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Packaging Solutions

Casings AMIFLEX

AMIFLEX T-AM

Process Operating Manual

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1. APPLICATION

This Process Operating Manual describes the process of production, transportation, storage and sale of meat products (restructured hams in casings) with shapes different from the traditional shape of sausage chubs, produced in press molds, and packaged in the **AMIFLEX T-AM** casing.

AMIFLEX T-AM is a five-layer 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 **AMIFLEX T-AM** casing is confirmed by Russian and international quality certificates.

The recommended shelf life of the cooked hams packaged into the **AMIFLEX T-AM** casing is 60 days at a storage temperature from 0 to 6°C and air relative humidity not higher than 75%.

The distinctive features of the **AMIFLEX T-AM** casing that make it suitable for the modern production of restructured hams imitating whole-muscle products, with high yields, zero losses and long storage terms, are the following:

- enhanced adhesion of the casing to the stuffing mass;
- greater heat shrinkage in the machine and transverse directions, and better elasticity achieved through special parameters of biaxial orientation.

2. PROPERTIES AND ADVANTAGES OF THE AMIFLEX T-AM CASING

2.1. High mechanical strength of the casing makes it possible to mold 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 molding.

2.2. High elasticity of the casing combined with **enhanced heat shrinkage** makes it possible to accurately reproduce the required shape and obtain products with a smooth surface without wrinkles or folds.

2.3. Greater adhesion to the stuffing mass prevents separation of the casing from the product and, consequently, formation of water pockets throughout the period of storage of the product.

2.4. Low permeability to oxygen and water vapor is ensured by a precisely selected combination of polymers and provides for the following advantages of the **AMIFLEX T-AM** 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.

2.5. Physiological safety - the **AMIFLEX T-AM** casings are impervious to microbiological degradation, because the materials used for their production are inert to the action of bacteria and mold fungi. This facilitates storage of the casing and improves the hygienic characteristics of both the casing itself, and of the sausage production.

3. ASSORTMENT OF THE PRODUCTS

AMIFLEX T-AM casing calibers: 80 – 200 mm

Colors of the **AMIFLEX T-AM casing:** according to the Color Catalogue.

Casings in bespoke colors can be supplied.

The **AMIFLEX T-AM** casing can be used for single- or double-sided single-color, multicolor or CMYK printing with the use of UV-cured inks or inks based on volatile solvents.

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 (at a temperature from 5 to 35°C, and air relative humidity not more than 80%).

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

4.1.3. During storage and transportation, protect the casing against exposure to high temperatures (above 40°C) or direct sunlight.

4.1.4 If the casing was stored at a temperature below 0°C, then prior to use keep it in its original packing at room temperature for at least 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 damages.

4.1.7. Sheath transportation should be carried out at temperatures not exceeding +40 ° C, direct sunlight is not allowed.

4.2. Preparation of the casing for use

Preparation of the casing for stuffing depends on the method of molding of the ham products:

- if molding is to be performed without overstuffing of the casing relative to the nominal caliber, or with a minimal overstuffing, then pre-soaking is not required.

- if molding is to be performed with overstuffing relative to the nominal caliber, then pre-soaking is required to impart elasticity to the casing.

The **AMIFLEX T-AM** casing should be soaked in potable water at a temperature of 20 – 25°C. Water must penetrate the tube and wet both the outer and the inner surface of the casing.

Unshirred casings should be cut into sections of required length before soaking. Keep the spool vertical throughout the unwinding to avoid damaging the ends.

Soak shirred casings without removing the net.

Casing soaking time:

- not less than 30 minutes for casings cut into lengths;
- not less than 60 minutes for shirred casings.

If too much casing was soaked, remove it from water, drain the excessive water and leave the wet casing away from any sources of heat or air draft. On the next day, soak the casing again before processing.

Never soak the casing in hot water, because this may start a process of uncontrolled longitudinal and transverse shrinkage leading to reduction of the length and caliber of the casing.

4.3. Preparation of the batter

The batter is prepared in accordance with the relevant regulatory documents for the products.

