



## **Metal Can Defects**

Identification and Classification

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### **2. CAN TERMINOLOGY**

Any discussion or description of can defects requires standard terminology relating to the can components (end, body, double seam). The terminology required to describe these components varies with style of construction thus, only the main construction types are discussed in this section.

#### **2.1 Three Piece Can Bodies - Soldered Side Seam**

Body - May vary in shape, body beads may be present, and is constructed of electrolytic tinplate (ETP).

Body Bead - Ridges or rib-like indentations on the can body located singly or in clusters on the general body area to provide resistance to lateral abuse (denting).

Flange - The outward flared edge of the can body that becomes the body hook of the double seam.

Lap - The short length of the side seam adjacent to each end where the side seam is reduced to two overlapping layers of metal plate bonded by solder.

Notch - The small cut-away portion of the body blank in the lap area which will reduce the amount of material in the area where a double seam will be formed.

Side Seam - The joint connecting two edges of the body blank (a piece of metal plate cut to individual can size). Along most of its length this joint consists of four tightly interlocked and soldered layers of metal plate (side seam fold). For a short distance adjacent to each end (lap areas) the side seam is only two layers thick.

Side Seam Enamel Margin (inside) - These are narrow strips of uncoated metal plate along the inside edges of an inside coated body blank that will form the side seam. The margins must be present, as organic coatings in either margin will preclude complete soldering of the side seam.

Side Seam Enamel Margin (outside) - These are narrow strips of uncoated metal plate (approximately 1 cm wide) along the outside edges of an outside coated body blank that will form the side seam. The margins must be present, as organic coatings in either margin will preclude complete soldering of the side seam.

Side Seam Indent - A small dent usually located at each end of the side seam fold. It strengthens the side seam, minimizes side seam bow and controls the cylinder length at the side seam.

Side Seam Vent - An opening in the side seam fold which allows the gases formed during soldering to escape and permits solder to flow into the folds.

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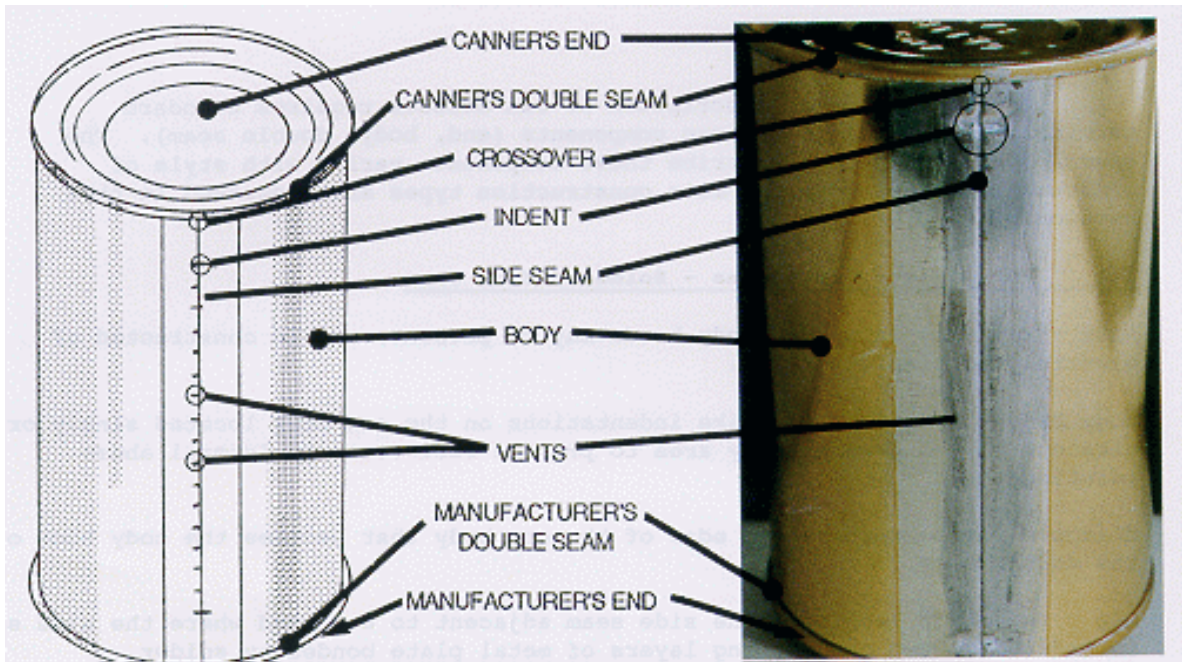
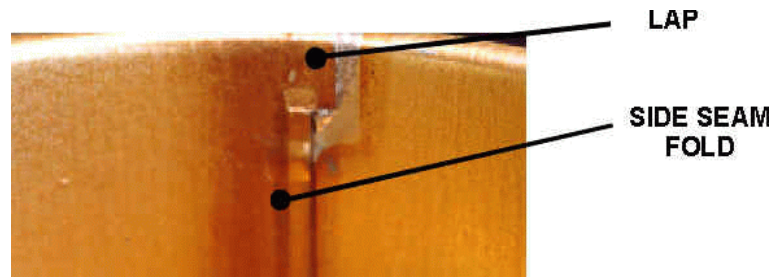


