



# VHB™ Tapes

for Smooth-Sided Trailers

*Smooth look,  
smooth ride  
with confidence*



# 3M™ VHB™ Tapes – giving trailer buyers what they want: smooth trailers

Whether they haul horses, tools, equipment or racing vehicles, trailer owners know what they want. 3M solicited third party research with two primary groups of trailer owners and here are the results:



## What horse trailer owners want

1. Durability
2. Horse comfort and safety
3. Aesthetics



## What cargo trailer owners want

1. Durability
2. Aesthetics



Using 3M™ VHB™ Tape for panel attachment can give your trailer a smooth look with improved durability and a potentially quieter ride.



## Smooth Sided (3M™ VHB™ Tape) vs. Mechanically-Fastened



Compare the reflections of the smooth-sided trailer at left made with 3M™ VHB™ Tape and the mechanically-fastened trailer at right. Smooth sides convey a professional appearance and quality construction, as well as improve the look of graphics.

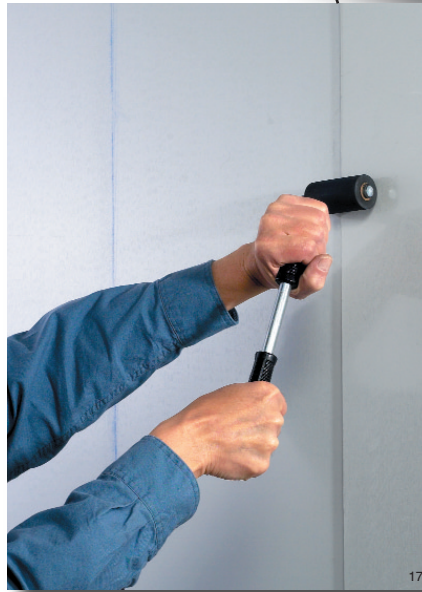
### Quick Glance Comparison

Customer wants	3M™ VHB™ Tape	Mechanical Fastener
Durability	Flexes with thermal expansion and contraction	May become loose during thermal expansion and contraction
	Absorbs vibration; helps maintains the bond and seals against water and dirt intrusion	May become loose over time which can lead to leaks
	Separates dissimilar metals to help prevent galvanic corrosion	Dissimilar metals can come in contact leading to galvanic corrosion
Aesthetics	Smooth appearance even in the sun's heat	Expands into a quilted pattern in the sun
	Improved appearance of graphics	Surface dotted with rivets and screws
Reduced noise	Taped panels stay tight helping to reduce rattling	Rigid metal-to-metal attachment of mechanical fasteners transfer sound
	Viscoelastic tape properties help provide sound damping	

Under equal stress conditions, metal panels bonded with VHB tape show no visible signs of stress compared to those with mechanical fasteners.



## How is a Smooth Trailer Made?



For the last 15 years, many trailer manufacturers have relied on 3M™ VHB™ Tape for assembly of their smooth-sided trailers. As seen above, VHB tape is used to replace screws, rivets, welds, and liquid adhesives.

The tape will bond side skins to posts. And it is used on overlap seams for skin to skin bonding. VHB tape has elastic properties that absorb shock and flex for reliability against wind, vibration, and thermal expansion/contraction. The result is a smooth and durable trailer wall assembly.

