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PRACTICAL
SIGN
MAKER

Issue 3 September 2005

3M: the specialists in non-mechanical
bonding solutions for signage



25
Years of 3M™
VHB™
TAPE



Concrete Repair

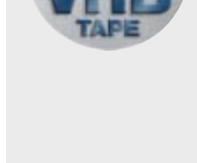
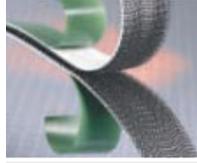
A simple squeeze to repair horizontal cracks, spalls and to set anchors.

The perfect fitters mate, not only does the new 3M™ Concrete Repair cartridge fix cracks in concrete. It also sets in minutes into a secure locking bond around bolts and anchors in masonry.



- Product hardens in 5 minutes to assist in safety and appearance - a fork lift truck can pass over the repair in as few as 15 minutes
- Universal cartridge designed to fit into any standard caulking gun - no additional outlay for equipment or contractors required
- Easily dispensed by hand from caulking gun
- Very versatile, can be moulded, sanded and painted making the repair job less of an eyesore
- Ideal for monolith anchoring and fixing in loose masonry
- Create a threaded recess by applying silicone grease to bolt threads and screw into pre-filled hole

Call the 3M Customer Information Team on **0870 60 800 50** for more details



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Why choose 3M?

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GRIPPING STUFF

For many years, the sign industry has benefited from the pioneering and frequently ground-breaking product innovations of 3M™ that have led to faster, cleaner, better and more reliable signage on a global scale. Brands like Scotchcal, Scotchlite and Scotchprint are as familiar to the sign industry today as many other long-established 3M brand names like Scotchgard, Post-It, Scotch-Brite and Thinsulate are to world industry and commerce generally.

Founded in 1902, 3M has become a world leader in technological innovation which has improved incalculably the well-being and future progress of every conceivable market sector in more than 200 countries. The company's many diverse innovations are evident in virtually every aspect of modern life, ranging from consumer and office materials and equipment, commercial graphics, electronics and telecommunications, environmental safety and security, healthcare and transportation. Employing around 67,000 skilled personnel, 3M has become one of the world's leading and most instantly recognisable brands. The UK and the Republic of Ireland are home to one of its largest subsidiaries outside of the USA, employing around 3,400 people based at 13 strategic locations which include eight manufacturing sites.

This latest issue of Practical Signmaker focuses on and celebrates 25 years of the special skills of 3M's Industrial Adhesives & Tapes Division and the significant technical and productivity contributions it has made and will continue to make to signmakers and display producers. Read, enjoy and, above all, benefit from its content.

Mike Connolly | Editor

SUPPLIER SPOTLIGHT



PROVIDING 25 YEARS OF ALTERNATIVE BONDING SOLUTIONS FOR THE SIGN INDUSTRY



In this third issue of Practical Signmaker, the spotlight falls on 3M Industrial Adhesives & Tapes Division and in particular heralds the achievement of 25 years in the development by this division of a range of widely specified non-mechanical sign-fixing solutions. Mike Connolly visited 3M at its impressive and near-futuristic UK headquarters in Bracknell to find out why 3M bonding solutions have proved so successful over the years and why they remain a preferred choice of so many signmakers and display producers, both in the UK and the Republic of Ireland and throughout the world.

During the past 25 years, 3M Industrial Adhesives & Tapes Division has been providing the sign and graphics industry with a continuous flow of increasingly innovative non-mechanical bonding solutions. These have become a preferred choice of the majority of sign manufacturers and display producers and are a key factor in the success of so many large corporate identity signage programmes to be seen on the high street, at large retail parks and within major industrial and commercial complexes.

By taking the initiative in understanding the potential for non-mechanical fastening in so many industries, 3M has performed better than any other global innovator in bringing to market a range of tape and adhesive products that provides high-performance assembly of components without the need for conventional mechanical fixing processes using, typically, screws, rivets and welding. Significantly, 3M developed a new generation of tape products which includes acrylic foam tape and what is known today as VHB™ tape which provides the additional benefits of vibration dampening, speed of manufacture and enhanced aesthetics.

