

CLASSIFICATION OF VISIBLE EXTERNAL



CAN DEFECTS

PUBLISHED BY AOAC INTERNATIONAL IN COOPERATION WITH THE FOOD AND DRUG ADMINISTRATION

Eliminate Can Defects

This pamphlet shows the types of defects that may be commonly found. It classifies the defects according to their degree of potential hazard, and shows what to look for in routine inspection of the finished product. These classifications may change after laboratory examination. It is essential that samples of each defect suspected of causing loss of hermetic seal be collected for laboratory examination.

Recognizing a defect, doing something immediately to correct the cause, and removing the defective cans may prevent these situations.

Safe preservation of canned foods depends on:

- **Forming containers and closures that prevent entry of microorganisms.**
- **Applying enough heat to ensure commercial sterility.**
- **Using container handling procedures that protect the integrity of the container.**

Canned food containers must be handled carefully before they are used and during filling, retorting, and storage. Rough handling can result in container defects that may cause loss of hermetic seal and spoilage.

The equipment for handling filled containers must be clean and sanitized as needed to avoid spoilage due to contamination after retorting. In addition, cans must be stored under conditions that minimize sweating and rusting.

During the day's operations, take containers from critical points in the line and check for any defects from rough handling. Correct problem areas. Make final examination of containers before labeling and casing. When defective containers are found, remove them. Spot check

previous production to be sure the same defect is not present.

Remember! When defects are discovered, it is essential to determine the cause of the defects and to correct the problem.

The Double Seam

Good manufacturing practice includes:

- Maintaining high quality double seams.
- Correcting out-of-specification measurements.

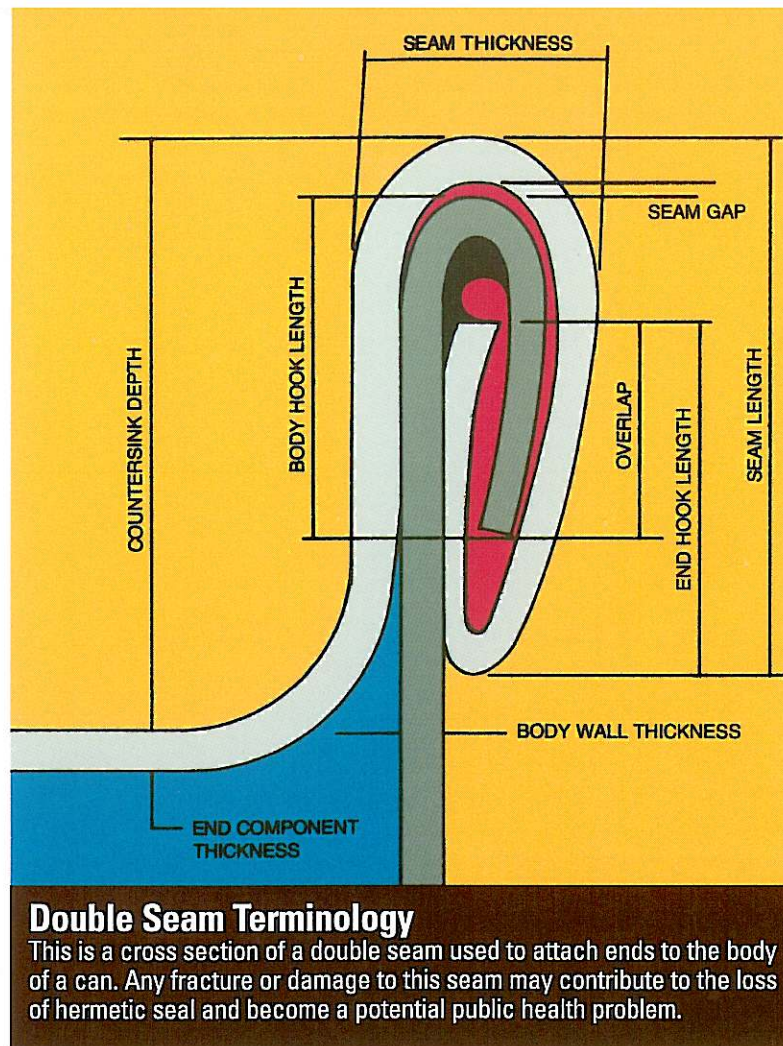
Most of the closure defects illustrated are due to the failure of double seaming control. When these closure defects are visible, control of double seaming has been neglected.

