Steel Industry Labeling

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Labeling or identification of steel products is an absolute necessity in today's global steel market. But when, where, and how, that occurs can vary from product to product. The specific product (shape), purpose of the identification (in-house vs. customer specifications), stage in the manufacturing process (i.e., hot vs. cold), and what the labeling is subjected to downstream all have to be considered.

Note that "labeling" methods can include: traditional labels (paper/plastic/vinyl); stenciling (ink/paint); stamping (die punch/dot-peen); RFID (radio frequency tags); direct mark (etching/laser) as well as other technologies. And the generic term "label" includes identification via color-coding, man-readable text, barcodes and logos.

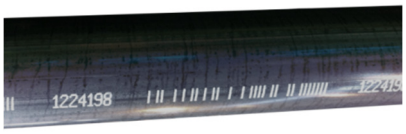
Although needs for individual piece marking, regardless of size, is growing, smaller cross sectional products are typically strapped and then labeled as a bundle whereas as larger products are usually identified individually. For the steel industry, this means that coils, plates, billets, slabs and larger pipes are typically labeled individually. Bars, rebar, and smaller tubes are usually labeled as bundles.

Bundled products are typically labeled along the length of the bundle by running the banding strap through the pre-printed, slotted label. Alternatively, the label can be affixed at the end face of the bundle by attaching the label to one of the individual pieces. Selecting just the right bar (that protrudes from the rest of the pack) is the key to placing a single label on the end of the bundle. Traditionally, this is considered a manual operation. However, more recent advancements in machine vision technologies and machine control now enables allow this process to be automated and efficiently utilized in day-to-day manufacturing environments.

Individual long products (such as slabs) can also be either marked along their length or on the end face. Although each location has its advantages and disadvantages, the decision should be made based on downstream use of the identification (such as storage yard or reheat furnace entry line-of-sight accessibility). For bars, billets, blooms, etc. end face marking is preferred.

For pipes, API specifications mandate the mark to be axially along the OD. These identifications can include text, thread engagement related triangles, locator lines, color-bands, etc. In addition, Large Outside Diameter (LOD) pipes can take advantage of their larger inside diameters to include identification just inside the ID, allowing access to the data from the end of the pipes. (In this case, the industry is moving away from traditional "sticky labels" and tending towards markings applied directly to the pipe inside wall to eliminate field issues with loose labels.)

Additionally, billets, bars, pipes and plates often require a permanent identification typically applied via some type of "punching" or dot-peen marking to create an indentation into the steel that cannot be readily removed, even if the whole bundle has a separate, additional label identification.



No matter the specific product, the labeling method/material must consider the original application as well as downstream processes and environment to ensure identification survivability.

For example, it is typically best to label a product at birth to minimize the possibility of lost identification. In the steel industry, this typically means the product must be identified at elevated temperatures (say 1000 deg. C). This requirement then in turn can drive the required labeling method and material. In addition to the thermal considerations (either at the time of marking or downstream), there are often other issues to consider including chemical, mechanical (wear/abrasion), and ultraviolet light exposure. Labels, tags and/or markings in general can be specifically designed and supplied to survive these harsh requirements including annealing, pickling, hot dip galvanizing (with exposure to caustics and acids), shot blasting and painting.

In a related matter, labeling today is often just a tool to facilitate automatic downstream identification of the product. This means, in a practical sense, that the labeling needs to include some type of barcode that can be scanned via handheld or automatic devices. Depending on the application, the label designer should consider traditional 1D barcodes (such as Code 128) or alternatively 2D barcodes (such as QR and/or DataMatrix). 1D codes can be read with either laser scanners or vision based systems whereas 2D barcodes, which can embed significantly more data in a smaller space, require some type of camera based reader.

Labeling steel products can be straightforward or it can be challenging. For the challenges, a solution is likely available or can be developed once the specific needs are defined.