

Blue Bird School Bus Side Panel Repair Procedure

School buses have exterior body panel joints reinforced to meet Federal Safety Standard 221 that requires 60% joint strength. Some joints will be reinforced using epoxy adhesive, extra screws, rivets, bolts or other mechanical fasteners. These panels (joints) can be repaired by same procedures used in the past to repair or replace damaged body panels.

Joints on new school buses will be strengthened by a combination of a tough epoxy adhesive plus the same number of fasteners which have been used in the past. This combination of an epoxy adhesive plus rivets and screws is called “rivet bonding”. Rivet bonding has been used for years in the aircraft industry to assemble commercial and military jet aircraft. Using the right combination of mechanical fasteners plus adhesive gives a combination of strength, toughness, weatherproofing and other advantages which can not be obtained with either fasteners or adhesive alone.

Because the bonded joints are so strong and so tough, special procedures will be required to repair buses which are damaged in the field. New techniques will also be needed to replace body panels, in order to guarantee that the new joints, made in the field, will also meet federal safety standards.

NOTE: The following repair procedures are approved only when using Blue Bird authorized original equipment panels, fasteners and adhesives.

SAFETY PRECAUTIONS: Park bus, apply parking brake, remove ignition key, chock wheels and disconnect battery.

COMPLETE SIDE PANEL REPLACEMENT PROCEDURE:

Step 1. Remove all rivets and other mechanical fasteners from all edges of damaged panel or panels by drilling, cold chisel, or other procedures. Because the epoxy also serves as a thread locking compound, it may be necessary to apply local heat, as in Step 3, around screw head areas to aid in removal of threaded fasteners.

Step 2. Wear safety glasses. Put an insulated glove on one hand, hold an 8” or 12” screwdriver in the gloved hand and a Master flameless heat gun (model 751) in the other.

Step 3. Heat a small section of the joint, about 6 to 10” long, preferably near an edge or corner, up to about 250 degrees Fahrenheit. Do not overheat. Do not try to “burn” out the epoxy. Do not char the epoxy or scorch the paint. Adjust the joint temperature by how far away you hold the hot air gun. If you start to blister or discolor the paint, back off. Neither the epoxy nor the paint should fume, smoke or discolor if you stay below the recommended temperature.

Step 4. Probe the joint with a screwdriver. When the joint reaches temperature, the epoxy will soften and the screwdriver can be inserted between the panels. Then move the torch and screwdriver along the joint and it will “unzip”.

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Step 5. Remove the damaged panels. Use the putty knife or a wire brush to scrape away any loose or flaky epoxy left on the edge of the panels remaining in place. Be sure to remove all original epoxy adhesive.

Step 6. Get the new panel(s) ready. Check alignment to make sure the new panel(s) fit.

Step 7. Make sure everything is ready (clamps, fixtures, drills riveting gun and other tools). Make sure the edges of panels where epoxy will be applied are clean to bare metal and dry. Use a solvent and clean rag to remove any oil or grease. Use a wire brush or grinding wheel to remove any rust or flaky paint.

Step 8. Each tube of Magnobond 6375 two-part Adhesive (part #00096088) will provide enough epoxy adhesive to repair about 50 feet of joint and will give about two hours of working time after mixing. **WARNING:** Before using Magnobond 6375 adhesive, review the manufacturer's handling instructions and cautions included with each shipment.

Step 9. Apply epoxy adhesive in a thin uniform 1/4" bead along one of the edges to be joined. If you accidentally skip any part of the edge, apply more adhesive.

Caution: Clean up tools with a nonirritating solvent such as isopropanol or a nonflammable solvent such as trichlor. Wash your hands with waterless skin cleanser and keep the adhesive away from the eyes and face.

Step 10. Put new panel in place. Install 4-6 rivets or bolts through the pre-drilled holes (to correctly align panel) and clamp panel in place. This should also squeeze out a small bead of adhesive (about 1/8" in diameter) along each edge of new bonded joint. Replace rivets with the same type, size and quantity of fasteners as was used in the original construction or with SSPV 86 blind rivets (part # 00888222) as necessary. When all riveting is completed, remove any excess adhesive by running the corner of putty knife along the joint edge.