Figure 2.1.a - Three Piece Can - Soldered Side Seam - Closed Can



INSIDE VIEW SHOWING SIDE SEAM FOLD & LAP

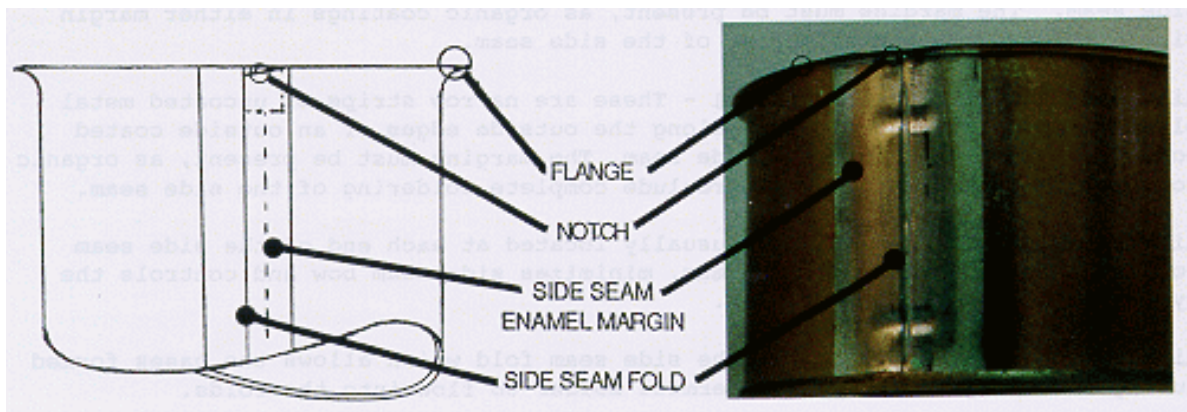


Figure 2.1.b - Three Piece Can - Soldered Side Seam - Open Top Can

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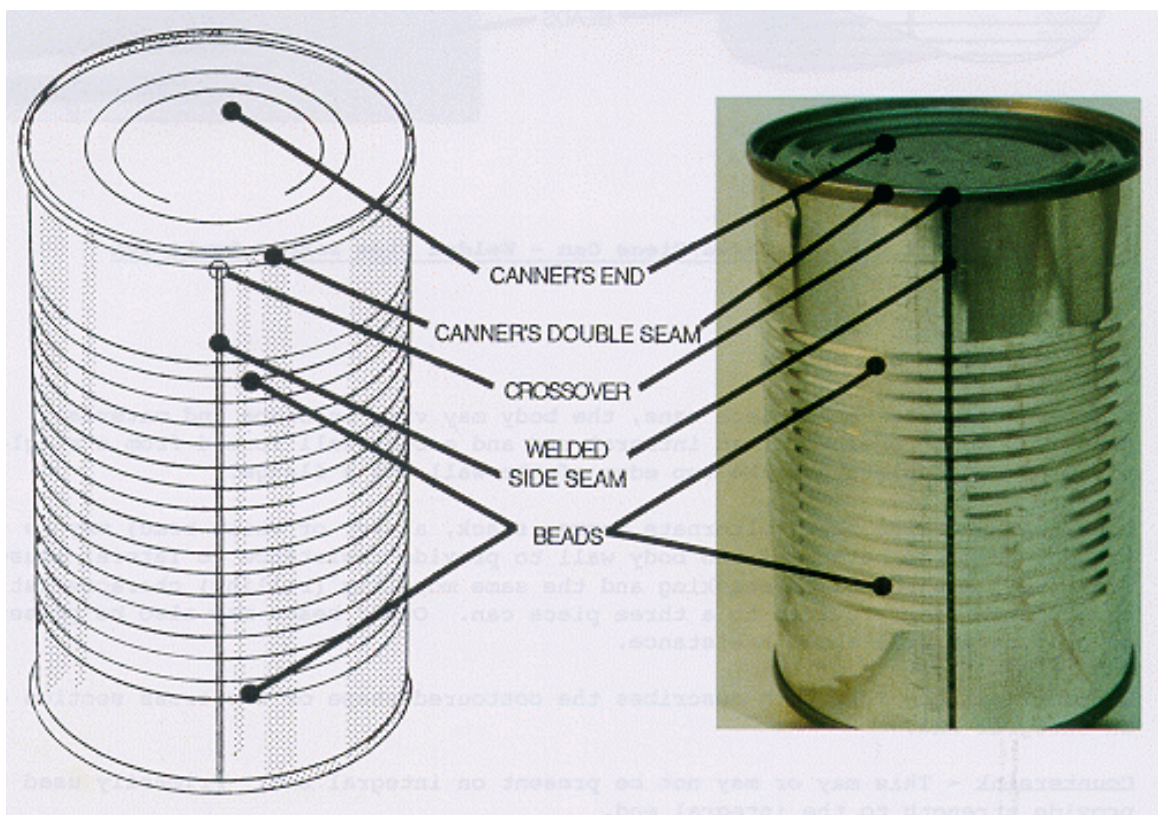
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#### 2.2 Three Piece Can Bodies - Welded Side Seam

Body - Similar to soldered three piece cans, welded can bodies may vary in shape, body beads may be present and they are constructed of either electrolytic tinplate (ETP) or tin free steel (TFS).

Side Seam - The lap joint formed when connecting the two edges of the body blank. The two edges overlap by approximately 0.5 mm. After welding, the thickness of the welded seam is approximately 1.2 times the thickness of the body plate.



