces should have high contrast colors in this regard, and high contrast signage and striping patterns shall be provided where necessary, as approved by the Engineer.

All apparatus being supplied which requires inspection or maintenance must be readily accessible and replaceable, and shall be arranged to provide simple, easy access. Special attention shall be given such that opened covers, access doors, etc., provide sufficient room for a maintainer to easily gain access to equipment within lockers or enclosures. Secondary safety latches shall be used for all overhead ceiling covers, and any car exterior enclosure cover. In general, frequency of required service shall determine the degree of equipment accessibility.

For newly designed systems being supplied under this Specification, the vendor shall prepare for Engineer approval a Maintainability Analysis for the components being supplied. The analysis shall be the basis for development of maintenance tasks procedures, methods, and techniques. This analysis shall establish the maintenance concepts to be incorporated in the design, taking into consideration the requirements for safety, reliability, accessibility of apparatus, and the skills available for performing maintenance. Maintainability Analysis shall include all tasks required at each level of maintenance (daily, periodic, annual and overhaul), the task frequency, the time required, required labor resource, skill levels, and the necessary tools and support equipment. The Maintainability Analyses shall be a continuing effort during design and shall provide data for consideration in the review of the design.

## **2.2 Environmental Conditions**

Any components being supplied under this Specification shall be designed to comply with the conditions listed in Amtrak Specification 429, Environmental and Operating Conditions, and must be suitable for use up to 10,000 feet elevation above sea level. They shall also be designed and mounted to have structural integrity and be operationally reliable for the vibration environment at the point of attachment, and shall prevent unacceptable vibration inputs to the attachment structure. The component structure and mounting shall be designed to prevent amplification through component resonance beyond a level twice that of the attachment point. The vibration force output of any rotating component shall not exceed the vibration environment specified for the component.

All carbody mounted equipment shall be designed to withstand continuous vibrations of at least 0.2 g at frequencies up to 100 Hertz in all directions, as well as randomly orientated shock loads of at least 5 g's longitudinally, 3 g's vertically and 3 g's laterally. Truck components located above the primary suspension shall be designed to withstand continuous vibrations of at least 6 g's at frequencies up to 100 Hertz in all directions, as well as randomly orientated shock loads of at least 8 g's. Truck components directly carried on the axles shall withstand continuous vibrations of at least 50 g's up to 100 Hertz in all directions, as well as randomly oriented daily shock loads of at least 200 g's. Vibration resistance shall be verified by analysis, to the satisfaction of the Engineer.

## **2.3 Interchangeability**

All similar parts on each item being supplied, and among all other assemblies and their spare parts, shall be designed and manufactured to be identical, both as individual parts and as subassemblies. All assemblies shall mount to the vehicle without modification. Model numbers for identical components shall be identical. Replaceable components of any such apparatus shall be fully interchangeable, without adjustments to any part being necessary.

## **2.4 Dimensions**

All designs, components, dimensions and fasteners used on the components being supplied under this Specification, unless otherwise stated in the bidding and contract documents, shall be of United States inch-standards. Due to potential compatibility issues with existing Amtrak rolling stock, any components and fasteners using metric dimensions shall not be supplied unless approved in writing by the Engineer.

The vendor shall provide English dimensioning for its drawings and other communications which are generated. Fractional measurements shall be expressed as a decimal value. Drawings prepared by the vendor shall be made using third angle projections. First angle projection shall be allowed provided all views are labeled, including the front, top, bottom and side views. Dimensional tolerancing shall be appropriately applied for the part being manufactured.

## **2.5 Cleaning and Maintenance**

All components being supplied under this Specification shall be easy to clean and maintain. They shall not require maintenance or adjustments at intervals of less than four years, unless approved in writing by the Engineer. Pockets where dirt and debris can collect shall be minimized; those that exist shall be made easy to clean with standard vacuum cleaner equipment. Light fixtures shall be fully gasketed, including diffuser covers, to prevent dirt entry into the fixtures. Where possible, components requiring maintenance or replacement at overhaul shall be replaceable as individual units. The design shall ensure that items that require repair and or service are easily accessed, removed and replaced and that this is possible with the use of standard hand tools. Variations of fastener thread size, thread length and head style shall be minimized to ease overhaul and regular maintenance. The number of fasteners shall be kept to a minimum. All paints, coatings and corrosion protection shall meet the requirements of Amtrak Specification 328.

## **2.6 Interference and Transient Suppression**

All electrical components and wiring being supplied shall be carefully planned and selected to avoid electrical interference in the operation of train crew and maintenance department portable radios, public address and any other frequency sensitive systems. Likewise, these components shall be immune to the EMI/RFI effects of electrical interference from Amtrak's electrically and diesel-electrically propelled trainsets, passenger cars and locomotives. The vendor shall include the use of shielded cables, chokes, filters, and capacitors, as required by good design standards, to avoid possible interference with these systems. Adequate voltage transient suppression shall be provided for the protection of circuitry involving semiconductor devices. Low voltage circuits shall be capable of withstanding 1.5 joules, unless otherwise approved by the Engineer.

Apparatus creating EMI emissions shall be designed to contain these emissions within their package area. Suppressors shall be incorporated across inductive devices to minimize switching transients. All suppression devices shall be selected on the basis of their ability to absorb the amount of energy available in the connected circuit, for the number of cycles of operation expected in service, without requiring replacement prior to scheduled overhaul. All magnet valves and relay/contactors coils shall have free-wheeling diode or metal-oxide varistor

voltage spike suppression, or other suppression means, except where this results in deterioration of performance. Coil suppression devices shall be located physically on or as close as possible to the coil it protects (preferably directly at the coil terminal). Wherever possible, the suppression of transients shall be at the source.

