

**3M** Science.  
Applied to Life.™

# 3M science keeping you on track.

Innovative solutions for the rail industry.







# 3M’s technology platforms helping you stay ahead.

3M has over 200 products that meet Network Rail’s Parts and Design System (PADS), and London Underground approvals (LUL) which have become the de facto standards for the UK rail industry.

Keeping pace with the rapid changes taking place in rail technology is more difficult than ever. Using 46 technology platforms our integrated team of scientists and researchers work with customers to create breakthroughs and help you stay one step ahead of the changes.

3M has over 80 years of experience in the industry, we can support you through each step from new builds to maintenance and infrastructure. As communities strive for more efficient and sustainable mass transit solutions, rail transportation is experiencing a renaissance in cities all over the world.

Today’s railway designs are lighter, faster, more aerodynamic and energy efficient than ever, with lighter weight materials and sleek designs. 3M technologies can help maximise manufacturing and operational efficiencies, while lowering costs and improving long-term performance.

## Increased productivity

From abrasives that cut and finish surfaces quicker, smoother and easier, to paint shop solutions that reduce material usage, clean-up and waste, 3M solutions can help to make your rolling stock manufacturing, maintenance and refurbishment processes faster, cleaner and ultimately, more cost-effective.

## Improved energy efficiency

Our lightweighting solutions include industrial tapes and adhesives which remove the need for heavy mechanical fixings, while our solar window films help to reduce heat gain and energy costs.

## Prolonged asset life

From infrastructure, including bridges, stations and gantries, to rolling stock and its components, 3M™ Scotchkote™ liquid coatings help provide long-lasting corrosion protection and finishing, while also helping to minimise downtime.

## Enhanced passenger experience

Our vinyl films and anti-graffiti solutions help keep trains looking smart, while our noise insulation technologies help make journeys quieter.

## Protected worker safety

Our range of comfortable, carefully designed personal protective equipment (PPE) offers your workers the effective protection available, with products that they feel good about wearing.

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# Rolling stock manufacturing solutions

3M's science aids in building rolling stock more efficiently, more cost effectively and above all, more competitively. With innovative solutions ranging from adhesives to graphic films, 3M industrial design solutions help to meet the challenges of lightweighting, noise and vibration issues.



## Design

### Coatings



#### Body shell exteriors

3M™ Scotchkote™ EA9WB Primer  
– waterborne epoxy primer

3M™ Scotchkote™ DICOL 170  
– waterborne polyurethane finish

#### Roofs

3M™ Scotchkote™ Polynox 136 –  
waterborne encapsulation coating

#### Interiors

3M™ Scotchkote™ PU WB AG 180  
– waterborne polyurethane finish

##### Suitable for use on:

- Interior panels
- Doors
- Draught screens and vestibules
- Seat backs
- Driver cabs
- Buffet cars
- Toilet cubicles
- Sleeper compartments

3M™ Scotchkote™ Pyrotech  
LS1000/ LS3000 intumescent  
coatings for timber substrates

##### Suitable for use on:

- Timber floor seats

#### Below solebar

3M™ Scotchkote™ EA5WB  
– waterborne primer finish

3M™ Scotchkote™ EA9WB  
– waterborne primer and finish

3M™ Scotchkote™ 152LV  
– solvent free epoxy

3M™ Scotchkote™ 172

##### Suitable for use on:

- Battery boxes
- Bogies
- Floorpans
- Traction equipment
- Underframes
- Underframe equipment

#### Benefits

- Two component advanced waterborne resin technology
- Excellent mar, chip and impact resistance
- UV stable finish colours
- Excellent reaction to fire performance



# Design

## Films: graphic and window

### 3M™ Controltac™ Graphic Film VHR180

A high performance, conformable film that can also be custom colour matched, and is ideal for complex livery designs.

The graphic film features 3M™ Controltac™ Adhesive, which enables easy repositioning of graphics and allows application in temperatures ranging from 4°C up to 38°C. This low minimum application temperature means there is no need to heat the train surface prior to graphic application.

This dramatically cuts service downtime, maintenance costs, delayed service charges and disruption to schedules when compared with alternatives.

And when it comes to removal, 3M film VHR180 is warranted to remove cleanly, leaving little or no adhesive residue, protecting the train surface underneath and reducing cleaning costs.

### Peace of mind

The 3M™ Select™ Platinum Rail Warranty covers removal, remanufacture and reapplication of 180 3M graphic films for 6 years. In the unlikely event of a problem, 3M will provide immediate technical support and work with our 3M select manufacturers to investigate and identify any issues. With over 40 years of proven experience in graphic film livery, you can trust our reputation for reliability and the financial security that 3M's global status offers.

### 3M™ Graphic and Surface Protection Films

Scratch marks on windows and paint or graffiti on interior and exterior surfaces are unsightly and expensive to remove. The public transport sector alone spends millions of pounds a year dealing with the damage caused by vandalism. 3M have designed a range of films, which resist the harsh chemicals needed to remove graffiti and which offer resistance against accidental or intentional scratching.

### 3M™ Scotchgard™ Graphic and Surface Protection Films 8991, 8993 and 8995

A range of protective overlaminates, offering resistance to graffiti and scratches on graphics and other surfaces. These films can withstand the harsh chemicals needed to remove paint and felt tip pen.



3M™ Graphic Film

### 3M™ Controltac™ Graphic Film VHR180 and VHRIJ180 are high performance films ideal for complex livery designs over flat, curved and corrugated surfaces with or without rivets.

And with 3M and their Scotchprint® Graphic Authorised Manufacturers, rail operators have access to 3M VHR film specification film solutions, supported by the 3M™ MCS™ Rail Warranty.

This dramatically cuts service downtime, maintenance costs, delayed service charges and disruption to schedules when compared with alternatives away from the depot.