**Figure 2.2.a - Three Piece Can - Welded Side Seam - Filled Can**

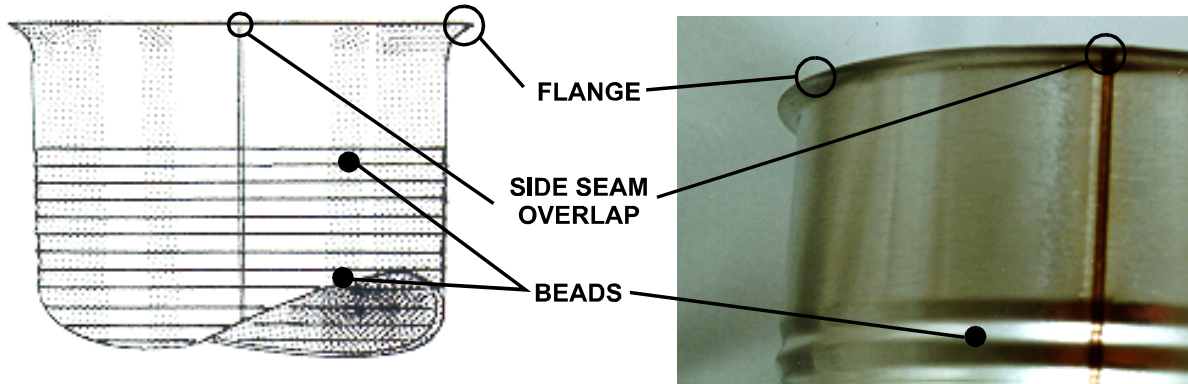


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**Figure 2.2.b - Three Piece Can - Welded Side Seam - Empty Can**

### 2.3 Two Piece Can Bodies

Body - Similar to three piece cans, the body may vary in shape and material used. The body consists of an integral end and a body wall formed from a single piece of metal plate and the top edge of the wall has a flange.

Body Bead - A side bead (alternate terms: stack, abuse, or chime bead) may be present near the bottom of the body wall to provide resistance to lateral abuse (denting), assistance in stacking and the same mobility (rolling) characteristic as a double seam provides to a three piece can. Other beads may also be present to provide lateral abuse resistance.

Bottom Profile - This term describes the contoured shape of the cross section of an integral end.

Countersink - This may or may not be present on integral end. Primarily used to provide strength to the integral end.

Panels - Raised or depressed surfaces of the integral end which provide strength or alter the container capacity. Step panels are the angular surfaces joining other panels (centre, first, second, outer, middle, etc. - see Fig. 2.3.a.)

Reinforcement Features - A series of rings, ridges or parallel lines pressed into the metal of any part of the can body or integral end. These features provide the metal with additional strength to withstand the stresses of retorting and handling.

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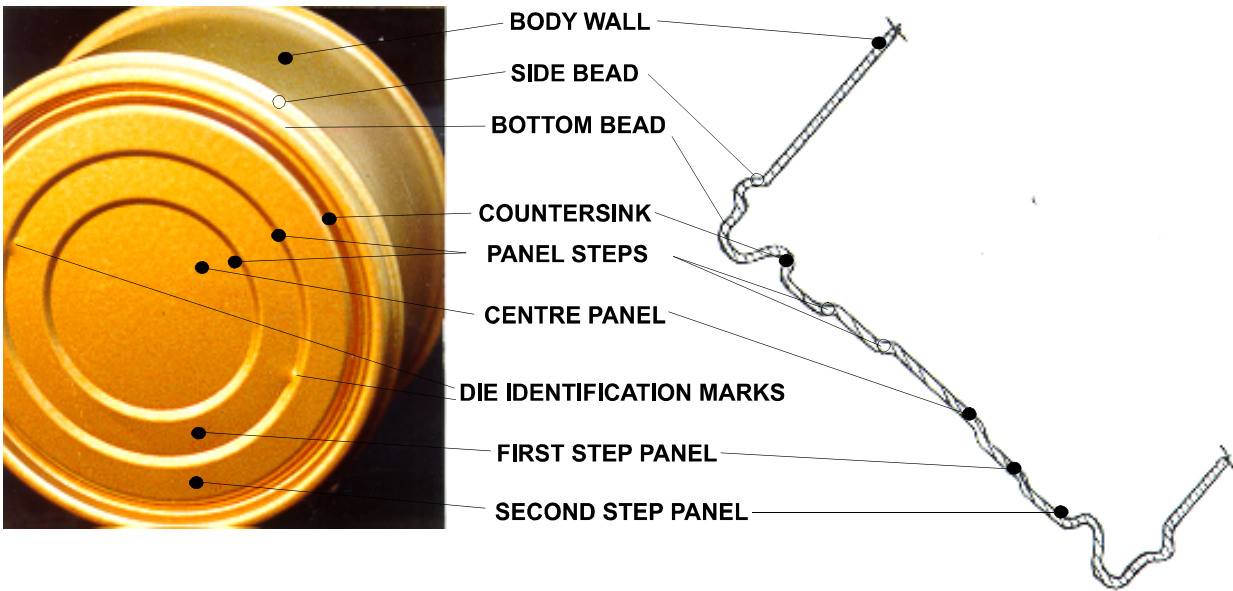