## **2.7 FRA Regulations, AAR Standards and other standards**

The locomotive shall comply in all respects with the applicable standards and recommended practices of the Federal Railroad Administration (FRA), Association of American Railroads (AAR), American Public Transportation Association (APTA), NRPC (Amtrak) and all applicable Federal and State laws, rules and regulations and industry recommended practices in effect at the time of the signing of the Contract.

If a conflict is discovered or arises among any of the above requirements, it shall be resolved in accordance with the order of precedence in the general provisions to the Contract.

The Contractor shall be responsible for full compliance with all regulatory, industry and Specification requirements regardless of any un-intentional omission from this document.

- Federal Railroad Administration (FRA);
- U.S. Department of Transportation (USDOT);
- U.S. Department of Health and Human Services;
- U.S. Public Health Service (USPHS).
- Federal Specifications TT-P-664, Primers for Metals other than Stainless Steel
- Federal Specification TT-P-38D, Aluminum Paint

The Contractor shall be solely responsible for control of the design of the repowering.

## 3.0 Locomotive Mechanical & Electrical Requirements

### 3.1 Locomotive General requirements

General Arrangement: The locomotive is arranged and equipped so that the cab end is considered the rear, as depicted in GA drawing.

|                                      |  |
|--------------------------------------|--|
| <b><u>Clearance:</u></b>             | Conformance to Amtrak Clearance Diagram A099-00089 |
| <b><u>Number of Axles:</u></b>       | 4  |
| <b><u>AAR S-580 Crashworthy:</u></b> | No   |
| <b><u>Air Brake Type:</u></b>        | 26L  |
| <b><u>Dynamic Brake Type:</u></b>    | Not required.                                      |

**Audible Noise Requirements:** Locomotive cab noise level shall meet the dB levels of 49 CFR 229.121

#### General Locomotive Requirements

|       |  |                         |
|-------|--|-------------------------|
| 3.1.1 | <b><u>Weight (Overall):</u></b>          | 246,000 lbs ± 3,000 lbs |
| 3.1.2 | <b><u>End-to-End Weight Balance:</u></b> | 1%                      |
| 3.1.3 | <b><u>Brake Horsepower:</u></b>          | 1200 BHP                |

### 3.2 Painting and Styling

#### **3.2.1 Decals:**

All doors and cover plates guarding high voltage equipment shall be marked “Danger High Voltage” or “Danger”. All Pinching Hazards shall be clearly marked “WARNING Pinch Points”.

#### **Style/Sandblasting and Paint:**

Shall be in accordance with drawings.

- 3.2.1.1 Logos and Markings shall be applied to the paint topcoat, by either paint or pressure sensitive vinyl.
- 3.2.1.2 All decals shall be applied per the customer paint scheme. Placement and time requirement will be determined during kick off meeting
- 3.2.1.3 Walkways, top of cab, and areas accessed will be coated with non-skid.

#### **Paint:**

- 3.2.2.1 Prepare complete exterior and prime.
- 3.2.2.2 Exterior of locomotive to be basic painted to customer specifications. (Standard 3 colors) with clear coat.
- 3.2.2.3 Cab interior is painted with basic enamel per customer specification.
- 3.2.2.4 Control stand will be black
- 3.2.2.5 The interior of the short hood, long hood, and components are painted with DuPont Suede Gray Enamel per Amtrak D12-0013: EMD Road Switcher Typical Marking and Paint.

### 3.3 Identification

#### **3.3.1 Identification**

Automatic Equipment Identification (AEI) Tags

- 3.3.1.1 Two (2) Static AEI Tags – Ametech #AT5110 – shall be installed.
- 3.3.1.2 AEI Tags will be securely mounted directly to the side sill.
- 3.3.1.3 The Tags are not to be painted.

### **3.3.2 Number Boxes**

- 3.3.2.1 Front and rear number panels are of plastic construction and included black on white.

### **3.3.3 Stencil**

- 3.3.3.1 Stencil “F” is located on the side sills, nearest the front end.

## ***3.4 Carbody and Related System***

### **3.4.1 Underframe:**

Frame will be inspected for damage and structural and reported.

### **3.4.2 Fuel Tank and System:**

- 3.4.2.1 Fuel tank to be used in kind, opened, and cleaned. Additional fuel piping will be added to support the genset arrangement.
- 3.4.2.1 Waste Tank/Retention tank shall be reconditioned.

### **3.4.3 Snowplow, Pilot Plate:**

- 3.4.3.1 Front End Arrangement – basic pilot to be reused in kind.
- 3.4.3.2 Read End Arrangement – basic pilot to be reused in kind.

### **3.4.4 Walkways and Handrails:**

- 3.4.4.1 Chains with breakaway links shall be installed.
- 3.4.4.2 Walkways shall be passable, slip resistant, unobstructed, and unencumbered by safety equipment, parking brake device, other equipment or carbody components.

### **3.4.5 Steps:**

Bottom step shall meet AAR Switching requirements.

### **3.4.6 Lifting and Jacking Devices:**

Combination sling/jacking pads welded to the underframe side sills, near the longitudinal booster center – shall be inspected.