### 3M™ Controltac™ Graphic Film VHR180 and VHRIJ180 with Scotchgard™ Graphic and Surface Protection Film 8993

All the benefits of VHR180 and VHRIJ180 Graphic Film with 8993 surface protection film. A durable, gloss surface protection film, 8993 film is designed to protect graphics and surfaces from graffiti, scratches and gouges by providing a protective barrier. It can also withstand harsh solvents that are needed to remove the graffiti.

Features	Advantages	Benefits
3M™ Controltac™ Plus Adhesive	<ul style="list-style-type: none"><li>▶ Can be positioned and repositioned during application</li><li>▶ Fast and efficient in-situ installation</li><li>▶ 'Dry' application</li></ul>	<ul style="list-style-type: none"><li>▶ Easy application of large panels for crease-free graphics</li><li>▶ Can apply in depot saving time and money</li><li>▶ Unlike paint, no 'drying time' minimises fleet downtime</li></ul>
Wide temperature application range	<ul style="list-style-type: none"><li>▶ Can be applied all year round in temperatures ranging from 4°C – 38°C</li></ul>	<ul style="list-style-type: none"><li>▶ Low application temperature allows year round fitting, enabling easier scheduling and reducing depot heating bills</li></ul>
High grab adhesive	<ul style="list-style-type: none"><li>▶ Rolling stock can be used immediately</li><li>▶ No overnight curing</li></ul>	<ul style="list-style-type: none"><li>▶ Minimises fleet downtime</li></ul>
Pigmented adhesive	<ul style="list-style-type: none"><li>▶ Excellent hiding power</li></ul>	<ul style="list-style-type: none"><li>▶ Covers existing film or underlying paintwork</li></ul>
Cast film	<ul style="list-style-type: none"><li>▶ Highly conformable and dimensionally stable</li></ul>	<ul style="list-style-type: none"><li>▶ Achieves complex livery designs over flat, curved and corrugated surfaces with or without rivets</li></ul>
Easy removal	<ul style="list-style-type: none"><li>▶ Removes cleanly, leaving little or no adhesive residue</li></ul>	<ul style="list-style-type: none"><li>▶ Helps reduce costs and time for graphic removal</li><li>▶ No reduced damage to substrate underneath helps maintain value of rolling stock</li></ul>
High grade face film	<ul style="list-style-type: none"><li>▶ Withstand rigours of working environment, weather and vehicle cleaning</li></ul>	<ul style="list-style-type: none"><li>▶ Helps cost saving and improved branding / corporate identity for longer</li></ul>
Custom colour matching	<ul style="list-style-type: none"><li>▶ Produce livery in unique corporate colours</li></ul>	<ul style="list-style-type: none"><li>▶ Helps control brand identity consistently across all rolling stock</li></ul>
Conformance to BS6853:1999 fire safety regulations	<ul style="list-style-type: none"><li>▶ Can be deployed within category 1a, 1b and 2 rolling stock</li></ul>	<ul style="list-style-type: none"><li>▶ Confidence in fire safety</li><li>▶ Tested for installation on most common rail substrates and surfaces</li></ul>
Surface protection film	<ul style="list-style-type: none"><li>▶ Anti-graffiti</li><li>▶ Durable</li><li>▶ Cleanable</li></ul>	<ul style="list-style-type: none"><li>▶ Minimises graphic replacement due to damage</li><li>▶ Minimises damage risk</li><li>▶ Better looking graphics for longer</li></ul>
Scotchprint® Premium Rail Warranty	<ul style="list-style-type: none"><li>▶ Matched component system – all elements designed for total compatibility</li><li>▶ Full six year printed warranty</li><li>▶ One of the strongest warranties in the industry</li></ul>	<ul style="list-style-type: none"><li>▶ Less risk of costly failure</li><li>▶ 3M will remove, remanufacture and re-apply failed graphics</li><li>▶ Total "peace of mind"</li></ul>





# Design

Films: graphic and window

## 3M™ Safety and Security Window Film

### *Safety exterior product family*

- ▶ Spontaneous glass breakage anti-shatter and retention
- ▶ Impact protection against flying or broken glass
- ▶ Resistance against graffiti, vandalism, scratches and abrasions
- ▶ High performance durability and weatherability
- ▶ Clear film that blocks 99% of UV to reduce fading

3M Safety and Security Window Films are composed of a transparent and weather stable polyester film, scratch resistant surface and a strong acrylic adhesive. The films' high tensile strength and elongation at break increases resistance of the glazing system to impact and pressure. The films also significantly reduce the transmission of UVA and UVB rays which are the main cause of fading.

3M Solutions help protect rail car exteriors from the environmental effects of rain, sun and abrasion, keeping the car looking good, mitigating moisture ingress and more. By helping extend the life of the railcar, 3M solutions can mitigate maintenance over the long haul.

#### **Solutions include:**

- ▶ Signage attachment
- ▶ Door assembly
- ▶ Sealing and protection
- ▶ Window insulation and glazing





