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# A POCKET GUIDE TO CAN DEFECTS



Association of  
Food & Drug Officials

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Canned foods are the safest food processed today. Approximately 60% of food consumed in the United States is thermally processed and packaged in hermetically sealed containers. However, regardless of the safety assured in canned foods, any damage or defective canned products are a potential public health problem. Defective cans may leak and allow microorganisms to enter that may cause food poisoning or other significant health problems. The deadly food poisoning, botulism, is always a significant threat and a potential public health problem to consider when dealing with serious defective/damaged canned food containers requiring inspection, evaluation and sampling. It is imperative that canned food products with visual and/or external defects be recognized. Those containers with “significant defects” should not be sold, distributed or consumed. However, canned foods with “insignificant defects” (Aesthetic Defects) normal represent no public health hazard, i.e., if the hermetic seal on the can has not been jeopardized, these products are generally considered safe and when properly labeled, such products are acceptable for distribution and sale.

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This pocket Guide is intended in part to help resolve the question which frequently arises concerning the evaluation and safety of canned food products, i.e., when does the can defect of damage become severe enough to represent a public health concern or hazard.

This simplified guide shows in color some of the major types of can defects which may be commonly found by visual observation. It categorizes the defects/damages according to their degree of potential hazard, and shows what to look for in the routine visual inspection of the finished product. These classifications may change after laboratory examination. It is essential that prior to sale, samples of each defect suspected of causing loss of hermetic seal be collected for laboratory examination e.g., measurement and integrity of can seams, microbiological analysis of contents, etc. Note that a “hermetically sealed” container for canned foods and/or beverages is considered as one that is appropriately constructed/designed and intended to assure no entry of bacterial microorganism and thus maintain the commercial sterility of its contents after thermal processing. Other definitions commonly and frequently used in the visual evaluation of can defects are included as part of this pocket guide for a quick and simple reference and for easy use in the field.

## DEFINITION OF DEFECTS (Updated November 1987)

Number and color ratings are used throughout this guide for simplification. From visual examination, if presence of microbial growth or evidence of loss of hermetic seal is in question (Class I or II); the container must be examined in the laboratory.

**Class I – Critical Defects:** Defects which provide evidence that the container has lost its hermetic seal (e.g., holes, fracture, punctures, product leakage, etc.) or evidence that there is, has been microbial growth in the can contents.

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

**Class II – Major Defects:** 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.

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

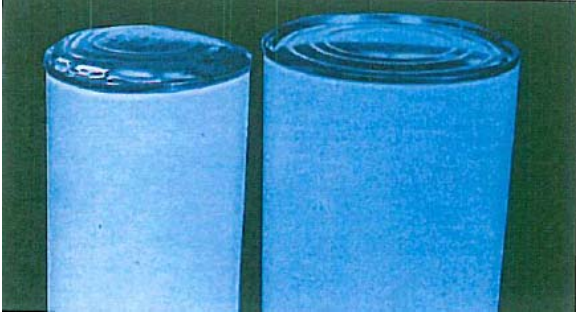
**Class III – Minor Defects:** Defects which have had no adverse effect on the hermetic seal.

This is a defect rating of minor significance from a public health standpoint. This guide 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 Class III when neither the double seam, side seam nor the body has been adversely affected. If the effect on the hermetic seal cannot be determined, sampling and examination would be appropriate.

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## Class I – Significant Defects

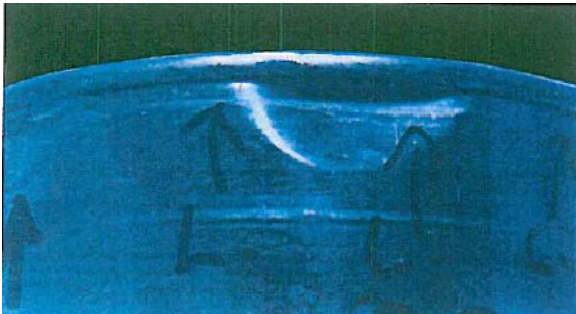
### *Body/End Defects*



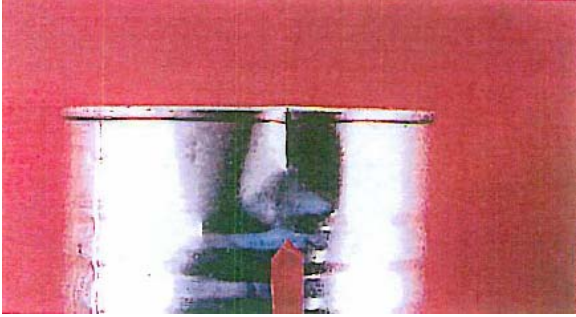
- 1** Bulged and/or swollen ends from gas formation in can which causes one or both ends to well producing a flipper, soft swell, hard swell or blown can.



