

## Whitepaper

5/30/19

### Cold Glue Labelers

Pressure sensitive labels are supplied in rolls, on plastic or paper backing strips with the adhesive already applied. Pressure sensitive label applicators are simple to operate and maintain, can run at fairly high speeds (up to 750ppm or more) and do not require cleaning of excess adhesive.

The downside of pressure sensitive labeling is that on the fly roll splicing is difficult and the labelers need to be shut down frequently, as often as every 30 minutes in some cases for roll replacement. Another issue is that the backing web needs to be disposed of. The backing web adds cost to pressure sensitive labels.

Glue labelers apply cold glue or hot melt glue to the label or the package, most often a bottle or can, at the point of label application. Then they put the label on the package.

Glue labels can be supplied in continuous rolls or can be supplied as individual, precut labels. When supplied on rolls, the labels will almost always be square or rectangular. This allows them to be cut off with a straight blade. Some labelers can diecut a shaped label but this adds complexity to the machine. Another issue is that the waste material from the diecut needs to be removed from the labeler. Even under the best operation this will never be perfect. Accumulations of waste can cause jams or other problems.

Another option is to use labels that are cut at the converter and supplied in stacks. Precut labels are often square or rectangular. For cans, they are almost always rectangular. Precut labels can also be diecut into virtually any shape by the converter.

As with anything else in packaging, there are advantages and disadvantages to both precut and roll fed labeling.

- Cut labels can be replenished while the labeler is running. Replacing the label roll may require stopping the labeler.
- Cut labels can be virtually any shape. Roll labels must be rectangular or square
- Cut labels are generally more appropriate to spot labeling as well as wraparound labeling. Roll labels to wraparound.
- It is difficult to mix up roll labels. Similar size cut labels for different products can get mixed together. Tight inventory controls and inspection systems are required for cut labels.
- It is relatively easy to print a lot/date or other variable code on roll labels. Hotstamp printing, debossing, and rubber stamps can be easily used. Cut labels will need to be coded offline or, and inkjet or laser code applied after application to the product.

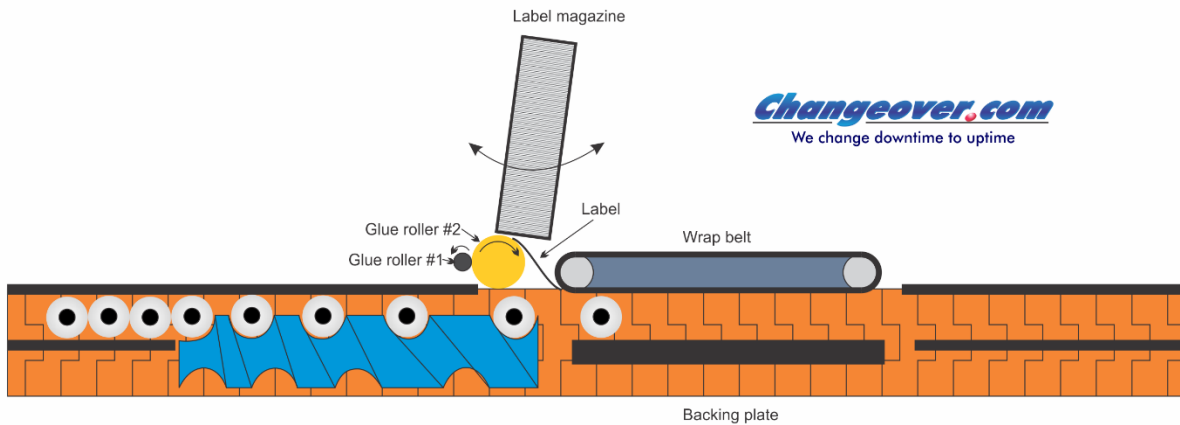
It is imperative to match the adhesive, label and package for good results. There are several hundred different adhesives available. None of them will work in all applications. Cold, sometimes called “wet”, glue adhesive is typically supplied as a viscous white liquid, similar in appearance to carpenter’s glue. It is applied in a thin film and becomes almost invisible when dry. It is normally applied at ambient temperature and is “cold” only relative to hotmelt glue. Hotmelt glue is supplied in solid pellets. These are melted at the labeling machine and applied at temperatures between 200 and 350 degrees. Hot melt adhesives are applied molten and adhere as the cool and solidify.

## Labeling machines

There are 3 main styles of cold glue labeler:

- Inline direct application
- Inline indirect application
- Rotary indirect application

Inline direct application is best suited for lower speeds, up to about 150ppm with stable bottles. They can apply short spot labels onto any package or long, full labels on round bottles. They can use hotmelt or cold glue. They can use cut labels or roll-fed labels.