# Assembly

## Abrasives

### Abrasives that transform your business

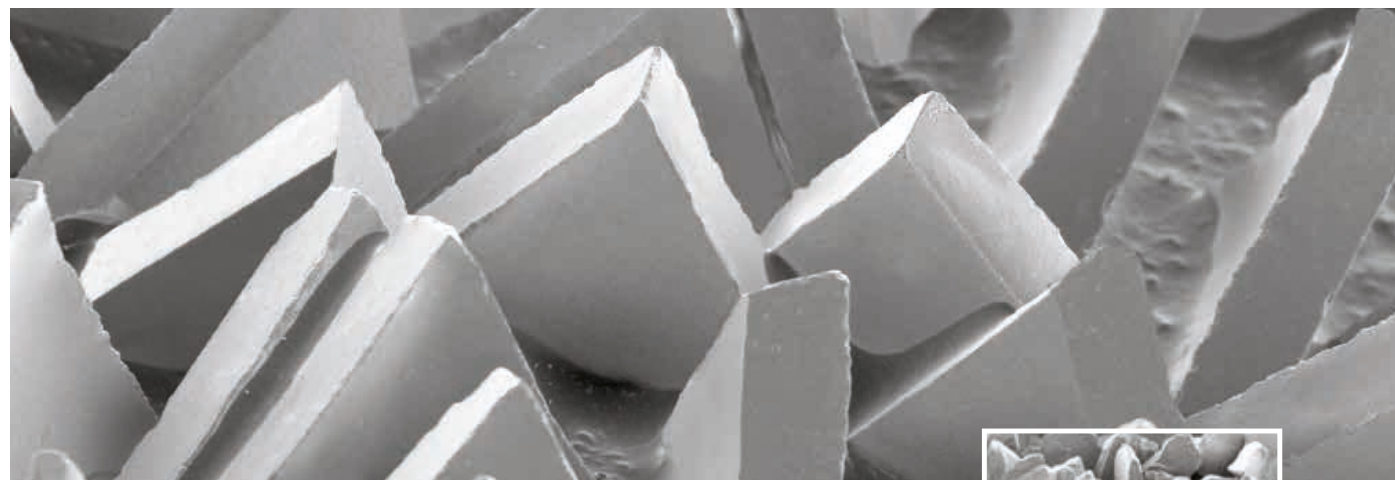
Whether you are manufacturing or refurbishing in the rail industry, with 3M you are buying into over 100 years of expert heritage. Combine this with cutting edge proprietary technology such as the revolutionary Precision-Shaped Grain ceramic mineral used in 3M™ Cubitron™ II abrasives and you have the cornerstones of our service to you – delivering the best products, trusted the world over.

Our unrivalled expertise in people and products will help you protect your workforce and realise productivity improvements throughout the manufacturing or refurbishment process.

### Abrasives reinvented

Using unique Precision-Shaped Grain technology, 3M Cubitron II will transform your cutting, grinding and sanding processes.

### A picture is worth a thousand words...

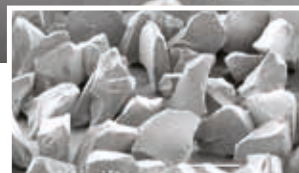


Precision-Shaped Grain in 3M Cubitron II abrasives slice through metal cleaner and faster



- ✓ Cooler operation
- ✓ Clean cut
- ✓ Lasts much longer

Conventional ceramic grain is irregular and “ploughs” through the metal



Conventional grain

- ✗ Heat build-up
- ✗ Slower cutting
- ✗ Shorter life

3M's proprietary Precision-Shaped Grain technology acts like a cutting tool, slicing through metal like a knife. The material is continuously self-sharpening, as points break off during use to expose new sharp edges – slicing cleaner and faster, staying cooler and lasting many times longer than conventional grain types.

### Abrasives applied to your workshop...

3M Precision-Shaped Grain technology in Cubitron™ II abrasives takes productivity to a whole new level. When compared to traditional products made with aluminium oxide, zirconia or ceramic grain, 3M Cubitron II abrasives cut faster and last longer.

- ▶ Meaning less wear and tear on your operators.
- ▶ More material removed by the same amount of effort.
- ▶ Improved productivity.

### Cutting and grinding steel and aluminium

#### 3M™ Cubitron™ II Cut Off Wheels and Grinding Wheels

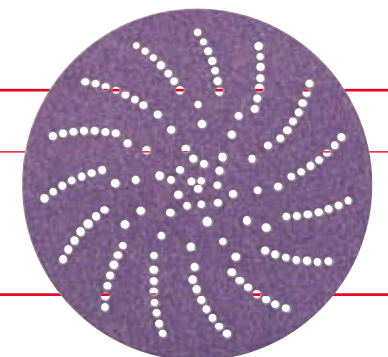
- ▶ High cut-rates boost productivity and long life means less change-overs.
- ▶ Ideal for weld removal and cutting of chassis and all types of metal panels.



### Paint preparation

#### 3M™ Cubitron™ II 775L Hookit™ Sanding Discs

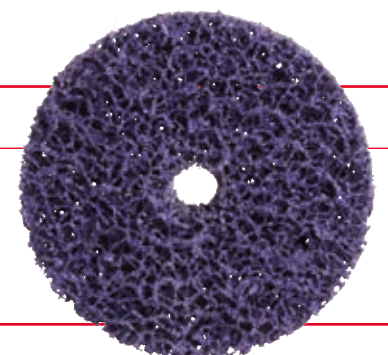
- ▶ Cutting edge technology helps deliver fast cut-rates and the potential to skip steps in your current process, saving time and money.
- ▶ Combine with our class leading orbital sander for even better results!



### Rust/paint removal

#### Scotch-Brite™ Clean & Strip

- ▶ Aggressive, coarse-grained Scotch-Brite Clean & Strip material for rapid cleaning action. Resists loading and heat build up.
- ▶ Available with 3M Roloc™ ‘Quick Release’ for quick and easy disc change – ideal for removal of corrosion and rust in hard to access areas.



