Vehicle Lift Kit Installation and Inspection Procedure

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Prepared For:

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# Initial Inspection

This Engineering inspection of the vehicle will evaluate the relative safety of the vehicle for operation on the Provincial Highways after the addition of a lift kit. In particular, the Static Stability Factor that determines the propensity for a rollover, and the Gross Vehicle Weight that affects the braking ability, are evaluated. However, the overall condition of the vehicle must also be checked.

While this inspection does not cover or replace the items inspected by the Provincial Vehicle Safety Inspection, it is prudent to perform an initial evaluation of the vehicle prior to installing the lift kit. If there are other aspects of the vehicle that render it unsafe for operation on the highways, then the Engineering Inspection may reject the vehicle.

To avoid disappointing the customer, the overall condition of the vehicle should be inspected. If there are other modifications or additions to the vehicle that might affect the approval they should be noted and pointed out to the customer. If the vehicle has additional items, such as a winch, steel rims, body armor, the customer should be advised to have the vehicle weighed prior to the installation of the lift kit in case the Maximum Gross Vehicle Weight is exceeded.

Assuming the initial condition of the vehicle is good, and there is nothing obvious that would cause the vehicle to fail an inspection, then the installation of the lift kit can proceed.

# Initial Measurements

Measure the following values, and record them in the inspection sheet:

2.1 The width of the vehicle from the center of the passenger tire to the center of the drivers tire.

\_\_\_\_\_\_\_\_\_\_N/A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.2 The wheel base of the vehicle from the center of the front axle to the center of the rear axle.

\_\_\_\_\_\_\_\_\_\_ N/A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.3 The height from the ground to the bottom of the driver side door.

\_\_\_\_\_\_\_\_\_\_\_ N/A \_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.4 The height from the ground to the bottom of the front and rear bumpers.

\_\_\_\_\_\_\_\_\_\_\_ N/A \_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.5 The height from the ground to the center of the headlights

\_\_\_\_\_\_\_\_\_\_\_ N/A \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Record the following information:

2.6 Manufacture and model of tire:

\_\_\_\_\_\_ N/A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.7 Size of tire and rim:

\_\_\_\_\_ N/A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Photograph the initial condition of the vehicle. Take pictures of the front and side of the vehicle, the steering system, and any non OEM equipment.

# Installation of the Lift Kit

3.1 Verify that all the required parts are supplied as per the manufacturer’s installation instructions.

Initial: \_N/A\_

3.2 Install lift kit as per manufacturer’s instructions.

3.3 Check all torque settings and mark with a red permanent marker after checking.

Initial: \_N/A\_

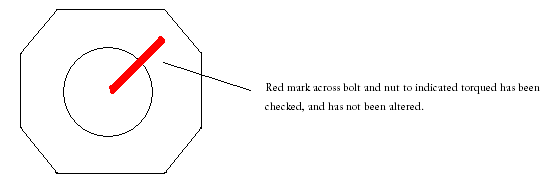


Figure - Torque Check

# 4.0 Final Measurements.

Measure and record the following values:

4.1 Width of the vehicle from the center of the passenger tire to the center of the drivers tire.

\_\_\_\_\_\_70.5”\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.2 Wheel base of the vehicle from the center of the front axle to the center of the rear axle.

\_\_\_\_\_\_133.5”\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.3 Height from the ground to the bottom of the driver side door.

\_\_\_\_\_\_\_28.25”\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.4 Height from the ground to the bottom of the front and rear bumpers.

\_\_\_26.5” (F) 23” (R)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.5 Height from the ground to the center of the headlights.

\_\_\_\_\_\_\_47”\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.6 Height from the ground to the center of the rear taillights

\_\_\_\_\_\_\_46.5”\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.6 Weight of vehicle on the front axle measured with the front half of the vehicle on the weigh scale (FAVW).

\_\_\_\_\_\_1350\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.7 Weight of the vehicle on the rear axle measured with the rear half of the vehicle on the weigh scale (RAVW).

\_\_\_\_\_\_910\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.8 Gross vehicle weight measured with the complete vehicle on the weigh scale (GVW).

\_\_\_\_\_\_2260\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Record the following information:

4.9 Manufacture and model of tire:

\_\_\_Dick Cepek\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

4.10 Size of tire and rim:

\_\_\_\_35-12.50-15 LT\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Photograph the final condition of the vehicle. Take pictures of the front and side of the vehicle, the steering system, and all installed equipment associated with the lift kit.

# 5.0 Conclusion

Lift kit not installed by Grove Auto, so initial values for truck not available to measure.