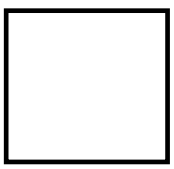
The **AMIFLEX T-AM** casing excludes any weight loss in the course of thermal processing, therefore the selected ham production process should not allow for appearance of jell-like pockets during the cooking. As a rule, the filling brine for hams produced in the **AMIFLEX T-AM** casing contains a large amount of moisture-binding additives, such as vegetable proteins, carrageenans, starch, and polyphosphates. The combination of such additives makes it possible to produce hams with a yield of up to 200%.

4.4. Molding of ham products

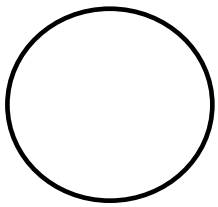
After processing in the curing tumbler, the meat mass is stuffed into the casing, put in the molds (mold frames or single-piece molds) and pressed.

The following guidelines apply to molding of ham products:

1. The main filling parameter is the weight, i.e. the quantity of the stuffing that goes into the mold of a preset size, and corresponds to the weight of the finished product.
2. The length of the casing put into the mold must be 10-15% longer than the length of the mold. If the casing length is too short, the chub ends will be rounded, which is undesirable, especially in the production of hams intended for slicing. If the casing is too long, folds may occur.
3. The caliber of the casing used must be in conformity with the mold size. The cross-sectional perimeter of the mold must be equal to that of the finished product.



Cross section of the mold



Cross section of the casing

Example of calculation.

If the cross section of the mold is sized 10 × 10 cm, then the perimeter of such cross section will be 10 + 10 + 10 + 10 cm = 40 cm.

The cross-sectional perimeter of the casing is equal to π × D = 40 cm (D – diameter of the casing, π = 3.14). D = 40/π = 12.7 cm = 127 mm.

Consequently, the casing required for this mold is the following:

- diameter 115 mm (filling with 10% overstuffing);
- diameter 121 mm (filling with 5% overstuffing);
- diameter 127 mm (loose filling without overstuffing);

A loose filling is possible with the brake ring slackened, or with a small empty section of the casing 'pulled back' from the location of the second clip, prior to fastening of that clip. Distribution of the emulsion throughout the volume of the casing facilitates a loose filling (achieved, as a rule, by using special clippers).

Loose filling makes it possible to evenly distribute the product in the mold, filling all corners and cavities. After the thermal processing, the casing will accurately reproduce the shape of the metal mold – the corners will be sharp, the edges clear-cut, the chub ends not rounded, and this shape will be preserved throughout the shelf life of the product. No pre-soaking is required for this type of filling.

Overstuffing is expedient when the product will not be used for slicing, and the shape of the chub ends is not important.

In all forms of the molding process it is important to exclude any voids, where jelly may form and the cohesion of the product may deteriorate. To preserve the desired shape of the product, the pressing stage must be as effective as possible. This will make the product monolithic and solid, and prevent disintegration into separate pieces after cooling and during the slicing.

When choosing a casing caliber one may use empirical data (table 2), but fine adjustment must be done at each company after buying molds or after changing the type of a casing used.

Table 1

Most widely used mold sizes and matching casing calibers

Mold	Size, mm	Casing flat width, mm	Nominal caliber, mm	Stuffing caliber, mm
Square	80 x 80	150 – 160	95 – 102	98 – 105
Square	100 x 100	180 – 190	115 – 121	118 – 123
Square	110 x 110	200 – 220	127 – 140	130 – 143
Rectangle	150 x 110	230 – 255	146 – 162	150 – 165
Rectangle	180 x 110	270 – 285	172 – 182	178 – 188
Rectangle	200 x 160	305 – 315	194 – 200	200 – 205

It is necessary to take into account the technical characteristics of the clipping equipment, such as the maximum allowable diameter of the chub and the clipping intervals. It is very important to select the correct size of the clip. The clip used must securely hold the chub ends and leave the casing intact. See the recommended use of clips to ensure the proper clipping (see Table 2).