# Paint shop solutions

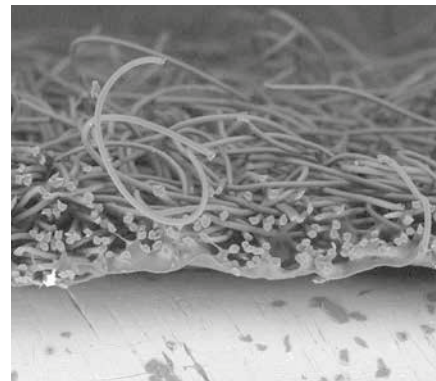
## 3M™ Dirt Trap Protection System

### Traps dirt. Protects profits.

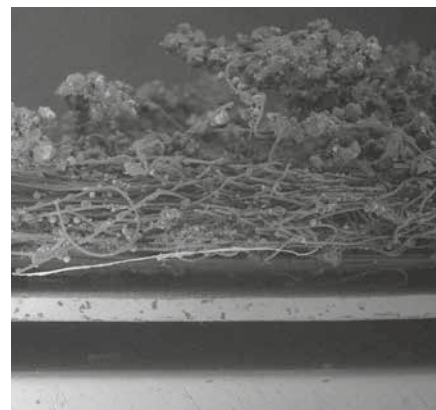
#### *Improve paint department productivity*

- ▶ Capture dirt and overspray
- ▶ Helps reduce paint booth maintenance
- ▶ Helps protect your investment

3M has taken the simple concept of surface protection and revolutionised it to enhance your painting process. Not only is the 3M™ Dirt Trap Protection System excellent for surface protection, but a closer look reveals a breakthrough innovation that actually traps dust, dirt and overspray in a unique non-woven construction.



*Patented adhesive-backed, non-woven material.*



*Build-up of trapped dust, dirt and overspray.*

### 3M™ Dirt Trap Protection Material

A specially engineered adhesive-backed white material designed to:

- ▶ Protect paint booth walls and floors
- ▶ Trap dust, dirt and overspray
- ▶ Brighten work areas



#### *Help increase paint booth productivity*

Increase paint booth utilisation by reducing daily and periodic maintenance.

#### *Save finishing time and increase customer satisfaction*

When airborne contaminants settle on your freshly painted surfaces, it creates an extra step to prepare the finish to meet your customer's expectations.

This additional time could be spent on another job and improve your throughput.

### 3M™ Dirt Trap Protection Film

Adhesive-backed clear film protects lights and windows from overspray build-up.

- ▶ No more scraping and cleaning... simply peel off and re-apply



#### *Help protect your investment*

Your paint booth is one of the largest investments in your shop. Keeping this asset in top working condition is a never-ending task.

Cleaning, scraping and re-painting takes away from valuable production time. Repeated washing introduces moisture, which promotes premature rust and corrosion.

The 3M Dirt Trap Protection System minimises booth down time and helps keep this valuable piece of equipment in top working condition.

#### *Excellent for waterborne paint systems*

Waterborne paint systems require more airflow to accelerate dry time. This increased airflow could mean more airborne dust and dirt.

3M Dirt Trap Protection Material helps trap these airborne contaminants and keeps them away from your paint job. Trap the dirt and help reduce your compounding and polishing times.



# Paint shop solutions

## Spraying solutions

The 3M™ Accuspray™ Pressurised HGP Spray Gun and PPS™ Pressure Cups are designed for high viscosity coatings.

You can now apply virtually any sprayable coating such as underbody protection, high build primers and stonechip.

For applying highly viscous materials:

- ▶ 3M Accuspray Pressurised HGP Spray Gun
- ▶ Easy cleaning
- ▶ Processing hard to reach places
- ▶ Diverse adjustment and nozzle options
- ▶ Many textures can be reproduced
- ▶ Less material consumption



1.4mm ▲



1.8mm ▲



2.0mm ▲



**3M™ Accuspray™ Spray Gun HG14 provides very good results though excellent atomisation resulting in higher transfer efficiency and lower overspray.**

Helps save you time, money and material. Using the 1.4mm, 1.8mm or 2.0mm atomising heads / nozzles to achieve the desired results.

- ▶ 1.4mm nozzles are perfect for wet-on-wet primer applications
- ▶ 1.8mm nozzle is still the first choice for high build primer
- ▶ 2.0mm nozzle for sprayable polyester primer

## 3M™ PPS™ Paint Preparation System



### Enhancing paint shop efficiency.

The innovative system from 3M enables painters to mix less paint and drastically reduce the amount of solvent and time required for gun cleaning, improving operator efficiency by as much as 15%.

Makes your job easier with this innovative system that helps increase efficiency by eliminating the need for traditional mixing cups and paint strainers.

Unlike traditional spray cups, paint is mixed and sprayed out of the same 3M™ PPS™ liner with a lid and built-in filter. Specifically

designed adapters allow painters to use the PPS system with virtually any spray gun.

A key advantage of this closed system is that it enables a painter's spray gun to function at any angle, even upside down. Safe from outside contamination, the 3M™ PPS™ system offers a cleaner, more efficient solution for all repairs from small spots to large surfaces.

The 3M PPS Paint Preparation System can be used for all painting applications such as Primer, Base Coat and Top Coat.

The key benefits of using 3M PPS Paint Preparation System include:

- ▶ Only one 3M™ PPS™ cup for mixing and spraying
- ▶ Enables painters to mix less paint
- ▶ Up to 70% saving of cleaning solvent
- ▶ Closed system – no outside contamination
- ▶ Faster system – from mixing to disposal
- ▶ Less operator exposure to solvents and reduction in VOCs
- ▶ Spray gun functions at any angle
- ▶ Available in 4 sizes: 180, 400, 650 & 850ml





# Rolling stock maintenance and refurbishment

When it comes to the overhaul and maintenance of rolling stock, rail operating companies face many different demands but they all share the same needs – to reduce turnaround times and refurbishment costs, while achieving exacting quality and safety standards. 3M's unique portfolio gives you the edge providing you with a continually evolving range of innovative, world-class rail rolling stock refurbishment solutions.



## Refinish



### **3M™ Masking Solution**

Masking tape is used in all types of applications throughout the repair process. 3M offers a range of products to help increase productivity and improve profitability, by reducing repair process times and eliminating rework costs.

3M™ Purple Premium PLUS Clear Masking Film helps prevent moisture imprinting and ghosting on painted vehicle surfaces. The film is a premium high density plastic sheeting which withstands temperatures of up to 120°C for an hour. Masking tape can easily be removed and repositioned on the film.

3M™ Taped Masking Film is used for localised masking. Our pre-applied tape makes this film easy to use, and our micro replication technology means that you can tear in clean, straight lines without a blade. It protects against paint spray and helps prevent paint running off the plastic film.





