BONDING SOLUTIONS FOR TRANSPORT
Would you like to reduce your assembly costs, increase productivity and improve the quality of the finished component? The answer could be in your structural adhesive.

Plexus adhesive solutions have helped manufacturers in the bus, rail and truck industries to maintain and exceed existing standards in the transportation industry.

Suitable for bonding the vast majority of thermoplastics, metals and composite materials, Plexus ensures durable bonds, offering countless possibilities for design engineers and the production managers. By chemically fusing plastics and composites, Plexus ensures bonds so strong the adhesive will outperform the substrate. In metal bonding Plexus adds value in applications where the aesthetic appearance is important and bond strength is crucial.

In addition to the improved design freedom and reliability, working with Plexus ensures you receive the fully comprehensive technical support and outstanding customer service expected from a leading global company.

The importance we place on building strong and lasting relationships with our customers, we believe, is a large part of our continuing success. We work in close collaboration with our customers, striving to understand all aspects of their bonding requirements and strive to meet their exacting specifications.
PLEXUS BONDING SOLUTIONS

**TRUCKS**

Worldwide, carbon emission standards are becoming more stringent and are an increasing challenge to truck manufacturers. Using Plexus adhesives can help reduce the overall weight of the vehicle and subsequently decrease emissions.

Working in partnership with design and engineering teams, Plexus aims to continually devise and implement new structural adhesive solutions and methods. Plexus specialists can be involved in the process from the original design stage to ensure a seamless transition to a bonded solution.

Plexus adhesive solutions have proven superior bonding performance, coupled with cost efficiency in the manufacturing process. This can be applied to a wide range of truck bonding applications to ensure durability and reliability with minimal disruption.

Our methyl methacrylate adhesives are a superior and practical alternative to traditional truck manufacturing methods and are approved by many Heavy Truck Manufacturers worldwide, including Peterbilt & Kenworth. The solutions are ideal for high liability truck assemblies, such as exterior trailer cappings, bumper assemblies, door extensions and exterior sun visors.

**PRODUCT BENEFITS INCLUDE:**
- UV stable
- Reduced VOC emissions
- High strength and durability
- Excellent resistance to salt spray
- Ease of use, no specialized training required
- Resistance to fuel, screen wash and other commonly used chemicals

**BENEFITS OF BONDING WITH PLEXUS:**
- Improved aesthetics and aerodynamic efficiency
- More design options due to the ability to bond dissimilar metals and materials
- A wide range of open and fixture times available to suit all applications
- Bondlines designed to withstand climatic stresses and different environmental conditions
- Easier recycling: no need to cut out the joint and is fully regrind compatible
- Avoid corrosion: no need to drill or pierce substrates for mechanical fastening.
- Reduction in the final weight of the assembly
- Improved efficiency and reduced emissions
- No need for mechanical fasteners
PLEXUS BONDING SOLUTIONS - TRUCKS

The truck illustration highlights where Plexus adhesives are used to bond many different substrates with little or no surface preparation.
PLEXUS BONDING SOLUTIONS
BUSES

Manufacturers of double-deckers, single-deckers and mini-buses are required to cope with a large number of daily commuters, ensuring they retain their durability and reliability over the typical 10-15 year life span.

We work closely with bus manufacturers to provide reliable fixtures for all challenging applications, including high liability assemblies such as front and rear end caps, internal mouldings and dashboard assemblies.

Plexus structural adhesives offer high strength with minimal surface preparation, therefore streamlining the production process. The unique characteristics of our adhesive systems allow bus manufacturers to replace welding structures, reduce distortion and post-weld dressing and improve fatigue performance.

Plexus provides customers confidence in the strength and reliability of our adhesives. In addition, Plexus has contributed to the development and manufacture of low carbon buses, as bonding with GRP has allowed manufacturers to reduce weight and improve fuel efficiency.

Manufacturers of double-deckers, single-deckers and mini-buses are required to cope with a large number of daily commuters, ensuring they retain their durability and reliability over the typical 10-15 year life span.

We work closely with bus manufacturers to provide reliable fixtures for all challenging applications, including high liability assemblies such as front and rear end caps, internal mouldings and dashboard assemblies.

Plexus structural adhesives offer high strength with minimal surface preparation, therefore streamlining the production process. The unique characteristics of our adhesive systems allow bus manufacturers to replace welding structures, reduce distortion and post-weld dressing and improve fatigue performance.

Plexus provides customers confidence in the strength and reliability of our adhesives. In addition, Plexus has contributed to the development and manufacture of low carbon buses, as bonding with GRP has allowed manufacturers to reduce weight and improve fuel efficiency.

