

## TRUCK, HEAVY, MC3, MACK – ALL TYPES

### INSPECTION/REPAIR/REPLACEMENT OF TAILGATE/SIDEGATE HINGES AND HINGE MOUNTS

## MISCELLANEOUS INSTRUCTION

This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with EMEI General A 001.

### INTRODUCTION

1. There have been instances where tailgates have separated from their hinge mountings. Subsequent investigation has found that the most likely cause is a combination of misaligned hinge assemblies, wear and the increase of the tailgate hinge gap allowing the tailgates to separate from their associated hinge mounts.
2. This instruction details the following:
  - a. inspection criteria for tailgate/sidegate hinge assemblies;
  - b. repair procedures for closing excessive gap in the tailgate/sidegate hinges;
  - c. replacement procedures for damaged or worn hinge mounts; and
  - d. replacement procedures for damaged or worn tailgate hinges.

### NOTE

There is no replacement procedure for the sidegate hinges. If a sidegate hinge gap is unable to be closed in accordance with the procedures detailed within this instruction, then the sidegate must be replaced.

3. If any tailgate/sidegate hinge or hinge mount fails to meet the inspection parameters as detailed in Paragraphs 11, 12 and 13, the tailgate/sidegate and/or vehicle are to be classified **XX – Do Not Use** until repairs have been effected.

### Associated Publications

4. Reference may be necessary to the latest issue of the following documents:
  - a. [EMEI Workshop D 180](#) – Flaw Detection, Non Destructive;
  - b. [EMEI Workshop D 700](#) – Painting of Army Equipment, Basic Painting Principles;
  - c. [EMEI Workshop D 701](#) – Painting of Army Equipment, Repair Policy for Equipment Painted in Polyurethane Paint (PUP);
  - d. [EMEI Workshop E 652](#) – Application and Removal of Polyurethane Paints and Solvents;
  - e. [EMEI Workshop J 003](#) – Welding Techniques, General;
  - f. [EMEI Workshop J 021](#) – Plants, Welding and Cutting, Oxy-Acetylene, Oxy Acetylene Welding and Cutting Equipment;
  - g. [EMEI Workshop J 022](#) – Plants, Welding and Cutting, Oxy-Acetylene, Terms and Definitions, Inspection, Testing Procedures and Maintenance;
  - h. [AS/NZS 1554.1](#) Structural Steel Welding – Part 1: Welding of Steel Structures;
  - i. [AS 1796](#) Certification of Welders and Welding Supervisors;
  - j. [AS/NZS 2717.1](#) ES6-GC/M-W503AH Welding – Electrodes – Gas Metal Arc – Ferritic Steel Electrodes;
  - k. [Defence Safety Manual](#) (SAFETYMAN);
  - l. [Material Safety Data Sheet](#) (MSDS) – product information sheet; and
  - m. [Technical Regulation of Army Materiel Manual](#) (TRAMM).

5. **Authority.** ECO LVSP0 032/06.

## GENERAL

### Instruction Application

6. This instruction is applicable to the Truck, Cargo, Heavy, MC3 – Mack 'R'.

### Items Affected

7. The items affected include the tailgate/sidegate hinges and tailgate/sidegate hinge mounts. These items may be misaligned/damaged and/or have excessive wear and/or excessive hinge gap due to mechanical spreading of the tailgate/sidegate hinge.

### Authorised Tradespersons

8. Action detailed in this instruction is to be performed only by RAEME or civilian equivalent tradespersons, in workshops authorised to carry out Light, Medium or Heavy Grade repairs as follows:
- a. **Inspection.** Inspection is to be carried out by ECN 229-4, 146-4 or 235-2 or civilian equivalent.
  - b. **Removal, Fitting and Re-sizing.** These actions are to be carried out by ECN 235-2 or civilian tradespersons qualified to Certificate No 8 or Certificate 3E, Gas, Metal, Arc Welding, in accordance with AS 1796 – Welding Certificate Code.