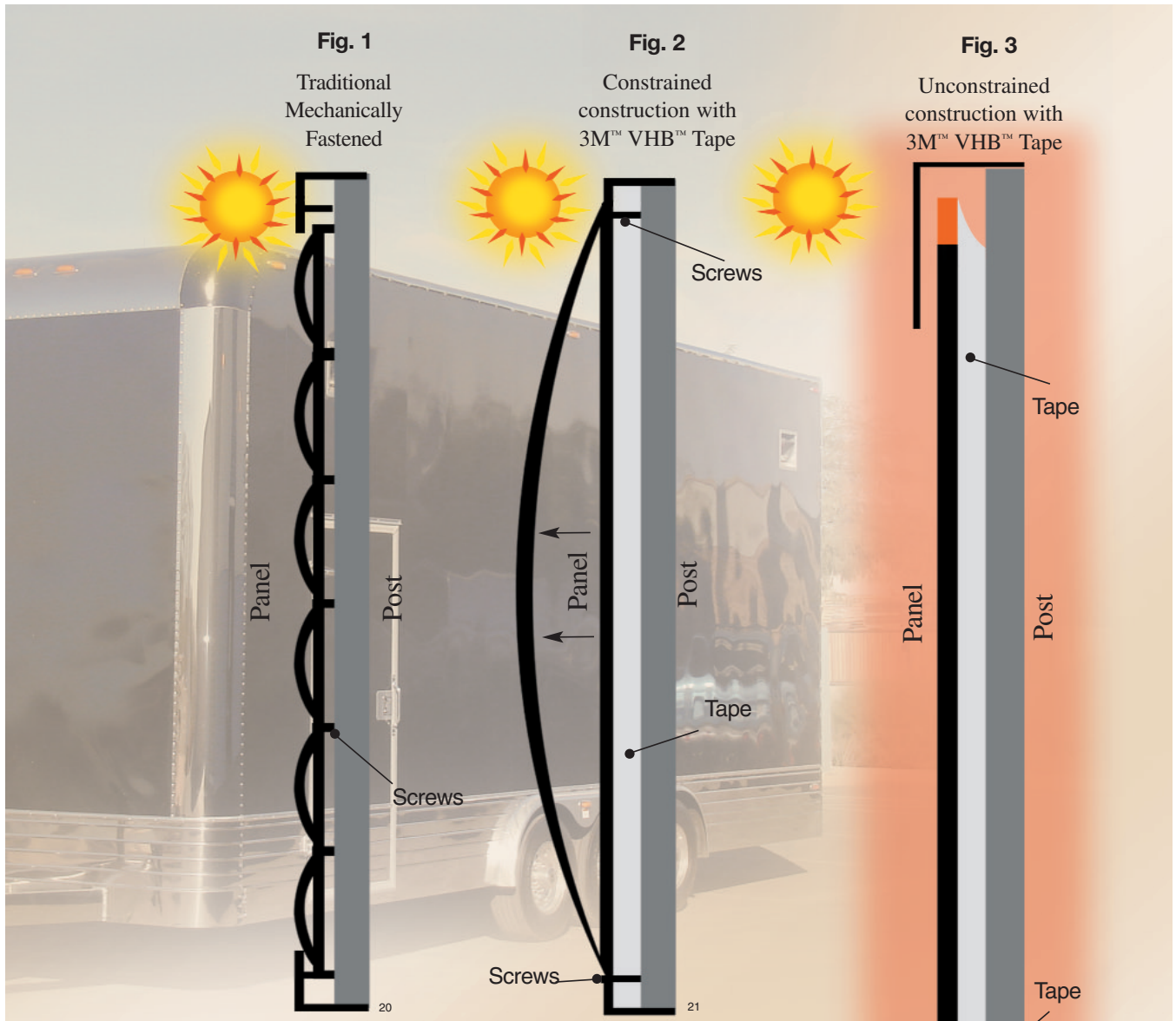
### Ease of building with 3M™ VHB™ Tape



Attaching 3M™ VHB™ Tape is different than attachment using rivets or screws. Our experience has shown that once a crew gets the hang of it, the time of assembly is about the same as mechanical assembly. There is less drilling on the line, which means less noise in the factory and reduced chances for operators to develop carpal tunnel syndrome.



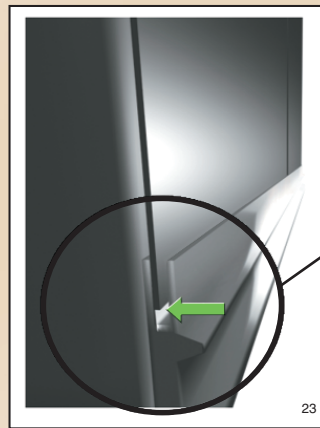
# Optimizing Smooth Panel Attachment with Unconstrained Construction



3M™ VHB™ Tape eliminates the concentrated stress points of mechanical fasteners (Fig. 1) that can weaken with time and vibration. The high strength of 3M™ VHB™ Tape is only part of the equation in building a trailer to last for the miles. Side panel design is also an important factor.