PRODUCT BENEFITS INCLUDE:
• High structural strength
• High impact resistance
• Reduced VOC emissions
• Excellent fatigue resistance
• Easy to use, no specialized training required

BENEFITS OF BONDING WITH PLEXUS:
• Improved production speed by efficient processing and quick cure
• Improved aesthetics of the finished vehicle
• Wide range of open and fixture times available to suit all applications
• More design options and substrate choices: ability to bond dissimilar metals and materials
• Bondlines designed to withstand climatic stresses and different environmental conditions
• Lower component costs, due to the ability of adhesives to bond to a wide variety of different substrates
• No need for rivets, therefore significantly reducing individual stress points and the evenly distributing the load
• Avoid corrosion: no need to drill or pierce substrates for mechanical fastening
PLEXUS BONDING SOLUTIONS - BUSES

The bus illustration demonstrates where Plexus adhesives can be applied. The bonding solutions are easy to use and fast fixture times meet production and process requirements.
PLEXUS BONDING SOLUTIONS

TRAINS

Durable bonded components are especially important when dealing with large numbers of daily commuters and travellers. At the forefront of innovative design, trains and carriages need to offer reliability, safety and optimal operational performance.

When using Plexus adhesives, manufacturers can assemble sub-components quickly and efficiently and apply modular assembly methods to production. Removing the need for mechanical fasteners can provide manufacturers with lower weight solutions.

Plexus adhesives MA300, MA310, MA420, MA515 and MA832 comply with R1 requirements for Hazard Levels HL1 – HL3 across all design and operational categories of rail vehicles.

Plexus adhesives have the ability to bond different types of plastics, metals and composites, helping to lower component costs, which is invaluable to the rail industry.

Plexus adhesives are used frequently during design and assembly to ensure these components remain intact and resistant to environmental stresses. Our unique adhesives offer distinct advantages when dealing with complex components and large surface areas.

PRODUCT BENEFITS INCLUDE:

- UV stable
- Reduced VOC emissions
- High strength and durability
- Excellent resistance to salt spray
- Ease of use, no specialized training required
- Resistance to fuel, screen wash and other commonly used chemicals

BENEFITS OF BONDING WITH PLEXUS:

- Improved aesthetics and aerodynamic efficiency
- More design options due to the ability to bond dissimilar metals and materials
- A wide range of open and fixture times available to suit all applications
- Bondlines designed to withstand climatic stresses and different environmental conditions
- Easier recycling: no need to cut out the joint and is fully regrind compatible
- Avoid corrosion: no need to drill or pierce substrates for mechanical fastening.
- Reduction in the final weight of the assembly
- Improved efficiency and reduced emissions
- No need for mechanical fasteners

Plexus adhesives MA300, MA310, MA420, MA515 and MA832 comply with R1 requirements for Hazard Levels HL1 – HL3 across all design and operational categories of rail vehicles.

R1/ Part 2 of EN45545-2:2013 standard for
- Toxicity – EN45545 Annex C (ISO 5659)
- Flammability (ISO 5658-2)
- Heat Release (ISO 5660-2)

PLEXUS BONDING SOLUTIONS

Durable bonded components are especially important when dealing with large numbers of daily commuters and travellers. At the forefront of innovative design, trains and carriages need to offer reliability, safety and optimal operational performance.

When using Plexus adhesives, manufacturers can assemble sub-components quickly and efficiently and apply modular assembly methods to production. Removing the need for mechanical fasteners can provide manufacturers with lower weight solutions.

Plexus adhesives have the ability to bond different types of plastics, metals and composites, helping to lower component costs, which is invaluable to the rail industry.

Plexus adhesives are used frequently during design and assembly to ensure these components remain intact and resistant to environmental stresses. Our unique adhesives offer distinct advantages when dealing with complex components and large surface areas.

PRODUCT BENEFITS INCLUDE:

- UV stable
- Reduced VOC emissions
- High strength and durability
- Excellent resistance to salt spray
- Ease of use, no specialized training required
- Resistance to fuel, screen wash and other commonly used chemicals

BENEFITS OF BONDING WITH PLEXUS:

- Improved aesthetics and aerodynamic efficiency
- More design options due to the ability to bond dissimilar metals and materials
- A wide range of open and fixture times available to suit all applications
- Bondlines designed to withstand climatic stresses and different environmental conditions
- Easier recycling: no need to cut out the joint and is fully regrind compatible
- Avoid corrosion: no need to drill or pierce substrates for mechanical fastening.
- Reduction in the final weight of the assembly
- Improved efficiency and reduced emissions
- No need for mechanical fasteners

Plexus adhesives MA300, MA310, MA420, MA515 and MA832 comply with R1 requirements for Hazard Levels HL1 – HL3 across all design and operational categories of rail vehicles.