Double seaming defects and examination are discussed in detail in Chapter XXIV of "The Bacteriological Analytical Manual" and in the Food Processors Institute Manual "Canned Foods—Principles of Thermal Process Control, Acidification, and Container Closure Evaluation." Also, can manufacturers and others offer assistance to processors to assure good double seams.

Definition of Hermetically Sealed Containers

The definition of a "hermetically sealed container" is:

A container that is designed and intended to be secure against the entry of microorganisms and to maintain thereby the commercial sterility of its contents after processing.



Can Seam Examination Records

Regulations require that all double seam visual examinations and measurements be recorded. Record:

- The exact nature of any serious defects observed.
- The steps taken for correction.
- Any marginal or unusual conditions.

Definition of Defects

Number and color ratings are used throughout this pamphlet for simplification. The pointers in the

photos are color coordinated to the color of the numerical defect ratings (1–3).

From visual examination, if presence of microbial growth or evidence of loss of hermetic seal is in question (Class 1 or 2), the container must be examined in the laboratory.

- 1** Defects which provide evidence that the container has lost its hermetic seal (holes, fractures, punctures, product leakage, etc.)

or

evidence that there is, or has been, microbial growth in the can contents.

1 is a critical defect rating which would be considered a potential public health problem. Any lot which is found to have a (1) defect must be set aside and thoroughly inspected and sorted to ensure that no containers that have lost their hermetic seal are distributed.

2 Defects that result in cans which do not show visible signs of having lost their hermetic seal, but are of such magnitude that they may have lost their hermetic seal.

2 is a major defect which may result in the loss of the hermetic seal and become a public health problem. Even though a (2) defect may not be health threatening by itself, a large number of cans with (2) defects necessitates more extensive sampling of such lots before sale. Evidence of a significant number of (2) defects may be considered a potential public health problem.

3 Defects which have had no adverse effect on the hermetic seal.

3 is a defect of minor significance from a public health standpoint. This pamphlet is not concerned with defects that only affect commercial sale. For example, dented cans which will not stack on shelves may be rated as a (3) when the double seam, side seam, or the body has been adversely affected. If the effect on the hermetic seal cannot be determined, sampling and examination would be appropriate.

How to use this guide

The following photos are numbered. To help standardize the reporting of defects, report the photo number and the defect rating as follows:

Photo Number	Defect Rating
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If the plate is fractured:

14

1

If the plate is not fractured, report the rating as:

14

2

Acknowledgments

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Metal container manufacturers through cooperation of the Can Manufacturers Institute and food processor members of the National Food Processors Association.

Additional copies are available from:

AOAC INTERNATIONAL
481 N. Frederick Avenue, Suite 500
Gaithersburg, MD 20877-2417, USA
Tel: +1-301-924-7077
Fax: +1-301-924-7089
Internet e-mail: aoac@aoac.org

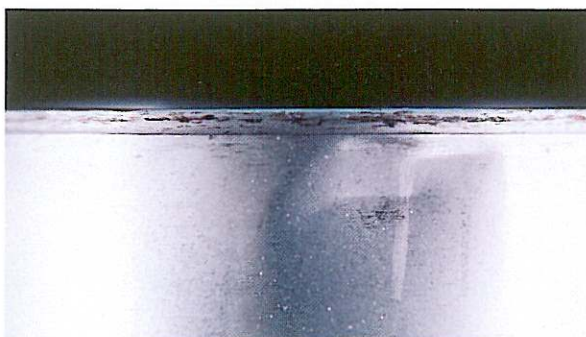
RUSTED CAN DEFECTS

1



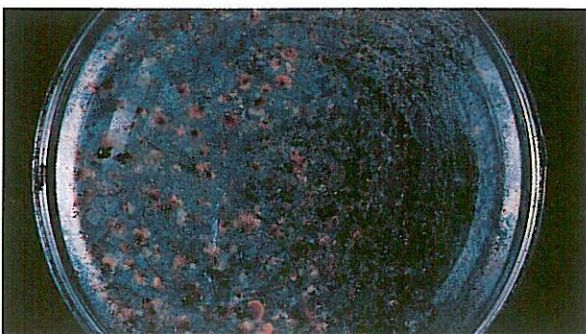
3 Food cooked on lid showing rust.

