

# RV REPAIR OPERATION - QUALITY ASSURANCE MANUAL

## **Scope and Purpose:**

This quality assurance manual covers the basic procedures for quality control and inspection of regulated repair. These procedures provide the necessary guidance to ensure that each regulated repair meets the minimum safety standards adopted by the state and any specific requirements established by the repair operation.

## **General Information:**

This quality assurance manual may be used in its current form or may be reprinted by the repair operation. If this quality assurance manual is reprinted by the repair operation, certain minimum information must be included. The required information that must be included is marked with an asterisk (\*).

To use this manual, simply complete requested information and submit to it to the Building Codes Division, Recreational Vehicle Program along with the appropriate application form and fee.

## **Business Information:**

\*Business Name: \_\_\_\_\_

\*Address (street or P.O. Box): \_\_\_\_\_

\*City: \_\_\_\_\_ \*State: \_\_\_\_\_ \*Zip: \_\_\_\_\_

\*Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail address: \_\_\_\_\_

\*Quality Assurance Technician(s) \*Include copy of certificate(s):

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

\_\_\_\_\_  
\*Owner/Operator (Name & Signature)

\_\_\_\_\_  
\*Service Manager/Foreman (Name & Signature)

## **\*Quality Assurance Procedures:**

To ensure that regulated repairs meet minimum codes, standards, and are performed at acceptable quality level, the following quality control procedures must be implemented by the repair operation:

1. The owner and/or service manager/foreman have complete control and responsibility over the work performed within this facility.
2. \*Every regulated repair performed must be inspected by an approved quality assurance technician during and/or at final completion of the repair.
3. Follow-up inspections must be made of unsatisfactory work by the approved quality assurance technician to ensure an acceptable quality level has been obtained.
4. \*Quality assurance technicians must use a quality control checklist for all regulated repairs. The quality control checklist is used to ensure conformance with the minimum safety codes and standards.
5. \*All appropriate tests must be performed and verified through the quality assurance procedures.
6. \*Upon satisfactory completion of regulated repairs, the quality assurance technician must affix an Oregon Insignia of Compliance to the vehicle and record the label number and corresponding work performed in the repair work order. The insignia of compliance may be placed near the repair or may be placed on the exterior near the main entry into the vehicle.
7. \*The Insignia of Compliance must reference the work/repair order number assigned to the vehicle being repaired and the registration number of the repair facility.

## **\*Testing Procedures:**

The following test must be performed, as applicable, to ensure that each regulated repairs meets minimum codes and standards:

### **Electrical**

There are four (4) different tests that may be performed on 120-volt and 12-volt electrical equipment: Continuity, Polarity, GFCI, and Operational test.

The tests are conducted as follows:

*\*Continuity Test:* A ground continuity test is performed after all work is completed. The test is conducted to ensure all metallic parts provide an adequate electrical connection throughout the ground circuit.

*\*Procedure:* Connect one clip of the continuity tester to the ground buss or “known” ground source and touch the other end of the tester to the metallic case or box of the equipment.

*\*Polarity Test:* A polarity test is performed any time a receptacle is added to the 120-volt electrical system. The test is made to ensure correct arrangement of wires or “polarity” at the receptacle.

*Procedure:* With the unit connected to 120 volt power supply, check the added receptacles by using a plug-in type testing device to determine if the polarity is correct.

*\*GFCI Test:* A ground fault circuit interrupter (GFCI) test is performed to ensure the correct polarity and functionality of an added GFCI receptacle.

*Procedure:* With the unit connected to 120-volt power supply, check the added GFCI receptacle by using a device designed to detect electrical leakage in excess of 5 ma.

*\*Operational Test:* An operational test is performed to demonstrate that all added equipment is properly connected and in working order.

*Procedure:* With the unit connected to 120-volt power supply, operate all switched and direct wired appliances, including 12-volt equipment.

## **Plumbing:**

There are two plumbing system tests that may need to be performed: Water piping & Drainage system.

*\*Water Piping Test:* Water piping must be subjected to a pressure test to verify that all connections have been made properly by using the following procedure:

Procedure: Fill the entire system including the water heater storage tank with water and pressure testing with air or water at 80 psi to 100 psi for 10 minutes without a drop in pressure.

*\*Drainage Test:* Plumbing fixtures must be filled with water to check for leaks under a “full-flow” of water.