In 1978 3M developed a revolutionary acrylic foam tape which transformed the car manufacturing industry by providing an alternative and more cost-effective method of attaching body-side mouldings and weatherstrips. More recently, the metal cladding of the world's tallest hotel, the Burj Al Arab in Dubai, is held together with VHB tape to tackle the very high prevailing temperatures and the strong desert winds. VHB tapes have in fact featured twice on the BBC's Tomorrows World and clips of both programmes, including the Dubai project, can be seen by clicking on video demonstrations at www.3m.com/uk/tag

'One of 3M's key strengths lies in being able to provide customers with solutions which make them (the customers) more competitive. In the industrial arena, no other company can offer the range of products and application solutions that 3M brings to its customers on a daily basis.'

Dr Chris Howitt, Technical Manager (Industrial Business) UK and the Republic of Ireland

The 3M Industrial Adhesives & Tapes Division has developed a wide range of bonding products. These are used in many diverse industries (for example, aerospace, building and construction, transportation and OEM assembly) and are, of course, preferred products for the manufacture and installation of signs and displays.

Poor commercial signage is arguably worse than no signage. Installed signs can reflect the credibility, stature and prestige of a business, making durable and



- ▲ Chicago's O'Hare Airport used VHB Tapes in construction.
- ◀ Metal cladding at the world's tallest hotel, the Burj Al Arab in Dubai, is held together with VHB Tape to cope with the very high temperature and strong desert winds.

aesthetically pleasing materials of construction as essential to a sign's utility as to its cost-effective production and performance. 3M offers precisely these parameters through the availability of its three core products: VHB tapes, Structural Adhesives and 3M™ Dual Lock™ reclosable fastening systems. Collectively, these solutions can effectively replace mechanical fastening processes in most situations whilst imparting huge additional benefits in terms of greater flexibility in sign design and manufacture, improved performance, longer life and greater resistance to environmental degradation.

For example, post and panel signs have traditionally relied on mechanical fastening to withstand extremes of weather and temperature variations. However, it is freely acknowledged by sign manufacturers and end users alike that both rivets and spot-welding can create isolated stress points which over time will distort the sign and damage the sign face. 3M™ VHB™ Tape and 3M™ Scotch-Weld™ EPX adhesive will deliver not only a bonding performance comparable to mechanical fastening but also will enable sign manufacturers to produce a consistently smooth sign face that is free of distortion and spot-weld marks. These materials form flexible bonds which reduce stress points otherwise unavoidable with mechanical processes and simplify and speed up the assembly of large signs.

The same benefits apply to the production of fascias and advertising panels for which 3M products will provide an invisible and therefore more vandal-resistant bond between both similar and dissimilar substrates such as plastics and their derivatives and metals. For illuminated sign boxes and box signs, 3M bonding solutions provide transparent and watertight sealing through a single, simple operation (of particular importance in the construction of modular signs used

externally). These solutions accommodate varying rates of thermal expansion across a sign face to ensure a watertight seal, regardless of the effects of internal illumination sources and the normally harsher outdoor environmental conditions to which, for example, shop fascia signs are exposed.

Contingent upon the differential expansion of the substrates being used and the prevailing environmental conditions, totem signs (seen mainly on garage forecourts and as corporate ID constructions at commercial, industrial, leisure and hospitality complexes) require a choice of bonding solutions. Whether assembly of these signs occurs before or after powder-coating, 3M solutions provide a simple single-action method of bonding and sealing whilst contemporaneously improving a sign's appearance and eliminating the adverse effects of mechanical stress or varying thermal expansion.

For temporary and/or removable signs, Dual Lock reclosable fastening solutions are a popular choice. The fasteners are made of hundreds of mushroom-shaped stems that interlock and secure the sign when pressed together. The result is a very strong but reclosable assembly which can be opened and closed over 1,000 times and which is up to 12 times stronger than conventional hook and loop systems. 3M also supplies a selection of removable foam tapes for temporary signs which provide strong adhesion and allow clean and easy removal.

Whether signage involves the bonding of dissimilar substrates, requires a watertight seal or must accommodate varying temperatures, 3M can provide a customised solution that is strong, durable, reliable and cost effective. Significantly, these solutions will also increase productivity by simplifying and speeding up the assembly process and achieving a sleeker finished sign or display. ■

VHB TAPE: THE PROVEN ALTERNATIVE TO RIVETS, SCREWS AND SPOT-WELDING



Celebrating 25 years of providing the most widely specified and trusted alternative to mechanical fastening is 3M's range of VHB Acrylic Foam Tapes. Due to the large number of options available, which could lead to confusion in the selection process, 3M has developed a choice of six primary bonding solutions for the sign industry to ensure that the correct product is always used for a given application.

