British Beer and Pub Association

TECHNICAL CIRCULAR No. 447

CODE OF PRACTICE TO MINIMISE LEVELS OF ALUMINIUM WITHIN BEER

ISSUE DATE: 25th October 2010

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Code of Practice to Minimise Aluminium Levels in Beer

This document has been developed to assist brewers in minimising the potential for introduction of aluminium as a contaminant within beer. The document outlines the European regulatory framework as it applies to aluminium as well as the various sources of aluminium that may be linked with brewing raw materials, brewery materials and process and final package. In particular this document provides recommendations for a good practice approach to controlling aluminium and specifically in connection with the use, handling and maintenance of aluminium containers intended for final package of beer.

1. Legislation

No limits have been set for aluminium in beer or in any other foods in the EU.

1.1 Water

A guideline of 0.2 mg/litre has been set by the EU for aluminium drinking water (*European Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption*). This limit is mandatory in the UK (*The Water Supply (Water Quality) Regulations 2000, SI2000/3184)*.

1.2 Additives

The use of aluminium-containing additives in food is controlled by *the Food\ Additives Regulations 2009, SI 2009/3238.* No additives with an aluminium formulation are authorised in the EU for use in beer (although some brewing materials may contain trace contamination of aluminium (see below).

1.3 Packaging

The use of aluminium and its alloys for food contact use is covered by the general provisions of the *Framework Regulation on Materials and Articles in Contact with Foods,* which states that materials and articles intended to come into contact with food should not, under normal conditions of use, transfer any of their constituents to the food in quantities which might endanger human health, bring about an unacceptable change in the composition of the food, or have any adverse effect on its flavour or taste

2. Recommended Exposure Limits

Both the WHO and the European Food Safety Authority (EFSA) recommend that weekly intake of aluminium should not exceed 1mg/kg body weight (that is, 60 mg a week for an adult weighing 60kg) in order to protect consumers against possible health effects. This was reduced from 1mg/kg body weight per day (seven-fold) in 2008 and EFSA has recognised that this recommended Tolerable Weekly Intake could be exceeded by intake from food for some population groups in the EU. Nevertheless, it would be prudent to ensure that levels of aluminium present in beer do not result in moderate beer consumption contributing significantly to this TWI.

3. Potential sources of aluminium relevant to brewing

Potential sources of aluminium in beer are:

- Fermentation/storage vessels of aluminium construction
- Water used for brewing, rinsing and dilution
- Raw materials – malt, cereals, hops and spices
- Adjuncts such as sugar syrup (aluminium salts can reportedly be used as processing aids in the manufacture of sugar syrups; however, no information is available as to the likely levels of aluminium in brewing syrups)
- Processing aids such as kieselguhr, bentonite and perlite
- Packaging, particularly kegs and casks where the internal lining has become damaged

4. Good Practice in Brewing and Packaging

4.1 Brewery Plant

- Any aluminium tanks used in breweries should be lined with food grade lining and the linings inspected on a regular basis. Consideration should be given to a replacement programme for such tanks.

4.2 Brewing Materials

- There are currently no specified limits for aluminium content within processing aids or additives. However, whilst no additives with an aluminium formulation are permitted for use in beer production, in some instances, those processing aids and additives that are permitted may contain low levels of aluminium as a

consequence of varying purity specifications. Wherever possible, brewing companies should select these materials with low aluminium contents.

- For breweries conducting their own water treatment, attention should be paid to the use of aluminium salts

4.3 Kieselguhr Filtration

- Filter sheets should be pre-washed prior to use with beer.
- Short filter runs should be avoided. Precautions should be taken to avoid layering in tanks for beer post-filter.

4.4 Cans

- Quality specifications should be set for can bodies and ends. Examples of guides for good manufacturing and hygiene practises in the production of metal food containers can be found using either the European Metal Packaging (EMPAC) or CEPE websites:
  http://www.empac.eu/index.php/site/section/201
  http://www.cepe.org/epub/easnet.dll/ExecReq/Page?eas:template_im=100087&eas:dat_im=05043D
- New batches should be checked for manufacturing faults.

4.5 Kegs

- Care should be taken in handling kegs to minimise physical damage.
- On return to the brewery, badly damaged kegs should be removed from service.
- An audit of the integrity of the lining in aluminium kegs should be carried out on a regular basis, particularly those where external damage is evident.
- It is not advisable to refurbish aluminium containers and therefore kegs which show evidence of liner damage should be culled and replaced with kegs of stainless steel construction..

4.6 Casks

- Care should be taken in handling casks to minimise physical damage.
- Aluminium casks should only be washed with a detergent specially formulated for the purpose, rinsed and steamed. Aggressive chemicals should be avoided.
- On return to the brewery, all aluminium casks showing any sign of external damage to the body or the ports and old aluminium casks should be set aside.

Such casks should only be reused if internal inspection shows the internal liner to be intact.

- As a consequence of use, it is likely that older casks will suffer from greater deterioration of the internal liner and therefore it is recommended that the age of casks be ascertained. If no date indication is visible on the cask to accurately establish its age, it may be possible to retrieve this information with reference to the serial number of the cask and brewery purchase invoices. Alternatively, based on the knowledge or records of an individual brewery, it may be possible to ascribe an approximate age to a sub-population of casks.
- An ongoing inspection protocol should be established to internally examine the liner integrity of aluminium casks, using a light wand or other robust measure. Some suggested criteria for an internal audit plan are provided in Appendix 1 and example images of damaged and undamaged internal surfaces are given in Appendix 2.
- It is not advisable to refurbish aluminium containers and therefore casks which show evidence of liner damage should be culled and replaced with casks of stainless steel construction.
- No aluminium casks should be sold to another brewing or packaging company.
- Breweries should use best endeavours to phase out all aluminium casks over a period of 3-5 years. However, any undamaged aluminium casks that remain within the population both during and following this period should be subject to the observance of good practise in auditing, inspection and scrapping.
- A list of companies accredited for the correct scrappage of kegs and casks can be found using the following web link: http://www.beerandpub.com/industryArticle.aspx?articleId=131

4.7 Due Diligence Testing

- Beers of less than pH 3.5 that are packaged in aluminium containers should be subject to ongoing evaluation for aluminium content.
- Aluminium should be included in any monitoring of beers and brewing/dilution water.
- The BBPA will commission ongoing aluminium surveys.

