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AMILINE Rondo 4 casing

Process Operating Manual



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1. APPLICATION

This Process Operating Manual describes the process of production of sausages and hams packaged in the **AMILINE Rondo 4** casing.

A unique feature of the **AMILINE Rondo 4** casing is the innovative structure of its inside layer, which makes it possible to retain food colorants and organoleptic substances on the inside layer of the casing. During the thermal processing, the food colorants and organoleptic substances applied on the casing transfer to the food surface to impart to the product its distinctive taste and improve the appearance.

This smoke and color transfer from the casing to the meat product surface makes it possible to dispense with certain production process stages (such as smoking, roasting and coloring of the product surface), which means:

- lower production costs, since the above production stages are no longer required;
- shorter duration of the production process;
- higher product quality and food safety, because after the thermal processing the product remains inside the casing until its peeling and slicing;
- zero weight losses and high product yield.

AMILINE Rondo 4 is a multilayer casing made of polyamide, polyolefin and an adhesive (modified polyethylene) permitted for use in the food industry by the Russian Ministry of Health. The quality of the raw materials used for production of the **AMILINE Rondo 4** casing is confirmed by Russian and international quality certificates.

The **AMILINE Rondo 4** casing is manufactured in accordance with Specifications TU 22.21.29-048-27147091-2012 (identical to TU 2291-048-27147091-2012) and can be used for production, transportation, storage and sale of:

- cooked sausages and hams;
- processed cheese and other food products.

The **AMILINE Rondo 4** casing is intended for production of cooked sausages and hams that will be subjected to thermal processing and then peeled, sliced and re-packaged for sale.

The recommended shelf life of cooked sausages made in accordance with GOST R 52196-2011 in the **AMILINE Rondo 4** casing is 60 days at the storage temperature from 0 to 6 °C and the air relative humidity not higher than 75%.

2. PROPERTIES AND ADVANTAGES

AMILINE Rondo 4 is a multilayer plastic casing and therefore possesses all properties of such casings, the most important of which are:



- mechanical strength, which makes it possible to form the chubs with the use of high-capacity automatic or semi-automatic clippers to ensure stability of the shape and fixed weight of the chubs at high rates of forming;
- elasticity combined with heat shrinkability, which makes it possible to obtain sausage chubs with a smooth surface;
- low permeability to oxygen and water vapor ensured by a precisely selected combination of polymers, which provides for the following advantages of the **AMILINE Rondo 4** casing:
 - zero losses during the thermal processing and storage of meat and sausage products;
 - microbiological stability of the products during storage;
 - retardation of the oxidation processes that cause rancidification of fats and changes in the natural color of the meat product;
 - excellent selling appearance (no wrinkles) of the finished products throughout the shelf life.

AMILINE Rondo 4 has the following features:

- high caliber accuracy, which ensures the dimensional stability of the chubs along their lengths during the forming and after the thermal processing, and guarantees the uniform size of the slices and the fixed weight of the retail packages;
- the casing is easier to break in the longitudinal direction, which provides for its easy peeling from the product;
- the casing is readily moldable and can be used for production of molded food products.

The technical characteristics of the **AMILINE Rondo 4** casing can be found in the product specification and in TU 22.21.29-048-27147091-2012 (identical to TU 2291-048-27147091-2012).

3. ASSORTMENT

The following calibers of the **AMILINE Rondo 4** casing can be supplied: 45 – 160mm.

Casing colors: clear only.

The casing can be supplied in:

- rolls;
- shirred sticks.



4. CASING USE TECHNOLOGY

4.1. Storage and transportation of the casing

4.1.1. The casing must be stored in the original packing in dry, clean, and cool rooms compliant with the sanitary/hygienic standards for the meat processing industry, at a temperature from 5 to 35 °C and relative humidity of the air not more than 80%.

4.1.2. It is recommended to open the manufacturer's packing just immediately before processing of the casing.

4.1.3. During transportation and storage, the casing should not be exposed to high temperature or direct sunlight.

4.1.4. If the casing has been stored at a temperature below zero, then prior to use hold it at the room temperature for not less than 24 hours.

4.1.5. Never drop the boxes with casings or subject them to impacts.

4.1.6. Throughout the technological cycle it is important to protect the casing from damage.

4.1.7. Transport the casing so as to exclude exposure to temperatures exceeding +40 °C or direct sunlight.

4.2 Preparation of the casing for use

The casing **AMILINE Rondo 4** need no pre-soaking. If necessary, the outside surface of the casing may be wetted when the casing is already installed on the stuffing horn. This prevents the damage of the layer consisting of a colorant or organoleptic substance by water penetrating inside the tube.