- 2** Can with likely loss of hermetic seal and normally a leaker due to the mislocked side seam.



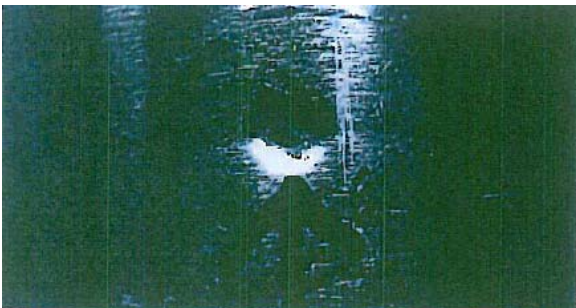
- 3** An opening below the double seam or plate fracture.



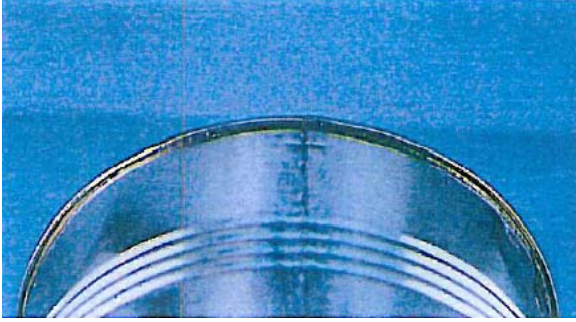
**4** Plate fracture in double seam or can body. (Note position of red pointer).



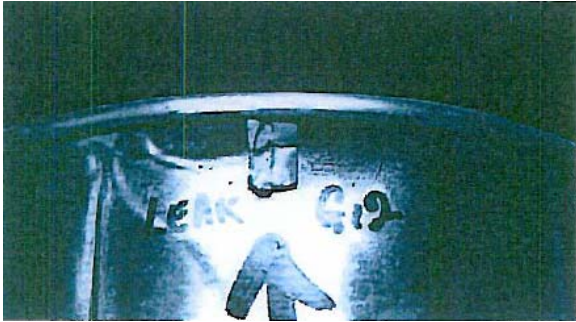
**5** Severe double seam dent plate fracture.



**6** Puncture in can body. Pinholes in can body plate also cause loss of hermetic seal.

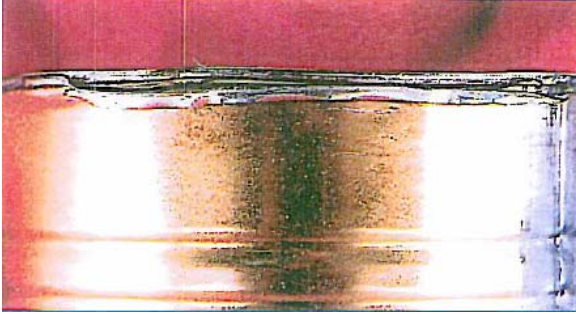


**7** Closure on end of can reflects incomplete double seam (Double seaming operation not completed by manufacturer)



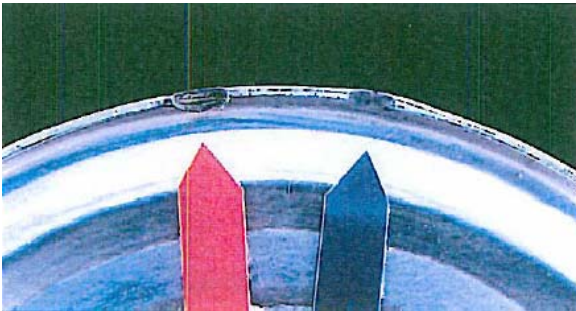
**8** Defect in end of closure on can (torn flange). Note arrow pointer.





**9**

Depicts a false seam with loss of hermetic seal. Seam is formed but not engaged properly. (Note knocked down flange).



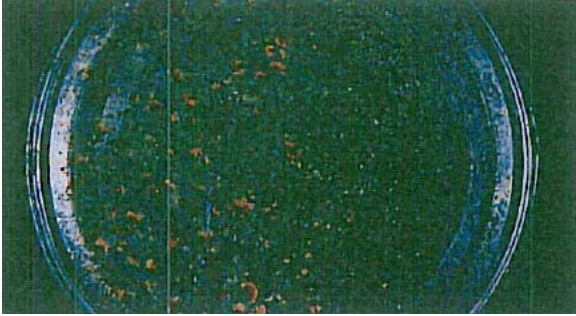
**10**

Example of cable cut on can end. Red pointer shows "significant defect", i.e., cut through double seam. Blue pointer depicts cut/abrasion not through double seam.