2



3 If superficial pitting only. Rust confined to double seam.

3



2 If nearly perforated.

3 Otherwise.

RUSTED CAN DEFECTS

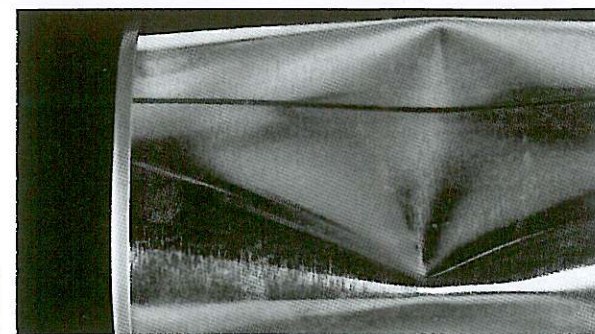
3.1



1 If perforated. **2** If nearly perforated. **3** Otherwise.

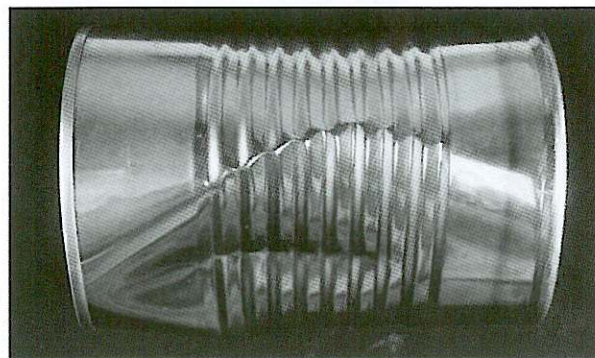
BODY DEFECTS—PANELED BODIES

4



3 Paneled non-beaded can. Materially affecting appearance, but not integrity, i.e., no plate fractures.

5



3 Paneled beaded can. Materially affecting appearance, but not integrity, i.e., no plate fractures.

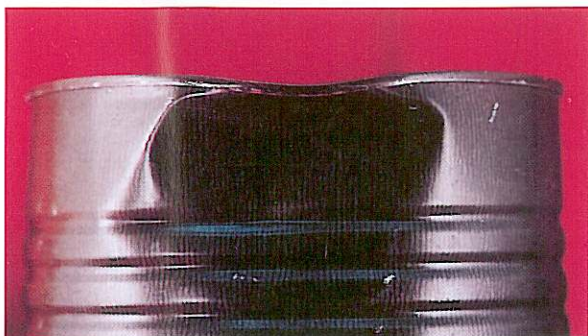
BODY DEFECTS—BODY DENTS

6



- 3** Moderate Denting. Double seam distorted, but not affected materially.

7



- 2** Severe body dent has affected double seam. Observe for fractured plate. **1** If fractured.

8



- 2** Severe body dent. Observe for fractured plate. **1** If fractured.

BODY DEFECTS—BODY DENTS

9



- 3** If the body dent does not significantly affect the side seam or double seams. **2** If side seam or double seams are significantly affected.

10



- 3** If the body dent does not significantly affect the side seam or double seam. **2** If side seam or double seams are significantly affected.

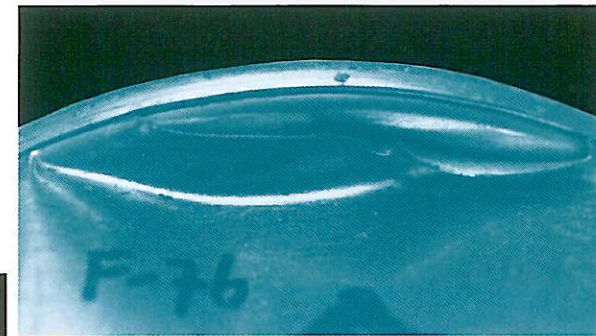
11



- 1** If plate fractured or opening below double seam. **2** If no opening visible.

