

The logo features the word 'Vibrastop' in a white, sans-serif font, centered on a dark blue background that tapers to a point on the right. The background of the banner is a textured, greyish-blue surface.

Vibrastop®

Vibrastop® – ‘a new solution’ from Alston Pre-Applied Ltd

Unit 27, Roman Way Industrial Estate, Longridge Road, Preston, PR2 5BD
Telephone: 01772 700590 Fax: 01772 706510 Web: www.pre-applied.co.uk

'**Vibrastop®**' has been developed and tested over a long period of time. The information included on this product sheet has been accumulated over many years from both theoretical and practical sources.

Key Benefits:

- Low Installation Torque
- Excellent anti-vibration properties
- Highly re-useable
- Reduces stripping and galling
- For ferrous and non-ferrous fasteners
- Particularly suited to micro-fasteners
- Indefinite shelf life
- Ideal for automated assembly
- Applied at low temperature
- High Speed process
- Low Heat process
- Colour coding for identification
- Low on part cost

The logo for Vibrastop® features the brand name in white text on a blue background that tapers to the right, with a grey, textured surface visible behind the text.

Vibrastop®

'**Vibrastop®**' is an acrylic based passive anti-vibration patch. It has been developed specifically for and is ideally suited to use on small and micro fasteners (M4 and below).

'Vibrastop®' as an aid to installation

Stripping and galling of threads is a particular problem with small fasteners. Traditional nylon patches greatly increase the risk of stripping and galling. In order to create an effective anti-vibration patch it is necessary for the nylon to fill the tolerance voids in the completed mechanical joint

To be effective it is necessary to coat the fastener with excess nylon. During assembly of the joint this excess nylon has to be 'torn' off the patch by the action of inserting the fastener.

The torque required to perform this task can in some instances cause catastrophic failure of small parts even resulting in the head of the fastener being torn off. The resultant 'shavings' of nylon can also cause problems of contamination if allowed to enter the workings of delicate equipment such as hard disk drives or other electronic devices.

Our product '**Vibrastop®**' is applied as a thin even coating of acrylic resin. This resin can actually reduce stripping and galling of threads, acting as a lubricant between mating parts during installation. As 'cold flow' takes place our product '**Vibrastop®**' then assumes its role as an anti-vibratory patch. In this manner the end user does not experience any of the issues faced when using a traditional nylon patch.



Cold Flow

'Vibrastop[®]' and cold flow properties

Consistent anti-vibrational performance is achieved through giving the patch 'cold flow' properties. Under pressure (created by tension in the joint), our product '**Vibrastop[®]**' will flow from those points where it is under a greater pressure (contact points) to those areas of a lower pressure (tolerance voids).

This cold flow process only occurs over time. When compared to the time span of movement due to vibration it is clear that the time required for cold flow to take place is much greater, thus no movement of our product '**Vibrastop[®]**' occurs due to vibration and the fastener remains in place.

What is 'cold flow'

When the solvent is driven off the applied patch the resultant effect is a patch of acrylic and methacrylic polymer together with a polyamide resin. The patch adheres to the surface of the threads whilst forming a non-tacky outer surface. This has the unusual characteristic that the internal cohesive forces are not as strong as the external adhesive forces of the surface that is in contact with the metal or fastener substrate.

When an external torque is applied to the coated fastener it is found that shear takes place within the coating material. This shear takes place internally rather than at the junction between the coating material and the fastener; as such the surface of the patch adhering to the fastener remains intact and separation takes place within the coating material itself.

When the external torque is removed the material is no longer required to separate and so re-establishes itself in the remaining 'spaces' between nut and bolt. At all times the surface adhesion between the coating material and the part it is coating (the fastener) remains intact with movement of the material taking place totally internally.

It is those properties listed above that we refer to as cold flow.

Surface Finish

The effect of heat on surface finishes

Heat and its effect on fastener coatings has a big influencing factor in specifying **Vibrastop**[®] over traditional anti-vibration patches. To apply a traditional nylon patch it is necessary to heat each fastener to 200° C minimum for several seconds in order to cause the nylon to fuse to the fastener. In almost all cases this causes the surface of the coating to develop micro-cracks that seriously degrades the performance of the coating. In more severe cases the coating can burn a) becoming unsightly and b) considerably affecting coating performance.

Our product '**Vibrastop**[®]' is applied in a liquid form rather than as a powder. As such the parts pass through a hot air oven of around 50° air temperature which gives a maximum part temperature of only 40° C to 45° C. This has no effect on coatings leaving the fastener in its desired state complete with an excellent anti-vibratory performance.