Figure 2.3.a - Two Piece Can - Integral End with Countersink

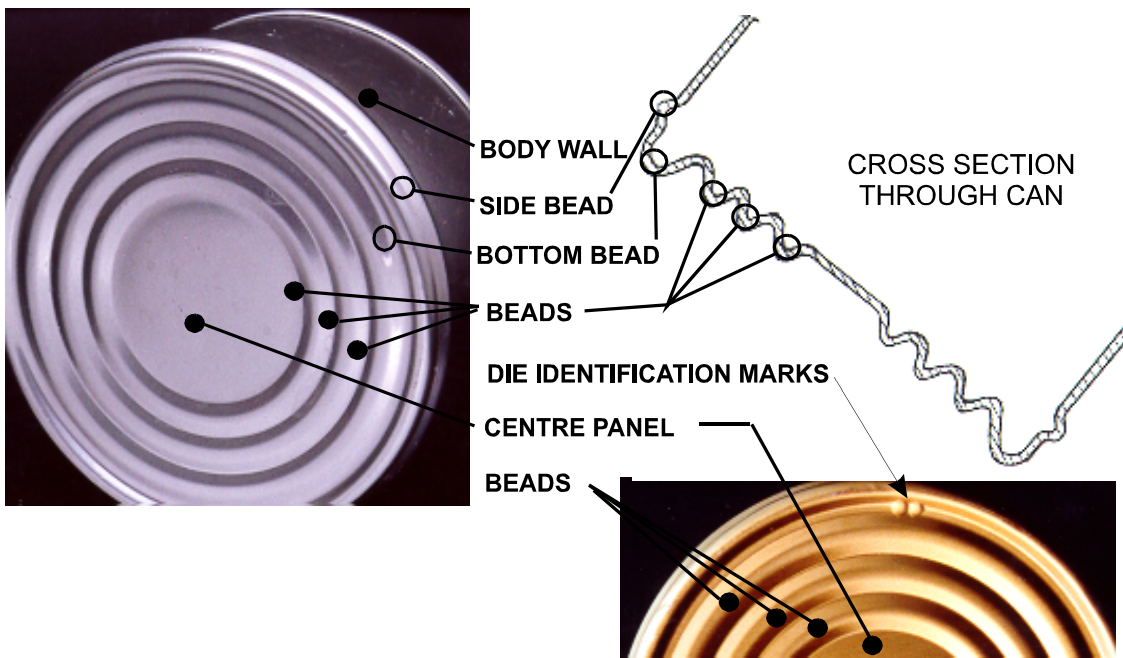


Figure 2.3.b - Two Piece Can - Integral End with Flex Bottom

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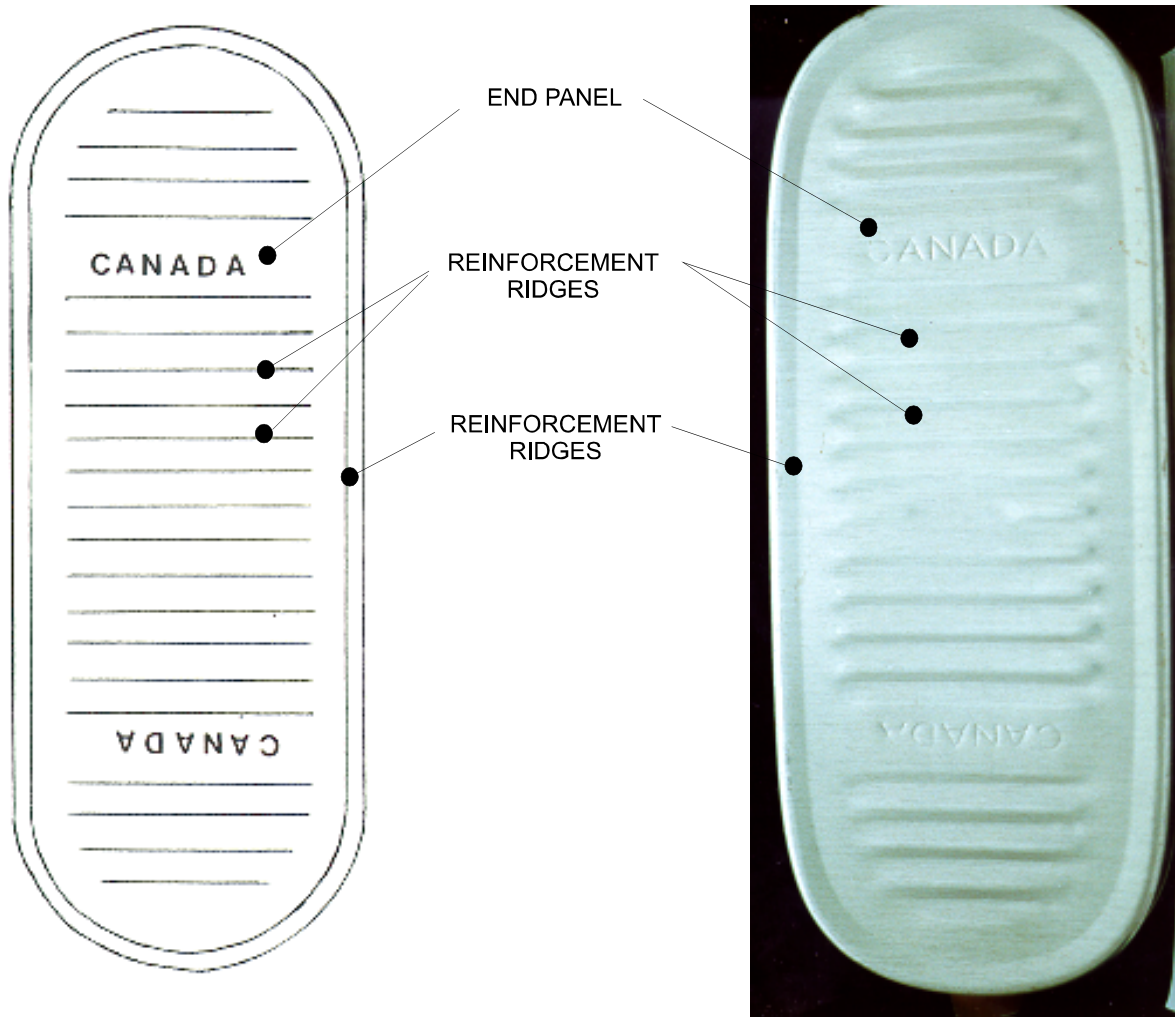