### **3.4.7 Couplers and Draft Gear:**

- 3.4.7.1 Draft gear pockets shall be inspected.
- 3.4.7.2 Type E coupler shall be reused.
- 3.4.7.3 Uncoupling mechanism – standard manual uncoupling levers.
- 3.4.7.4 Coupler height shall meet FRA requirement of 31.5 to 34.5 inches from top of rail to center including when wheels are at the condemning limit.

## ***3.5 Trucks System***

### **3.5.1 Trucks:**

- 3.5.1.1 Trucks to be inspected per OEM specifications and report any repair needed for Change Order and Approval.
- 3.5.1.2 Ensure truck center bearing fill , oil cups, and associated piping remains accessible from the top side (in cabinet/compartment).

### **3.5.2 Brake Rigging:**

Brakes will be inspected and report any repair needed for Change Order and Approval.

### **3.5.3 Suspension System:**

Truck springs to be evaluated to insure they are appropriately sized to accommodate the final locomotive weight and replaced, if required.

#### **3.5.4 Rail Gauge:**

The locomotive shall be designed to operate on standard rail gauge per FRA Regulation, 49 CFR 213

### **3.6 Braking and Air Systems**

#### **3.6.1 Air Brake System:**

The Air Brake system is 26L retained in kind, report any repair needed for approval.

#### **3.6.2 Emergency Brake:**

Conductor Side Emergency Brake valve will be in cab compartment.

#### **3.6.3 Pneumatic Control:**

- 3.6.3.1 Instantaneous PC knockdown to idle and brake pipe charging cutoff in the event of an Engineer Induced Emergency or Conductor Induced Emergency.
- 3.6.3.2 Six (6) seconds delay PC knockdown for train initiated emergency (break-in-two) – including while in Motoring.
- 3.6.3.3 Six (6) seconds delay on penalty brake application (overspeed, etc.).
- 3.6.3.4 Independent brake valve control pressure set for 45 PSI.
- 3.6.3.5 All Safety cut-out cocks will have locking handles and sealed in the cut-in position.**

#### **3.6.4 Air Compressor:**

- 3.6.4.1 Air Compressor shall be an Atlas Copco AG-30 with all discharge venting to the outside of the locomotive carbody.
- 3.6.4.2 Air Compressor Protection - short and open circuit protection shall be provided.
- 3.6.4.3 Air compressor set to load at 130 PSI and unload at 140 PSI.
- 3.6.4.4 Air compressor shall provide a minimum displacement of 140 CFM at maximum operating rpm.
- 3.6.4.5 Air Compressor safety valve shall be piped outside or to the retention tank.

#### **3.6.5 Main Reservoir:**

Main Reservoirs to be left in kind inspected to FRA compliance.

- 3.6.5.1 Safety Valve Setting and Location:
  - 3.6.5.2 Main Reservoir safety valve shall be set at 150 PSI and piped between MR1 & MR2 tanks and before the air dryer to protect the air dryer from over pressure.

#### **3.6.6 Air Filters:**

Inspect and service air filters.

#### **3.6.7 Air Dryer:**

- 3.6.7.1 Air dryer to be a new Salem 975-100 series unit.
- 3.6.7.2 Air dryer circuitry shall be protected by utility circuit breaker.

3.6.7.3 Air dryer should feed MR1.

**3.6.8 Gauges & Fittings:**

- 3.6.8.1 The Graham White analog assembly gauge assembly with mounting base and test fittings shall be installed.
- 3.6.8.2 The assembly shall include both the Main Reservoir/Equaling Reservoir and the Brake Pipe/Brake Cylinder air gauges.
- 3.6.8.3 No Air Flow Gauge will be provided.

**3.6.9 Sanding System:**

Sanding system will be left in kind and inspected.

**3.6.10 Handbrake:**

- 3.6.10.1 Salem Electric Brake will be applied in rear of cab compartment.
- 3.6.10.2 Hand brake indication light shall be mounted in the cab.
- 3.6.10.3 Hand Brake Chain assembly housing will have some type of sound absorption to prevent chain weight from hitting the housing.

## **3.7 Engine**

**3.7.1 General Engine Specification:**

- 3.7.1.1 Cummins QSX Tier IV Compliant using Exhaust Gas Recirculation (No Urea required)
- 3.7.1.2 In Line, 4-Cycle, 6-Cyl
- 3.7.1.3 Rated Power: 400 – 600 HP, 298 – 447 KW
- 3.7.1.4 Aspiration: Turbocharged
- 3.7.1.5 Variable Geometry Turbocharger
- 3.7.1.6 Total Engine protection alarm and shutdown functionality for oil and water pressures, temperatures, and levels.
- 3.7.1.7 All fuel, oil and water hoses and connections certified to -40F.
- 3.7.1.8 All gasket materials certified to -40F.
- 3.7.1.9 Retention tank system.
- 3.7.1.10 Dyno Meter Testing and Test results to be provided of Engine and Alternator when mated

**3.7.2 Main Alternators:**

New alternator(s) applied as part of the new diesel generator package - 240 Volt, 60 Hz @ 1800 rpm.

## **3.8 Cab Compartment**

**3.8.1 Cab:**

A Standard cab will be new and located near the rear end of the loco with long hood facing forward. It will be equipped with a rear window arrangement. The cab interior will conform to the clean cab aspects set forth by AAR recommended practices. Locomotive cab noise level shall meet the dB levels of 49 CFR 229.121.

