

SECURED QR CODE VERSUS CRYPTOGLYPH

WHICH TECHNOLOGY FOR
WHICH APPLICATION

White Paper

RESTRICTED

INTRODUCTION

Many different security features are available on the market. When it comes to invisible security features able to secure packaging featuring a QR code, AlpVision can provide two different features called Cryptoglyph and Secured QR Code.

This document will highlight the different use-cases for each technology and the related pros and cons. We assume that you are familiar with both technologies. If this is not the case, please have a look at our web page www.alpvision.com, contact us at avsales-20@alpvision.com, or give us a call at +41 21 948 64 64 for more details.

COMPARISON OF CRYPTOGLYPH AND SECURED QR CODE TECHNOLOGIES: EXPLANATIONS

The label, box or any other material featuring the QR code can be printed either digitally or using processes such as flexography, offset or rotogravure printing. Printing in digital is required for variable data and often used for small batches. Both Cryptoglyph and Secured QR code can technically be used in both cases.

Cryptoglyph (see Figure 1) is composed of tiny holes in the varnish layer of the product, which is most commonly printed in Flexography.

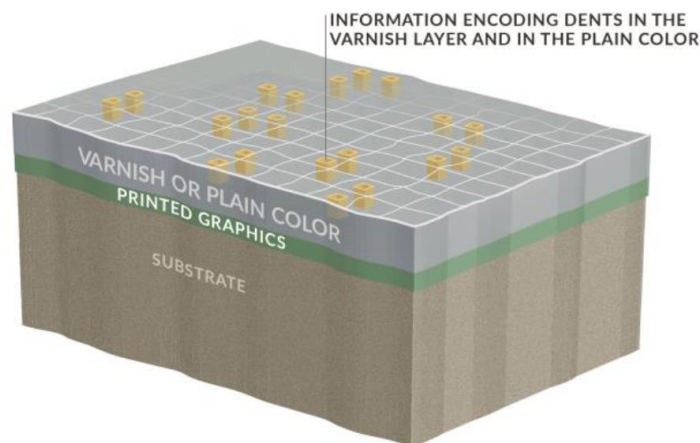


Figure 1: Varnish layer with integrated Cryptoglyph

Secured QR code (see Figure 2) follows the same principle as Cryptoglyph but the modifications are directly integrated into the QR code.



Figure 2: Secured and Normal QR code cannot be distinguished with the naked eye

As mentioned in the introduction, both technologies are invisible. Furthermore, they are detectable via smartphone.

SECURED QR CODE COMPARISON TABLE

The following table presents two different columns depending on how the QR code is be printed:


- Column 1: Digital printing, allowing for a per-label serialization
- Column 2: Static printing (i.e. either in offset or in flexography), allowing for a per batch serialization

For each QR code printing method, we present the 2 different possible security features:

- AlpVision Cryptoglyph in the varnish layer; i.e. the security layer is distinct from the QR code printing
- AlpVision Secured QR Code; i.e. the security layer is part of QR code printing.

We present in particular

- The printing technology used to print the security feature
- The variability of the feature: for example, can we have a different feature per batch, per printer, etc
- The feature visibility: All AlpVision technologies are invisible
- The authentication method: AlpVision technologies can always be detected using a simple smartphone

 QR Code on Label or Boxes		
Printing	Digital (inkjet)	Flexo/Offset
Serialization	Per label	Per trade name
Security Layer Option 1: AlpVision Cryptoglyph in varnish layer		
Printing Technology	Offset, flexography, digital	Static printing (offset, flexography)
Feature Variability	Batch, printer, trade name, etc	Batch, printer, trade name, etc
Feature Visibility	Invisible	Invisible
Authentication	Smartphone	Smartphone
Security Layer Option 2: AlpVision Secured QR Code		
Printing Technology	Digital (inkjet)	Static printing (offset, flexography)
Feature Variability	Label, batch, printer, trade name, etc	Batch, printer, trade name, etc
Feature Visibility	Invisible	Invisible
Authentication	Smartphone	Smartphone

PRO AND CONS

The following table summarizes the pros and cons for the two options proposed in the previous section.

	Option 1: AlpVision Cryptoglyph in varnish layer	Option 2: AlpVision Secured QR Code printed in digital	Option 3: AlpVision Secured QR Code printed in offset
QR Code printing	Standard QR code printing approaches can be used by printers. Printers can rely on industrially approved printing approaches or even use currently owned equipment.	As the security layer is directly integrated into the QR code, this makes printing more challenging and delicate. Printers may have to invest into appropriate digital printing equipment and have an important overhead with respect to quality control.	As the security layer is directly integrated into the QR code, this makes printing more challenging and delicate.
Security Layer printing	Very stable, industrially proven on billions of products. Printers are able to apply the security layer with their current equipment.	Printing the security layer integrated into the QR code requires printing head satisfying minimum requirements. Printing in general is more delicate and quality must be monitored as the resolution is low.	Printing the security layer integrated into the QR code requires printing head satisfying minimum requirements. Printing in general is more delicate and quality must be monitored.
Authentication	Smartphone based authentication.	Smartphone based authentication.	Smartphone based authentication.

	Option 1: AlpVision Cryptoglyph in varnish layer	Option 2: AlpVision Secured QR Code printed in digital	Option 3: AlpVision Secured QR Code printed in offset
Smartphone resolution requirements	In general smartphones with a flash work fine.	In general smartphones with a flash work fine. Even some smartphones without flash can be appropriate.	In general smartphones with a flash work fine. Even some smartphones without flash can be appropriate.
Security	Good	Good. Nevertheless a machine learning step is necessary to obtain this good security level	Good
Robustness	Difficult to destroy the security layer as it is all over the label.	Removing or destroying the QR code also destroys the security layer.	Removing or destroying the QR code also destroys the security layer.
Integration	Requires additional modification of artwork to integrate the security layer	Requires securing of the QR code-	Requires securing of the QR code-
Quality Control	Quality control based on sampling sufficient	100% quality control ideal. Sampling acceptable if readability of QR code is guaranteed.	Quality control based on sampling sufficient
Feature Variability	Cannot be changed on a per label basis	Can be changed per label.	Cannot be changed on a per label basis

CONCLUSION

Both, Cryptoglyph and Secured QR codes technologies are suitable to effectively protect boxes and labels. The choice of one of the 3 presented options depends on the application:

- Option 1 (i.e. Cryptoglyph on top of QR code) would be more effective in the event that you face attacks where QR codes on labels or boxes are destroyed and removed as it would still be possible to authenticate the label/product.
- Option 2 (i.e. Secured QR code printed in digital) would be more effective in case the QR code is serialized and no protective varnish is added on top of the label/box as it would avoid additional costs.
- Option 3 (i.e. Secured QR code printed in offset) would be more effective in case the QR code is not serialized and no protective varnish is added on top of the label/box as it would avoid additional costs.

If you have any questions or comments, please contact us at avsales-20@alpvision.com or give us a call at [+41 21 948 64 64](tel:+41219486464).

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