Figure 2.3.c - Integral End of a Non-round Two Piece Can

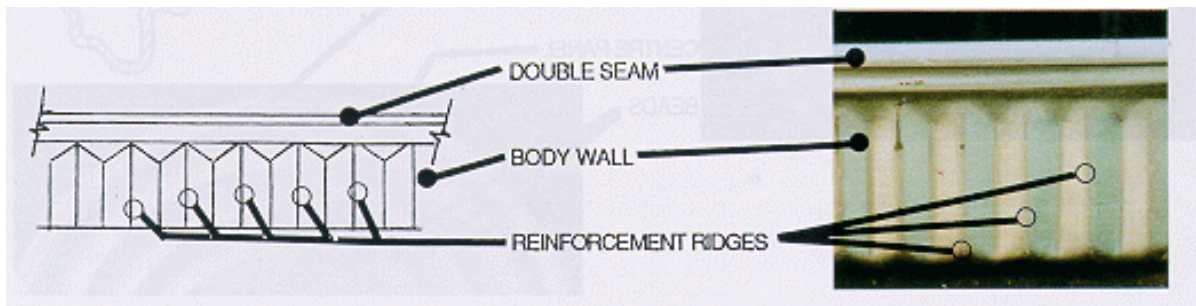


Figure 2.3.d - Body Wall of a Non-round Two Piece Can

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**2.4 Can Ends - Conventional**

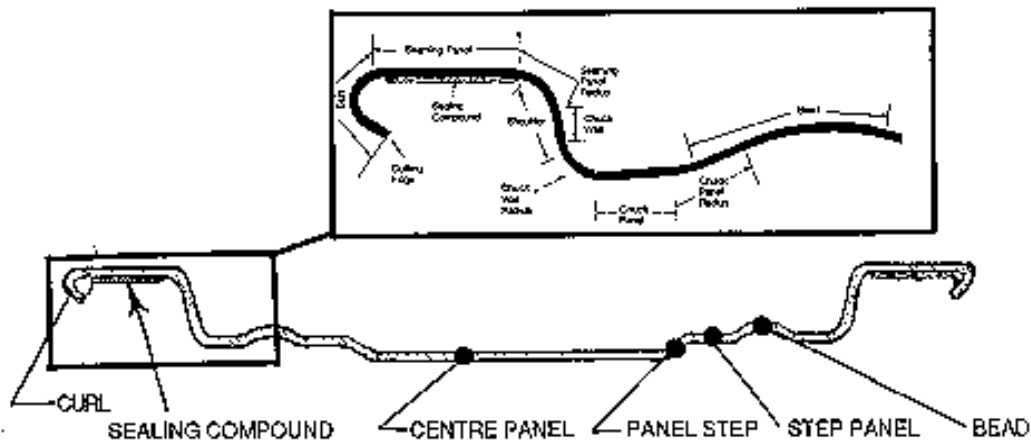
Canner's End - Alternate terms: cover, lid, top, packer's end, code end, customer end. This is the end applied to the filled can by the canner. Its material and shape may vary and it may have panels and beads.

Curl - The extreme edge of the can end which is turned inward when the double seam is formed to become the end hook.

Coding - Lettering, numbering or designs that are permanently stamped on either end, either raised (embossed) or in relief (indented). Embossing may be done by the manufacturer of the ends or by the canner just prior to applying the end to the filled can (code marking). Code markings applied by the canner indicate date code and other canning information. Indelible printing, or any other type of permanent marking, may also be used in place of embossing or indenting for coding of cans.

Manufacturer's End - Alternate terms: plant end, factory end, maker's end, bottom. This is the end applied by the can manufacturer of three piece cans.

Sealing Compound - Alternate terms: gasket compound  
 A sealing material consisting of a water or solvent dispersion of rubber placed in the curl of the can end. The sealing compound's function is to effect a hermetic seal by filling the voids left after mechanical formation of the double seam. Its primary functions are to: a) fill the void at the end of the body hook (prime sealing area Fig. 2.7.a); b) fill the end hook wrinkles; and c) prevent any seam areas having solely metal to metal contact.



**Figure 2.4.a - Cross Section of a Conventional End**

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### 2.5 Can Ends - Full Panel Easy Open - Key-open

The key-open style of full panel easy open (FPEO) ends may vary in material, shape, and may have reinforcement features similar to two piece bodies. A key is inserted onto the key tab and rotated, rolling up the tab, tearing the metal along the scoreline, and rolling the end from the can.

Key Tab - That portion of the can end projecting from the double seam.

Scoreline - A single or double line which follows the perimeter of the end. The metal thickness at the scoreline is less than the rest of the end so that during key opening the metal tears along the scoreline enabling the can to be opened without the use of other tools.

Tab Hook Radius - Alternate term: tonguehook radius

That part of the key tab area formed by the tab acting as an end hook (tucked into double seam).