The roll casing should be first cut into sections, then put over the horn. During the unwinding of the roll and cutting of the casing, avoid friction of the roll end and the casing surface against any uneven surfaces. Unwind the roll with the core positioned vertically.

4.3 Preparation of the batter

During the thermal processing the sausage emulsion inside the **AMILINE Rondo 4** casing does not lose moisture, therefore the calculation of the amount of water added to the stuffing at the stage of cutting shall be made with regard to the moisture resistance properties of the casing.

When sausages or hams are made in the **AMILINE Rondo 4** casing, it is recommended to reduce the added moisture by 10% of the batter weight, on the



average, as compared with the recipes for the natural, collagen, and viscose-reinforced casings.

4.4. Molding of sausage products

The **AMILINE Rondo 4** casing is intended for use on automatic or semi-automatic filling and clipping equipment, but may also be used for manual tying.

Never prick the chubs (perforate the casing). The casing will burst, if punctured.

In the production of traditional sausages, the overfilling relative to the nominal caliber may be from 5 to 15 %, depending on the product type and the stuffing equipment used for **AMILINE Rondo 4** casings.

When molded products are made, strive to fill the casing with the emulsion so as to exactly fit the caliber. In this case, provided that the casing caliber and the mold size have been selected correctly, the product will be distributed in the mold evenly, filling all corners and cavities, so as to exactly reproduce the inner shape of the metal mold after the thermal processing.

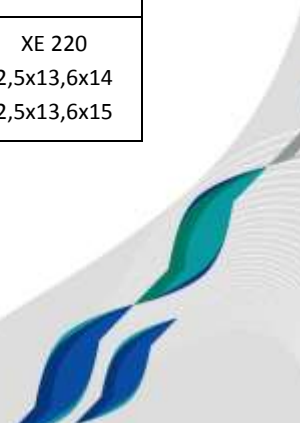
When sausage or ham sliceware is produced, it is recommended to make chubs with a length of at least 1 meter to reduce the product waste during the slicing.

The clips used must provide for secure holding of the chub ends without damaging the casing. To ensure the secure fastening of the clips, adhere to the recommendations on the use of the clips.

Table 1

Recommended clip types for the **AMILINE Rondo 4** casing

Caliber	POLY-CLIP		TIPPER TIE	TECHNOPACK		COMPO	CORUND
	Clip interval 12 interval 15 interval 18	Clip series S	Clip interval 12 interval 15 interval 18	Clip series E	Clip series G	Clip series B, BP	Clip
40-50	12-6-4×1.25 15-7-5×1.5 18-7-5×1.75	625 628 735	12/6-4×1.25 15/7-5×1.5 18/7-5×1.75	210 410	175	B 1, BP 2	XE210 2,5x13,6x14
55 - 60	15-7-5×1.5 15-8-5×1.75 18-7-5×1.75	628 632 735	15/7-5×1.5 15/8-5×1.75 18/7-5×1.75	210 410	175 370	B 2, BP 2	XE 210 XE 220 2,5x13,6x14
65-70	15-8-5×1.5 18-7-5×1.5 18-9-5×2.0	628 632 735	15/8-5×1.5 18/7-5×1.5 18/9-5×2.0	210 220 410	175 370	B 2, BP 2	XE 220 2,5x13,6x14 2,5x13,6x15



75-80	15-8-5×1.5 15-9-5×1.5 18-9-5×2.0	632 638 735 844	15/8-5×1.5 15/9-5×1.5 18/9-5×2.0	220 410 420	175 200 370	B 2, BP 2 B 3, BP 3	XE 220 2,5×13,6×15 2,5×13,6×16
85-100	15-9-5×1.5 15-10-5×2.0 18-9-5×2.0 18-10-5×2.5	740 844	15/9-5×1.5 15/10-5×2.0 18/9-5×2.0 18/10-5×2.5	220 420	200 370 390	-	XE 220 2,5×13,6×15 2,5×13,6×16
105-120	15-10-5×2.0 15-11-5×2.0 18-10-5×2.5 18-11-5×2.0	740 744 844	15/10-5×2.0 15/11-5×2.0 18/10-5×2.5 18/11-5×2.0	220 230 420	200 225 370 390	-	-
125-140	15-11-5×2.0 18-10-5×2.5 18-11-5×2.0	844 848	15/11-5×2.0 18/10-5×2.5 18/11-5×2.0	420 430	390 400	-	-
145-165	18-11-5×2.0 18-12-5×2.2	848 854	18/11-5×2.0 18/12-5×2.5	430	400	-	-

The POLY-CLIP FCA, TIPPER TIE TT1815 and COMPO KH-501 clippers use blocks, each of which corresponds to a certain clip type indicated in the Table. In order to determine whether the clip matches the block, see recommendations of the manufacturer and the technical description of the clipper.