### Welding Process

9. The welding process is as follows:
- a. **Pre-Weld Cleaning.** Pre-weld cleaning is to remove all surface protective coatings from the repair area for a distance of 25 mm in all directions in accordance with EMEI Workshop D 701. This will include the tailgate hinges if required. Personal Protective Equipment for this procedure is detailed in EMEI Workshop E 652.
  - b. **Workshop Environmental Conditions.** The weld repair area should be maintained at a temperature of not less than 10° C and the temperature of the actual metal should not be less than 20° C.
  - c. **Welding Procedure.** The welding procedure is to be in accordance with AS 1554.1 (SP).
  - d. **Type.** The welding process is to be Gas Metal Arc Welding (GMAW).
  - e. **Joint Position.** The joint position will be a 6 mm single run fillet weld Horizontal 2F, Vertical 3F/PF and single V butt joint.
  - f. **Shielding Gas.** The shielding gas is Argoshield Light (Composition is Argon + 5% CO<sub>2</sub>, + 3% O<sub>2</sub>) with a flow rate of 15 to 20 L/Min.
  - g. **Inspection of Welds.** A visual inspection of the repair is required during the preparation and setting up of the joint to ensure alignment. After welding a visual inspection is to be conducted for any weld defects. If a Dye Penetrant Inspection is required the procedure is detailed in EMEI Workshop D 180.

### Stores Required

10. **Consumables.** The stores required are the welding consumables (filler wire) to meet AS 2717.1 ES6-GM-W503AH (Autocraft LW1-6) - 0.9 mm wire.