BODY DEFECTS—BODY DENTS

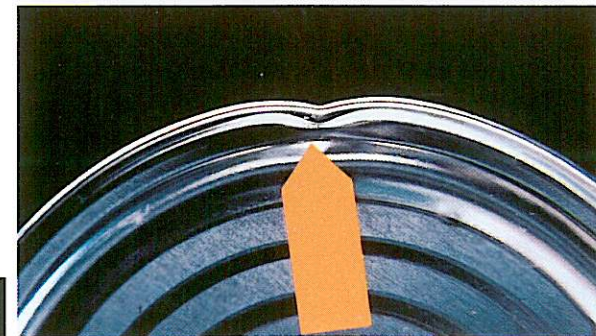
12



- 1** Obvious opening below the double seam.

BODY DEFECTS—BODY/END DENTS

13



- 3** Double seam dent if not creased or sharp. **2** If creased or sharp.

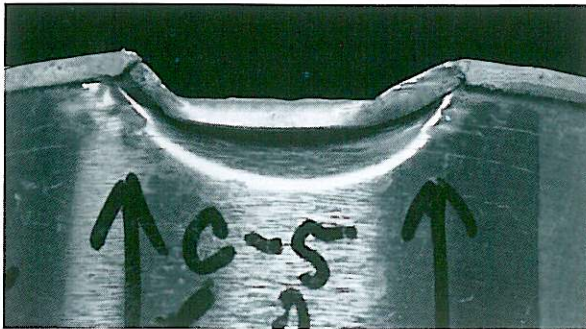
14



- 1** If plate is fractured in double seam or body. **2** If plate not fractured.

BODY DEFECTS—BODY/END DENTS

15



- 1** Double seam dent plate fractured.

16



- 3** Double seam not severely damaged.

17

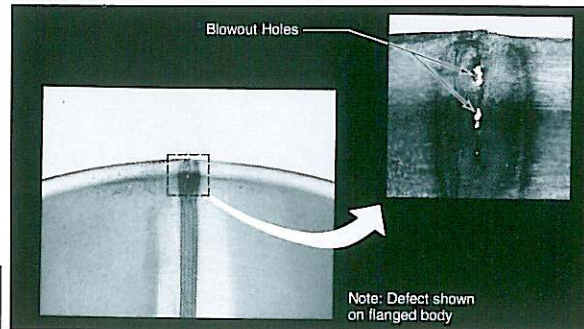


Heel dents on a two-piece can.

- 1** If plate fractured.
- 3** Affecting appearance, but not integrity.

BODY DEFECTS—SIDE SEAM

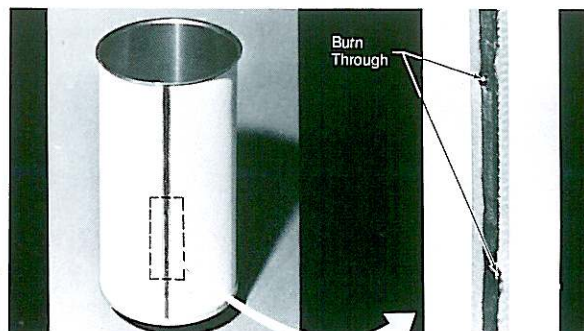
18



Defective welded side seam blowout.

- 1** Crack or hole through plate.

19



Defective welded side seam burn through.

- 1** Cracked or hole through plate.

20



Defective welded side seam.

- 1** If portion of seam not welded.

BODY DEFECTS—PUNCTURE

21



- 1** Body puncture.

BODY DEFECTS—CASE CUT

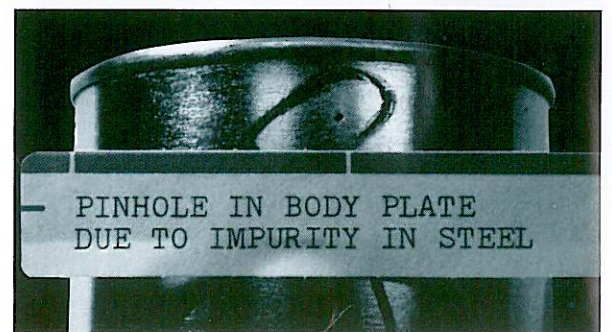
21.1



- 1** If body fractured at cut.
- 2** If plate not fractured.