Make sure there are no burrs on the equipment parts contacting the casing, to avoid any damage to the casing. Never puncture the chubs (perforate the casing). The casing will rupture, if punctured.

Recommended clip types

Table 2

Caliber	POLY-CLIP		TIPPER TIE	TECHNOPACK		COMPO	CORUND
	Clip interval 12 interval 15 interval 18	Clip S	Clip interval 12 interval 15 interval 18	Clip series E	Clip series G	Clip series B, BP	Clip
85-100	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	-	XE 220 2,5x13,6x15 2,5x13,6x16
105-120	15-9-5×1.5 15-10-5×2.0 18-9-5×2.0 18-10-5×2.5	740 744 844	15/9-5×1.5 15/10-5×2.0 18/9-5×2.0 18/10-5×2.5	220 220 420	200 370 390	-	-
125-140	15-10-5×2.0 15-11-5×2.0 18-10-5×2.5 18-11-5×2.0	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	-	-
145-170	18-11-5×2.0 18-12-5×2.2	848 854	18 /11-5×2.0 18/12-5×2.5	430	400	-	-

Note: The POLY-CLIP FCA and TIPPER TIE TT1815, TT1512 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

The **AMIFLEX T-AM** casing is designed for products not subjected to smoking. Thermal processing of hams in the **AMIFLEX T-AM** casing consists in cooking and cooling. The stages of drying and roasting can be excluded from the technological process.

Thermal processing of the molded products can be carried out in universal heat chambers (when mold frames are used), or in stationary cauldrons (when single-piece molds are used).

The following guidelines apply to cooking:

- 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;

- regardless of the boiling method, the duration of processing must always be determined by the cooking 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.

4.5.1. Cooking

Cooking at a constant temperature (cooking in stationary cauldrons) is suitable for single-piece molds and a small production volume. In this case the temperature of the heating medium remains constant from the beginning to the end of thermal processing. A disadvantage of this method consists in overheating of the outer layers in the product.

Cooking at a growing temperature is suitable for thermal processing of hams in mold frames placed into universal heat chambers. There are two methods: staged cooking, and delta cooking. In either case, cooking should start from a temperature of

50 – 55 °C to trigger the coloring reactions. Higher starting temperatures may cause color defects.

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 'stages' is determined by the product diameter– the greater the caliber, the greater is the number of the stages. The first stages consist in heating at moderate temperatures – 50, 60, 70 °C to ensure slow coagulation of proteins and redistribution of heat throughout the volume. The last stage is bringing of the product to consumption readiness.

Delta cooking creates more favorable conditions for uniform heating of sausages. The temperature in the chamber gradually increases in parallel with the increase of the temperature in the product core, with preservation of a certain difference (Δ). The optimal Δ value is 20 – 25°C. In the end of the process the chamber temperature remains steady, having reached a certain value. Delta cooking in production conditions requires a longer heating, but yields higher quality products.

4.5.2. Cooling

This stage of thermal processing has a significant effect on the characteristics of the finished product (yield, shape, structural cohesion of the product).

After completion of the cooking process, the product must be immediately cooled.

To prevent an excessive temperature in the core of the product and overheating of the cooling chambers, the preliminary cooling of hams 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.

Immediately upon 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.

Unlike molded ham produced without any casing, the encased hams can be extracted from the molds without pre-heating of the molds with hot water.

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 repackaging under vacuum or in a modified atmosphere, take care to prevent recontamination of the product during its manipulation.

4.6. Transportation and storage of products

Transportation and storage of products manufactured with the use of the **AMIFLEX T-AM** casing shall be in accordance with the regulatory documentation for these products.

Products packaged into the **AMIFLEX T-AM** casing and intended for slicing and repackaging, 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 GUARANTEES

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 **AMIFLEX T-AM** casing without printing is 3 years from manufacture.

5.3. The shelf life of the **AMIFLEX T-AM** casing with UV-printing is 2 years from manufacture.

6. APPENDICES

6.1. No appendices in this document.

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