Designed for heavy industrial use and for outdoor applications in frequently hostile environments, VHB tapes provide the ideal solution to the manufacture and installation of large-format signs used in corporate ID projects as well as for signs used more generally where durability, reliability and aesthetic appearance are similarly of paramount importance.

IMAGINE... A WORLD WITHOUT RIVETS, SCREWS OR SPOT-WELDING

- Signs would be sleeker and seamless
- Expenditure on fabrication equipment would be radically reduced or eliminated
- Removal of isolated stress points in a sign assembly resulting in more consistent more reliable performance
- Finished signs would be lighter
- Reworking could become a thing of the past



In effect, since 1980 3M has transformed the manufacture and assembly of signs by combining the strength and high performance of a structural adhesive with the speed and simplicity of a bonding tape.

The result is an extremely high-strength, shock- and weather-resistant product that will greatly speed up the manufacture of signs whilst reducing production

costs and imparting performance benefits not possible with alternative mechanical processes. Whilst all VHB tapes share common characteristics which result in a much greater bonding performance, they also have individual qualities which determine their suitability for specific applications. The following brief product appraisals will help in selecting the most suitable of the six primary VHB tape solutions for a given application.



SIX REASONS TO STICK WITH VHB ACRYLIC FOAM TAPES

1. VHB 5952 POWDER-COATED SURFACES TAPE

Bonding to powder-coated substrates invariably requires additional surface preparation, including priming and abrading. With VHB 5952 this sometimes lengthy preparatory work is no longer necessary. No abrading and no primer mean reduced production time and costs, no damage to an already prepared surface and the strongest bond achievable.

5. VHB 4611 HIGH-TEMPERATURE TAPE

This solution can withstand intense heat and is used for bonding substrates before powder-coating.

2. VHB 4941 ALL-SURFACE TAPE

The best all-round performer in the 3M VHB tapes range, this option provides ultimate conformability (a feature unique to 3M technology). This results in more surface contact, thus increasing the bond strength even when applied to textured surfaces whether they be metals, glass, polycarbonates, pvc, acrylic or composites.

6. NEW SIGN MAKERS' ASSEMBLY TAPE

This latest addition to the VHB range is a strong, reliable and cost-effective solution for applications requiring no special features. It is ideal for simple and fast bonding.

3. VHB 4910 CLEAR TAPE

The perfect answer when aesthetic appearance is critical. Enables high-strength but hidden sign-fixing.

4. VHB 4943 LOW-TEMPERATURE TAPE

The ideal solution for sign assembly in cold conditions, it can be applied at temperatures as low as 0°C.



VHB ACRYLIC FOAM TAPES: 25 YEARS AND ONWARDS



Although most consumers may never have seen or handled one of these versatile 3M products, they all will have been confronted at some time with visual evidence of their existence and their superb performance capabilities.

Exterior truck panels, the interior panelling of trains, building facades and, of course, the proliferation of corporate ID, information and wayfinding signage seen throughout the country will invariably have owed their existence to VHB tapes technology.

Since their launch 25 years ago, VHB tapes have evolved and progressed technologically due to 3M's known ability to adapt to the changing requirements of those market sectors in which the company has identified a need for these products. Signage and transportation applications were the primary users of VHB tape solutions and remain so today, although the technology has now been adopted by virtually every industrial sector throughout the world.

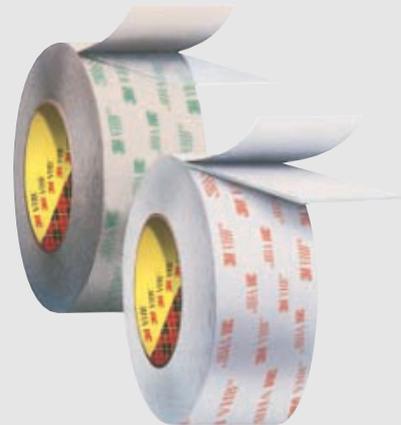
'Ever since 3M launched its VHB Tapes 25 years ago, the product line has evolved to ensure the performance profile meets the demands of new markets and the new substrates being used.'

James Gravestock
UK Marketing Manager
3M Industrial Adhesives & Tapes Division

Unlike other fastening solutions, 3M technology bonds substrates with a continuous and lightweight viscoelastic seal that has proved resistant to impact and vibration as well as to extreme variations in environmental conditions. Designers of signage, for example, found they could remove the need for mechanical fastening, which had the potential for damaging brittle materials, while increasing the aesthetic appearance of the finished product.