BODY DEFECTS—PINHOLE

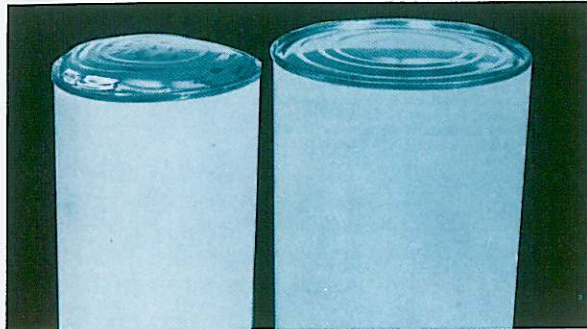
22



- 1** Pinhole in plate.

END DEFECTS—SWOLLEN ENDS

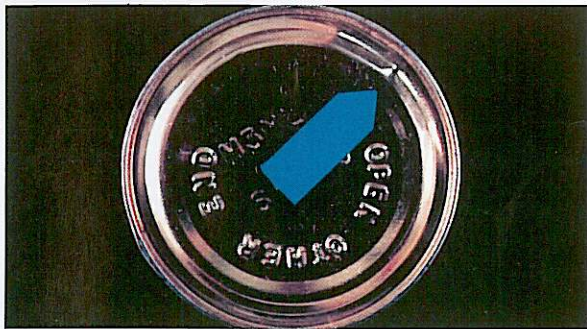
23



- 1** Gas formation in can which causes one or both ends to swell producing a flipper, soft swell, hard swell, or blown can. Hold for investigation.

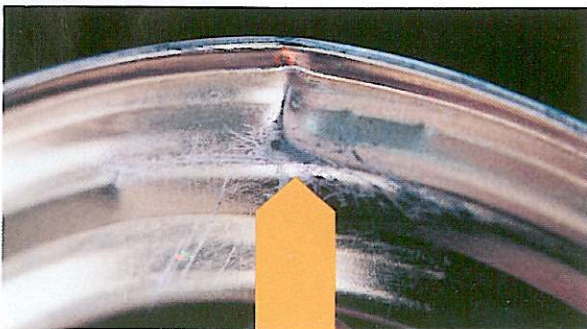
END DEFECTS—BUCKLES

24



- 3** Buckles not involving double seam.

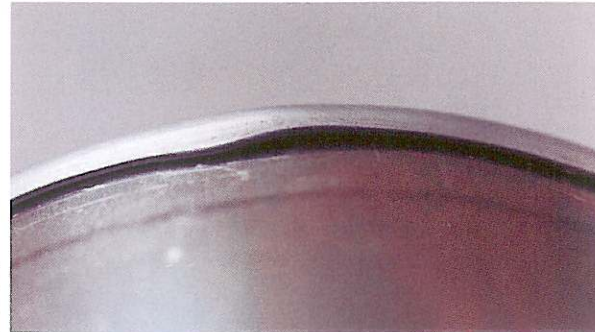
25



- 3** Buckle barely extending into double seam. **2** If extending further into double seam.

END DEFECTS—SEAM BUMP

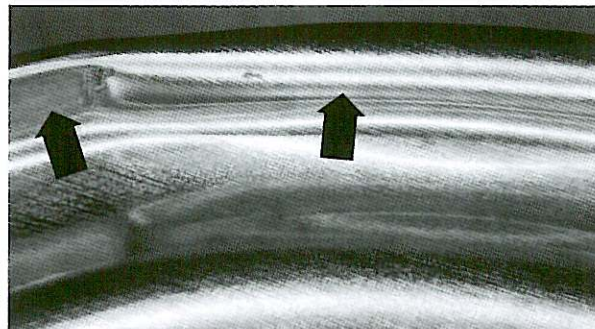
25.1



- 2** If seam thickness at bump greater than 0.003 inch with an arc dimension within 1/2–3/4 inch. **3** If seam thickness at bump no greater than 0.003 inch.

END DEFECTS—BROKEN CHUCK

25.2

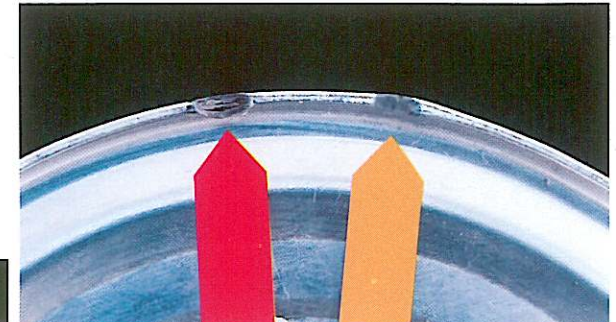


Broken chuck.