Figure 2.5.a - FPEO Key-open End

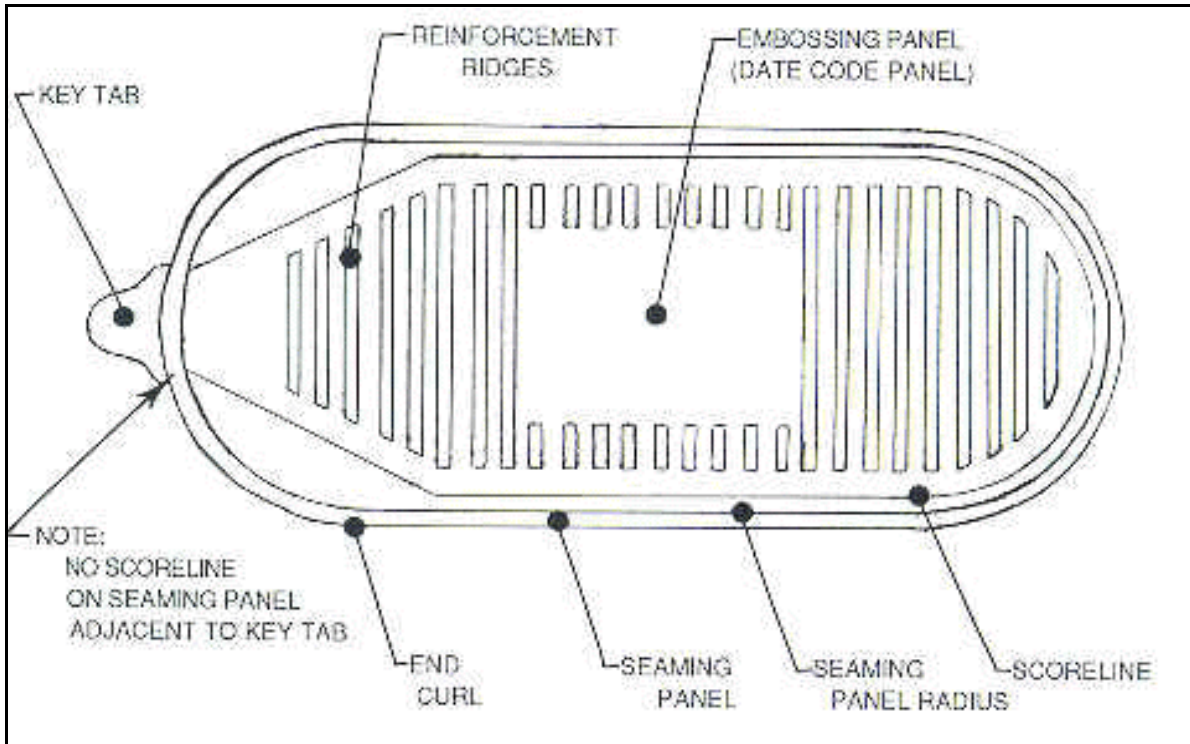


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**Figure 2.5.b - FPEO Key-open End**

#### 2.6 Can Ends - Full Panel Easy Open - Pull Tab

The pull tab style of full panel easy open (FPEO) ends may vary in material and shape, and may have reinforcement features similar to two piece bodies. By lifting and pulling back on the pull tab, the scoreline is broken. By continuing to pull, the scoreline tears along its length.

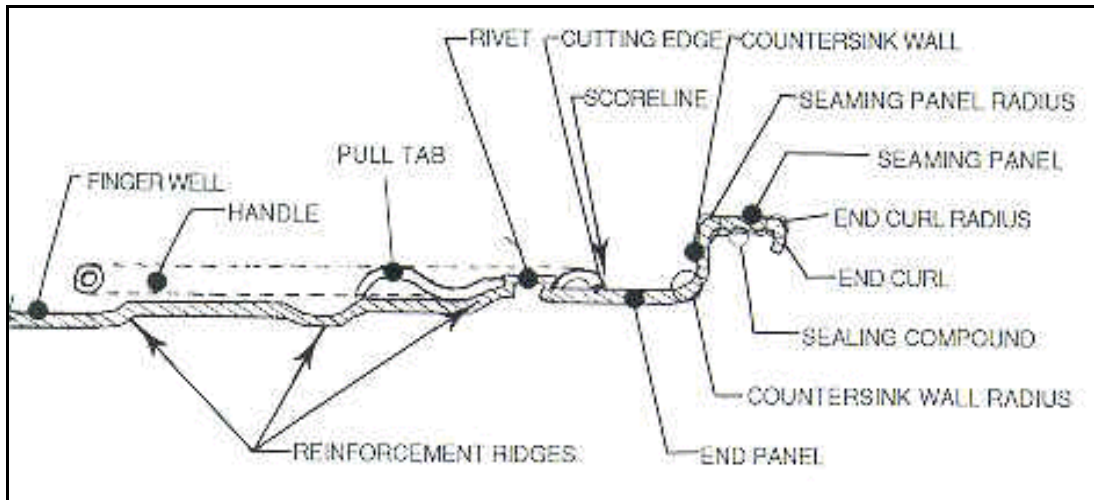
Pull Tab - A ring-shaped feature attached to the end panel by the rivet. The pull tab may be constructed of different material than the end.

Rivet - A small projection formed from the end panel to which the pull tab is attached.