View the effects of over heating plated fasteners – Micro-cracks

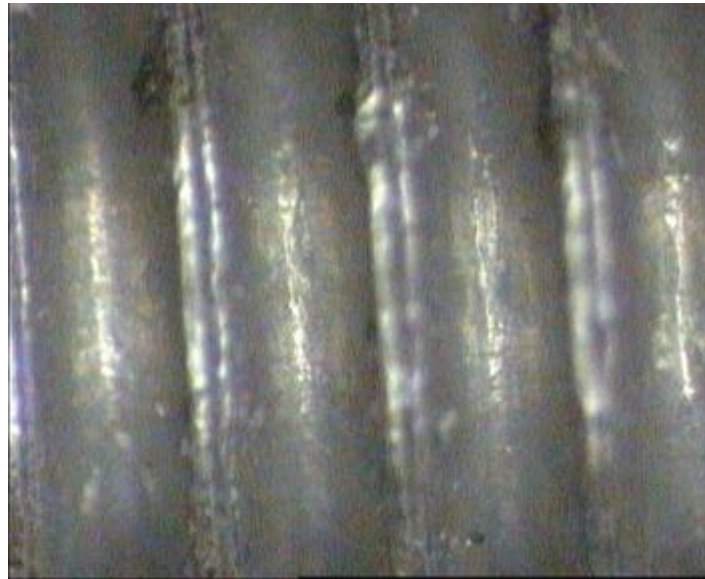


In the example above two screws have been taken from production batches. The upper screw has a 180 degree nylon type patch - this requires that the screw be heated around 200 degrees Celcius in order to correctly fuse the nylon to the fastener. There is an obvious discolouration of the nylon coated screw (yellow patch) at the top of the picture, when compared to the 'Vibrastop[®]' coated part (Blue patch) at the bottom of the picture. The end of the screw has become burnt during the patching process (see enlarged photos below).

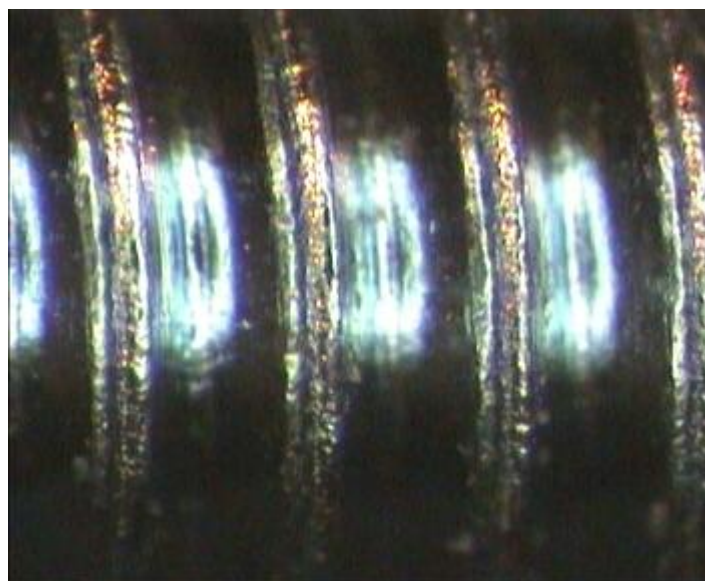
This is a particular problem with small fasteners as they cool much more quickly than larger fasteners and often more heat has to be put in to the fasteners to ensure good patch adhesion.

Vibrastop®

Our product 'Vibrastop®' does not rely on heat for adhesion but relies on the good adhesion attained by use of the correct choice of acrylic and methacrylic resins. Air temperatures within the heating process are low, typically 55 degrees Celcius or less. The bolt temperature is generally measured at less than 40 degrees Celcius. This has no known effect on platings or substrates and facilitates the use of 'Vibrastop®' on some plastic fasteners



Close up of burnt fastener surface after nylon patching

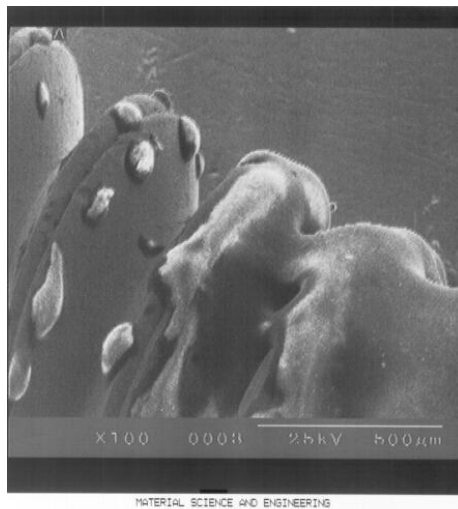


Close up of non-burnt fastener after Vibra-Stop® patching.

Micro-cracks

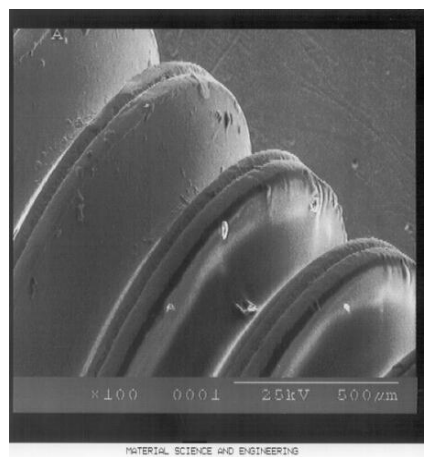
Below are a number of comparative pictures of the fasteners shown in the page above. The photos were taken from the same fasteners used in these other pictures. They were taken at Liverpool University Material Science and Engineering Dept using an electron microscope to highlight the issue of surface degradation through fastener heating.