**3.8.2 Cab Seats:**

- 3.8.2.1 New engineer and conductor cab seats will be installed equipped with removable arm rest.
- 3.8.2.2 Third cab seat will be provided on top of ice cooler of a similar design and location to current configuration.
- 3.8.2.3 Conductor seats shall include removable armrests.

**3.8.3 Cab Accommodations:**

Cab accommodations can be installed as defined below:



- 3.8.3.1 First Aid Kit – shall be equipped with ORR safety first aid kit.
- 3.8.3.2 Cab card holders, full-sized, mounted on control compartment at the rear of the operator’s cab.
- 3.8.3.3 Fire extinguisher(s) - one (1) 20-pound ANSUL fire extinguisher bracket shall be mounted in the cab and one (1) 20 pound ANSUL fire extinguisher with bracket shall be installed inside the carbody, near rear of locomotive and clearly marked.
- 3.8.3.4 Standard coat hooks shall be installed on Main Electric Cabinet.
- 3.8.3.5 Fuse and Flag Box to be mounted in cab and clearly marked.
- 3.8.3.6 Trash Bag Holder.

**3.8.4 Temperature Control:**

**Sidewall Strip Heaters**

- 3.8.4.1 Engineer’s sidewall heater shall be provided.
- 3.8.4.2 Conductor’s sidewall heater shall be provided.

**3.8.5 Air Conditioning:**

- 3.8.5.1 One RV type roof mounted unit will be in the cab compartment.
- 3.8.5.2 HVAC System and ducting shall be free of walkways and entrances to reduce exposure to occupants striking the HVAC System

**3.8.6 Cab Floors, Walls, and Steps:**

- 3.8.6.1 Apply new Plywood with Lonseal cab flooring.
- 3.8.6.2 Steps shall be installed under the trapdoor in the subfloor compartment.
- 3.8.6.3 Cab walls, ceiling, and floor shall be fully insulated.

**3.8.7 Cab Doors:**

- 3.8.7.1 Aluminum “Flange” type Cab Doors shall be applied.
- 3.8.7.2 All doors will have a rubber door stop to prevent the door from directly hitting Grab Irons.
- 3.8.7.3 All cab door weatherstripping and seals to be replaced new.

**3.8.8 Windows and Glass:**

- 3.8.8.1 Glass will be checked for fit, and condition reported and will meet 49 CFR223.
- 3.8.8.2 A separate fan(s) and defroster with independent controls are to be provided for windshield.
- 3.8.8.3 One mirror will be installed one each side of the cab.

**3.8.9 AAR Clean Cab Requirement:**

- 3.8.9.1 Cab door cushion pads.
- 3.8.9.2 Cab door closure bars.
- 3.8.9.3 Flexible hinge guard on cab doors.
- 3.8.9.4 Wiper motor handles with soft rubber.
- 3.8.9.5 Padded sun visors.
- 3.8.9.6 Recessed wiper valves and train order light switch and flush mounted train order light.

- 3.8.9.7 Rounded window latches.
- 3.8.9.8 All exposed convex edges and corners rounded.
- 3.8.9.9 Window wiper motor with protective cover.

### **3.8.10 Control Console in Cab:**

- 3.8.10.1 AAR Control Stand operator's console.
- 3.8.10.2 Master controller with a single handle AAR type controller.
- 3.8.10.3 Main Reservoir/Equalizing Reservoir air gauges: See Section 3.6.
- 3.8.10.4 Brake Pipe/Brake Cylinder air gauges: See Section 3.6.
- 3.8.10.5 26C Auto/ Independent Valve: part of 26 L standard equipment.
- 3.8.10.6 Radio: Ritron RCCR-151-NX-AM and antenna installed
- 3.8.10.7 Load Ammeter Type: Hickock Ammeter (p/n 441-218 w/o DB)
- 3.8.10.8 Front Headlight Switch Type: 3-Pos Sw - Off/Dim/Bright/ Bright& Ditch.
- 3.8.10.9 Rear Headlight Switch Type: 3-Pos - Off/Dim/Bright /Bright &Ditch.
- 3.8.10.10 Horn Type: Wobble Stick placed in similar location to original location.

### **3.8.11 Main Electrical Cabinet (MEC)**

The MEC shall be new and located in the operator's cab.

## ***3.9 Auxiliary Power and Control Systems***

### **3.9.1 Auxiliary Power Systems:**

AC Inverter

- 3.9.1.1 Inverter shall be applied for Auxiliary and AC requirements.

### **3.9.2 Control Systems:**

The control system will be an Electronics Microprocessor with operator interface panel designed to maximize the adhesion of the traction motors & monitor as many practical system parameters & log fault data as follows:

#### **Contactor and Relay Control**

The Microprocessor will control the following contactor and relay pick-up and drop-out:

- 3.9.2.1 Power Contactors, Reversing Transfer Switches, Air Compressor Loading Relays and Contactors, Air Compressor Drive Motor Contactors, Ground Relay, Alarm Relay, Load Shedding Contactor, Traction Motor Cut Out Relay, GenSet Starting and Shutdown control, and Equipment Blower Contactor.

