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Frain White Paper

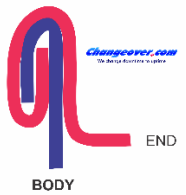
Double seamed cans

Steel cans are the 2nd oldest type of packaging after glass and clay bottles. They are still popular today, especially for food but for many other products as well. They have a number of desirable characteristics including:

- Tamper resistant
- Rugged
- Easy to open
- Inexpensive
- Familiar to consumers and packagers
- Easy to run at high speeds (Up to 3,000 can per minute)

Originally cans were single seamed. The can lid or “end” was cupped, placed over the straight sided can body and soldered in place. Single seam cans are now rare. Virtually all cans are double seamed. The double seamed can seals by mechanical force with no

need for potentially contaminating solder. Double seaming eliminates the time and complexity of soldering or welding body and end. Double seaming allows the use of dissimilar materials such as a plastic body with an aluminum end.



Double Seam

Cans are most frequently made of steel or aluminum but can be made of composite board as well as plastic. They are usually round but many products such as processed meat are packed in non-round cans.

In this whitepaper we will focus on round metal cans with double seamed ends. These may be 2 or 3 piece. A 2 piece can has a drawn can body and is most frequently made of aluminum. The second piece is the end seamed on after filling.

A 3 piece metal can is most often made of steel. It consists of an open ended tube or body and 2 ends. The body is formed in the can making plant by rolling steel sheet into a tube then joining the lengthwise seam. These are usually laser welded but in the past have been crimped and/or soldered.

Can bodies can be formed continuously and cut to length or can be formed from individual, pre-cut sheets. Pre-cut sheets allow for printing of label graphics directly onto the can.

The finished body is flanged on both ends and is often ribbed. These ribs allow the can to expand or contract with changes in internal pressure. After forming, the maker’s end

is applied to one end of the can and without paneling. The finished can, with one end left open is sent to the filling line.

Two piece metal cans are formed by deep drawing a metal, usually aluminum, blank to form the Body. The flange as well as any necking is formed in a secondary operation. Necking reduces the diameter of the can opening and allows a smaller, and less costly, end to be used.

Whether 2 or 3 piece, can interiors are generally coated as a final step. This prevents the product from coming into contact with the can material, protecting each from the other.

Can ends, whether aluminum or steel, are manufactured by a stamping process. After stamping, a coating and, if required, the pop-top feature are applied in separate operations.

Metal will never seal well to metal and cans are no exception. A liquid elastomeric material is applied after stamping to the can end where it contacts the can body. This forms a gasket with the finished can to assure a good seal.

Can ends are normally supplied to the filling line in paper sleeves holding stacks of 100 or more ends. This allows easy handling as well as easy loading into the seamer's magazine.

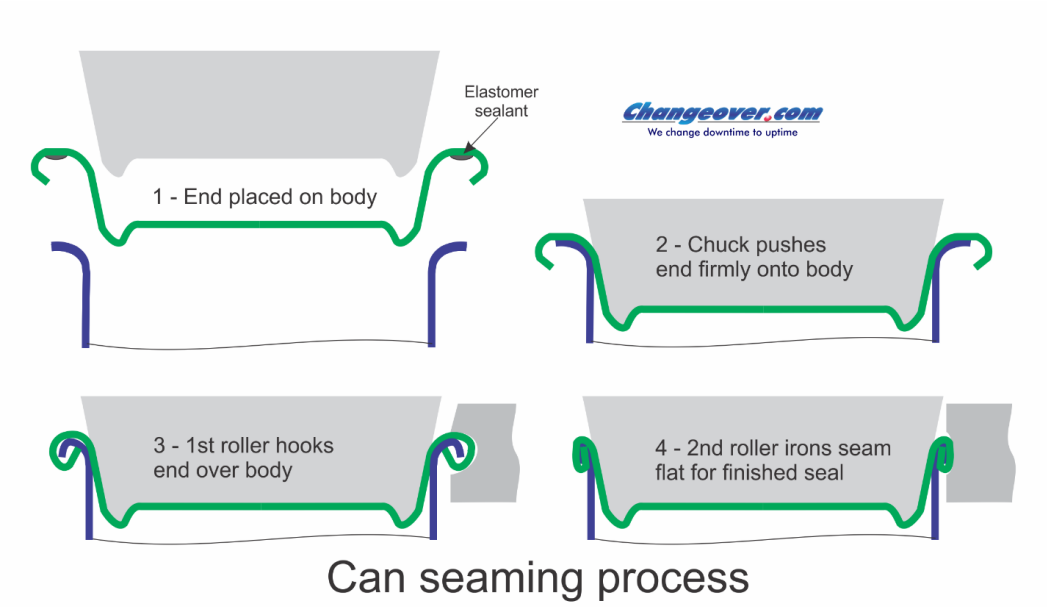
After rinsing and filling the cans are transferred to the seamer for closing. Can filling lines often run at very high speeds, up to 3,000 cans per minute. Smooth transfer

between filling and closing machines, or between any other machines, is always a must regardless of machines or line speeds.