## DETAIL

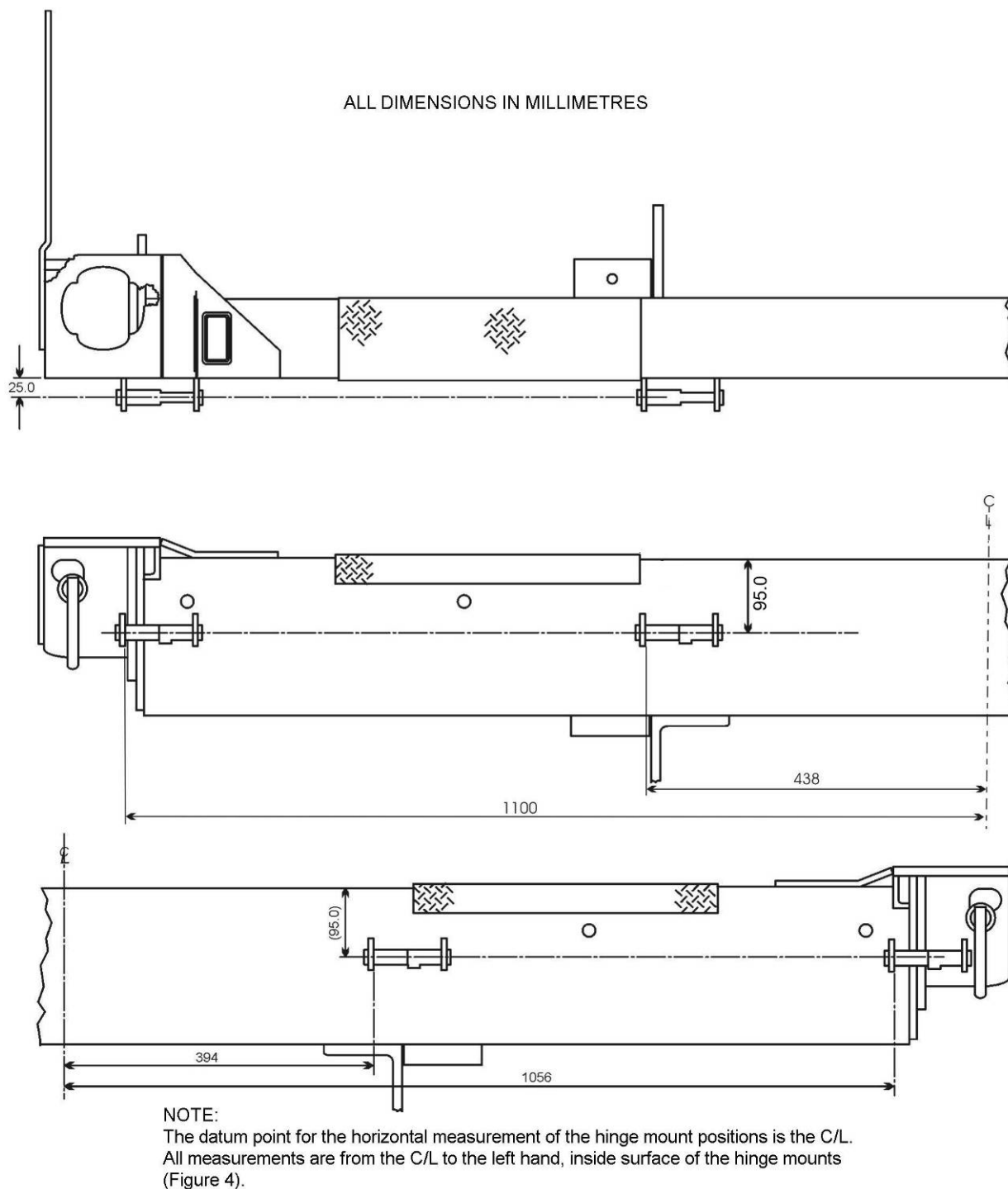
### Inspection Criteria

#### NOTE

All dimensions are in millimetres unless stated otherwise.

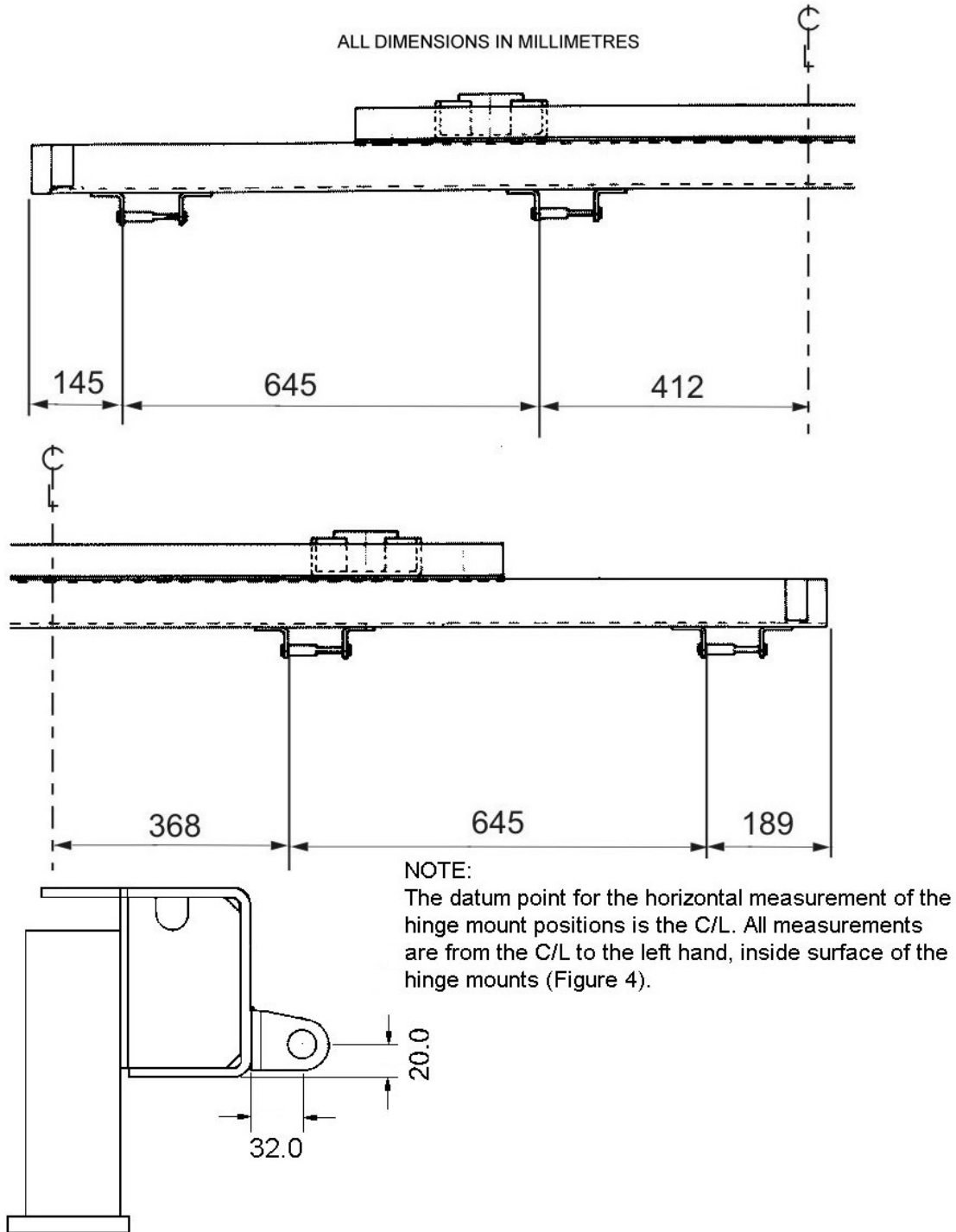
For vehicles fitted with twist locks, some tailgate hinge mounts were not aligned correctly during the fitting program. It is imperative that the hinge mounts are positioned in accordance with the dimensions shown in Figure 1. Likewise the tailgate hinges may also be out of alignment due to the tailgate and/or the hinges being damaged and may require adjustment.