## Inline Wrap Labeler (Cold or hot glue)

This sketch shows a top view of an inline wrap labeler set up to run cut labels. A stack of labels is placed in the magazine, glue side forward. A rotating glue applying wheel or drum (glue roller #2) is between label and bottle. This may be solid if a uniform coating of glue over the entire layer is desired. It and also be grooved to that stripes of glue are applied. This can cut glue usage in half. These pictures show a glass bottle with the glue stripes visible and the grooved glue applying roller.



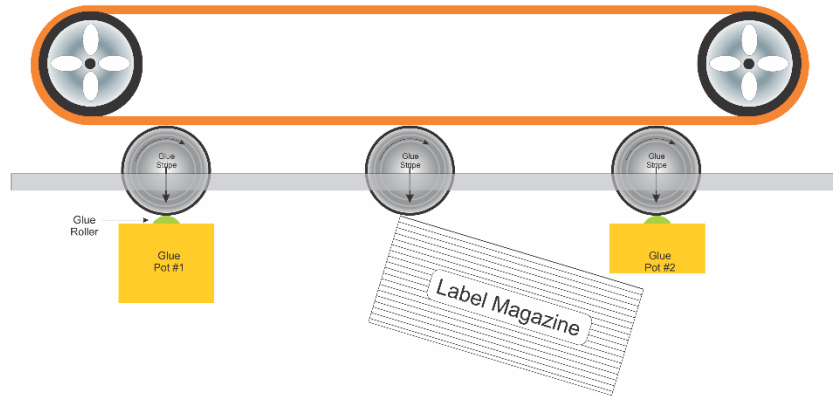
Cold or hotmelt glue is pumped up and dribbled down glue roller #1, thoroughly coating it. A “doctor” or scraper blade scrapes off excess glue leaving a thin film to be transferred to glue roller #2.

Bottles are metered to the labeler via a timing screw. As the bottle is in position, the magazine swings to the left, making contact between the glue roller and label. The roller pulls the label from the magazine and moves it into position to tack the leading edge to the tangent of the bottle. As the label moves toward the bottle, the glue transfers from roller to label. A wrap belt rolls the bottle assuring smooth laydown and good adhesion of the label.

A variation of this can use a roll feeding system. Labels are pulled from the roll to a cutting head located in the area of the magazine in the sketch. Labels are cut off and fed to the bottle through the glue roll and applied similar to the cut label.

### Roll-through labelers

A specialized type of direct inline glue labeler is the roll-through labeler. These are particularly designed for cans but can be used for other round containers. They can run at speeds ranging from 20 cans per minutes to 1,200 and more. They are simple and rugged with some machines still in daily use after more than 50 years. A schematic is below.



## Roll-through Can Labeler

The roll through labeler rolls the cans through it just like the name says. Cans are fed to the labeler horizontally on a track which keeps them perpendicular to flow. A top belt rolls the cans through the labeler.

Cans pass over the first glue pot which commonly has a set of rotating wheels. These can be disks or solid rolls depending on the desired glue pattern. As the cans contact the glue roll, a stripe of glue adheres to the can. This picture shows 6 rollers which will apply a stripe consisting of 6 dots of glue.

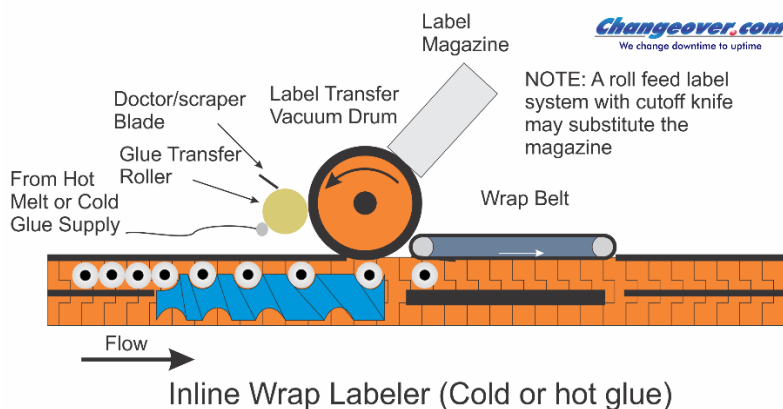


Next the can passes over a vertical label magazine. This is kept pumped up as it depletes so that the can and glue stripe make contact with the trailing end of the label. This adheres label to can and allows the can to pull the label out of the magazine as it rolls along. A second glue pot and roll apply glue to the outside of the trailing label edge where it is affixed to the can. The leading edge of the label is then rolled down on top of it completing the wrap. Typically the can discharges to a twister chute which turns it upright and places it onto a conveyor.