# Refinish

## The ultimate finish

### Paint defect removal

Paint imperfections can be removed using 3M™ Hookit™ Purple Finishing Film Discs 260L grades P1200 – P2000 with an interface pad on an appropriate sized sander.

Scratches caused by removing paint imperfections can be refined using a 3M™ Trizact™ Fine Finishing Disc P3000, and then perfected even further with a 3M™ Trizact™ Fine Finishing Disc P6000.

Featuring 3M's Precision-Shaped Grain technology, 3M Trizact abrasives deliver more consistent finishes, consistent cut rates, and cooler grinding and finishing temperatures than conventional abrasives. They continuously expose fresh abrasive cutting surfaces, for more predictable, higher worker productivity and more consistent quality in your end products.



### The ultimate finish

Finally, using the 3M™ colour-coded system will help achieve the ultimate finish.

#### 1. Compound

3M™ Perfect-It™ III Fast Cut PLUS Compound is the smart choice for professionals. This fast-acting, high-performance liquid abrasive is designed to remove sanding scratches from both refinished and OEM paintwork, for an immaculate finish.



#### 2. Polish

Place a small amount of 3M™ Perfect-It™ III Extra Fine PLUS Compound onto a 3M™ High Gloss Polishing Pad. Move the polisher across the panel until a high shine is achieved.



#### 3. Finish

Apply a small amount of 3M™ Perfect-It™ Ultrafina™ SE to a 3M™ Perfect-It™ Ultrafina™ Foam Polishing Pad to remove swirls and holograms, and to achieve the excellent finish.





# Industrial adhesives and tapes

## Design & assembly

### Bonding solutions for manufacturing, maintenance and refurbishment.

Industrial adhesive and tape solutions for interior and exterior designs are vast, offering both bonding and fastening solutions. 3M has adhesive bonding technologies ranging from spray able adhesives, structural adhesives, hot melt adhesives, bonding tapes and adhesive sealants. Our solutions help speed up your assembly process, increase durability, increase productivity and lighten the load by reducing the number of mechanical fasteners needed.

#### Interior:

Rail carriages transport masses of people quickly, safely and comfortably. 3M bonding technologies are there – sealing the windows, attaching interior panels and carpets, helping construct next generation composites, and helping to keep passengers comfortable and secure while they ride to their destinations. Solutions include:

- ▶ Removable panel attachment
- ▶ Window protection
- ▶ Insulation attachment
- ▶ Fire protection
- ▶ Sealing and noise reduction
- ▶ Floor system assembly
- ▶ Panel bonding

#### Exterior:

3M bonding solutions help protect rail car exteriors from the environmental effects of rain, sun and abrasion, keeping the car looking good, mitigating moisture ingress and more. By helping extend the life of the railcar, 3M bonding solutions help mitigate maintenance over the long haul. Solutions include:

- ▶ Signage attachment
- ▶ Door assembly
- ▶ Sealing and protection
- ▶ Window insulation and glazing

#### Maintenance

3M industrial tape and adhesive solutions support extended life of a railcar, when it comes to maintenance with offer solutions to support a quick turnaround. Solutions include:

- ▶ Exterior repairs sealing to windows, doors and roofs
- ▶ Interior panel repairs
- ▶ Interior sealing to floor repairs
- ▶ Interior fitting repair



# Industrial adhesives and tapes

## Design & assembly

### Structural adhesives

Our range of 3M™ Scotch-Weld™ structural adhesive products are designed to provide a very high-strength joint between two surfaces with the resulting bond often being as strong as the surfaces they join.

The products are based on epoxy, acrylic or polyurethane chemistry, so are able to cure at room temperature and can be applied at selected points or in a continuous bead. As they are applied using a hand-held or air-powered dispenser, they are quick and easy to use, ensuring accurate mixing and no wastage.

Our structural adhesive products help achieve permanent, high-strength bonds with many materials including metals, glass, ceramics, wood, technical plastics and rubbers.

The benefits of designing and building products with 3M Scotch-Weld structural adhesives is that it helps drive product success.

- ▶ **Freedom of design:** helps improve aesthetics, reduce weight and noise, and enhance corrosion and fatigue resistance
- ▶ **Process efficiencies:** helps with effective production with quiet, fast and easy manufacturing processes
- ▶ **Low odour advantages:** improve your environment with 3M's low odour structural adhesives
- ▶ **Dispensing options:** dispense by hand or with automated equipment



### 3M Scotch-Weld adhesive sealants

3M offers a wide range of adhesive sealants uniquely positioned to offer a comprehensive line designed for industrial markets.

High quality formulations result in significant advantages that resist yellowing, cracking, chalking, and UV degradation. Precision formulations with proven performance that maintain internal integrity, resulting in long term durability. Adhesive sealants that are reliable and create a secure, high quality bond and seal for a variety of surfaces and applications, indoors and out.

- No matter what your choice of 3M adhesive sealants is, you get the same benefits:
- ▶ Bond lines that bend and flex to hold tight in vibration and seal tight against corrosive elements
  - ▶ Resist yellowing, cracking, bubbling, chalking, and UV degradation for long term reliability indoors and out
  - ▶ Helps save rework time and expense
  - ▶ Resist bleeding and staining finishes
  - ▶ Improved productivity: paintable polyurethanes when skinned, paintable hybrids when wet



- ▶ Isocyanate free
- ▶ Paintable when wet



# Industrial adhesives and tapes

## Design & assembly



### 3M™ Dual Lock™

Hundreds of reattachments in a snap. Strong and simple to use.

3M reclosable fasteners provide secure fastening with easy access and enhanced gripping for a wide range of applications in specialty vehicle and rail.

Holding power to replace screws, bolts and rivets.