- 11.** Visually inspect all tailgate/sidegate hinges and hinge mounts for signs of misalignment, damage, deformation or cracking and adjust/repair/replace as required (Figures 1 and 2).



**Figure 1 Tailgate Hinge Mount Positions – with Twist Lock**

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**Figure 2 Tailgate Hinge Mount Positions – without Twist Lock**

**12.** Ensure that there is clearance between all tailgate/sidegate hinge ends and their respective hinge mount tangs when the gates are in the closed position (Figure 3). Any hinge end and hinge mount tang contact can cause mechanical opening of the hinge gap when the gates are opened. Adjust/repair/replace any affected items as required.

ENSURE THERE IS  
CLEARANCE  
BETWEEN ALL HINGE  
ENDS AND HINGE  
MOUNT TANGS  
WHEN THE GATES  
ARE CLOSED.



Figure 3 Hinge End to Hinge Mount Tang Clearance

NOTE

Due to the sidegate hinges not being a supported supply item, if a sidegate hinge gap is unable to be closed in accordance with the procedures detailed within this instruction then the sidegate must be replaced.

13. Using suitable precision measuring equipment, measure the diameter of the hinge mount pivot bolts along their length where the hinges rotate when fitted. If the diameter is less than 16.5 mm the hinge mount must be replaced (Figure 4). Measure along the opening of each hinge, the gap of the hinge must be equal to or less than 2.0 mm under the size of its associated hinge mount bolt e.g. if the hinge bolt is 18 mm the hinge gap must be 16 mm or less otherwise the hinge gap must be closed or have the hinge replaced (Figure 5). In the case where a sidegate hinge end gap cannot be closed the side gate must be replaced.