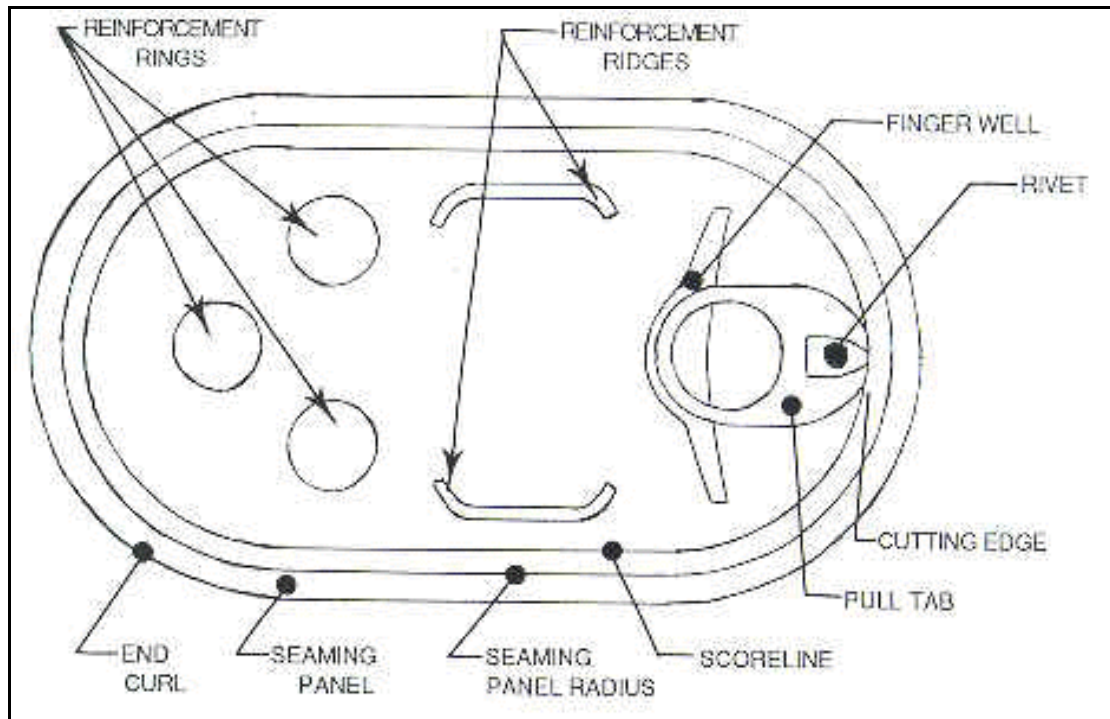
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**Figure 2.6.a - FPEO Can End with Pull Tab - Cross Section**



**Figure 2.6.b - FPEO Can End - Hansa**

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**Figure 2.6.c - Top - Dingley can end**  
**- Bottom - Obround can end**

**2.7 Double Seams**

The double seam is the joint formed between the body and the end by the mechanical interlocking and compression of the can flange and the end curl. For heat-treated food in sanitary cans this seam must be hermetic: that is, it must be impervious to the flow of materials through it in either direction.

The double seam is usually formed in two operations and consists of five layers of plate, except in the crossover area of three piece soldered or welded cans where there are seven layers and in the key tab area of key-open cans where there are six layers. The first operation determines the amount of material in the seam while the second operation compresses the layers together. The suggested dimensions of a double seam will vary according to a number of factors including the shape and size of the can, the thickness of end and body plate, and the manufacturer of the can components and double seaming equipment.

Body Hook - The flange of the can body which is turned down in the formation of the double seam.

Countersink - The dimension from the top edge of the double seam to the bottom of the countersink radius.

Crossover - Alternate term: juncture. That portion of the double seam that intersects with the side seam or lap of the three piece can body.

End Hook - Alternate term: cover hook. The curl of the can which is turned inward in the formation of the double seam.

Free Space - The difference between the measured seam thickness and the sum of the five plate thicknesses making up the double seam.

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Overlap - The distance which the end hook laps over the body hook.

Pressure Ridge - A continuous impression around the inside periphery of the can body in the double seam area formed by the seaming roll pressure.

Seam Gap - The gap between the body hook and the seaming panel.

Seam Length - Alternate terms: seam height. This is the external dimension of the double seam parallel to the vertical axis of the can.

Seam Thickness - The external dimension of the double seam measured approximately perpendicular to the vertical axis of the can. The actual measurement assumes the same angle as the countersink wall.

Voids - The non-metal areas at the ends of the end hook and body hook. For a hermetic seal the void at the end of the body hook must be filled with compound; this is the prime sealing area.