#### **Functions to be Displayed**

The Microprocessor will monitor and have available for display with a laptop, a serial connection to an onboard computer and an Operator Interface panel and will display the following functions:

- 3.9.2.2 Generator, Voltage and Current of each Gen Set, All Traction Motor Currents, All Traction Motor Volts, Throttle Notch, Contactor and Relay Position, Air Compressor Cycle, Battery Charging Voltage and Current, Generator Set Fault and Warning Status, Trainline Status, Total Horsepower, Locomotive Speed, Main Reservoir Pressure, Reversing Switch Position, Sanding

Status, and Engine RPM

### **3.9.3 Microprocessor Controlled Systems:**

The microprocessor will control the following systems:

- 3.9.3.1 Wheel slip detection and correction including auto sanding
- 3.9.3.2 Traction power regulation
- 3.9.3.3 Air compressor functions
- 3.9.3.4 Auto Start/Stop functionality as per AAR S-5502.

### **3.9.4 Fault Monitoring:**

The microprocessor will log the following fault conditions and include separate maintenance access plugs for central control and engine control units as installed:

- 3.9.4.1 Ground Fault, Overspeed, Engine RPM, Generator Set Fault and Warning, Over and/or Under Current and Voltage (Gen Set, Traction Motor, Air Compressor Motor, Equipment Blower, Low Voltage Power Supply and DC Chopper), Open Circuit (Traction Motor Blower, Air Compressor Motor, etc.), Contactor or Relay Fault, Undesired Horsepower Output, Battery Charging Failure, and Air System Failure.

### **3.9.5 Fault Log Snapshot:**

The microprocessor will “snapshot” the following parameters with a fault log:

- 3.9.5.1 Traction Horsepower, Throttle Notch, Speed, Traction Motor Current, Traction Motor Voltage, Power Contactor Status, Transfer Switch Status, Generator Set Status, Generator Current, Air Compressor Status, Battery Charging Current, Battery Charging Voltage, Train line Status, Sanding Status, and Air System Status.

### **3.9.6 Performance Data:**

The microprocessor will store the following types of performance data:

- 3.9.6.1 Throttle notch percentage
- 3.9.6.2 Miles per throttle notch
- 3.9.6.3 Horsepower per throttle notch
- 3.9.6.4 Auto start/stop time periods
- 3.9.6.5 Real time display of the Vac and Vdc buss output on the locomotive.

### **3.9.7 Ground Detection:**

Ground relay reset: Automatic ground relay reset provided with ground relay lockout and fault logging.

### **3.9.8 Multiple Unit Control:**

MU NOT APPLIED.

### **3.9.9 Battery System:**

- 3.9.9.1 Battery type: New 450 AMP Hour Locomotive Batteries.
- 3.9.9.2 Battery charging: One (1) Low Voltage Power Supply shall be provided to maintain all onboard

battery systems.

3.9.9.3 Battery shed: Start battery load shed shall be provided. Battery shed reset button shall be in the MEC.

3.9.9.4 Battery Box(s): Battery box(s) will be properly marked. Battery box cover(s) will have a closing system to prevent the cover(s) from slamming on the box.

### **3.9.10 Electrical Outlets:**

AC Outlet – provided in MEC. AC Electrical Outlets, Shall be switchable inside Cab and installed on the inside the cab, the MEC (Outlet on MEC Exterior) and inside the Engine(s) Compartments internal to the carbody. All AC Electrical Outlets shall be mounted inside sealed waterproof boxes, with self-sealing outdoor outlet covers and have power supplied through the bottom of the electrical box to prevent accidental water ingress.

## **3.10 Electrical System**

System designed to follow the latest industrial standards for this group.

### **3.10.1 Latest Industrial Standards:**

- 3.10.1.1 All wiring and cabling to be new with EXANE insulated AAR approved cabling.
- 3.10.1.2 New main electrical cabinet with interiors to be painted white.
- 3.10.1.3 Electrical equipment in cabinet shall be new, battery switch, and breaker switch panel. Low voltage carrying relays and current rectifiers shall be new.
- 3.10.1.4 Electrical switch gear shall be magnetic.
- 3.10.1.5 All magnet valves on locomotive shall be new.
- 3.10.1.6 All temperature and pressure switches shall be installed.
- 3.10.1.7 All accessory lighting will be new LED style. (Edison base where applicable)
- 3.10.1.8 New rubber style cable cleating shall be applied.
- 3.10.1.9 Equipped with AAR standard control stand.
- 3.10.1.10 All Microprocessor subsystem the trouble shoot software will be supplied

## **3.11 Safety Accessories and Appurtenances**

### **3.11.1 Radio:**

- 3.11.1.1 Radio – Ritron RCCR-151-NX-AM
- 3.11.1.2 Radio Mounting -
- 3.11.1.3 Radio Antenna installed

3.11.1.4 Radio Cable - shall be installed.

### **3.11.2 PTC and Event Recorder:**

Cab Signal/ACSES system will be required, Siemens (PHW) LDL system is the system to be installed. Front and rear Cab Signal pick up bars. The ADU will be located between the forward facing windshields and a WABTEC M-5 FRA event recorder, the Event Recorder will follow 49 CFR 229.135 for the required inputs. The function of the M-5 FRA event recorder Alerter will be used as the Alertness System for the locomotive. Pneumatic sealable cut out cock for Cab Signal, ACSES and Alerter will be supplied

Speed indicator installed and shall be accurate to within  $\pm 3$  MPH for speeds of 10 - 30 MPH &  $\pm 5$  MPH above 30 MPH.

3.11.2.1 Speed indicator must be clearly readable from the operator's normal position under all lighting conditions, shall be viewable on both long and short hood operations.

Alertness System: will be part of M-5 Event Recorder.

