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Report on Barcoding

Barcoding Shipping Containers: An Overview

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The past 18 months have witnessed a whirlwind of activity as manufacturers aim to comply with "Step One" of the Efficient Consumer Response (ECR) initiatives, mandating that all items sold in retail stores carry a printed Universal Product Code (U.P.C.) symbol. Although this process was initially frustrating to most and technically difficult for some, the results now appear better than anticipated.

The deadline for Step Two is now upon us: as of January 1997, all shipping containers transported within the ECR environment (i.e., most grocery manufacturers and retailers) must display a Shipping Container Code. Although many manufacturers have used container codes for years, ANSI minimum requirements are causing manufacturers and corrugated suppliers to review this.

The question "What Barcode Symbol do I use on my shipping containers?" is still being asked by many corrugated users. The answer, of course, depends on individual circumstance. And I will attempt to address this and other relevant questions.

Barcode Symbols

Most manufacturers using corrugated shipping containers will employ the SCC-14 Code now familiar to many in the industry. This code, designed specifically for corrugated shipping containers, is scanned at manufacturing, warehouse and distribution centres to facilitate sorting, stock control and Electronic Data Interchange (EDI). The code can be printed directly onto corrugated, applied with ink-jet devices or via printed labels.

Where a corrugated carton is to be used as both retail package and shipping container, it must comply with the retail U.P.C. requirement. Fortunately, because industrial scanners are able to read and recognize both U.P.C. codes and SCC-14's, therein lies the solution: a U.P.C. code may be used in place of an SCC-14, provided it appears in the same location as the SCC-14 and meets the minimum ANSI "C" Grade (covered in my previous *Canadian Packaging* article). Note that if the shipper contains more than one item, the code must be assigned an Item Number different from that of the products within.

The UCC/EAN-128 (European Article Number) symbology, enables any specific product or shipping container to be identified anywhere in the world. It conveys all of the information coded in U.P.C. and SCC-14 Symbols, and more. It is only readable (decodable) by industrial scanners. Manufacturers wishing to include information such as purchase order number, lot number, expiry date, destination etc. are opting for this symbology. Because the type of information included in this symbology is normally known only at the time of packaging, it will most likely be applied using a printed label.

Printing on Corrugated

Printing directly on corrugated board does not pose the same problems for the SCC-14 Symbol as it does for the U.P.C. Because the SCC-14 requires only an ANSI minimum "D" grade, most kraft linerboards milled in North America are light enough in colour to ensure a symbol contrast when printed. Although many ink colors can be used, their acceptability depends on the difference between the reflectance values of ink and substrate. Not surprisingly, black ink delivers the best symbol contrast. But dark blues and dark greens are also good performers. Avoid ink colors that contain red pigment such as reds, yellows, oranges and light browns. The red color is invisible to the scanner's infra-red light beam.

All flexographic printing presses have an inherent inclination to increase the size of a print area from the original printing plate. Called "dot gain" or "print gain", this effect is accelerated when printing on substrates with a high Cobb (water absorbency) index. When printing barcodes on corrugated, the resulting "bar width gain" equates to a loss of decodability that can result in a symbol failing its ANSI minimum requirements.

To help avoid this, the printing plate should be produced with the print area smaller than the size required on the printed symbol. This is achieved by building a "bar width reduction" into the printing plate, with the reduction equivalent to the print gain of a particular press. Because every printing press is unique in terms of how much print gain it generates, all presses should be "fingerprinted" to determine the appropriate bar width reduction that must be applied to the printing plate.

Manufacturers that have been successfully using printed barcodes for several years may suddenly find their cartons failing code verification tests. Old or worn printing plates may be the cause; however, it is often the result of inadequate bar width reduction. In this case, new printing plates with higher bar width reduction may be required. The quick fix — attempting to add inserts or "slugs" to old printing plates or marrying photopolymer with rubber — does not usually work. Where printing plates are complex or complicated, running the barcode as a separate color on a second press station may be the necessary (short-term) solution. Although the printing cost will be higher, this solution eliminates — or at least delays — replacing the entire printing plate.

When printing on flexographic presses, printing the symbol too small or without a bearer bar will likely cause problems. Because a symbol's decodability decreases in proportion to the reduced size of the symbol, a minimum 100% size SCC-14 symbol should be used when printing on corrugated. The bearer bar supports the narrow bars, preventing distortion when applying pressure while transferring ink from printing plate to substrate.

Printing in the cross-machine direction may cause bar distortion from two sources: (a) printing across the corrugation flutes and (b) the printing plate being squeezed when the bars are in a horizontal direction to the press cylinder. Lightweight liner board combinations may also add a severe washboard effect, which can compound otherwise minor distortions.

Other problem areas: poor press technique, old or dirty plates, or a heavy print impression can contribute to decodability defects or failure. Rough paper finish and loose paper fibre also reduce print quality.

The ECR Technology Committee has recently agreed it is acceptable for manufacturers to have a scannable barcode appear on only one side of a shipping container and on any panel. It must still be positioned 1.25 in. from the bottom and a minimum 1.25 in. (excluding bearer bar and quiet zone) from a vertical edge.

Many manufacturers will still request their corrugated suppliers print more than one code on containers, so a code is always visible when palletized. Some will request a code on all four panels. But be cautioned: if more than one code is printed on a container, all must pass the ANSI specifications. If a container is exceptionally large, the converter may experience problems controlling a uniform print impression across the wider web.

If all of the rules for producing barcodes are followed, using good printing plates and proper press techniques, we can meet the ANSI specifications consistently. By using barcode verifiers within our production process to monitor compliance, case manufacturers and their customers can feel assured that they are achieving the optimum result.

So, is that all there is? Not quite ...

Manufacturers are also required to have Pallet License Plates (labels) on their pallet loads by January 1997. These license plates will also carry barcodes that include information about the product, manufacturer, purchase order, destination, etc. and will match up with information that was previously sent electronically to the customer in an "Advance Ship Notice."

Where does all of this lead? To a completely paperless process using EDI: where transactions such as the buying and selling of goods and services occur via an electronic medium. This environment of electronic commerce enables information and funds to move rapidly and without error. By eliminating non-value-added tasks we will enhance the quality of services and products to our final customer, the consumer.

This, then, is the reality of "Efficient Consumer Response" and of the role played by barcodes as a Canadian ECR enabler. ❑

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