

An Introduction to PAS 820

August 2012 sees the publication of a Publicly Available Specification (PAS) that provides a method of assessing the performance of a forensic code. This is an important step towards improving the quality of products used to protect materials, goods and cash against theft and other crimes.



PAS 820:2012 "Laboratory-identifiable forensic codes – Classification of performance when exposed to artificial weathering" is a document published by the British Standards Institution and commissioned and sponsored by BSIA member SmartWater Technology Limited. A large proportion of the products in the UK that use forensic codes are manufactured or distributed by BSIA members.

Forensic marking products are used to link items to an owner or place, or a suspect to stolen goods or the scene of a crime. They can be used to protect cables, lead roofing, property (e.g. computers, mobile phones), banknotes, safety critical parts, etc. They work because they contain a forensic code from which specialists can extract information and then use a database to link the code, and hence the marked goods or suspects, to a registered owner or location. Their use with appropriate signage is a very effective theft deterrent.

There are other products that are put to similar use but are not considered as "forensic marking products". For example a UV pen product could be used to write a postcode or a product could simply use microdots. These are not "forensic marking products" unless they also include a material that has to undergo laboratory analysis to identify it (i.e. a forensic code).

The development of a PAS is a fast track process managed by the British Standard Institute (BSI). Unlike the process for a British Standard (BS), which requires complete consensus from all stakeholders, in the PAS process stakeholders can comment on the technical content but BSI does not necessarily incorporate the comments.

What does PAS 820 apply to?

To understand PAS 820 it is important to understand the difference between the terms "**forensic code**" and "**forensic marking product**" that it uses. A purchaser may be buying either of these but PAS 820 gives requirements related to the "forensic codes" as used in a forensic marking product rather than the whole of the "forensic marking product." To explain this it is worth considering an example product. If you wish to place a mark on a computer it may be applied using a brush. For it to stay on the computer it needs to have an adhesive and so that it can be found in the future it may contain a fluorescent material. This product is a "forensic marking product". The part of this that enables a laboratory to determine that, amongst all similar marks, this is uniquely the one that you applied to the computer is called the "forensic code".

Typically the "forensic code" will be mixed with other materials such as adhesives, dyes, solvents, anti-fungicides and / or fluorescent markers. It is this mixture that is the "forensic marking product". It is important to be aware of the difference between the two things.

PAS 820 describes how a "representative forensic marking product" (see below) is used to test a forensic codes using simulated artificial weathering, specifically exposure to ultraviolet (UV) light such as is found in sunlight and a water spray for products intended for outdoor use. Obviously if the marking product is going to be exposed to sunlight, whether indoors or outdoors, then it is useful to know if the forensic code it contains is going to be damaged by the UV in the light.

A test to PAS 820 relates only to the forensic code, not to the whole of the forensic marking product. It does not include any tests for the other aspects of the forensic marking product. Some of these other aspects of the forensic marking product may not be suitable for your use, for example the robustness of the adhesive to attack. It does not include tests to verify that a dye or fluorescent component will still be visible after exposure. The tests in the PAS prove that following exposure to an amount of UV light and, in the case of external testing, to water spray, it can still be examined to find the link needed to the database entry.

What does a label saying “tested to PAS 820” mean?

There are several cautions related to such claims. The first is *who did the testing*. It is preferable if the testing is independent from the manufacturer. You may be able to find out who did the testing, for example from a test report. For greater assurance of the quality of testing look for an indication that the test laboratory is accredited to BS EN ISO/IEC 17025 by a national or international accreditation body.

The second question is *what was tested*. Normally it would not be possible to test just the forensic code so it has to be mixed with other materials to make a “**representative forensic marking product**”. It could be that the product that was tested is the same as the one you are considering. The “representative forensic marking product” tested will be indicated in the test report. However it could be that the tested forensic code is being used in a different forensic marking product, in which case the test would not necessarily indicate the performance of the forensic code. Perhaps the manufacturer of the code and the marking product are the same but it could be that the forensic code has been sold to another manufacturer. In either case the other materials in the forensic marking product or the way it has been mixed may have an effect on the code that would mean the test results would be different (either better or worse).

What do the grades in PAS 820 mean?

Codes tested to PAS 820 have three grades (A, B and C) and are also either “internal” or “external”.

“Grade A” codes last longer than “Grade B” and “Grade C”. The Grade A forensic codes are subjected to tests that indicate they should last for 5 years, Grade B for 2 years, and Grade C for at least 6 months. Products graded as “internal” are assumed to be used in a dry environment where UV light is filtered by windows. “External” products are assumed not to have this protection and are also tested under wet conditions.

The tests are artificial and accelerated. That means that the products are tested for shorter periods of time but receive a more concentrated amount of UV exposure and water spray. When the product is in use the amount of UV that reaches it may be significantly different from the average assumed by the PAS but the Grade achieved during testing to the PAS will still indicate the relative performance of different products. Users should always follow the manufacturer’s instructions to obtain the best results.

Other Cautions

When testing is carried out it obviously cannot include a test of all possible variants of its use. There is no certainty that the item you may wish to apply a product to will behave in the same way as the one used in testing. So if you use the product on an absorbent material it may work differently from the same product applied to a non-porous surface. Equally the environment in which it is used may alter its performance. Exposure to above average levels of sunlight or use in damp, salty atmospheres could change the lifetime of the product.

The way in which the product is applied is usually important. Care should be taken to follow the manufacturer’s instructions.

Should you be looking for products with a forensic code tested to PAS 820?

If you are selecting a forensic code, for example you are a manufacturer of forensic marking products and you wish to find a suitable material to add to your mix, then PAS 820 is obviously relevant. Testing to PAS 820 enables a forensic code to be directly compared to another forensic code in terms of its lifespan under accelerated weathering.

If you are purchasing a forensic marking product then selecting one that includes a forensic code tested to PAS 820 could be an indication that the product is of higher quality. The evidence of quality is particularly good if you know that the “representative forensic marking product” (see above) tested was the same product that you are considering for purchase. However just because the labelling or advertising for a product states it was tested to PAS 820 this does not mean it is the right product for the job you have in mind. Always ensure that you select the appropriate product. It could be that you should be looking for a product that also includes microdots for the task you have in mind rather than a purely forensic marking product. Other aspects of products, such as the performance of the adhesive, the degradation of fluorescent markers and visibility of microdots (if the product includes them), although not tested according to the PAS, can be checked by the user and their performance can be readily monitored.

It should also be remembered that there is no requirement for manufacturers to test products to particular standards or specifications, including PAS 820. They may choose to have independent testing of the quality of their product but they may not believe there to be any benefit.

Standards and quality benchmarks for asset and cash marking products

The purchasers and users of any product are always keen to be sure that it does what the seller or maker claims. The difficulty with products used for marking of property when the essential component that makes it work cannot be seen or checked by the user is that the purchaser has no way of knowing when it is no longer of use. PAS 820 was created to overcome particular difficulties with assessing the length of time a forensic code will continue to be identifiable. This should help those making purchasing decisions to assess this dimension of a product.

However, as this document highlights, it is not the whole story. The forensic code is usually mixed with other materials to make the forensic marking product and purchasers could be helped by standards that cover further aspects of these products such as resistance to attack. The BSIA are working towards introducing standards that cover more of these attributes and also for other types of marking product. The correct use of standards should benefit everybody.