### **3.11.3 Crossing Bell:**

New Graham White 373-011 electronic bell shall be mounted under the mainframe, near the front.

### **3.11.4 Horn:**

3.11.4.1 Two (2) electric over air operated three (3) chime horns shall be mounted, one on front and one on the rear of the locomotive.

3.11.4.2 Horns shall be controlled by a horn wobble stick.

## ***3.12 Lighting Systems***

The following sections describe the requirements of the lighting system for both the exterior and interior lights of the locomotive. The lighting system includes headlights, ditch lights, interior lighting, and compartment lights.

### **3.12.1 Headlights:**

3.12.1.1 Two (2) headlights shall be provided at each end of the locomotive.

3.12.1.2 Headlight type: Replaced in kind

3.12.1.3 Headlights shall be controlled by a three-position switch with ditch light.

### **3.12.2 Ditch Lights/Crossing Lights:**

Ditch lights installed front and back.

### **3.12.3 Number Lights:**

Fully illuminated at each end of the locomotive.

### **3.12.4 Exterior Lights:**

3.12.4.1 Platform lights

3.12.4.2 Step lights

3.12.4.3 Ground Lights – mounted near the right front jacking pad on the engineer's side.

### **3.12.5 Interior Lights:**

Cab lights will include two (2) overhead lights located on each side of cab compartment.

### **3.12.6 Compartment Lights:**

3.12.6.1 Air Compressor Compartment - Two (2) lights shall be installed.

3.12.6.2 Genset Compartment and Chopper/Electric Compartment will be interior illuminated

## **4.0 Packaging and Shipment**

For all components produced, following all assembly the vendor is required to perform and fully document a complete verification test and evaluation of each component being supplied, prior to shipment to Amtrak. The results of this final testing shall be recorded in the documentation record. When successfully completed, the vendor may be directed by the Engineer to apply a permanent Engineer-approved identification label in an inconspicuous agreed-upon area, which shall include the name and location of the vendor, any serial number used by the vendor, any Amtrak "AAMPS" internal catalog number, and the date of manufacture.

All packaging and shipping requirements shall be performed by the vendor. It is required that the vendor properly prepare all components being supplied under this Specification for shipment to Amtrak so that they are ready to install following unpacking. Any food service item being supplied shall be completely cleaned and sanitized in accordance with all requirements of the latest edition of the Food Code, issued by the Food and Drug Administration (FDA) of the US Department of Health and Human Services.

All components being supplied prior to shipping shall be completely winterized and drained by the vendor of all internal water, so as to be undamaged by freezing temperatures. The vendor shall package the components, unless otherwise instructed by the Amtrak Contracting Agent, to be suitable for continuous storage prior to unpacking in unheated (subfreezing), dusty indoor storage conditions. Fabric and soft goods shall be wrapped in plastic for protection against water exposure. Components shall be appropriately packaged for their weight and size. Special efforts must be used to protect unusually fragile or plastic items from damage during shipping and handling. Large and bulky items shall be secured to a shipping skid or other commercial shipping media suitable to allow the use of fork lift trucks for handling.

The shipping package shall have an identification label. This label shall include the vendor's name and address, purchase order number, date released for shipment, Amtrak "AAMPS" internal catalog number, and any component assembly serial number. This information shall also appear in the vendor's invoice, and be included in the documentation record.

The vendor shall retain a copy of the shipping documentation record, and shall make three copies for Amtrak. One copy shall be included within the shipping container for the assembly, one copy shall be sent to the Amtrak Contracting Agent (or as otherwise designated in the purchase order), and the third copy shall be sent to the attention of the Amtrak Quality Assurance inspector in care of the Amtrak "ship to" address.

### **4.1 Drawings/Documentation**

Vendor shall provide information in formats per Amtrak's Construction Support Document 5.2, and will include, but not be limited to the following:

1. Clearance Diagram (locomotive dimensions and capacities)
2. General Arrangement Drawing (component – part – identification)

3. Air Brake and piping schematic.
4. Electrical schematic.
5. Wire running list.
6. Maintenance Manual:
  - a. CD and one (1) hardcopy of the maintenance manual. The electronic copy shall be in a format that is readable with Adobe Acrobat Reader and contained in one file. These manuals shall provide sufficiently detailed information necessary for maintenance of the locomotive and equipment at a back shop or depot level of maintenance.
  - b. NOTE: Customer shall be granted the right to distribute these manuals to personnel.
7. Troubleshooting Guide
8. Operator's procedure manual:
  - a. Vender shall provide one (1) operating manual plus a diskette/CD of the manual in an electronic format that is readable with Adobe Acrobat Reader 7.0. and contained in one file.
  - b. This manual shall describe the standard operating procedures for the locomotives, familiarizing the operator with the location of devices, safety procedures, and basic maintenance requirements for operation.
9. Illustrated Parts Manual

## **5.0 Product Support**

### **5.1 First Article Inspections**

To verify that any components being supplied under this Specification meet all Specification and drawing requirements, and are truly interchangeable with existing components, Amtrak will conduct a series of two (initial and as-installed) First Article Inspections (FAI) on the first complete assembly manufactured by a vendor, prior to allowing unrestricted manufacturing work to start. It is the intention of the FAI process that every function and feature of the items being supplied under this Specification be fully exercised and tested for proper operation under all normal, abnormal and fault conditions, both in the vendor's workshop and as applied on the vehicle.