100 x magnification of M1.6 screw with 180 degree nylon patch



Note how 'lumpy' and uneven a nylon patch appears on a small screw. This causes irregularities in performance.

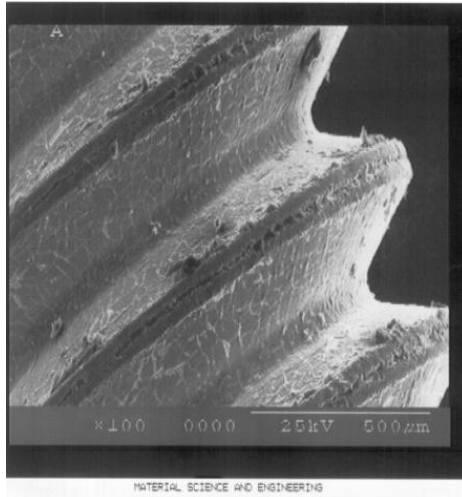
100 x magnification of M1.6 screw with 360 degree 'Vibrastop®' patch



The black line on the bottom two threads is the edge of the 'Vibrastop®' patch. Note that the tips of the thread are clear of 'Vibrastop®'. This helps reduce installation torques.

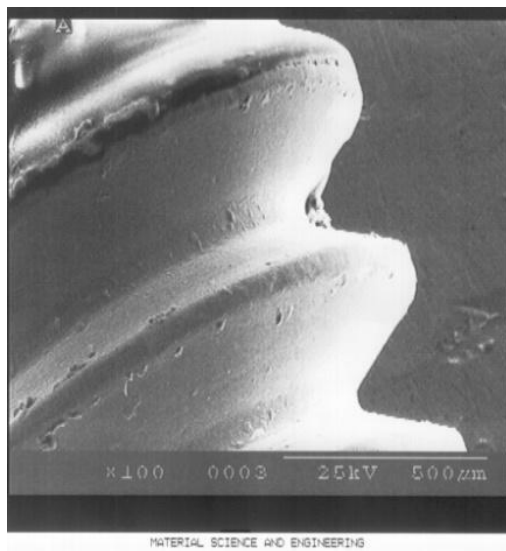
Micro-cracks

100 x magnification of M1.6 screw with 180 degree nylon patch showing heat affected zone



Note the 'crazing' effect on the fastener surface due to the heat required for processing with nylon.

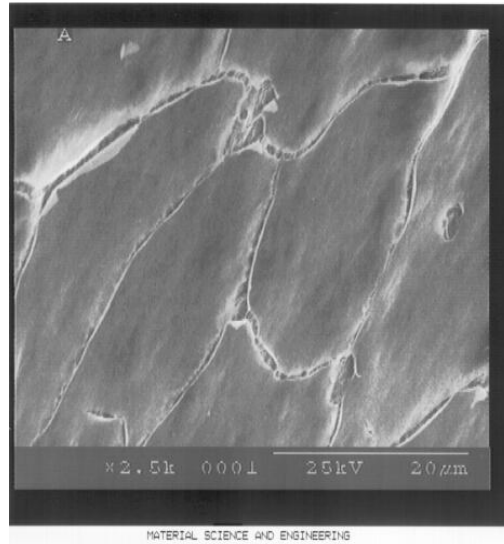
100 x magnification of M1.6 screw with 360 degree 'Vibrastop®' patch showing heat affected zone (no effect)



*This is the same area of the screw that has been subjected to our 'Vibrastop®' process - note that there is **no** 'crazing'.*

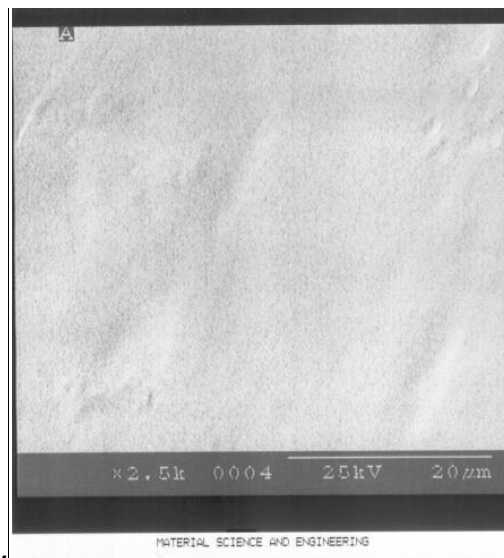
Micro-cracks

2500 x magnification of M1.6 screw with 180 degree nylon patch showing close-up of heat affected zone



At this magnification (2500x) the damage caused to the fastener plating is clear - only a few degrees over 200 Celsius will cause this effect.

2500 x magnification of M1.6 screw with 360 degree 'Vibrastop®' patch showing close-up of heat affected zone (no effect)



Clearly the surface of the fastener has been unaffected during the 'Vibrastop®' process