Strong, interlocking mushroom-shaped heads close with a snap, working behind the scenes as an invisible fastener to create a secure fit and smooth lines for improved aesthetics and sleek appearances. Providing the application ease of tape and the durability of a traditional fastener.

#### Benefits:

- ▶ Durable – up to 1,000 openings and closings before losing 50 per cent of original tensile strength
- ▶ Helps reduce vibration
- ▶ Temperature, moisture and UV resistant
- ▶ Strong, pressure-sensitive adhesive bonds on contact
- ▶ Interlocking mushroom-shaped heads have 5 times the tensile strength of hook-and-loop products



### 3M™ VHB™ Tape

Bonding product parts with precision, ease, reliability, and strength requires an approach that breaks the barriers of traditional construction elements. 3M VHB tape opens up a world of possibilities virtually eliminating rivets, screws, bolts, and welds whilst improving design construction, aesthetics and productivity. With unmatched strength, these tapes help increase the overall durability and reliability of every product bond.

- ▶ **Demanding strength:** disperses stress, dampens sound and vibration
- ▶ **A durable difference:** resistance to extreme temperatures, wind, UV rays
- ▶ **Application efficiency:** bonds and seals in one step, cuts down prep work, conforms to surfaces. Simple and easy to apply
- ▶ **Improved aesthetics:** help enhance your design appearance with a virtually invisible bond

# Industrial adhesives and tapes

## Design & assembly

### Extreme sealing tape

*Instant sealing that rolls on fast and looks good*

- ▶ Sticks on contact to many metals and plastics without dripping, oozing, or clean-up
- ▶ Increases productivity throughput with no drying time, immediately paintable
- ▶ Conforms over contours, edges, rivets and screw heads for a watertight seal
- ▶ Eliminates caulking guns to buy, clean and store and no empty cartridges for disposal
- ▶ Looks neat and precise; improved aesthetics
- ▶ Choice of three colours to match most applications
- ▶ Options of two thicknesses offer regular or low profile

### The winner over liquid sealants

*Over time even more extreme advantages become obvious*

- ▶ Holds securely through sun, rain, snow, and extreme temperature and humidity
- ▶ Excellent resistance to many common industrial solvents
- ▶ Stays flexible to compensate for vibration and thermal expansion/contraction
- ▶ No cracking or crumbling
- ▶ Excellent resistance to abrasion and high pressure washing



### 3M™ Double Coated Tapes

Laminating tapes provide a thin bond line for improved aesthetics and are available in different formats to aid maximum design flexibility: 3M™ Adhesive Transfer Tapes (ATT), 3M™ Double Coated Tapes (DCT), 3M™ Double Coated Tissue and Scrim Tapes. Vehicle construction process requires laminating adhesives for multiple applications:

- ▶ Noise and vibration dampening
- ▶ Cushioning and sealing
- ▶ Carpet or flooring bonding
- ▶ Trims attachment
- ▶ Logo / label attachment

Laminating adhesives bond to dissimilar materials. The specialist adhesive families provide varied advantages:

- ▶ Broad working temperature range
- ▶ Good to excellent UV and chemical resistance
- ▶ Low VOC / low fogging
- ▶ Plasticiser resistance
- ▶ Removability and repositionability
- ▶ Die-cut friendly tapes for intricate designs





# Infrastructure

3M products help to protect and provide reliability in key places both on the network, providing leading edge electrical and coatings technologies for overground and underground rail applications, through to cost-effective protection of the station building itself via our corrosion solutions.