The initial FAI shall consist of a pre-shipment inspection and testing of a prototype assembly at the vendor's facility. This shall be an active test, and the vendor shall provide all mounting fixtures, electrical and pneumatic power, etc, as required to fully functionally exercise all components and features. A complete range of operating voltages, currents, pressures, loads, etc. shall be applied to simulate both normal and abnormal conditions, and the response of the components to these conditions.

Once this FAI is successfully completed at the vendor's facility, the vendor shall ship the same assembly to the Amtrak maintenance facility identified by the Amtrak Bidding and Contract Documents or the Engineer, where Amtrak will install the assembly onto an Amtrak vehicle. A

second "as-installed" FAI shall then be performed to verify proper operation of the assembly in the "as-installed" configuration. This shall in particular verify all component interface conditions with the vehicle.

Each FAI shall have Amtrak Engineering and/or Quality Assurance personnel as well as the vendor in attendance. They shall include, but not be limited to, a mechanical and electrical inspection to determine compliance with the specifications and the drawings, complete testing of the functionality of the component, demonstration of maintainability and troubleshooting, and verification of proper operation and complete compatibility/interoperability when installed on a vehicle. Approval by the Engineer following successful completion of the FAI process, as communicated through the Amtrak Contracting Agent, shall constitute final system approval.

## **5.2 *Delivery of All CAD Models and Drawings***

Following the successful completion of the First Article Inspections, and as a precondition to permit production delivery of material to commence, the vendor must supply to the Amtrak Bureau of Rolling Stock Engineering, via the Amtrak Contracting Agent, an electronic set of every fully-developed CAD model and dimensioned drawing and Bill of Material which may have been created for every individual part used for the manufacture of all items being supplied under this Specification. All models and drawings shall comply with Amtrak Specifications 866 and 867. Refer to Section 5.4 for additional details. Any later modifications as a result of warranty or other actions must include the affected models and drawings being revised as necessary and resubmitted to Amtrak.

## **5.3 *Production Changes Require Engineer Approval***

Once final system approval is granted by the Engineer and production has commenced, the vendor is forbidden to make any changes in the design, material or configuration of the items being supplied, unless approved in writing by the Amtrak Contracting Agent as per Amtrak Procedure PD 3.7.3.01, Design Review and Control Procedure. This shall include any modifications required as a result of warranty actions, so as to provide complete documentation.

## **5.4 *Spare Parts List***

The vendor shall supply to the Engineer, via the Amtrak Contracting Officer, a Microsoft Excel spreadsheet list in Engineer approved format of any spare or consumable parts which are recommended to be stocked by Amtrak for maintenance of the components being supplied. Such lists shall contain for each item an item number, the spare part name (in noun, adjective format), the name of the Original Equipment Manufacturer (OEM), the OEM part number, approximate cost for each item, and recommended stocking quantity. The vendor shall also supply any revisions in this data up to the conclusion of the warranty period.

## **5.5 *CAD Models, Drawings, Manuals and Parts Lists***

All CAD models and drawings prepared by the vendor under this Specification shall be in full compliance with Amtrak Specification 866, CAD Model Standards and Amtrak Specification 867,



Amtrak Drawing Standards for CAD. All CAD models and drawings shall be in Engineer-approved formats, and shall include a complete set of all "as-built" drawings of every part, component and assembly used for all items being supplied to Amtrak of all levels, not only the top assembly level. All CAD models shall identify all materials, surface finish and fasteners. Each drawing shall include a complete Bill of Material, providing quantities, original component manufacturer name and part number of the actual supplier of the part. Every part on the Bill of Material must be fully identified regarding its characteristics including material, plating, finishing, heat treatment, secondary operations, etc. Amtrak drawing formats and number series shall be used as agreed upon with the Engineer. The drawing package shall also include drawings of every special tool, jig or fixture required to install, maintain or overhaul the assembly, and if referenced in any of the maintenance manuals. The final CAD models shall be delivered as 3 sets of DVDs or CDs in SolidWorks 2004 or above. The as-built drawings shall be delivered as 3 sets of DVDs or CDs of all drawings in electronic format in SolidWorks 2004 or above (DXF and AutoCAD 2000 format files shall be accepted only with prior approval of the Engineer) along with 3 sets of CDs of all drawings in Adobe Acrobat read-only PDF file format. The vendor shall also supply any revisions in this data up to the conclusion of the warranty period.

One set of software (including any diagnostic tester software) used for any microprocessor system being supplied under this Specification shall be included with each assembly, with an additional complete set on CDs or DVDs to be provided to the Engineer via the Amtrak Contracting Agent. Amtrak shall be identified as the license holder for any commercial software used. Complete operations, programming, and diagnostic tester documentation shall be provided to the Engineer, including procedures for Amtrak to revise all user-changeable software settings. The vendor shall also supply any revisions in this data up to the conclusion of the warranty period.