Procedure: Plug all sinks and fill with water. Conduct a flow test by pulling the drain plugs as quickly as possible. Water should not back up in any fixture and there should be no leaks around the P-trap or drain line connections.

## **LP-Gas System Test:**

LP-Gas system tests must be performed to ensure there are not gas leaks in the gas piping system prior to function testing any LP-Gas appliance.

*\*Appliance Test:* An appliance test is performed to check LP-Gas fittings within the system for leaks. This drop test is typically performed at the range/cooktop burner.

Procedure: Apply 8-14 inches of water column to the system. Shut off the supply pressure and open the range burner valve to drop the pressure to 8 inches of water column.

No drop in pressure shall occur over a 3 minute period. Use a gauge that is calibrated in 1 inch water column increments or less. In the event of a drop in pressure appliance connections can be tested for leakage with either soapy water or bubble solution. Do not use products containing ammonia or chlorine.

# \* Regulated Repair / Alteration Checklist

\*Label # \_\_\_\_\_

\*Repair Order # \_\_\_\_\_

A copy of this checklist must be attached to the work order when regulated repairs and alterations are performed.

This checklist will be used to verify conformance to the adopted codes and quality assurance manual.

### Battery Installations

- Compartment vaportight to the interior.
- Battery compartment vented within two inches of top and bottom.
- Fuse within 18" of Battery.

### Generator Installations

- CO detector added.
- Vented per Mfg.'s instructions.
- Compartment constructed of sheet metal & vapor tight to vehicle interior.
- Ground strap to frame.
- Gen. supply conductors in flex conduit.
- Generator exhaust not located within 6" of opening into vehicle.
- Transfer switch and/or cord recept. added to prevent interconnection of power sources.

### Washer Installation

- Main Panel can accept new branch circuit.
- Circuit breaker and wire matches nameplate rating or meets installation instructions.
- Circuit is dedicated for washer.
- Water lines are sized correctly.
- Washer standpipe meets code or Mfg.'s installation instructions.
- Venting, "P" trap, & clean-out provided.

### Structural Remodeling

- All interior materials used have a flame spread rating of 200 or less.
- Mirrors exceeding 431-sq. in. safety glazed.
- Access to exits thru doors are not locked.
- Exit windows are not blocked or removed.
- Smoke detector not blocked or removed.
- Fire extinguisher available

### Tank flush kits

- Listed system.
- No cross connection between drinking water system and flush system.

### Converter

- Listed for RV use.
- Enclosure bonded to frame with #8.
- Converter rating meets 12v load.

### Air Conditioner

- Installed per Mfg.'s installation Instruction.
- Circuit breaker matches nameplate rating of unit (usually 20 amp required).
- Correct wire sizes (usually 12 awg.).
- Proper wiring, connections and boxes installed.

### Dryer Installation

- Main Panel can accept new branch circuit.
- Circuit breaker and wire matches nameplate rating or meets installation instructions.
- If 240 volt, neutral & ground separated.
- Metallic only approved exhaust duct used.
- Duct does not terminate under the RV.
- Return air provided, if installed in alcove.

### Exhaust Re-location

- Exh. does not terminate under the vehicle.
- Exhaust does not terminate under slide-out
- All holes which could communicate exhaust gasses are sealed.

### Testing - LP-Gas

- Appliance Operation
- Drop Test - 8" WC for 10 min. without drop.

### Testing - Electrical

- Continuity
- Polarity
- GFCI
- Operational

### Plumbing

- Listed Components
- Venting Provided for all fixture traps.
- Test Performed
- No Cross Connection Between Potable water sources and waste water tanks.

### Microwave Installation

- Installed per Mfg.'s installation instruction.
- Circuit breaker matches nameplate rating or meets installation instructions.
- Receptacle is dedicated for the microwave or GFCI protected.
- Receptacle is accessible.

### Dishwasher Installation

- Main panel can accept new branch circuit.
- Circuit breaker and wire matches nameplate rating or meets installation instructions.
- Air gap installed at correct height and location.

### Add Outside Shower

- Listed System with back-flow prevention.
- Water line sized appropriately.
- Shower head does not reach ground.

### Testing - Plumbing

- Water piping
- Drainage

\*Other Regulated Repair Work: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Inspected By: \_\_\_\_\_

Date: \_\_\_\_\_