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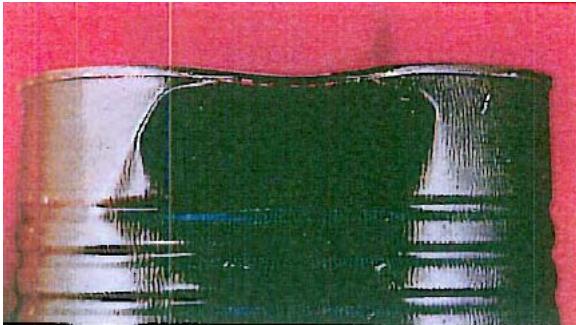
## Class II – Other Serious Defects

### *Body Dents, End/Closure and Rust Defects*



**11**

Severely rusted with deep pits near point of perforation.



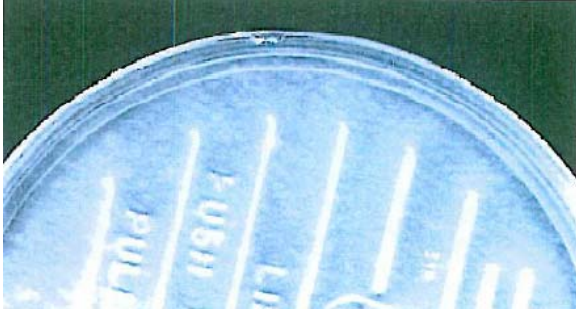
**12**

Major body dent which has impacted on double seam. (Plate may be fractured with loss of hermetic seal).

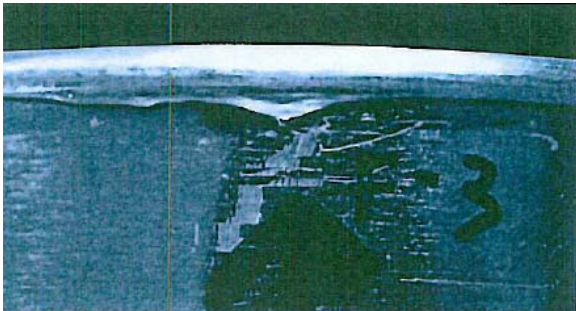


**13**

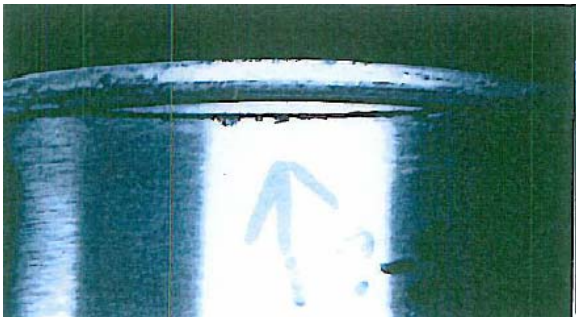
Major dent in center of can body. (Plate may be fractured with loss of hermetic seal).



**14** "Cut-over" depicting sharp seam. (Observe for potential plate fracture or loss of hermetic seal).



**15** Defect shown termed a "vee" or "spur" with end curl knocked down. Can is a potential leaker.

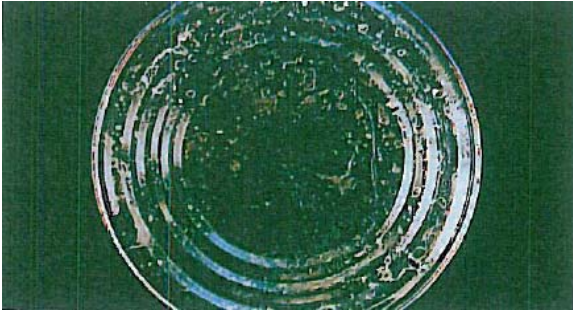


**16** Pointer indicates a "knocked down flange".

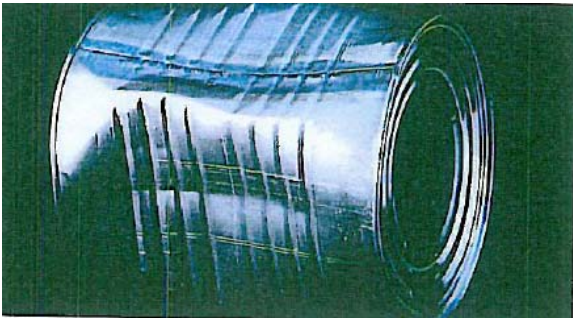
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## Class III – Aesthetic Defects

### *Body/End Defects*



- 17** Surface rust and residue food cooked on end of can. (Minor external rust and light superficial pitting easily removable by light buffing is considered an insignificant defect).



