



CodeFacts

AIDC (Automated Identification and Data Collection) Technical & Informational Documents
Written for Everyone

Durable Bar Code Labels

When you're attempting to identify and track something that may have to endure a harsh environment, a paper label just isn't going to do the trick! Here's a primer on what we at Aurora Bar Code Technologies can offer you in the way of durable and special-purpose bar code labels...

Preprinted Labels

In general terms, no label you print yourself—using an office (laser or inkjet) or thermal printer—is even going to get *close* to the durability and longevity of a preprinted, manufactured bar code label. You're just going to have to realize that you'll be purchasing these labels in logical sequences (i.e. singles or duplicates printed in consecutive order) and that the bar code cannot *mean* anything. What does this mean? What we're stating here is that you're not going to be able to put anything meaningful into each bar code symbol, like a date or item category code. Instead, each symbol is just going to have to encode a five-digit number, for example, that is more akin to a licence plate number than a derivative part number. So, rather than the system generating the bar code that you're going to affix to your widgets, you are going to have to have a process that associates bar code 1234 with widget AZ345. That process typically involves opening a data record form in a software program and scanning the bar code from the widget that you're associating with the record. Make sense?

Label Usage Environments

Where your labels are expected to live and what will they be subjected to are significant. Consider the following:

- **Temperature.** Will the labels be in moderate temperatures, or will they be expected to survive cold or hot? How about very cold (like liquid nitrogen) or very hot (like a furnace)? Are these temperature extremes short-lived, or long-term, one-time only or multiple times? Are the labels going to be applied at room temperature, or at a significantly colder or warmer temperature?

- **Abrasion.** What other materials might the labels come in contact with and is there a possibility that they may scrape or abrade the labels? Human hands and gloves can carry small particles that can rub off images or deteriorate them to the point of unreadability.
- **Fluids.** Will the labels be subjected to moisture or any fluids? Are they relatively benign, like water, or do they contain solvents, acetone, caustic chemicals, or other liquids that might affect the label materials and/or the inks used in printing the bar codes and other images on the labels?
- **Mounting Surface.** Are the surfaces to which the labels are to adhere relatively smooth and clean, or are they porous, rough, or oily? Is the surface always flat, or are the labels expected to be applied to curved or bumpy surfaces?
- **Sunlight.** Are the labels going to be on things that regularly live in the outdoors? Will they be subjected to sunlight, which transmits UV and IR wavelengths that can quickly deteriorate many synthetic label materials?

We categorize the majority of labels into three different groups, based upon what they're made of and their relative durability: paper (light-duty), poly¹ (medium-duty), and metal (heavy-duty). The scope of this document only deals with the latter two types.

Putting a medium-duty label on an item that is subjected to a heavy-duty environment ends up costing more in the end; labels need to be replaced and determining exactly *which* of your tracked widgets has lost its label—especially if a lot of your widgets are the same make and model number—can be a very tedious effort!

Poly labels can be imprinted or laminated. In the former case, the image is merely printed onto the label material using a durable ink that is scratchproof, but not necessarily immune to high levels of abrasion or many solvents or other liquids that might degrade or erase the ink.

¹ The term "poly" refers to most any synthetic plastic-like material, such as polyester, polypropylene, and vinyl

Laminated poly labels have a thin, clear layer of plastic added over top of the printed image, making them substantially more resilient to abrasion, and especially to any harsh liquids or sunlight.

Dura-poly labels go one step further in that the image is actually printed on the *underside* of a clear label material, to which a white ink “wash” is then applied and an adhesive layer added. In this situation, the label itself is actually the lamination!

The majority of metal labels we provide are made of anodized aluminum. While aluminum is, admittedly, one of the softest metals, these are what our clients affix to heavy-duty tools, road signs, vehicles – anything that is being subjected to extreme conditions. Anodized aluminum labels can come in gauges ranging from the thickness of a beer can to a licence plate, with or without Teflon coating and mounting holes for screws or rivets.

Adhesives

We could write about adhesives for a hundred paragraphs! What one needs to understand is that there is no perfect “do-all” adhesive when the label application surfaces are variable in any way. The best adhesive used to affix a label to glass is totally different from one used for wood. The only direction we can offer you within the scope of this brief document is to let us know of all of the types of surfaces you want the labels to adhere to and we’ll try and find an adhesive that addresses that need.

Two other statements are pertinent to the discussion of label adhesives:

- There is no such thing as an “unremovable” label. Given enough personal will and the right tools, any label can be removed from any surface.
- Pretty well any label can be easily removed a few minutes or hours after it’s been applied. Most acrylic adhesives require a curing period of at least 48 hours to set up and bond to the application surface. So, *be patient* if you want to test the permanence of a given adhesive.

Common Label Pricing

The prices of these labels vary greatly, mainly depending upon the order quantity and label size. A typical asset identification label is about 2 X 1", has no extra features (e.g. coloured logo or special shape) and the following budgetary costs are based on this size:

- Imprinted poly - 10 to 25 cents each
- Laminated poly - 15 to 35 cents each
- Dura-poly - 25 to 40 cents each
- Anodized aluminum - 75 cents to \$1.50 each

Note that most label orders have a minimum order quantity of 1,000 (imprinted poly) or 500 (all the rest).

Special-Purpose Labels

Please note that we also provide bar code labels for a number of other somewhat exotic situations and applications:

- **Floor Labels.** Typically used to identify areas in a warehouse that a forklift driver can easily scan and associate with a pallet of goods being dropped there, these labels are typically made of ceramic-coated metal and are affixed to a concrete floor with epoxy.
- **Super-High-Temp Labels.** These are affixed to toilets and other ceramic components that go through high-temperature kilns and ovens.
- **Retro-Reflective Labels.** These labels are constructed of almost the same material that road signs are made from. They offer superior reflectivity, increasing the range that bar codes printed on them can be successfully scanned. Labels like this are most commonly hung from the ceilings of warehouses and used to identify aisles and rack locations.
- **Windshield Labels.** Used on the inside of a windshield—and therefore manufactured backwards (with the adhesive on the face of the label)—these identify a specific vehicle, typically a rental.
- **Tamper-Proof and Destructible Labels.** These are typically used to identify fixed assets. In the case of tamper-proof labels, if a label is removed from an item a residual pattern (usually checkerboard) of adhesive and material is left on the asset, indicating the label's removal. Destructible labels are made of a very thin material (typically vinyl) that has very little intrinsic strength. When someone attempts to remove a label, it must literally be removed in dozens of tiny shards, making the reaffixing of the label to another item absolutely impossible.

- **Stainless Steel Labels.** Some of our clients require durable metal labels that are harder and more abrasion-proof than aluminum and that's where stainless steel comes in. Typically costing at least a couple of dollars apiece, these are about as durable and temperature-resistant a bar code label you're going to get.

***CodeFacts** are whitepaper documents written and provided with no obligation by Aurora Bar Code Technologies, a systems integrator and developer that has furnished solutions that use bar code and RFID (Radio Frequency Identification) technologies since 1987. We hope that you find **CodeFacts** to be interesting and informative and look forward to providing you with the necessary hardware, software, media, and consultation to make your system need a reality.*

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