



## Joint Strength Review

### FMVSS 221

The two joints that need to be reinforced to meet FMVSS 221 regulation are located at the 1/3 and the 2/3 of the bus. See Figure 1 below.



Figure 1: Location of the joints to reinforce

A number of rivets or screws are to be added between the actual 15 rivets in place. Either the rivets or the screws are to be used. Two different templates are shipped with the rivets and the self-tap screws to allow you to choose, regarding the tooling you have, how you want to implement the fix. Figure 2 shows the joint between two ceiling sheets.



Figure 2: Photo of the actual joint

### Steps to follow using the rivets

There are 42 rivets to add to the actual configuration. This means that 3 rivets need to be installed between every two rivets all along the joint. Figure 3 illustrate the template made of a thin magnet that sticks to the ceiling without any help.

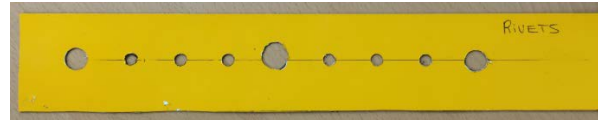


Figure 3: Template to Install the Rivets

The three larger holes serve to locate the template in place and assure to align the new holes.

Tools needed:

- Drill
- Marker
- 1/4 , G4 Riveter

1. Align the template



2. Mark the holes with a marker



3. Remove the template and drill the holes with the short F drill provided



4. Repeat the same operations for the whole width of the joint.
5. Install the ¼ rivets in the holes.

### Steps to Follow Using the Self-Tap Screws

There are 70 self-tap screws to add to the actual configuration. This means that 5 screws need to be installed between every two rivets all along the joint. Figure 3 illustrate the template made of a thin magnet that sticks to the ceiling without any help.



Figure 4: Template to Install the Rivets

The three larger holes serve to locate the template in place and assure to align the new holes.

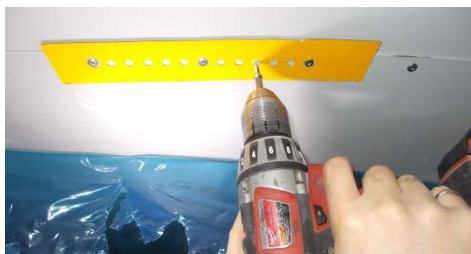
Tool needed:

- Drill

1. Align the template



2. Centered and drill the self-tap screws in the template holes while the template remains in place. (the template will protect the paint of the ceiling in case of a wrong move with the drill)



3. Remove the template (the screw heads will slide through the template holes)



4. Repeat the same operations for the whole width of the joint.