## Slip resistance

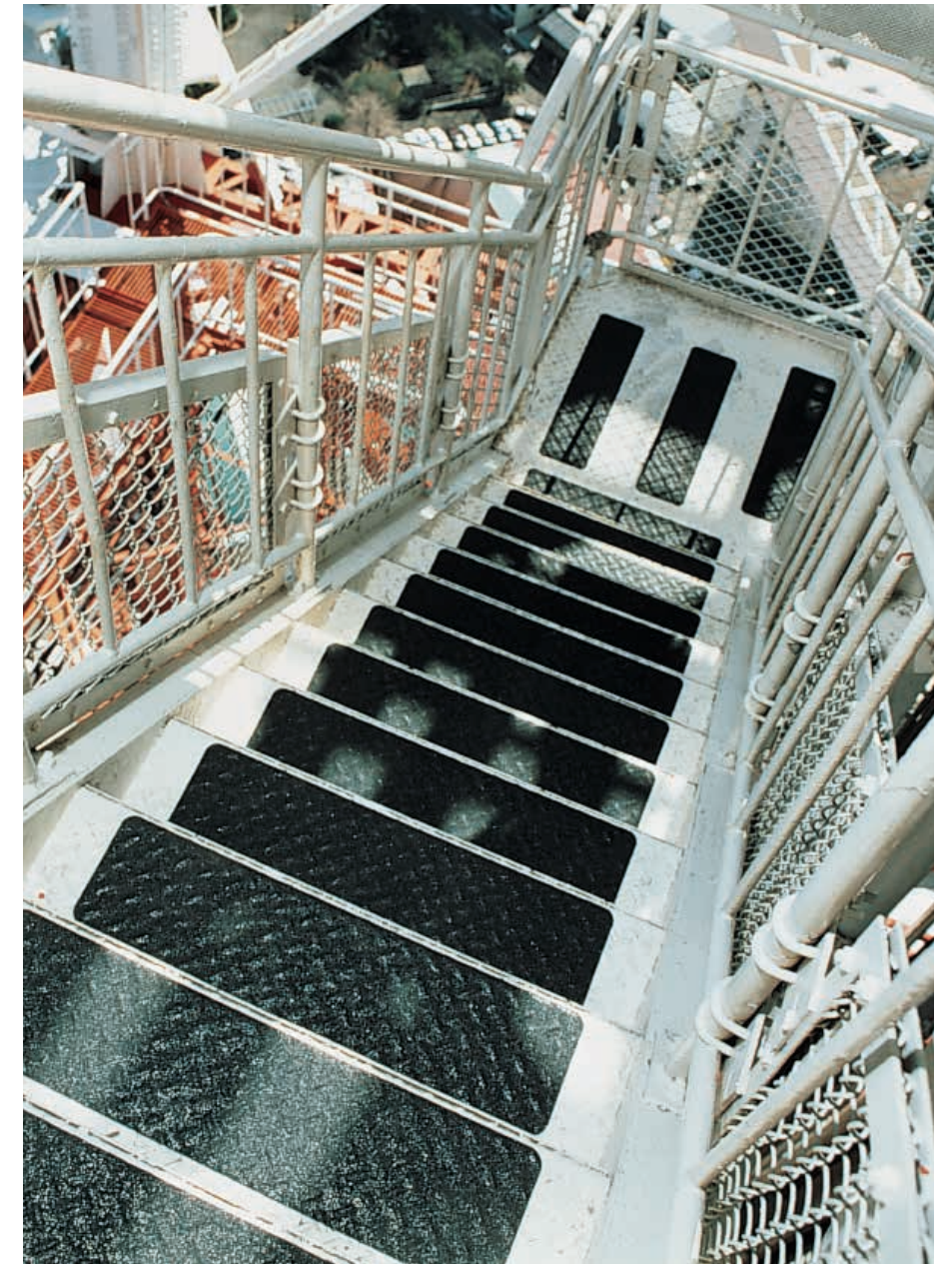
**3M™ Safety-Walk™**

### Slip-resistant tapes and treads

As one of the leading global manufacturers of slip-resistant products, 3M offers a full range of functional, slip-resistant materials designed for the safety of people in the workplace.

These mineral and non-mineral coated products are suitable for industrial or residential applications in dry, wet or oily conditions. 3M Safety-Walk slip-resistant tapes and treads adhere to clean, dry surfaces without wrinkling, curling, tearing, shrinking or lifting and offer proven durability for long life. Pressure sensitive adhesive backing makes it easy to apply tapes and treads without the use of anchoring.

3M Safety-Walk tapes and treads meet or exceed the standards and recommended guidelines for slip resistance in accordance with ASTM requirements. Standard rolls and pre-cut treads are available in a variety of sizes, colours and textures ranging from fine resilient, medium resilient and general purpose to coarse and conformable material types. Custom sizes, pieces and die-cut shapes are available through an extensive national network of 3M authorised converters.







## Platform and passageway coatings for underground stations

- ▶ 3M™ Scotchkote™ WB Epoxy Primer GP 830
  - Durable, easy to clean coating system
  - Suitable for both customer and back office areas
  - Compliant to Sub Surface S1085 requirements for fire performance
- ▶ 3M™ Scotchkote™ Urethane Wall Coating UV 843 with primer benefits:
  - Tested for limited fire hazard performance in 3M™ Scotchkote™ WB Epoxy Primer GP 830

## Bridges, gantries and roof steelwork

- ▶ 3M™ Scotchkote™ Epoxy Coating 152LV/172
- ▶ 3M™ Scotchkote™ Urethane Coating 129
  - Network rail Specification NR L3/CIV/039 certified over Sa2½ and St3 preparation (15 year life with St3)
  - Can be applied in high humidity and in damp cold conditions

## Trackside plant and equipment

- ▶ 3M™ Scotchkote™ Epoxy Coating EA9WB
- ▶ 3M™ Scotchkote™ Urethane Coating Dicol 170
  - Long term corrosion protection
  - Compliant to Sub Surface S1085 requirements for fire performance

## External station facades

- ▶ 3M™ Scotchkote™ Urethane Wall Coating UV 843 with primer
  - Tested for limited fire hazard performance with 3M™ Scotchkote™ WB Epoxy Primer GP 830
- ▶ 3M™ Scotchkote™ Urethane Coating Dicol 170
  - High levels of ease of graffiti removal

