



H.B. Fuller

Connecting what matters.™

CASE STUDY

TONSAN® TS1956 Enables Lightweight Bus Manufacturing

TS1956 helps bus manufacturers to improve their production process and to lower their costs. This high-performance bonding solution leads to a higher quality and longer lasting end product.

In order to save power and run longer distances, an electric bus needs to be lightweight. One way to shed weight is to use an aluminum frame and skin as the bus body. Welding aluminum can be energy, labor, and cost intensive. In addition to these challenges, the high temperatures produced by welding aluminum can add stress points to the material. Therefore, seams must also be sealed afterward. For these reasons, our customer was seeking an alternate joining process for the assembly of their aluminum electric bus body.

To solve the customer's challenges, our team suggested using an adhesive as an alternative to welding. Adhesives offer a complete, high-strength bond, which eliminates stress point created by heat when welding. We recommended TS1956, a one-part polyurethane adhesive with high strength and elasticity, to bond their aluminum skin and frame. Complementary products, including a cleaner and primer, were available to offer them a complete bonding solution.

Initially, the customer began using a competitor's product to bond the aluminum skin. However, our transportation experts provided examples and successes of TS1956 bonding subway and truck windows. These examples convinced the customer to test our product in their process for approximately six months and ultimately switch to TS1956. During the test stage and changeover, our team assisted with all steps of the new process and trained the customer.

By choosing adhesive bonding over welding, the customer was able to reduce their processing cycle times and production costs. In addition to the benefit of the complete bond that using adhesives created, the customer also notes additional features like sound and vibration damping. Altogether the bonding solution led to a higher quality and longer lasting end product compared to their traditional welding process.

CUSTOMER QUOTE:

“We could reduce our cycling times and thus our production costs, which is a real competitive edge for us.” - Plant Manager

Product Performance

Tonsan TS 1956 Polyurethane Adhesive

TS 1956 is a fast curing product that maintains a fast-cure speed even in a low-temperature, low-humidity environment. This single-component polyurethane is black in color and offers great moisture curing, high strength, good flexibility, and excellent waterproof properties. In addition to aluminum bus frame bonding, TS1956 is suitable for bonding windshields and windows in vehicles, trains, and vessels.

| Product | Color | Density (g/cm ³) | Tack Free Time (min) | Curing Speed (mm/24h) | Elongation at Break (%) | Tensile Strength (MPa) | Shear Strength (MPa) | Hardness Shore A | Service Temperature (°C) |
|---------|-------|------------------------------|----------------------|-----------------------|-------------------------|------------------------|----------------------|------------------|-----------------------------|
| TS 1956 | Black | 1.18 | 30-60 | 4 | 500 | 6.3 | 4.0 | 55 | -40 to 90 short-term 140 |

Summary of Customer's Results:

- Improved Lightweighting
- Power Saving
- Increased Distance Capability
- Improved Production Process
- Reduced Cycling Times
- Lower Costs
- Enhanced Sound and Vibration Damping

Ask H.B. Fuller today about how we can help to improve your production process with our innovative bonding solutions.

About H.B. Fuller

Since 1887, H.B. Fuller has been a leading global adhesives provider focusing on perfecting adhesives, sealants and other specialty chemical products to improve products and lives. H.B. Fuller's commitment to innovation brings together people, products and processes that answer and solve some of the world's biggest challenges. Our reliable, responsive service creates lasting, rewarding connections with customers in electronics, disposable hygiene, medical, transportation, aerospace, clean energy, packaging, construction, woodworking, general industries and other consumer businesses. And, our promise to our people connects them with opportunities to innovate and thrive. For more information, visit us at hbfuller.com.



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ea_btscasestudy001 Rev. 07/2019