Needs new inner tie rod off the pitman arm, and both front wheel bearings need replacing. These items will affect the handling of the vehicle, but they do not affect the engineering calculations, and do not presently render the truck unsafe.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Vehicle Modification Installation and Inspection Sheet** | | | | | | | |
| Make:  **GMC** | Model:  **Pickup** | | Year:  **1987** | | | VIN:  **1GTEV14H7H5J24121** | |
| Description of Modification: **Lift Kit Installed and larger tires added.** | | | | | | | |
| Kit Manufacturer: | | Part No:  **N/A** | | Installed By:  **N/A** | | | Date of Installation:  **N/A** |
| **Measurements** | | **Original** | |  | **Modified** | | **Comments** |
| Vehicle Width: | | 65.8” | |  | 70.5” | |  |
| Center of Gravity Height | | 29.4” | |  | 34” | |  |
| Static Stability Factor | | 1.12 | |  | 1.04 | |  |
| Gross Vehicle Weight: | | N/A | |  | 4972Lbs | | Limit 7000Lbs |
| Front Axle Weight | | N/A | |  | 2972Lbs | |  |
| Rear Axle Weight | | N/A | |  | 2000Lbs | |  |
| Driver door height | | N/A | |  | 28.25” | |  |
| Front Bumper height | | N/A | |  | 26.5” | |  |
| Rear Bumper Height | | N/A | |  | 23” | |  |
| Headlights height | | N/A | |  | 47” | |  |
| Taillights height | | N/A | |  | 46.5” | |  |
| **Check List** | |  | | **Yes / No** | | | **Comments** |
| Correct kit for Vehicle: | | | | N/A | | |  |
| Correct Parts supplied as per packing slip: | | | | N/A | | |  |
| Installation Procedure Followed: | | | | N/A | | |  |
| All bolts torque and checked as per specifications: | | | | N/A | | |  |
| Brake lines long enough for lift kit: | | | | Yes | | |  |
| Tires and fenders are free of interference: | | | | Yes | | |  |
| Tires and steering or suspension are free of interference: | | | | Yes | | |  |
| Overlap of tires beyond fenders is within 2”: | | | | Yes | | |  |
| Driveshaft rotates without binding: | | | | Yes | | |  |
| Lights are within regulation height: | | | | Yes | | |  |
| Bumpers are within regulation height: | | | | Yes | | |  |
| Gross Vehicle Weight is within limits: | | | | Yes | | |  |
| Axle Weights are within limits: | | | | Yes | | |  |
| **The installation of the lift kit has been performed correctly, and the kit is correct for this vehicle. The modified vehicle is within the maximum gross vehicle weight for its class, and the lights and bumpers are within regulations.**  **This modification may alter the handling characteristics of the vehicle; however the vehicle is safe for operation on the road.** | | | | **Certified by: Stephen Adamson P.Eng** | | | |
| The handling of this vehicle has been changed from the original factory settings, and the owner / operator has been made aware of this fact. There are many factors that affect the safe handling of a motor vehicle, of which the static stability factor (SSF) is one. The speed of operation and the condition of the road are also major factors. The installation of this lift kit modifies the handling of this vehicle, but does not render it unsafe for use on the road. However, the owner / operation is responsible for operating the vehicle in a safe manner consistent with the road / trail conditions. | | | | | | | |

The likelihood of a rollover in a vehicle is related to the stability factor of the vehicle. The stability factor is a ratio of the height of the center of gravity to the track width. When stationary or moving in a straight line at a constant speed, the stability factor is represented by the static stability factor. However, when a vehicle accelerates the center of gravity changes and the stability factor also changes. A vehicle with a low static stability factor will be more likely to rollover when exposed to sudden changes in direction, such as avoiding obstacles. In addition, there are factors associated with off road vehicles that could cause a rollover to be more likely. **It is up to the operator of such vehicles to be aware of the risks, and to operate the vehicle accordingly**.

As a vehicle turns it will lean towards the turn. This causes the center of gravity to move upwards, and towards the side of the vehicle facing the turn. This acts to reduce the stability factor and to make a rollover more likely. The quicker the turn, the more a vehicle leans, and the lower the stability factor becomes. **Sharp sudden turns should be avoided**.

When driving off road, it is common to lower the air pressure in the tires to gain more traction. As a vehicle turns, the tire on the inside of the turn will tend to roll into the vehicle. This adds to the lean causing the center of gravity to rise up, and the track width to decrease, again decreasing the stability factor. **Correct tire pressure will minimize this effect**.

Additionally, as the tire rotates it goes through a compression and expansion process. This causes internal friction and hence heating of the rubber. An under inflated tire will experience greater compression and heating. This heating will cause the tire to roll more in a turn, and to possibly fail. **Correct tire pressure will minimize this effect**.

Finally, if any stability features such as sway bars have been disconnected for off road use, they should be reinstalled before driving on the highways. These items minimize the lean of the vehicle when turning, and aid in keeping the stability factor higher.

Raised vehicles that are driven off road require the operator to be more aware of the handling characteristics of the vehicle, and the possible dangers when driving on and off road, especially at higher speeds. Any modifications made while off road driving should be corrected before driving back on highways. **The owner of the vehicle should also inform anyone who borrows the vehicle of the handling characteristics of the vehicle, and should ensure they are capable of safely operating the vehicle under all conditions.**