- 1** If leaking or not leaking.

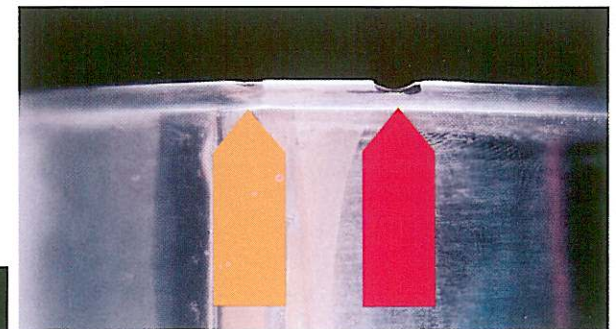
END DEFECTS—CABLE CUT

26



- 1** Red pointer double seam cut through. **2** Yellow pointer if not cut through. **3** If slight abrasion only.

27

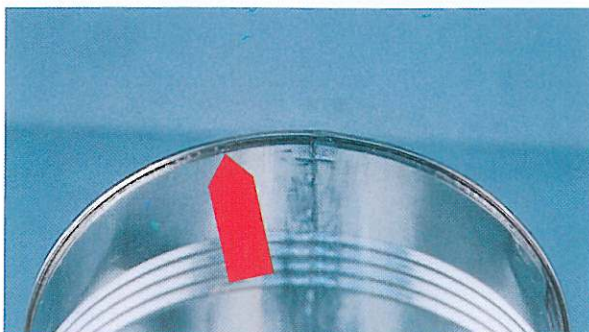


Another view of same ratings above, except pointers reversed.

- 1** Red pointer. **2** Yellow pointer.

END DEFECTS—CLOSURE

28



- 1** Double seam not completed—no second operation seam.

29

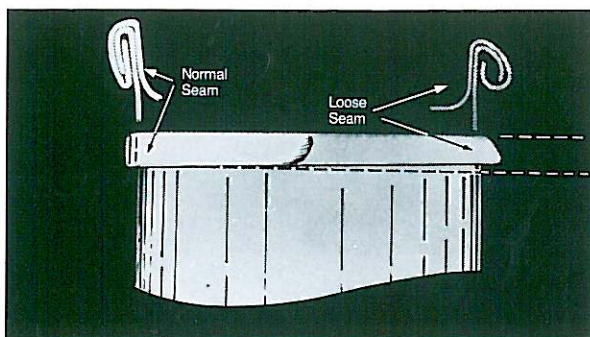


Diagram of normal and loose seam.

The diagram above illustrates the appearance of incomplete double seams. A "Skid," "Deadhead," or "Spinner" may have various lengths of a loose seam. These defects are difficult to show in photos and must be rated as to their potential for leakage:

- 2** If no loss of vacuum or hermetic seal.
- 1** If loss of vacuum or hermetic seal.

END DEFECTS—CLOSURE

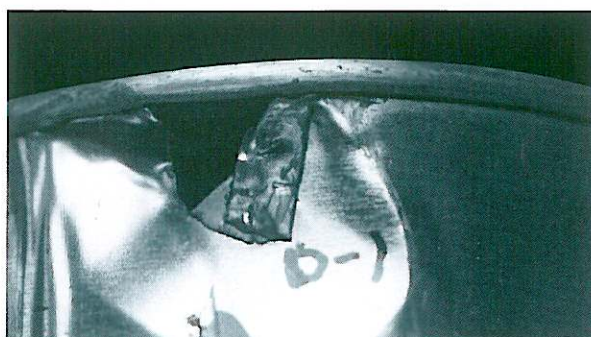
30



Cut-over or fractured seam.

- 2** If sharp seam and not fractured.
- 1** Plate fractured or loss of hermetic seal.

31



- 1** Torn flange caused by can reformer.