R1/ Part 2 of EN45545-2:2013 standard for
- Toxicity – EN45545 Annex C (ISO 5659)
- Flammability (ISO 5658-2)
- Heat Release (ISO 5660-2)
The illustration demonstrates the key joining areas where Plexus adhesives are applied. Our adhesive solutions are suitable for bonding a wide range of substrates including metals, coated steel and plastics.
PRODUCTS

Methacrylate structural adhesives are now commonplace in highspeed production processes, and offer engineers a range of benefits from joint design to manufacturing efficiency savings.

To select the most suitable structural adhesive, we recommend our customers consider the following factors:

- Design parameters
- Substrates used
- Production environment
- Bond strength requirements

Plexus recommends the following adhesive ranges for use in transportation applications:

300 SERIES
Includes both 1:1 and 10:1 general purpose adhesives
Main benefits:
- High adhesion
- Excellent impact resistance
- Little or no surface preparation
- Good environmental durability
- Aesthetic finish to the component
- High shear strengths up to 24 MPa

Ideal for bonding:
- GRP's
- Metals
- Phenolics
- Most plastics
- Nylon and gelcoats

400 SERIES
A multipurpose range of 10:1 adhesives
Main benefits:
- Excellent elongation
- High chemical and impact resistance
- Wide range of open and working times to suit specific applications
- Little or no surface preparation
- High shear strength
- Tough and durable bonds

Ideal for bonding:
- Large components which require a longer working and fixture time

800 SERIES
“Metal Bonding” series of fast curing, structural adhesives
Main benefits:
- Strong yet flexible
- Excellent adhesions
- No need for primers
- No need for extensive surface preparation
- Allow users to move away from traditional methods such as mechanical fastenings, riveting, welding

Ideal for bonding:
- Variety of ferrous and non-ferrous metals including aluminum, stainless steel and carbon steel

METEERING MIXING AND DISPENSING MACHINES

Specifically developed to process high viscosity material systems, the metering, mixing and dispensing machine, is recognised as the industry standard for dispensing precise doses or accurate beads of mixed product within a wide range of applications.

Suitable for processing the majority of two-part, high viscosity material systems, these proven metering and mixing systems, provide a clean and cost efficient alternative to hand mixing.

FEATURES AND BENEFITS OF PLEXUS DISPENSING MACHINES

- Metering Pumps: Single acting positive displacement.
- Ratio Range: Fixed ratios are available from 1:1 to 13:1.
- Viscosity acceptance: Up to 1,000,000 + cps.
- Shot size: 15ml to 100ml at a ratio of 10:1.
- Cycle rate: Up to 20 shots per minute.
- Mixing: Disposable Static or Base Purge Static.
- Reservoir Capacity: 18 litre or pump fed from 20 litre pails.
- Controls: Air supply filter regulator and gauge, machine on/off, dispense pressure regulator and gauge, foot valve start and emergency stop.
- Services: Clean, dry compressed air @ 80 psi.

Plexus equipment range also includes manual and pneumatic dispense guns to suit both 1:1 and 10:1 cartridges, specifically for dispensing our adhesives, and a range of static mixers to suit most applications.

ANCILLARY EQUIPMENT

The Plexus technical support team has decades of research knowledge and practical experience dealing with the specific requirements of our customers. We can provide Installation, commissioning and onsite training to our customers.

The Plexus team works closely with leading equipment manufacturers to ensure that their own full range of machines are also manufactured to suit our adhesives. These machines range from industry standard piston pump machines through to complete “closed loop” systems to suit the requirements of high volume robotic applications that some of our customers require.
Although structural adhesives have revolutionised manufacturing and assembly industries, the technology is still in its relative infancy in comparison to traditional methods of joining substrates.

Our challenge is to demonstrate that structural adhesives will outperform traditional methods in terms of improved aesthetics, durability, and fatigue resistance.

At Plexus we have a specific test program allowing us to test the type and level of stress the joint will experience over its service life. Tests simulate the vibrations, harmonics and repeated cyclic loading together with the chemical and environmental exposures in transportation assemblies.

Using a representative sample of the substrates, and correlating the number of cycles with the service conditions, can assist in predicting the number of days, months or years until failure.

Our static and dynamic testing offers valuable data to the designer of two component assemblies and insures long-term part performance.

**Testing methodology**

Samples of each joining method are first tested as static lap shears which were pulled to failure at a constant speed. The average maximum stress is referred to as the ultimate strength which represents the load that the joint can bear in a single cycle. Samples are cyclically fatigue tested to various percentages of their ultimate strength. Cycles are performed at a rate of 30 cycles per second (30 Hz).