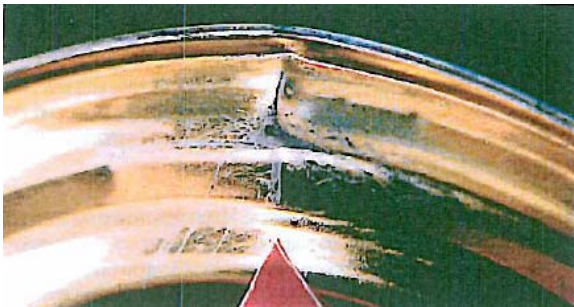
- 18** Paneled container without visible signs of loss of integrity, i.e., no plate fractures.



- 19** Obvious body dent on side of container body. Side seam and/or double seams appear not significantly affected.



**20** Minor dent to double seam on end of can body, i.e., it does not appear creased or sharp.



**21** Minor "buckle" just extending into double seam on end of can body. (Double seam does not appear significantly affected.)

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**1. HERMETIC SEAL** – “Hermetic” means air tight. A “hermetically sealed container” is one that is suitably designed to maintain the commercial sterility of its contents after processing, i.e., preclude the entrance of bacteria and also maintain the desired vacuum or pressure in the can. Food and beverage cans (tin and steel) normally have three hermetic seals – one along the side seam and one on each at the top and bottom ends of the can.

**2. SWELLS** – Both ends of the can are bulged. Neither end will remain flat without pressure. Soft swells yield to manual pressure, but no impression can be made manually on hard swells. Swells result from positive pressure in the can usually because of spoilage of the contents. Some swells, especially in acid products, may result from chemical reaction between the contents and the container.

**3. FLIPPERS** – Only one end is slack or slightly bulged. That end will remain flat if pressed in. Cans which bulge when sharply and squarely struck end-down on a flat surface are flippers, provided that the bulged end remains flat when pressed. Flippers result from a lack of vacuum.

**4. SPRINGERS** – One end of a can bulges. Manual pressure on the bulged end forces the opposite end out or the same end will spring out with release of pressure. If both ends bulge but only one will remain flat when pressed, the can is a springer. Springers result from moderate positive pressure in the can.

**5. HYDROGEN SWELL** – A bulged, closed metal can caused by hydrogen produced therein by reaction of the metal with the content of the can.

**6. FALSE SEAM** – A significant defect in the double seam in which the cover and body hooks are not overlapped or engaged. (Photo 9). Defect is not always detectable by simple external examination, i.e., a complete can tear down inspection may be necessary to reveal the false seam.

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**7. RUST** – Iron oxide produced by moisture in contact with the unprotected base plate metal. (Photos 11 and 17).

**8. PITTING** – Depressions in a metal surface caused by corrosion. (Photo 11).

**9. CORROSION** – Any deterioration of the surface of the container due to a chemical reaction.

**10. PIN HOLES** – Minute opening in the base plate metal due to corrosion.


**11. SHARP SEAM** – A sharp edge at the top inside portion of the seam. Condition can be first indication of further complication known as a “cut-over”. (This defect can usually be felt more easily than it can be seen).

**12. CUT-OVER** – A sharp break or bend in the can end metal at the seaming panel radius. (Photo 14)

**13. VEE OR SPUR** – Small metal irregularities in the double seam in one or more “V” shapes.

**14. PANELING** – Flat side on can body and/or permanent distortion (dimpling) of the can body caused by internal vacuum and excessive external pressure developed during processing or cooling. (Photo 18).

**15. BUCKLE AND/OR BUCKLING** – Permanent distortion of the can end caused by excessive internal pressure. (Photo 21).



This pocket guide was produced by the Association of Food and Drug Officials, Education Committee, in cooperation with the State Training Branch, U.S. Food and Drug Administration.

The Association of Official Analytical Chemists provided material assistance in the production of this pocket guide.

Other organizations providing information and photographs were:

Health Protection Branch  
Health and Welfare  
Canada

Department of Health and Social Security  
United Kingdom

Container Integrity Task Force  
National Food Processors Association  
The Can Manufacturing Institute

Processed Product Branch  
Food Safety and Quality Service  
U.S. Department of Agriculture