The original product line consisted mainly of white tape formulations which helped improve aesthetic requirements. However, in 1988 3M introduced its VHB Clear Tape which offered near-100 per cent transparency. This further extended the product's aesthetic appeal whilst also highlighting its safety and security benefits when applied, for example, to signage, buildings and glass constructions.

By the 1990's, there were fresh demands from industry in general and from sign designers and sign manufacturers in particular. Designers were now adding complex curves, layered surfaces and illuminations to their concepts and were specifying new and more adventurous substrates.



'We use 3M bonding tapes as a preferred product and have never found it necessary to use alternative products for the many high-profile corporate rebranding projects in which we are continually engaged. This policy emanates from our long-standing relationship with 3M and the total confidence we have in this company's products and the technical back-up provided which are both excellent.'

Russell Watkins
Project Manager at Blaze Neon for the recently completed Abbey rebranding project

To meet this new challenge, 3M developed its Conformable VHB and Structural Bonding Tape variants, the former of which quickly establishes a viscoelastic bond on textured surfaces and between dissimilar substrates frequently used in sign manufacture.

As powder-coating has become more widely adopted and in response to market demand, 3M has also developed a new range of VHB tape solutions offering solutions for powder-coated substrates. The expanded product line includes solutions capable of withstanding the very high temperatures associated with powder-coating as well as specific formulations designed to ensure premium performance on difficult-to-bond powder-coated substrates.

The next 25 years promise new innovations for users of 3M VHB tape solutions. Whilst not targeted specifically at the sign industry, the company plans to introduce a new fire-retardant grade. However, given the rate of technological advancement this new solution, like so many others in 3M's formidable armoury, may yet find a niche requirement with sign manufacturers and sign installers.



TWO-COMPONENT STRUCTURAL ADHESIVES AND APPLICATION SYSTEMS

The range of 3M™ VHB™ tapes is just one aspect of 3M's extensive portfolio of bonding solutions for signmakers. 3M™ Scotch-Weld™ EPX™ Structural Adhesives and 3M™ Dual Lock™ Reclosable Fastening Systems provide distinctive and yet complementary bonding capabilities for a wide range of substrates.

Fundamentally, 3M's high-strength structural adhesives are load-bearing formulations with a bond strength often as strong as, or stronger than, the materials joined. These structural adhesives have sufficient cohesive strength and creep resistance to permanently bond high-strength materials and have the potential to replace mechanical and fusion fastening processes in many applications.



Available in a choice of epoxy, polyurethane and acrylic formulations, Scotch-Weld EPX Structural Adhesives claim distinct advantages over mechanical fastening through a significantly higher bonding performance and without the need for investment in special equipment. Apart from being able to join a wide variety of materials that cannot be assembled by traditional fastening methods, they will also reduce costs for combining different materials for the same or better performance, will eliminate secondary sealing or finishing operations (thus saving time and money) and achieve stronger and stiffer structures and improved stress distribution.

The latest addition to the range of structural adhesives from 3M is Scotch-Weld EPX DP805 adhesive. This new innovation provides all the performance characteristics of existing EPX adhesives in terms of room temperature cure and precise mixing. This new five-minute acrylic adhesive offers high-viscosity (ie, non-sag) properties, rapid strength build up and exceptional adhesion performance when used on a multitude of surfaces. The oil-tolerant formulation means minimal surface preparation is necessary when bonding oily metals.

3M Structural Adhesive DP805 can be used where ultimate bonding performance is required but where the available surface area is limited. Typical shear strength is 3,000psi on aluminium.

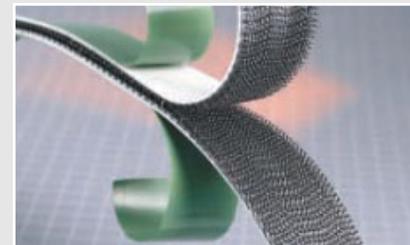


3M RECLOSABLE FASTENING SYSTEMS

THE FAST & EASY ALTERNATIVE TO TRADITIONAL MECHANICAL FASTENERS

For signs and graphics and exhibition booths that need to be assembled and dismantled or changed easily and at speed, 3M's VHB-backed Dual Lock™ Reclosable Fastening Systems are the perfect alternative to conventional mechanical fastening methods. They offer obvious advantages in terms of ease and speed of assembly and dismantling and due to their self-adhesive construction they require no tooling or drilling. Special characteristics include low- or high-temperature and plasticiser resistance, the elimination of alignment issues common to drilling and riveting and, ipso facto, an ability to be easily reworked if mistakes are made.