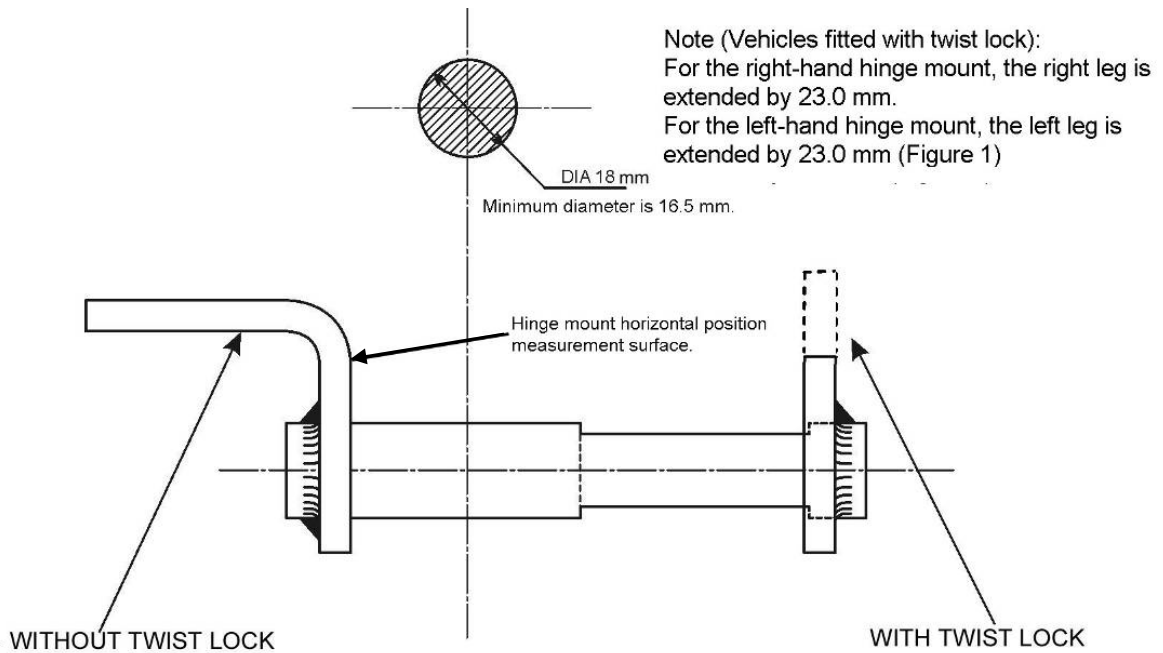


Figure 4 Hinge Mount Pivot Bolt

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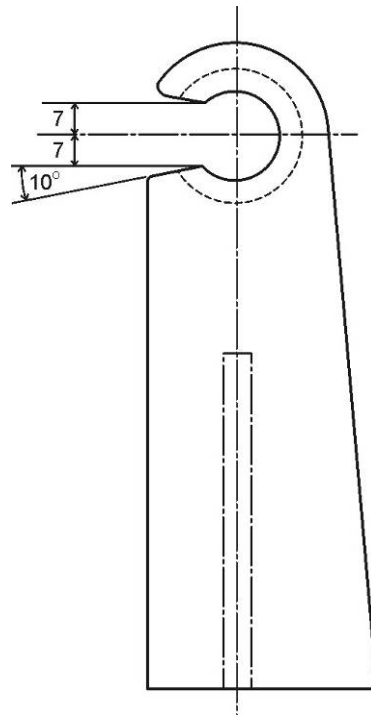


Figure 5 Hinge Gap

#### Repair Procedure

### WARNING

All industrial safety, work practices and equipment operating and maintenance instructions pertaining to this EMEI are to be adhered to.

Precautions should be taken prior to carrying out repairs which include painting, sanding, scraping, heating or welding. Refer to EMEI Workshop:

D 701 – Repair Policy for Equipment Painted in Polyurethane Paint; and

E 652 – Application and Removal of Polyurethane Paints and Solvents.

**14. Hinge Gap Re-sizing - Heating Not Required.** Should any hinge gap fail the inspection criteria in Paragraph 13 (Figure 5) and in the inspector's opinion that closing the gap is feasible without using heat, proceed as follows:

- a. Using suitable tools close the hinge gap to 13 to 14 mm.
- b. Carry out a visual inspection for any cracks, if cracks have appeared refer to Paragraph 18 or 19 for tailgate hinge replacement (if any sidegate hinge is cracked the sidegate assembly must be replaced).
- c. Check the alignment of the hinges and adjust them if required.
- d. Ensure that the associated hinge mounts are aligned and fit the tailgate/sidegate.
- e. Check that there is clearance between the hinge and the hinge mount tang, adjust if required.
- f. Swing the gate down and up to ensure free movement, adjust it if required.
- g. Touch-up any affected paint surfaces in accordance with EMEI Workshop D 700.

**15. Hinge Gap Re-Sizing – Heating Required.** Should any hinge gap fail the inspection criteria in Paragraph 13 (Figure 5) and in the inspector's opinion closing the gap is feasible by using heat, proceed as follows:

- a. Remove paint in accordance with EMEI Workshop D 701 and EMEI Workshop E 652.