### Inline indirect labeler

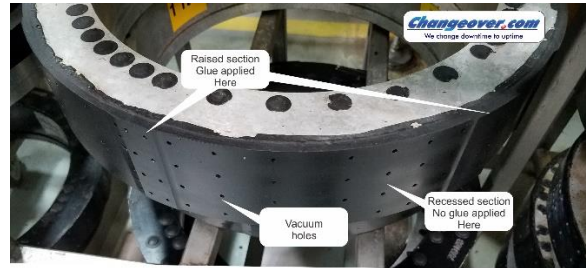
When higher speeds, to 750ppm or so, are desired a vacuum drum labeler may be used. These commonly used roll fed labels in wraparound applications but other uses are possible.

The main component of this type labeler is the rotating vacuum drum. Roll labels are cut and fed to the drum where they are held in place by vacuum. The drum rotates them past the glue roller where glue is transferred to the label. The design of this roll eg; textured, grooved, determines how much glue is transferred to the label and in what pattern.



Most cans and beverage bottles have full wrap labels with 1/4 or so of overlap. It is not necessary to apply glue to the full length or the label, a vertical stripe at each end is

generally sufficient. This is accomplished with raised portions of the vacuum drum as shows here:



The label ends are on the raised sections and make contact with the glue roller. The main portion of the label is in the recess and does not touch the glue roll.

The bottle is timed so that tangent and label end meet. The bottle pulls the label off the drum and is rotated to lay the label down. The glue stripe on the trailing end of the label is laid down on top of the leading edge of the label or, if it is a partial wrap, on the bottle itself.

A variation on this replaces the glue roller with a hot melt glue spray. This is timed to spray a glue pattern on the label ends. Other than glue application, the labeler is the same.

### Rotary labeler

The labelers described above work best on relatively simple labels on round containers. When more complex labeling is required, especially at speeds over 150ppm or so, a rotary labeler is required. The bottle handling portion of the labeler is similar to rotary fillers, cappers and other machines with one important distinction. Those machines hold the bottles so they do not rotate. The rotary labeler places the bottles on pallets that are designed to rotate using belts, gears, cams or servomotors. Some bottles will have featured molded in such as a logo, hand grips, or special shape. The rotation of the pallets is controlled to assure that the bottle is in the proper position before labeling.

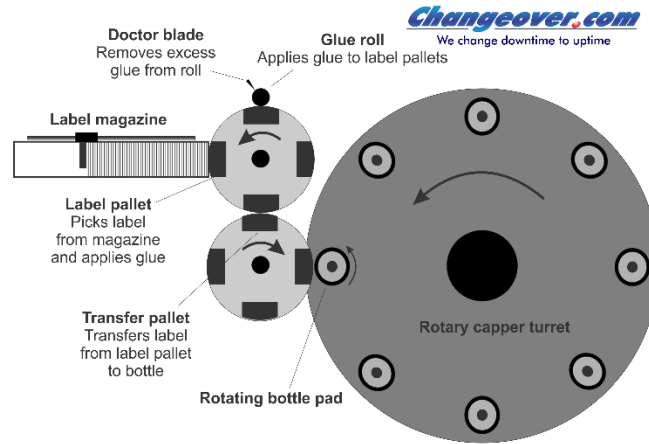
A top centering bell comes down to fix the bottle in an exact location between bell and the pallet which has a recess to position the bottle. Normally the bottle is centered on the pallet. In this photo the bottle is offset due to small size.



For a simple round bottle with a rectangular label, the application process is similar to the roll-through labeler. The bottle is presented to a glue applicator and a stripe of glue is applied. The bottle is then rolled over a label magazine, picking up the label and a second stripe is applied to glue the end.

For more complex bottles or labels, a pallet transfer labeling head is required.





**Pallet Transfer Glue Labeler  
(Schematic)**

A label magazine feeds the labels, glue side out, to the glue application turret. This turret has, in this schematic, 4 glue pallets. The glue pallets are rotated past the glue roller and receive a coating of glue. This glue is used to pick the labels out of the magazine. The pallet is also used to transfer a film of glue to the label.

As the glue turret rotates, the label is transferred to a corresponding pallet on the transfer turret. A set of gripper fingers hold the label to prevent it falling out of position. As the turret rotates, it meets the bottle. As it does, the gripper releases and the label is adhered to the bottle.

As the main labeler turret rotates, the bottle pallet is rotated and brushes smooth the label onto the bottle. The amount of rotation will depend on the amount of wrap around the bottle.

Pallets are normally sized and shaped to the specific bottle and label. Angled, for example, if running a tapered bottle.