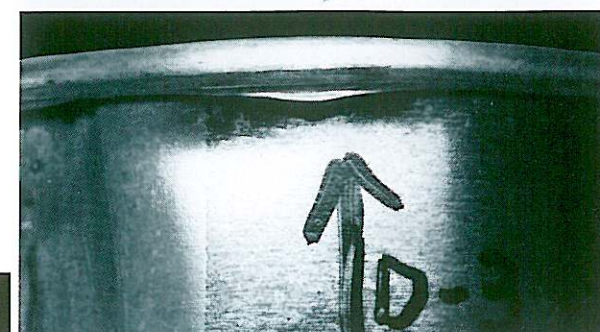
32



- 1** Torn flange caused by can reformer, without obvious hole.

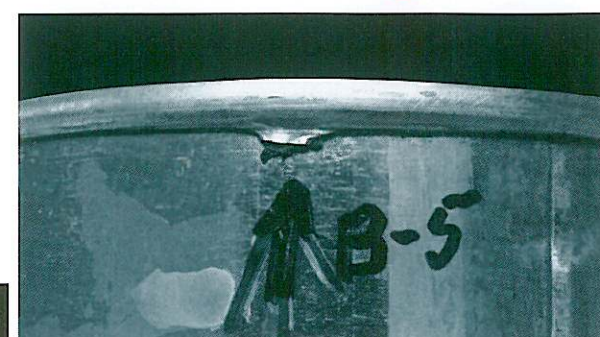
END DEFECTS—CLOSURE

33



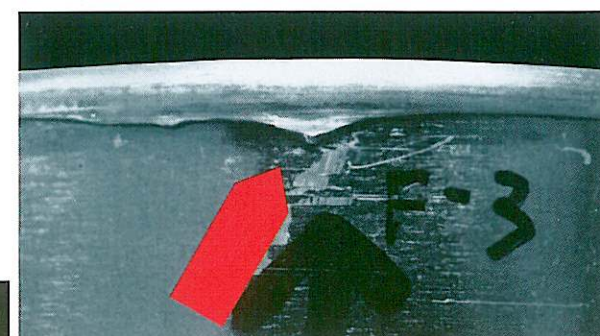
- 3** Droop causing a reduction in cover hook length. Should not be more than 1/3 of double seam height.
- 2** If droop is more than 1/3 of double seam height.
- 1** If evidence of loss of hermetic seal.

34



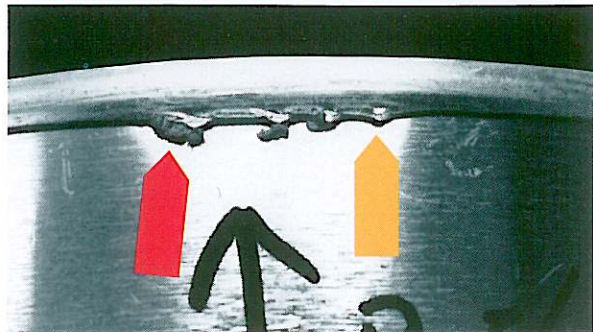
- 1** Knocked down end curl.

35



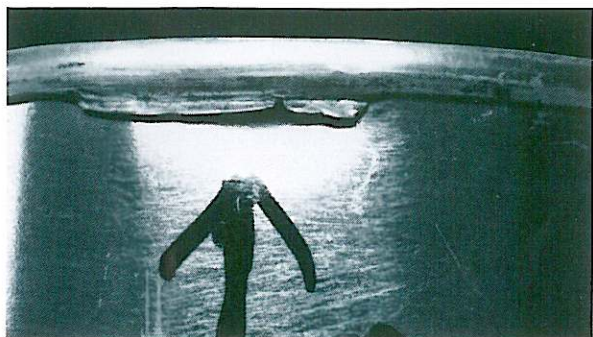
- 2** Vee with end curl knocked down and a potential leaker. (Also may be termed as a "Spur").
- 1** If evidence of loss of hermetic seal.