## Line marking

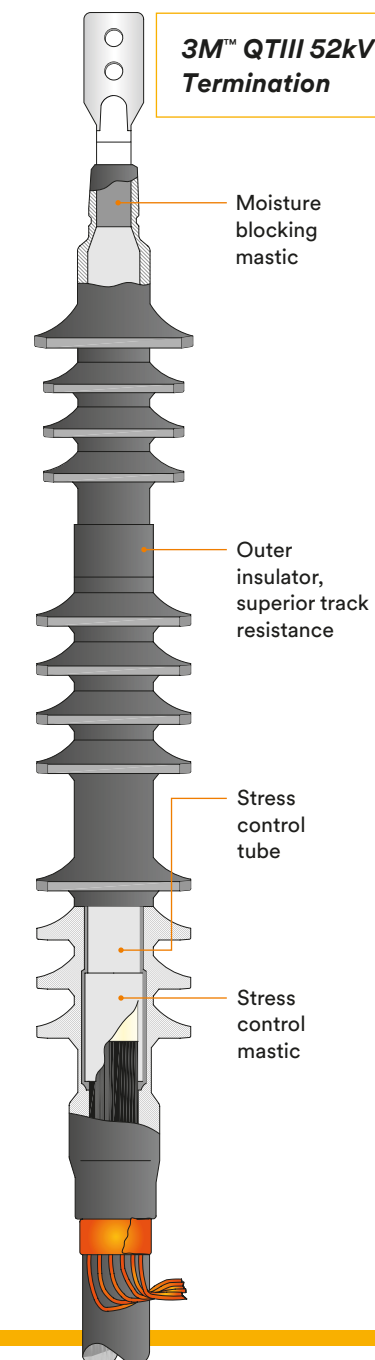
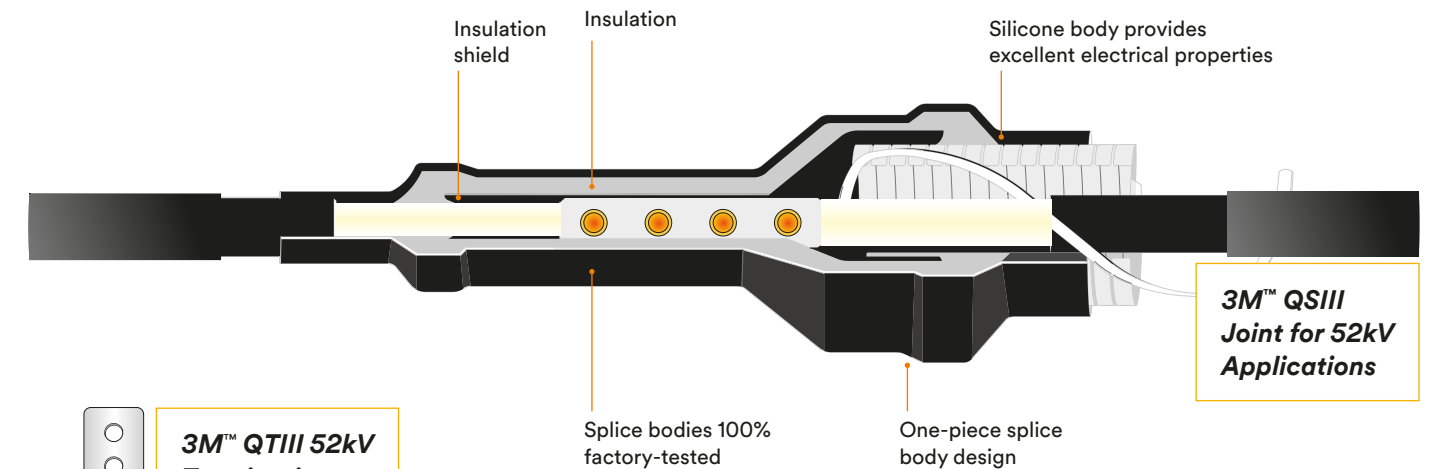
- ▶ 3M™ Scotchkote™ Liquid Line Marking LXF 897

## Escalators, lifts and ancillary steelwork

- ▶ 3M™ Scotchkote™ Epoxy Coating EA9WB System
  - Fully compliant with Sub Surface S1085 requirements for fire performance
- ▶ 3M™ Scotchkote™ Urethane Wall Coating UV 843 with primer
  - Tested for limited fire hazard performance with 3M™ Scotchkote™ WB Epoxy Primer GP 830

## Floor coatings

- ▶ 3M™ Scotchkote™ Epoxy Floor Coating HB 850
  - 100% solids protection system for application to a wide range of floor surfaces
- ▶ 3M™ Scotchkote™ Liquid Line Marking XF 895
  - A fast drying line marking coating for concrete surfaces with minimum disruption, suitable for return to service in 1/2 hour



## Track and station infrastructure

**Cold Shrink technology offers five-star performance. Cold Shrink cable jointing and terminating.**

- ▶ Found to be a safer, more reliable and easier to install solution for low, medium and high voltage applications
- ▶ Invented over 40 years ago by 3M, Cold Shrink technology is designed to make cable jointing, terminating and abandonment as simple as possible
- ▶ Many components have a one-part construction
- ▶ Simple, tool-free installation (after cable preparation)
- ▶ Permanent radial pressure
- ▶ Extensive quality and factory testing programmes
- ▶ Lower installed cost – compared to many competitive products

## Fire protection

### 3M STFF Shield products

The Smoke, Toxicity, Flame & Fume (STFF) Shield from 3M range provides a protective sleeve for polymeric cable joints in electrical power networks. This recent introduction gives rail installers and contractors a fast and efficient way to ensure compliance with industry standards, regulations and challenging environmental conditions and has been tested to the London Underground 1-085 standard and is also PADS approved.





# Worker safety

Any organisation should not take safety for granted. The health and welfare of your workforce depends on it. By working in association with skilled safety practitioners, partners and customers, we are committed to ensuring that we help you create an environment that protects your workforce – effectively, efficiently and economically. We offer ranges in respiratory, head, eye, hearing, skin and fall protection that not only offer optimal protection functions, but excel in comfort too.

## Personal protective equipment

### High-performing protection for high-performing people

3M's rail solutions include a wide range of Personal Protective Equipment, allowing your employees to work with more confidence and helping you to manage risks when working in hazardous environments. 3M manufactures a range of respiratory protection, fall protection, hearing and eye protection, among other things, for assured safety on the job.



#### Inspired respiratory protection

Our respiratory protective equipment includes disposable, reusable, powered and supplied-air respirators to protect against harmful gases, vapours and particulates. The 3M respiratory protective products range gives you an unparalleled choice when it comes to the level of protection, comfort, style and maintenance you need to work effectively and safely.



#### We hear you

With everything from disposable earplugs to hi-tech electronic defenders and detection equipment, 3M hearing protection looks after one of our most delicate senses. We've designed our products to be comfortable, easy to use and highly effective against temporary or permanent hearing impairment.



#### The eyes have it

Our eye protection range offers a carefully crafted balance of style, comfort and safety. Options include durable anti-scratch and anti-fog coatings and lens variations to meet a wide range of needs.



#### Always one step ahead

Our wide range of tried and tested head and face protection systems includes 3M™ Uvicator™ Sensor Helmets – designed to integrate with eye, face and hearing protective products. These multi-systems mean you can customise your Personal Protective Equipment to suit your needs and personal preferences.



#### We've got you covered

3M's protective coveralls give you comfortable protection you can rely on. We've designed each model for specific applications; from simple dusts to aggressive chemicals.



#### An eye for detail

The 3M™ Speedglas™ Auto-Darkening Filter (ADF) was the first of its kind on the market and set new standards in eye protection and comfort for welders. We've since expanded the range to provide outstanding state-of-the-art protection.





# Personal protective equipment

Added value support





**Product Use:** Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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