4.5 Thermal processing

Thermal processing of sausages in the **AMILINE Rondo 4** casings consists in cooking and cooling. If necessary, the stage of drying can be added to the technological process after cooking, cooling and peeling before slicing and re-packaging.

Thermal processing of sausages and molded products can be made in heat chambers of various types.

4.5.1. Cooking

Sausage chubs in the **AMILINE Rondo 4 casing** with a significant length and a caliber up to 60mm can be cooked suspended, while the chubs of calibers over 60mm should be cooked lying down to ensure a uniform gauge along the entire length of the chub.

For uniform heating of all cooked hams in a batch, use molds of the same size and fill each mold with the same quantity of meat (by weight). This will ensure similar thermal processing conditions in all molds.

The duration of processing must always be determined by the consumption readiness of the product. To obtain products with a long shelf life, the temperature in



the core of the product must reach 71 ± 1 °C by the end of cooking, and must be held at that level for a period of 10–15 minutes.

When processing in heat chambers, it is recommended to use either staged cooking, or delta cooking. In either case, it is recommended to start cooking at a temperature of 50 – 55 °C to trigger the coloring reactions. A higher starting temperature may lead to stratification of the emulsion and color defects (grey rings).

Staged cooking consists in step-by-step raising of the temperature in the heat chamber, as the temperature in the center of the product reaches the temperature of the heating medium. The number of 'steps' is determined by the product diameter– the greater the gauge, the greater is the number of the steps. The first stages consist in heating at moderate temperatures – 50, 60, 70 °C to ensure slow coagulation of proteins and distribution of heat throughout the volume. The last stage is bringing of the product to cooking readiness (72 °C in the chub core during 10 - 15 minutes).

Delta cooking creates more favorable conditions for uniform heating of sausages. The difference between the chamber temperature and the product temperature in the beginning of the process is 15 – 20 °C, reducing to 5 - 8 °C by the end of the process. Delta cooking in production conditions requires a longer heating, but yields higher quality products. The duration of cooking depends on the cooking readiness point of the product (72 °C in the chub core during 10 - 15 minutes).

4.5.2. Cooling

Upon completion of the cooking process, the sausages must be immediately cooled. The first stage of cooling is spraying with cold water (time-delayed sprayers may be used) to bring the chub core temperature down to 25 - 35° C. After spraying, the sausages must be air-dried before putting them in a cold store.

Cold air cooling is undesirable. Exclude any exposure of the finished products to air drafts until complete cooling of sausages, because this may cause wrinkles on the surface.

To prevent an excessive temperature in the core of the product and overheating of the cooling chambers, the preliminary cooling should be achieved either by spraying, or immersion of the molds in cold water to bring the temperature in the core of the product down to 25 – 30 °C.

After preliminary cooling, the product should be left in the cooling chamber for at least 24 hours before removal from the mold, and at least 38 hours before sale, to ensure stabilization of the color and other sensory characteristics of the product.

Removal from the molds must be done only after complete cooling. The core temperature of the product must be 2 ± 2 °C.



If the product is not intended for slicing, then the casing should not be removed after cooking and cooling. The casing will serve as the transportation and storage packaging.

If the product is intended for slicing and re-packaging under vacuum or in a modified atmosphere, take care to prevent recontamination of the product during its manipulation.

4.6. Transportation and storage of sausages

Transportation and storage of sausage products manufactured with the use of the casing **AMILINE Rondo 4** shall be in accordance with the regulatory documentation for these products (GOST, TU).

Products packaged into the **AMILINE Rondo 4** casing and intended for slicing and re-packaging, must be dried before packaging and therefore should not be subjected to temperature drops that may cause the formation of condensate on the surface.

5 MANUFACTURER'S GUARANTEE

5.1. The Manufacturer guarantees conformity of the casing with the Specification requirements subject to compliance with the required conditions of transportation and storage at the user's warehouse, and preservation of the integrity of the original packing.

5.2. The shelf life of the casing is 3 years from manufacture to processing.

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