The vendor shall also submit in electronic format to the Amtrak Bureau of Rolling Stock Engineering, via the Amtrak Contracting Agent, a complete set of all documentation including the operating manual, maintenance manual, and parts list. All documentation data must be compatible with Microsoft Office 2000 or newer applications. The parts list shall identify all individual parts used (in noun, adjective format) in the items being supplied under this Specification, and must include the original equipment manufacturer (OEM) name and part number; use of an intermediate supplier or distributor's name or part number is not acceptable. The parts list shall indicate quantities for each item within each assembly, use exploded isometric-view parts diagrams if possible, use separate pages for parts diagrams and tabular data if possible, and be sufficiently complete to permit Amtrak to order individual replacement spare parts direct from the actual parts manufacturer. The maintenance manual shall include complete information from installation, through troubleshooting, repair and complete overhaul. The manuals shall include maintenance and parts information for every special tool, jig, fixture or diagnostic test equipment used to repair or overhaul the assembly. The vendor shall also supply in electronic format all other manuals and other support documentation it has available for the components being supplied under this Specification. All documentation data must be delivered as 3 sets of CDs in Adobe Acrobat read-only PDF file format, distilled in Acrobat 5.0 or higher, and in addition 3 sets of CDs in its original Microsoft Office applications format, for internal use by Amtrak for future revision of the data. The vendor shall also supply any revisions in this data up to the conclusion of the warranty period.

All PDF files (other than drawings) shall be distilled from the authoring documents, resulting in PDF documents that can be indexed and searched. All authoring electronic data files making up the manuals shall be delivered formatted such as to not cause pagination errors during the PDF distillation process. The PDF file produced from the distillation process shall match any

published version of the authoring document. All files shall be editable by Amtrak for future document maintenance. All columnar data found within word processing files shall be presented in a table format. Any fonts used on the creation of authoring and/or PDF files shall be embedded and not restricted for use. PDF documents with definable chapters, sections and/or subsections shall be linked to their individual locations with bookmarks internal to the file in the fashion of a hierarchical format such as a Table of Contents. Creation of PDF files from scanned images only, resulting in non-searchable or non-indexable documents, will be restricted to only those allowed by the Engineer. Scanned information in the form of document attachments may be allowed to be imported into an existing PDF file that is searchable and capable of indexing, if the information is supplemental to context to the file and not the primary means of communicating the subject's information. If documents are scanned, careful attention will be taken to not allow misalignment of the pages. Opening options in the PDF file format should be set to show bookmarks and page, with magnification at "Set Width" and "Continuous Page" settings. Distillation settings shall be "E Book" or "Print", with DPI settings set to produce quality printing from a desktop printer without overly increasing the size of the file.

## **5.6 Training**

If required by the Bidding and Contract Documents, following the successful conclusion of the First Article Inspection, the vendor shall provide complete on-site training at the Amtrak maintenance location identified in the Bidding and Contract Documents. The training shall highlight both the operation, maintenance and calibration procedures for the components being supplied. This shall include a minimum of 8 hours of classroom time and "hands-on" training, to be scheduled as mutually agreed between the vendor and the Engineer. The training program shall be presented in written format and shall include the written manuals that are provided for operation and maintenance.

## **5.7 Failure Analysis**

A Failure Analysis to determine the cause and frequency of defects occurring during the warranty shall be performed by the vendor and submitted to the Engineer and the Amtrak Contracting Agent for concurrence. Such analysis shall be performed and reported within 30 days from the date of each failure.

## **6.0 Source Inspection**

### **6.1 Purpose**

Amtrak will perform periodic source inspection of vendor materials and components being supplied. The following is intended to be used as an outline defining activities and responsibilities of the vendor performing the source inspections.

### **6.2 Professionalism**

All inspections, test observations, and other activities performed in the fulfillment of the contract are to be conducted in a professional and ethical manner. The vendor is representing Amtrak in the performance of the contract and therefore must remain courteous, conscientious and professional under all circumstances arising from performance of the contract.

### **6.3 Scope of Work**

Amtrak has implemented a multi-faceted supplier management program of which source inspection is an integral part. Amtrak identifies vendors and materials/components through various methods which will be subject to source inspection. By performing source inspections, Amtrak expects to benefit by use of vendor facilities, measuring and testing equipment to verify materials/components, through rejecting noncompliant materials/components before shipment and receipt by Amtrak, presence of Amtrak representative periodically to ensure continuing good performance, and assist to communicate Amtrak intentions and interpretations of specifications and resolve issues. The vendor will conduct inspection or verify through observation, product compliance with drawings, specifications, standards or Amtrak contract documents and report findings of said inspections to Amtrak.

### **6.4 Services**

#### **6.4.1 Scheduling Inspections**

The vendor shall conduct observations and verifications on Amtrak identified materials and components produced by the vendors for Amtrak. Inspections must be scheduled to coincide with final inspection of said materials/components due for shipment to Amtrak. The vendor may use random sampling where large quantities of material are subject to shipment and note sampling method in associated reports. The vendor must perform all dimensional and operational inspections in accordance with the Quality Plan prior to source inspection, and make all inspection records available for review by the Amtrak source inspector, with focus on CTQ items.

#### **6.4.2 Dimensional Inspection**

The vendor must witness and verify conformance with dimensional characteristics per drawings identified in the Amtrak contract documents. The vendor must witness and verify conformance with regulatory standards and requirements including material certification as cited in specification or other reference documents identified in Amtrak contract documents.

#### **6.4.3 Operational Inspection**

The vendor must witness and verify conformance with operational tests as cited in specifications, operators manual or other reference documents identified in Amtrak contract documents.

#### **6.4.4 Inspection Reports**

The vendor must provide a report documenting the vendor source inspection and the inspection results. The report must include the name of the vendor, the date of the inspection, the material or component name,

#### **6.5 *Qualification of Personnel***

It is the responsibility of the vendor to provide personnel with adequate training and experience to perform all the activities of the source inspections described above. Personnel must also conduct their activities with professionalism.