In practice, when two parts of the Dual Lock fastener are pressed together hundreds of mushroom-shaped stems interlock with each other. A 'snap' sound indicates the fastener is engaged. The result is outstanding holding strength (up to 12 times that of conventional hook and loop solutions) and naturally the elimination of unsightly mechanical fasteners. Such is the durability of Dual Lock, up to 1,000 opening and closing operations can be made.



The latest addition to the Dual Lock range is 3M Dual Lock Thin. It offers many of the benefits of the standard Dual Lock but, as the name implies, is much thinner (just 1.7mm in engagement). Recommended for lighter-duty applications, 3M Dual Lock Thin can be opened and closed between



▲ 3M™ Dual Lock™ Fastening Systems allow for fast and easy changes of displays like these programme information signs at a cinema complex.

50 and 100 times and provides twice the performance of regular hook and loop fasteners.

A second lighter-duty alternative is 3M™ Scotchmate™ Reclosable Fastener. Suitable for attachment to most vinyls and similar in design to 3M Dual Lock Thin, these fasteners can be opened and closed up to 10,000 times and are available in both self-adhesive and plain-backed versions.

3M FASTENING FACTFILE

1. One of the first UK applications for 3M™ VHB™ tapes was their use to stiffen road signs
2. The first global signage application for VHB Tapes was on BP's network of garage forecourts
3. 3M™ Structural Adhesives have been used in some of the most demanding applications, including the bonding of helicopter rotor blades and the construction of Formula 1 racing cars
4. One square centimetre of 3M Structural Adhesive will support a load bearing of 70kg
5. In theory, one square metre of Dual Lock™ fastener system can support an articulated lorry



6. 3M VHB tapes have securely bonded wing plates onto aircraft and lorry roofs
7. The standard temperature range of VHB tapes spans -30°C - +150°C
8. Dual Lock reclosable fastening systems can be fastened and unfastened over 1,000 times
9. Over time, VHB tapes build up more bonding strength
10. Metal cladding on the giant Burj Al Arab Hotel in Dubai is held together with VHB tape
11. Refurbishment at London's Grosvenor Hotel involved the use of VHB tape in the replacement of all of the windows in order to retain the traditional appearance of the window bars
12. Dual Lock reclosable fastening systems have 400 mushroom heads per square inch
13. Rigorous testing of VHB tapes has ensured that, once installed, they will resist hurricanes and fire



VHB TAPE APPLICATION TIPS

ANSWERS TO SOME FREQUENTLY ASKED QUESTIONS

- **How long does VHB Tape last?**
Over 25 years
- **How thick should the VHB tape be?**
The tape should be twice the width of the gap or mismatch area
- **How much VHB tape should I use?**
Sixty square centimetres per kg
- **How do I prepare the surface area?**
With VHB surface cleaner, abrade and use cleaner again (view the 'VHB Application Demonstration' under 'Video Demonstrations' at www.3m.com/uk/tag)
- **Can I apply VHB tape to brick surfaces?**
Yes, simply prime the surface with 3M™ ScotchGrip™ 10 adhesive before applying the Tape
- **How strong is VHB tape when compared with rivets and welds?**
Again, visit the Video Demonstrations at www.3m.com/uk/tag and click onto 'VHB Performance Demonstration'

14. 3M has various tapes and adhesives for bonding applications both before and after powder-coating and with no surface preparation required
15. Some VHB tapes will withstand temperatures up to 230°C



WHY CHOOSE 3M?



3M believes strongly that a culture of innovation offers their customers a number of unique strategic and competitive advantages which are increasingly important in today's fast-moving and competitive marketplace.

- **Continuous investment in innovation**
- **Comprehensive UK-based state-of-the-art testing and analytical laboratories**
- **Strong manufacturing base in the UK**
- **25 years of proven performance with VHB™ tape™ bonding solutions**
- **Dedicated and well-informed sales team**
- **Excellent technical support with a Dedicated Solutions Helpline at 0870 60 800 50 e-mail: bondingsolutions.uk@mmm.com**
- **Products of the highest quality and reliability**

Since 1902, 3M's success has come from producing imaginative and powerful solutions to customers' problems.

3M's strength in innovation stems from the cross-fertilisation of well over 100 different technologies which enables 3M to support its drive for new and better products for its customers in virtually every market sector.

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