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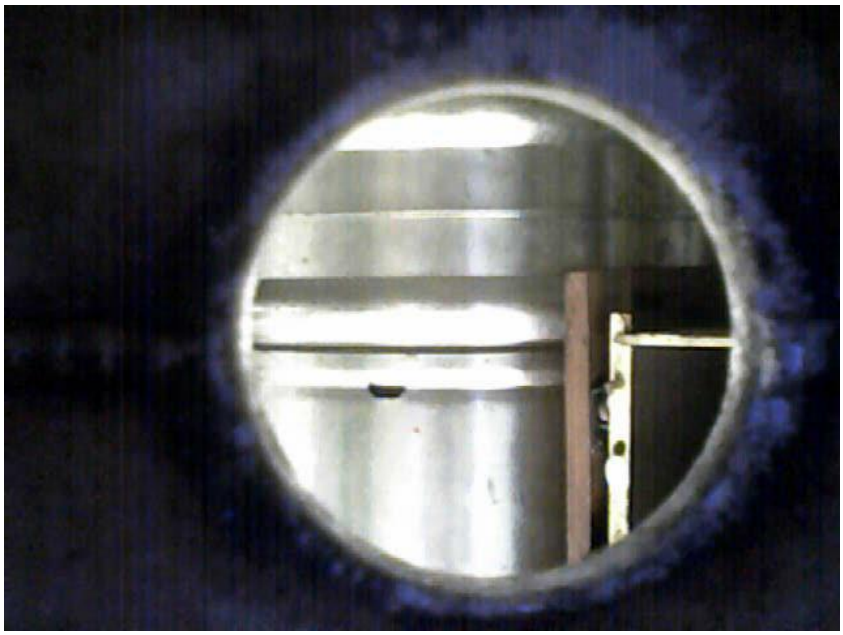
Appendix 1 – Suggested criteria for an internal inspection programme:

1. Container inspections should be conducted for both external damage and internal liner integrity
2. Containers with major external body deformities should be rejected
3. When conducting internal liner assessments the internal surface should be as dry as possible. This is necessary as light reflecting off water inside the cask can lead to the false identification of exposed aluminium.
4. When examining the internal surfaces of casks, particular attention should be paid to:
    - The shive/keystone areas.
    - The weld seams.
    - Any areas associated with external damage to the container.
5. Inspection of the internal surface around the shive/keystone area is particularly difficult using a torch. However, use of an alternative light source such as a flexible light wand or light stick may improve the inspection of the internal lining at this location.
6. Liner integrity should be categorised according to the level of damage eg “Good, Fair or Poor”. Auditors should reject casks with a “Poor” liner
7. It is important not to confuse physical damage to the container liner with build-up of deposits.

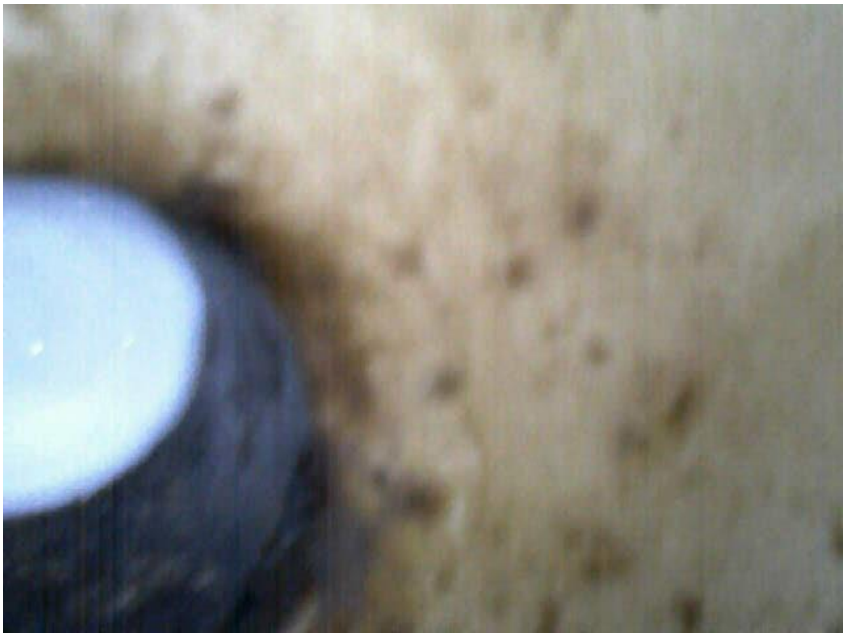
Appendix 2 – Example images of damaged and undamaged container surfaces

2(a) Inside Surface of Good Keg: no aluminium exposure

2(b) Inside Surface of Poor Cask: exposed aluminium



2(c) Internal Surface of Shive of Poor Cask: exposed aluminium



2(d) Internal Surface of Shive from Good Cask: no exposed aluminium

2(e) Internal Surface of Centre Weld Seam of Poor Cask: exposed aluminium