- b. Using oxy-acetylene equipment in accordance with EMEI Workshop J 021 and 022, heat the hinge end area to a dull red.
- c. Using suitable tools close the hinge gap to 13 to 14 mm.
- d. Quench the heated area using a water medium.
- e. After the area has cooled, carry out a visual inspection for any cracks, if cracks have appeared refer to Paragraph 18 or 19 for tailgate hinge replacement (if any sidegate hinge is cracked the sidegate assembly must be replaced).
- f. Check the alignment of the hinges and adjust them if required.
- g. Ensure that the associated hinge mounts are aligned and fit the tailgate/sidegate.
- h. Check that there is clearance between the hinge and the hinge mount tang, adjust if required.
- i. Swing the gate down and up to ensure free movement, adjust it if required.
- j. Touch-up any affected paint surfaces in accordance with EMEI Workshop D 700.

**16. Hinge Mount Adjustment/Replacement - Tailgate.** Should any tailgate hinge mount bolt fail the inspection criteria in Paragraph 13 (Figure 4) or the hinge mount requires adjustment, proceed as follows:

- a. Remove the hinge mount by cutting the hinge mount as close as possible to the welds without damaging the base material and remove the hinge.
- b. Buff away the excess weld and paint ensuring there is no penetration into the base material.

**NOTE**

For vehicles fitted with twist locks that require new mounts, modify the mount legs to the dimensions shown in Figures 1 and 4 (the old mount can be used as a guide).

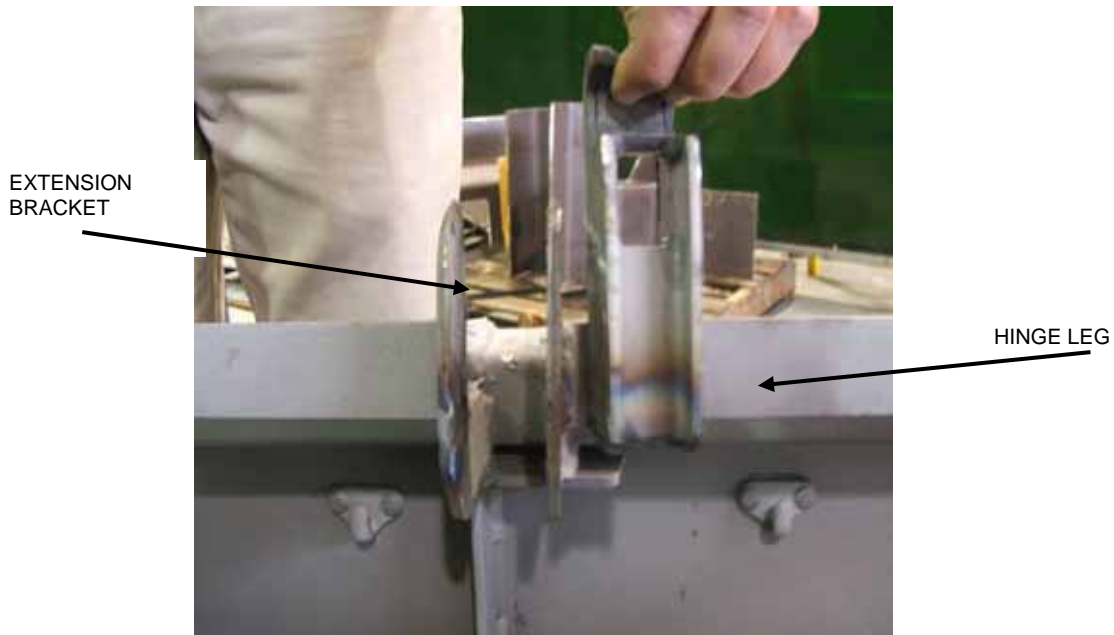
- c. Position and tack weld the hinge mount to the rear beam to the dimensions shown in Figure 1 (vehicles with twist lock) or Figure 2 (vehicles without twist lock).
- d. Check the hinge mounts for correct alignment and adjust them if required.
- e. Weld the mounts in position.
- f. Touch-up any affected paint surfaces in accordance with EMEI Workshop D 700.