Step 11. Prime and paint new panel(s) using your regular procedures. Allow adhesive to "set up" (cure) over night before driving the bus or subjecting the new joints to any force or vibration.

Note: If paint oven or heat lamps are used to dry paint, this same heat will also serve to set up (cure) the adhesive. If ambient temperature is below 55 degrees Fahrenheit, adhesive will need heat applied to cure properly. Panel(s) can be heated by holding heat gun about 12" away from the body. Don't overheat or try to cure one area at a time, keep heat gun moving and try to keep the whole length of the new joint warm (uncomfortable but not "hot" to the touch) until adhesive hardens. This will take about 10-15 minutes. Bake adhesive 255 degrees for 30 minutes for full cure.

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FMVSS 221 LOWER SIDE PANEL REPLACEMENT PROCEDURE:

An alternate method of repairing lower panel only damage is to cut the panel below the floor line rub rail and install a replacement panel with its upper edge inserted under the floor line rub rail. We have developed and tested the following repair procedure.

Step 1. Remove the lower portion of side panel by carefully drilling out the vertical rows of rivets on each side of the panel from the bottom of the floor line rub rail to the bottom of the skirt and the rivets attaching the bottom rub rail to the panel to be removed. Cut the panel not less than one inch below the floor line rub rail and remove by following steps 1-5 above.

Step 2. Clean to bare metal the one inch wide section of panel left below the floor line rub rail.

Step 3. Get the new panel(s) ready. Check alignment to make sure the new panel(s) fit.

Step 4. Make sure everything is ready (clamps, fixtures, drills riveting gun and other tools). Make sure the edges of panels where epoxy will be applied are clean to bare metal and dry. Use a solvent and clean rag to remove any oil or grease. Use a wire brush or grinding wheel to remove any rust or flaky paint.

Step 5. Each tube of Magnobond 6375 two-part Adhesive (part #00096088) will provide enough epoxy adhesive to repair about 50 feet of joint and will give about two hours of working time after mixing. **WARNING:** Before using Magnobond 6375 adhesive, review the manufacturer's handling instructions and cautions included with each shipment.

Step 6. Apply epoxy adhesive in a thin uniform 1/4" bead along one of the edges to be joined (including the one inch wide section of panel left below the floor line rub rail). If you accidentally skip any part of the edge, apply more adhesive.

Caution: Clean up tools with a nonirritating solvent such as isopropanol or a nonflammable solvent such as trichlor. Wash your hands with waterless skin cleanser and keep the adhesive away from the eyes and face.

Step 7. Insert the replacement panel between the rub rail and the original side panel far enough to insure a minimum of 1/2" of the replacement panel is under the rub rail. Install SSPV 86 blind rivets (part # 00888222), on 3.5" centers through the rub rail lower flange and the new and old side panel.

Step 8. Replace the vertical rows of rivets and the rivets attaching the bottom rub rail with the same type, size and quantity of fasteners as was used in the original construction or with SSPV 86 blind rivets (part # 00888222) as necessary.

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Step 9. Prime and paint new panel(s) using your regular procedures. Allow adhesive to “set up” (cure) over night before driving the bus or subjecting the new joints to any force or vibration.

Note: If paint oven or heat lamps are used to dry paint, this same heat will also serve to set up (cure) the adhesive. If ambient temperature is below 55 degrees Fahrenheit, adhesive will need heat applied to cure properly. Panel(s) can be heated by holding heat gun about 12” away from the body. Don’t overheat or try to cure one area at a time, keep heat gun moving and try to keep the whole length of the new joint warm (uncomfortable but not “hot” to the touch) until adhesive hardens. This will take about 10-15 minutes. Bake adhesive 255 degrees for 30 minutes for full cure.