END DEFECTS—CLOSURE



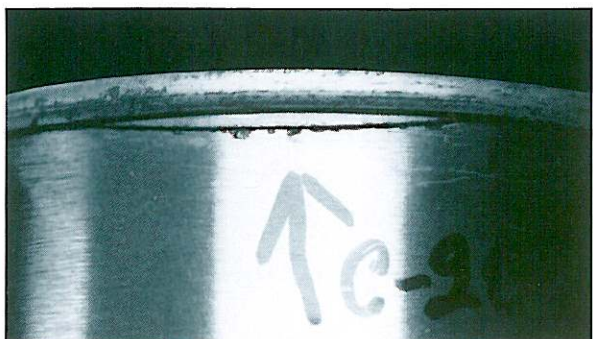
36

- 1** If evidence of loss of hermetic seal. **2** Multiple vees with end curl knocked down and potential leaker. (Also may be termed as "Spurs").



37

- 1** Knocked down end curl.



38

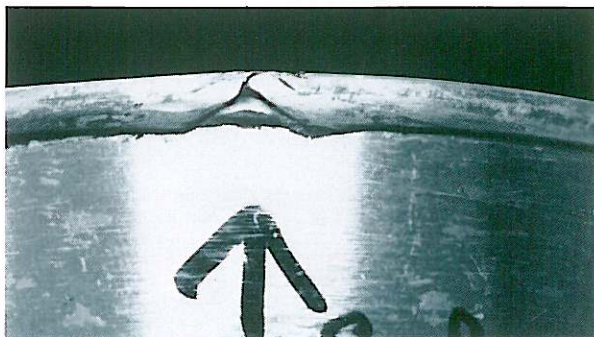
- 1** Knocked down flange.

END DEFECTS—CLOSURE



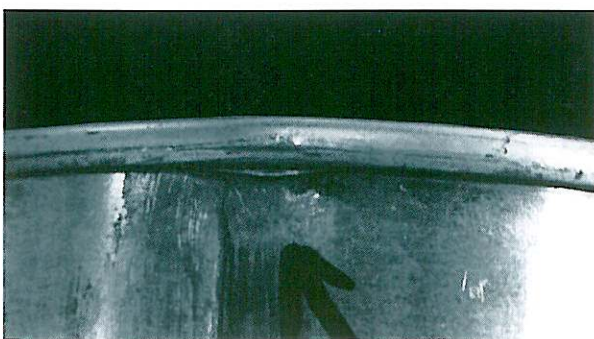
39

- 1** False seam. Knocked down flange.



40

- 1** Fractured curl.

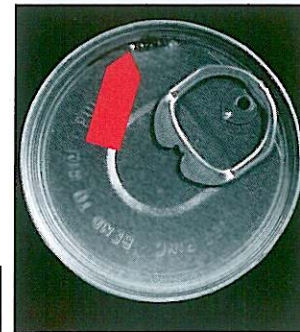


41

Cut seam

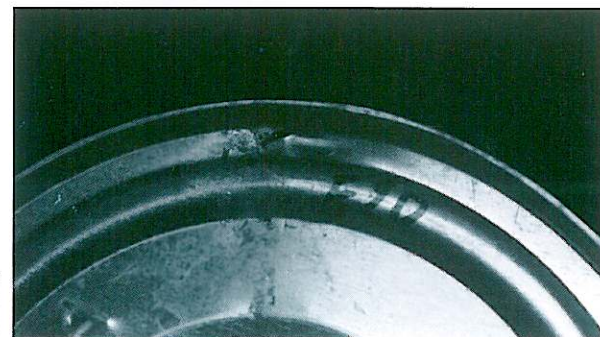
- 1** Fractured or leaking.

END DEFECTS—CLOSURE



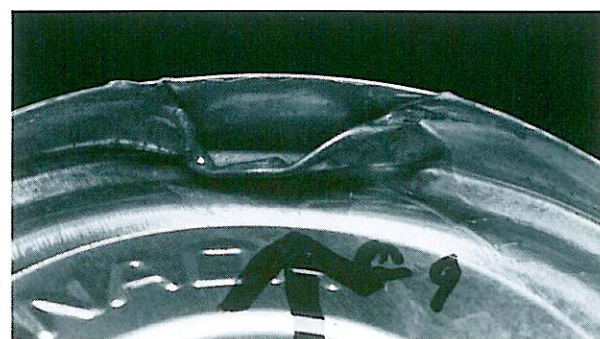
42

- 1** Score line fracture.



43

- 1** Fractured lid.



44

- 1** Torn lid. (Knocked down end).