SLOVENSKI STANDARD
SIST EN 16773:2016

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Aluminij in aluminijeve zlitine - Smernica za proizvodnjo folijskega polizdelka za poltoge posode za živila

Aluminium and aluminium alloys - Guideline for the production of foil-stock in the field of semi rigid foodstuff containers

Aluminium und Aluminiumlegierungen - Leitfaden zur Fertigung von Folienvorwalzbändern für halbstarre Lebensmittelbehälter

Aluminium et alliages d'aluminium - Lignes directrices relatives à la fabrication de feuilles minces dans le domaine des récipients alimentaires semi-rigides

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 16773:2016) has been prepared by Technical Committee CEN/TC 132 “Aluminium and aluminium alloys”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2016, and conflicting national standards shall be withdrawn at the latest by July 2016.

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This standard gives indication on production’s practices to obtain rolled products with specific surface quality properties, necessary for the production of disposable food containers. It contains references to smell and cleanliness requirements of the rolled products, evaluation criteria linked to specific tests; furthermore it contains selection’s criteria for rolling oil and pre-lubricant to be used in the manufacturing process.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The European Regulation (EC) 1935/2004, regarding materials and objects intended to come in contact with foodstuff and abrogating Directives 80/590/EEC and 89/109/EEC at point 3, states:

“The principle underlying this Regulation is that any material or article intended to come into contact directly or indirectly with food must be sufficiently inert to preclude substances from being transferred to food in quantities large enough to endanger human health or to bring about an unacceptable change in the composition of the food or a deterioration in its organoleptic properties.”

Food containers represent a typical example of products often used in direct contact with food, for which reason they need to be produced in order to avoid particular smells and with an adequate level of “surface cleanliness” (which can otherwise adversely modify food organoleptic properties).

1 Scope

This European Standard provides a guideline about manufacturing practices for rolled products in the thicknesses range between ≥ 35 µm and ≤ 200 µm having surface quality characteristics essential for production of aluminium semi-rigid containers, lids and disposable platters which are used in contact with foodstuff.

This European Standard can be applied to the production cycle of the "rolled semi-finished goods". The European Standard cannot be applied to the production process of containers, lids and disposable platters.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 6886, *Animal and vegetable fats and oils - Determination of oxidative stability (accelerated oxidation test) (ISO 6886)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
tray
equivalent of disposable "single-use" containers intended to be used in contact with foodstuff, produced by aluminium rolled strip having a thickness in the range ≥ 35 to ≤ 200 µm, soft or partially annealed temper

Note 1 to entry: The strip is normally supplied pre-lubricated in order to allow drawing or stamping. The tray as finished good can have wrinkle or smooth walls.

3.2
lid
disposable aluminium rolled product used for container closure and based on plain foil or paper coupled (the side in contact with food will be the laminated one)

Note 1 to entry: It can close the container with mechanical seaming or by folding an adequate "L shaped" border.

3.3
platter
containers produced by aluminium rolled strip with platter shape, always used with disposable features

3.4
typical rolled strip smell
low intensity and constant through time smell, presenting small variations depending on various rolled aluminium manufacturers and the subjective olfactory perception

Note 1 to entry: For typical smells comparison reference test we can consider the pre-lubricant's smell as it is (with no definite odour), which resists to photo-oxidation processes and to temperature ranges comparable to the conditions existing during transport and storage of containers.

3.5
pungent rolled strip smell
smell clearly different from the typical one, with an intensity that can modify the perception of the food contained

Note 1 to entry: Typical examples are acrid, rancid or unpleasant smells (which may arise also after several months of storage period) or pleasant but intense odours which may modify the original food smell.