**17. Hinge Mount Replacement – Sidegate.** Should any sidegate hinge mount bolt fail the inspection criteria in Paragraph 13 (Figure 4), proceed as follows:

- a. To enable the replacement sidegate hinge mount to be fitted to the correct position, mark the position of the mount to be replaced.
- b. Remove the hinge mount by cutting the hinge mount as close as possible to the welds without damaging the base material and remove the hinge.
- c. Tack weld the new mount into the previously marked position.
- d. Check the alignment of the mount and adjust it if required.
- e. Weld the mount in position.
- f. Touch-up any affected paint surfaces in accordance with EMEI Workshop D 700.

**18. Tailgate Hinge (Leg) Replacement – Vehicles with Twist Locks.** Should any of the hinges fail the inspection criteria in Paragraphs 11, 12 and 13 and the hinge gap is unable to be closed, proceed as follows:

- a. Remove the tailgate hinge leg by cutting it as close as possible to the welds, without damaging the extension brackets it is attached to, and remove the leg (Figure 6).



**Figure 6 Hinge Leg Removed From Extension Brackets**

- b. Buff away any excess weld ensuring that there is no penetration into the extension leg base material.
- c. Ensure the hinge mounts are aligned in accordance with the dimensions shown in Figure 1.
- d. Fit the new hinge leg to the tailgate hinge extension brackets (the fit should be tight to aid alignment and welding – the extension legs may be opened or closed to suit).
- e. Ensure the tailgate hinges are aligned correctly, if not adjust them to suit.
- f. Fit the tailgate to the vehicle tray in the closed position.
- g. To enable the tailgate to open and close without interference, ensure that there is sufficient clearance between the tray and the bottom of the tailgate ends (approximately 3 mm).

**CAUTION**

**To help prevent the tailgate hinge gap widening when the tailgate is lowered, ensure that there is clearance between all the hinges and hinge mount tangs when the tailgate is in the closed position.**

- h. Tack weld the replacement hinge/s in position.

**WARNING**

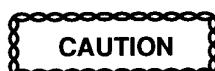
**Take extreme care while adjusting the tailgate. The hinge legs and other brackets are only tack welded therefore can break off easily. This can cause the tailgate to fall off causing injuries to personnel and damage to equipment.**

- i. Swing the tailgate down and up to ensure free movement and adjust it if required.
- j. Weld the tailgate leg hinge/s to the extension brackets.
- k. Check the tailgate again for correct operation and adjust it if required.
- l. Touch-up any affected paint surfaces in accordance with EMEI Workshop D 700.



**19. Tailgate Hinge Replacement – Vehicles without Twist Locks.** Should any of the hinges fail the inspection criteria in Paragraphs 11, 12 and 13 (Figure 5) and the hinge gap is unable to be closed, proceed as follows:

- a. Remove the tailgate hinge by cutting the hinge as close as possible to the welds without damaging the tailgate base material.
- b. Buff away any excess weld ensuring there is no penetration into the tailgate base material.
- c. Ensure the hinge mounts are aligned in accordance with the dimensions shown in Figure 2.
- d. Fit the tailgate to the vehicle tray in the closed position (if all tailgate hinges are not being replaced, ensure the hinges not replaced are aligned, if not, adjust them).
- e. To enable the tailgate to open and close without interference, ensure that there is sufficient clearance between the tray and the bottom of the tailgate ends (approximately 3 mm).



**To help prevent the tailgate hinge gap widening when the tailgate is lowered, ensure that there is clearance between all the hinges and hinge mount tangs when the tailgate is in the closed position.**

- f. Tack weld the replacement hinge/s in position.



**Take extreme care while adjusting the tailgate. The hinge legs and other brackets are only tack welded therefore can brake off easily. This can cause the tailgate to fall off causing injuries to personnel and damage to equipment.**

- g. Swing the tailgate down and up to ensure free movement and adjust it if required.
- h. Weld the tailgate hinge/s to the tailgate.
- i. Check the tailgate again for correct operation and adjust it if required.
- j. Touch-up any affected paint surfaces in accordance with EMEI Workshop D 700.

**20. Documentation.** All welds are to be notated in Part 4 of the vehicle's Record Book for Service Equipment (GM 120). A copy of a Weld Data Sheet can be located in EMEI Workshop J 003.

**END**

Distribution List: **VEH G 50.0 – Code 2** (Maint Level)  
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