It is particularly critical on high speed lines and especially with non-viscous liquids like juices or carbonated beverages. The cans are usually filled to very near the top. Even slight jerkiness between the filler and the capper will cause sloshing and spillage of the product. This creates mess as well as underfilled cans.

As the can enters the seamer, the end is placed on top of the can.

As the can enters the seamer, the end is placed on top. A top pressure block, called the chuck, applies downward pressure. This assures good compression and sealing of the elastomer lining. The chuck also acts as an anvil to provide a solid backing during seaming. This prevents the seaming rolls from deforming the can.



Can seaming process

Once the can and end are firmly in place, the grooved first roller forms the “hook”. It folds the end’s flange in, up and under the body flange which is folded down. The end and body are now hooked, loosely, together. If they were removed from the seamer at this stage the end will be mechanically locked to the can body but loosely and unsealed.

After forming the hook, the second roller, with a less pronounced groove, compresses, or irons, the overlapped can end and flange together. It is this step that makes the final, leakproof, seal.

When seaming composite or plastic cans the shape of the rollers may change but the process is similar.

Som can seamers are inline and intermittent. These will typically have a single head and run at speeds up to about 50cpm. Higher speed seamers use multiple seaming heads in a continuous motion rotary layout. These can run as speeds up to 3,000 cans per minute.

This picture shows a single head seamer. The cans enter the machine and a timing screw or starwheel synchronizes them with the seaming head. As the can enters the seaming station, an end is slid out from a magazine at right and positioned between can and seaming head.

The can stops on an elevating platform and raised. As it rises, it pushes the end onto the body and body with end into the seaming rollers. In this machine the can is gripped at the base and does not rotate. The seaming head with, rolls, rotates around the periphery of the can. On the first several revolutions, the first roller is pushed in. After forming the hook of end and body the first roller retracts. The head continues rotating and the second roller is moved in to iron the seam tight. The sealed can is lowered, exits the seamer and the process repeated with the next can.

A variation on this places the can on a rotating platform and raises it into the seaming head against the chuck. As the can rotates the first roller, in pushes in forming the initial hook. It is retracted and the second roller flattens and finishes the seam.

To achieve higher speeds, multiple seaming heads are required. These can be mounted on a rotating turret as shown here.

The seaming process is the same as described above except that the end is placed before the can is under the chuck. As before, the can does not rotate, the seaming heads do. This 3 head seamer will run at speeds up to 130cpm depending on can, end and other parameters.

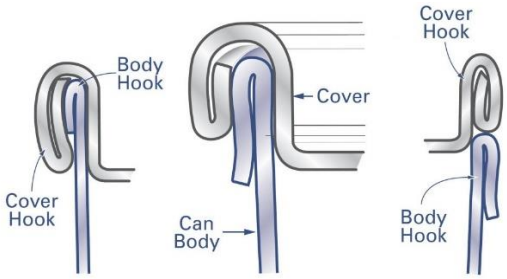
For truly high speeds, a different style of seamer is required. High speed continuous motion rotary seamers synchronize the can into the seamer and place the end as it enters. The can/end assembly is placed on a spinning base and raised against the chuck. The can is continuously spinning.

The first and second rollers are mounted on a rocking arm as shown below.

As the can and turret rotate, the rocker arm moves the first and second rolls in and out to make the seal.

The majority of all double seamed cans are round, Round is relatively simple. When the can is not round, the two step seaming process is similar. What does change is that instead of spinning the can or the seaming head, a more complex seaming path must be followed. This is done using special cams or templates.

Although double seaming is a relatively simple process, attention to setup is critical. As with any machinery, the higher the speed, the more critical the setup. There are a number of defects which can occur but they are beyond the scope of this paper. A few are shown here.



These come from the Seam School website which has a wealth of information on double seaming, defects, and troubleshooting at www.seamschool.com

Hundreds of millions of double seamed cans are produced daily around the world. In addition to cans which are filled and seamed on the packaging line, there are many double seamed cans with standard screw or other type closures.


These come to the packaging line already seamed. They are filled and closed on standard packaging machinery.

High speed, low speed, large or small, Frain knows cans and seaming. Visit them online at www.fraingroup.com to see videos of can seaming machines in operation. Even better, visit their plant in Carol Stream Illinois, minutes from O'Hare Airport.

At Frain we say: Yes we can!