In constrained construction using 3M™ VHB™ Tape, the top and bottom of the panels are mechanically fastened (Fig. 2). This constrains panel expansion and increases force on the taped seams that can lead to panel separation.

An unconstrained design is much more durable. Mechanical fasteners are completely eliminated and the taped panels expand and contract without constraint at top and bottom (Fig. 3). This preferred method of panel attachment greatly reduces expansion forces on the seams and helps ensure a long lasting bond.



**Result:**  
The unconstrained panel design was found to be the most durable smooth panel attachment system.

## Third Party Testing of the Unconstrained Design

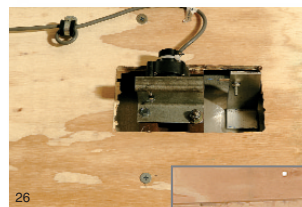


To prove the durability of the unconstrained design, 3M sent two trailers to the Bosch Automotive Proving Grounds in South Bend, Indiana. The side panels on one test trailer were attached with 3M™ VHB™ Tapes. Panels on the other test trailer were mechanically fastened. An independent test team at Bosch performed durability testing over various road conditions and exposure to heat cycling.

## Road Condition Durability Testing

### Testing parameters for heat cycle and road condition durability

- Instruments were attached inside each trailer to detect changes in side panel position or dynamics
- Trailers were overloaded 120%
- Series of road tests simulated hauling 100,000 miles



String pot



Instruments for measurement



Weight



After the 100,000 mile road test, a pressure washer set at 3200 PSI sprayed water over each seam of the smooth-sided trailer. No leaks were detected. 3M™ VHB™ Tapes bond and seal in one step, helping reduce or eliminate the sealants required with mechanically-fastened panels.

**Result:** After a simulated 100,000 miles of different road conditions non-constrained panel construction held tight preventing leaks, absorbing vibration, and reducing noise. 33% of the mechanical fasteners were loose at 36,000 miles.

# Thermal Cycling Durability Testing

After 36,000 miles each trailer was placed in an environmental chamber and exposed repeatedly to temperature cycling.

Heaters inside the enclosure radiated up to 190°F to simulate the sun's heat against the trailer. 30 cycles were repeated for each side of the trailer in the graphics below. Panels with 3M™ VHB™ Tape are at the bottom while mechanically fastened panels are at the top.

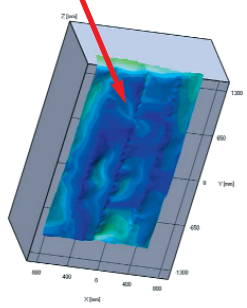
Thermographic imaging below quantifies the deformation.



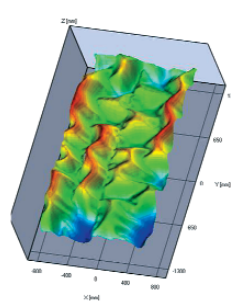
Heaters radiated up to 190°F

## Room Temperature

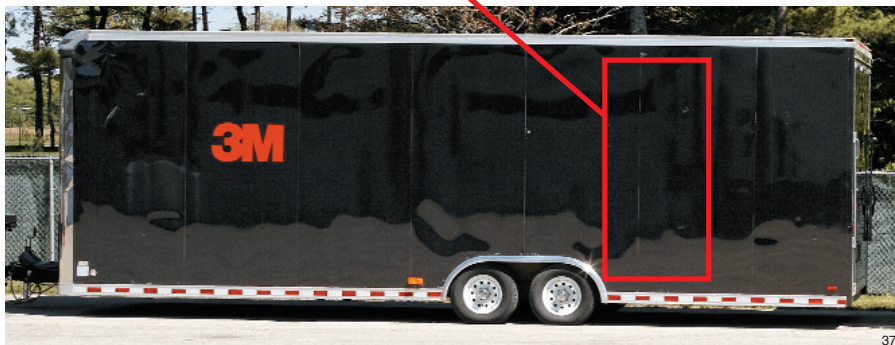
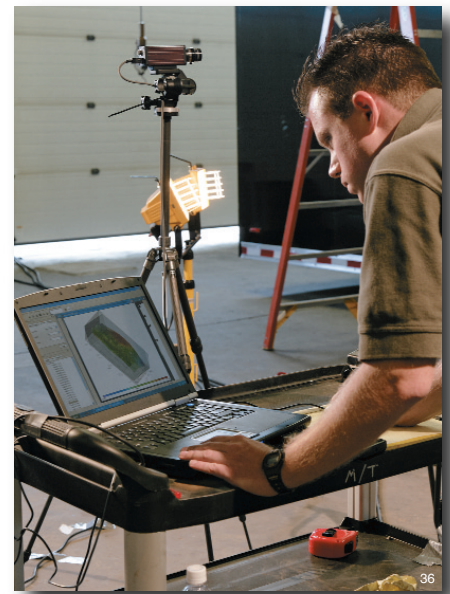
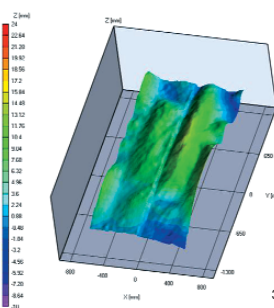
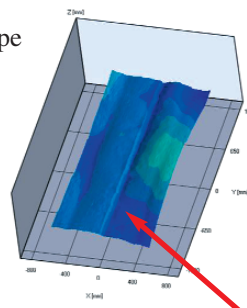
Mechanically fastened