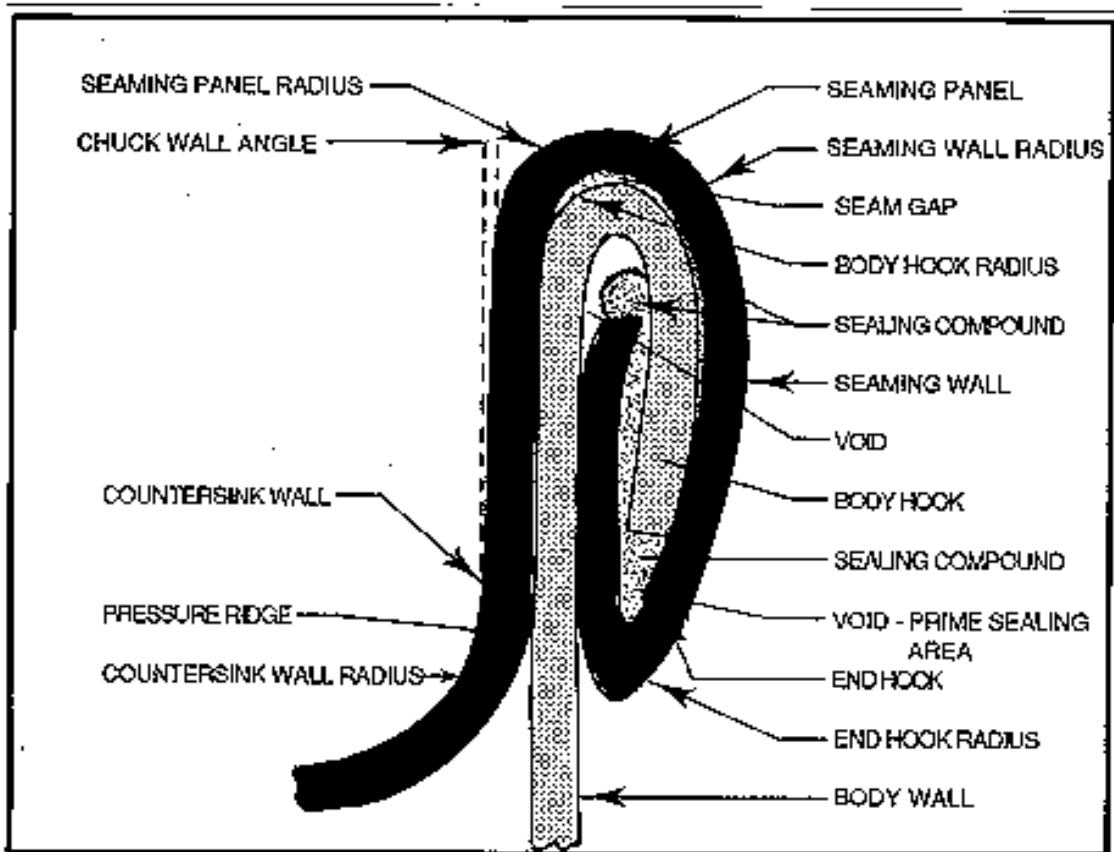


Figure 2.7.a - General Terminology of the Double Seam



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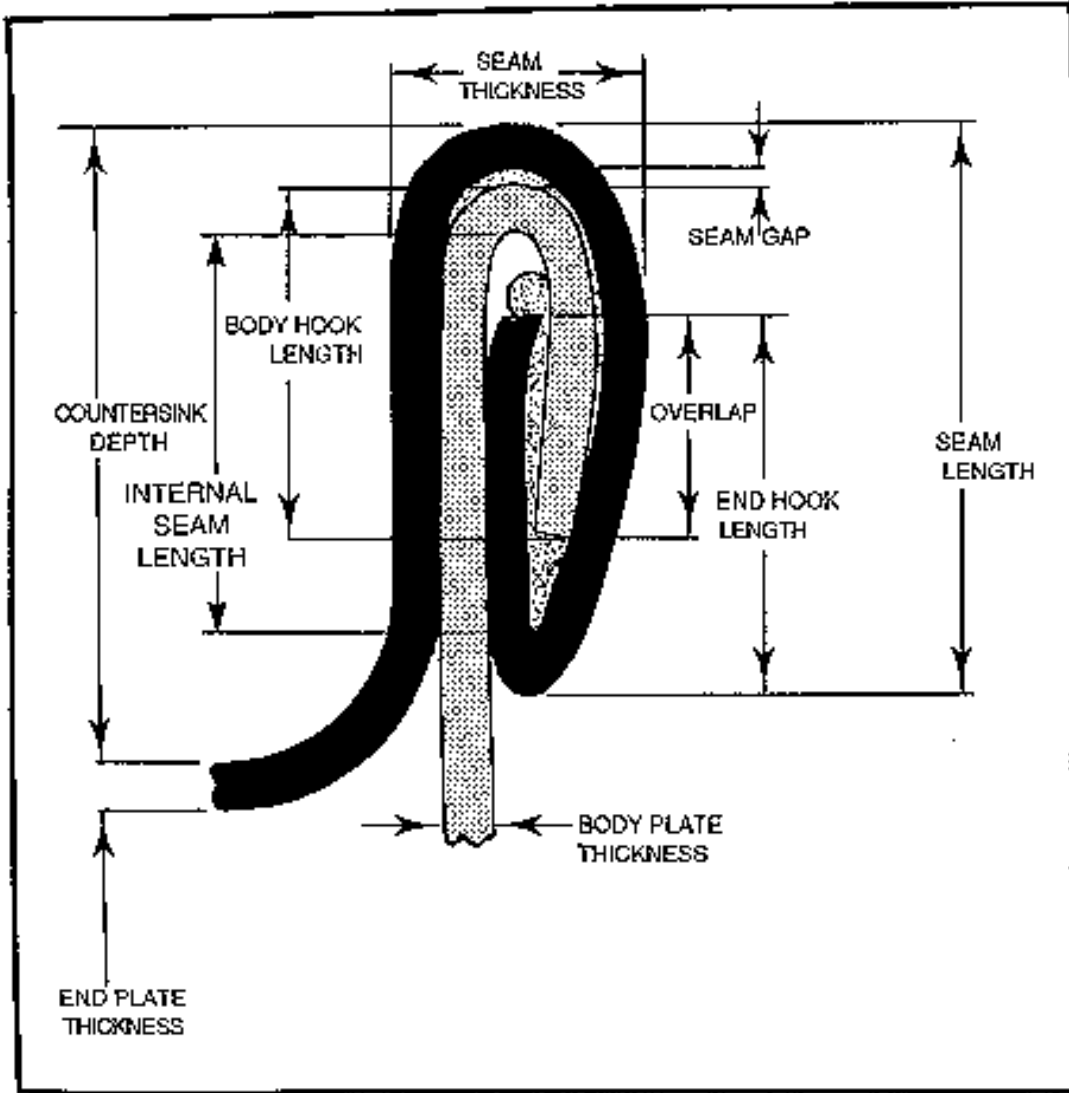


Figure 2.7.b - Dimensional Terminology of the Double Seam