3.6
chemical degreasing
operation done in order to eliminate eventual unwanted substances on the rolled surface by acid or basic chemical reagents containing surfactants

3.7
lubricant
substance introduced to reduce friction between moving surfaces

3.8
pre-lubricant
technological adjuvant or processing aid to the drawing or forming process

3.9
rolling oil
oil lubrication-cooler used in the process of cold rolling

4 Pre-lubrication oils selection criteria for rolled semi-finished products

4.1 General

Depending on the final use of the semi-finished rolled product, the purchaser can ask for the foil to be supplied with a pre-lubrication layer. Such a layer is necessary for drawing or forming processes taking place normally through a male–female dies with deformation depth depending on the shape of the tray.

Consequently the stress on the material is a combination of the forming force, transmitted from the die to the material and the surface friction between die and metal.

Surface friction represents an important limit on the deformation possibilities because the breaking strength of the rolled material is limited and cannot assume higher values than the metal specific ones. Furthermore, the sliding between the die and the metal sheet leads to continuous die and metal sheet wearing. From this basis results the unavoidable necessity to use a pre-lubricant which has the following tasks:

— to establish a balance between friction reduction and the blank holder braking power;

— to ensure a film between metal sheet and dies in order to avoid grip between aluminium and tool;

— to minimize punches and matrix wearing;

— to uniform deformations distribution;

— to remove heat from the working area;

— to facilitate the detachment of the formed container from the die;

— to prevent corrosion of the formed part and the die.

4.2 Pre-lubricant selection criteria

In the production of food containers and their lids it is allowed to use pre-lubricant oil.

NOTE Some national regulations do not limit the maximum lubricant quantity per surface units but limits only the chemical features of the lubricant itself.

Oils and fats used as pre-lubricants, according to good manufacturing practice, should have an oxidation stability equivalent to a minimum of 100 h at a temperature of 100°C, determined by the method described in EN ISO 6886.

The lubricant selection shall be done among the following categories:

1) Paraffinic hydrocarbons of medicinal level type, either semi-solid (Vaseline) or liquid (Vaseline oil);

2) Synthetic and natural esters, obtained through reaction of natural acids and polyalcohols or by glycerines modification, or their mixtures. Synthetic esters are defined as esters of natural origin submitted to chemical processes of trans-esterification or re-esterification in order to eliminate unwanted compounds that can bring about negative features to the food they are in contact with. Basically these processes are essential to eliminate compounds easily oxidizable which may lead to the oil deterioration (going rancid).

3) Hydrocarbons mixtures mentioned at point 1 with esters mentioned at point 2 are allowed.

Pre-lubricants used shall not contain potentially allergenic substances.

In any case the producer choosing the pre-lubricant shall verify together with the manufacturer if there are additional limitations related to substances used in the specified product.

The quantity of pre-lubricant put on upper and lower surfaces of the rolled strip can vary according to the difficulty of the tray design; however, the maximum quantity applied should not be higher than 900 mg/m² as sum of the surfaces (maximum quantity used for particularly severe tray design).

5 Cleanliness and smell of rolled products

5.1 General

During Cold Rolling process usually are in use lubricant and cooling fluids, said rolling oils, generally constituted by hydrocarbons mixtures, normal- or iso-paraffin (with aromatic content < 0,05 %) with added mixtures of long chain alcohols (normally from C12 to C14) or methyl esters and/or fatty acids mixtures.

Such fluids are generally evaporated from the rolled strip during the heat treatment processes following the rolling.

The rolling oil quality management is very important for the production of rolled semi-finished products intended to be used in contact with food, both regarding fluids filtration and pollution of the rolling oil by the other service oils used for lubrication of mechanic components or for hydraulic system normally used in the rolling-mills. Service oils of compatible nature to rolling fluid should be used in order to prevent the risk of surface staining during the annealing process.

In order to get higher cleanliness level, a chemical degreasing treatment can be added as final working step of the manufacturing process. Such operation is normally obtained by washing the strip surface with water solutions based on acid or alkaline or surface-active degreasing agents, followed by rinsing it with demineralized water.

This degreasing step, when used, improves the rolled strip surface's cleanliness by means of the chemical and the hydro-mechanical effect. Normally few second of "Contact time" are sufficient. After