## Heat Elevated to 190°F



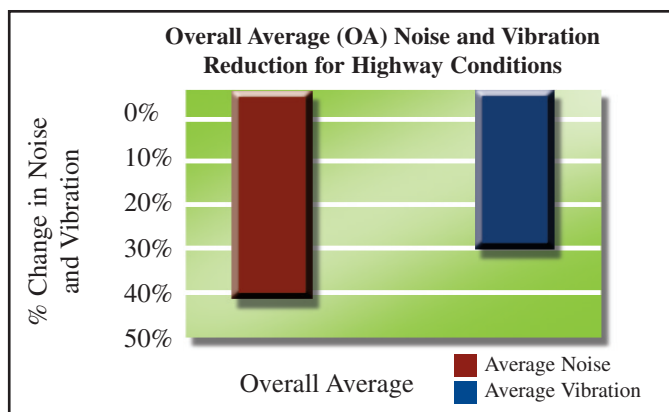
Unconstrained tape construction



**Result:**  
Unconstrained design looks great and stays strong – even in extreme heat.

# Noise and Vibration in Horse Trailers

In other testing, an independent noise vibration expert found that a trailer assembled with 3M™ VHB™ Tape was up to 41% quieter at highway speeds and had up to 30% less vibration than a mechanically fastened trailer.



According to horse experts, reducing noise and vibration during transport could help reduce stress and fatigue for horses. This means shorter recovery times before shows, races or other events.

## The confidence of a warranty

Based on the track record and recent testing results, 3M now offers a 36-month warranty to qualified manufacturers with properly assembled panels.



Trailer assembly tool kit

## Product Information: 3M™ VHB™ Commercial Vehicle Tapes

Product Number	Tape Thickness w/o liner Mils(mm)	Description	Adhesive Type	Temperature Resistance		Solvent Resistance	Application Ideas
				Minutes Hour	Days Weeks		
CV45F	45(1.1)	Gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted metals.	Acrylic	300F (149C)	200F (93C)	High	Bond overlap seams on vehicle side panels
CV62F	62(1.6)	Gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted metals.	Acrylic	300F (149C)	200F (93C)	High	Bond vehicle side panels to posts

Note: The technical information and data on these pages should be considered representative or typical only and should not be used for specification purposes.

**Limited Product Warranty:** 3M warrants for 24 months from the date of manufacture, that 3M™ VHB™ Tape will be free of defects in material and manufacture. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. This warranty does not cover damage resulting from the use or inability to use 3M VHB Tape due to misuse, workmanship in application, or application or storage not in accordance with 3M recommended procedures. **Important Notice:** User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of these materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application. **Limitation of Remedies and Liability:** If the 3M™ VHB™ Tape is proved to be defective within the warranty period stated above, THE EXCLUSIVE REMEDY, AT 3M'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OF OR TO REPAIR OR REPLACE THE DEFECTIVE 3M™ VHB™ TAPE. 3M shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including negligence, warranty, or strict liability.



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