



ATLANTIS-PAK

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Packaging Solutions

CASINGS

AMIFLEX Optima

Process Operating Manual



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1. APPLICATION

The present Process Operating Manual describes the process of production of cooked sausages with the use of **AMIFLEX Optima** casing.

AMIFLEX Optima is a multilayer casing made of polyamide, polyolefin, and an adhesive (modified polyethylene) permitted for use in the food industry. The quality of the raw materials used to manufacture the **AMIFLEX Optima** multilayer casing is confirmed by Russian and international quality certificates.

The **AMIFLEX Optima** casing can be used for production, transportation, storage and sale of:

- traditional cooked sausage and ham products;
- blood and liver sausages, and spreads;
- souse, aspic, and jellied products;
- processed cheeses;
- other food products.

A distinctive feature of **AMIFLEX Optima** is its selective permeability to smoke: under the conditions of wet smoking, this casing is permeable to certain fractions of the process smoke, which imparts to the products the smoke flavor and taste.

The **AMIFLEX Optima** casing is designed for production of cooked sausages, as well as semidry sausages with a high mass content of residual moisture.

The **AMIFLEX Optima** casing is intended for products sold in retail trading in the form of whole chubs.

The recommended shelf life for cooked and semidry sausages made in the **AMIFLEX Optima** casing is not more than 60 days at a temperature from 0 to 6°C, and relative humidity of the air not more than 75-78%.

2. ADVANTAGES

AMIFLEX Optima is a multilayer barrier casing and, therefore, has all properties of such casings, the most important of which are the following:

- **mechanical strength**, which makes it possible to mold chubs with the use of high-capacity automatic and semi-automatic clippers to ensure stability of the shape and fixed weight of the chubs at high rates of molding.

- **heat-shrinkage**, which provides for no wrinkles on the finished sausage products.

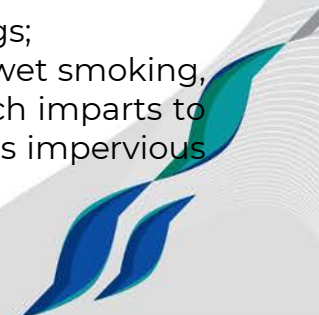
- **low permeability to oxygen and water vapor**, which provides for zero losses during the thermal processing and storage of meat and sausage products, microbiological stability of the products during storage, retardation of the oxidation processes leading to rancidification of fats and changes in the natural color of the meat product, excellent selling appearance (no wrinkles) of the finished products throughout the shelf life.

- **physiological safety** due to the fact that the **AMIFLEX Optima** casing is impervious to microbiological degradation, because the materials used for its production are inert to the action of bacteria and mold fungi.

The **AMIFLEX Optima** is distinguished among other multilayer barrier casings by the following features:

- matte appearance, which makes it similar to collagen casings;

- **selective permeability to smoke**. Under the conditions of wet smoking, this casing is permeable to certain fractions of the process smoke, which imparts to the products the smoke flavor and taste. The **AMIFLEX Optima** casing is impervious



to water vapor, therefore the product preserves moisture during the thermal processing and no crust is formed on the product surface.

3. ASSORTMENT OF PRODUCTS

There are two variants of the casing: **AMIFLEX Optima** and **AMIFLEX Optima-C**

Calibers of the casing: 29 – 120 mm.

Casing colors: according to the Color Catalogue.

The casing can be used for double-sided UV printing, with edge-to-edge printing as an option. Printing is applied by the flexographic method; the inks are resistant to boiling, fats, and mechanical damage.

The casing can be supplied in:

- rolls;
- shirred sticks.

The **AMIFLEX Optima** casing can be supplied in R2U shirred sticks. This option is obtained with the surface of the casing being covered with a special solution. R2U-option is not available for the casing with UV-printing. R2U-option is not available for the **AMIFLEX Optima-C** casing.

4. CASING USE TECHNOLOGY

4.1. Storage and transportation of casing

4.1.1 The casing must be stored in its original packing in dry and clean rooms (at a temperature from 5 °C to 35 °C, and air relative humidity not higher than 80%) complying with the sanitary and hygienic standards applicable to the meat processing industry.

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

4.1.3 During storage and transportation, do not expose the casing 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 at room temperature during at least 24 hours in the manufacturer's packing.

4.1.5 Never drop the cases containing the casing or subject them to impacts.

4.1.6 The casing must not be damaged throughout the technological cycle.

4.2. Preparation of the casing for use

In order to impart elasticity to the casing and provide for a uniform filling, the **AMIFLEX Optima** casing must be pre-soaked. Soak in potable water with a temperature of 25-30°C.

Take care to ensure that the water penetrates inside the tube and that both the outer and the inner surfaces of the casing are wetted.

Unshirred casings must 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 60 minutes for casings cut into lengths;
- not less than 90 minutes for shirred casings.



4.3. Preparation of the stuffing

In the process of thermal processing, the sausage batter inside the **AMIFLEX Optima** casing does not lose moisture, therefore the calculation of the amount of water added to the batter at the stage of cutting shall be made on the basis of the moisture resistance properties of the casing.

Considering that the **AMIFLEX Optima** casing is impervious to water vapor and there is no loss of moisture during the thermal processing and storage, it is recommended to reduce the added moisture by 10% of the batter weight, as compared with the recipes for the natural, collagen, and viscose-reinforced casings.

For the development of new recipes, determine the quantity of the added moisture with regard to the moisture-retaining properties of the additives (emulsifiers, stabilizers, gelling agents, plant proteins, etc.), the raw meat quality, and the technical condition of the equipment, paying special attention to optimal binding of proteins, fats, and water.

All technological measures aimed at increased binding of water (raising of the yield) lead to raising of the pressure in the batter during the thermal processing. Batter with an elevated percentage of meat substitutes tends to swell more. This must be taken into account. In order to preserve the batter's ability to bind significant amounts of water and to prevent rupture of the casing during the thermal processing, it is recommended to introduce all additives into the cutter not in a dry form, but in the form of jellies or emulsions.

4.4. Molding of sausage products

AMIFLEX Optima is intended for use on automatic or semi-automatic filling and clipping equipment.

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

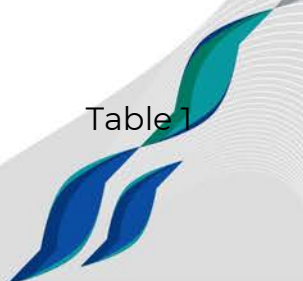
To ensure a good appearance of the finished product, increase the holding capacity of the casing, and to reduce the risk of water and fat pockets, it is recommended to overstuff:

- the **AMIFLEX Optima** casing with emulsion by **10%** relative to the nominal caliber.
- the **AMIFLEX Optima-C** casing with emulsion by **20-25%** relative to the nominal caliber.

During the molding it should be borne in mind that the difference between the nominal caliber of the casing and the stuffed caliber depends not only on the properties of the casing, but also on the emulsion consistence and temperature, the stuffing pressure, and the conditions of cooling after thermal processing. Thus, if the emulsion has a high binding or swelling ability, it is recommended to somewhat reduce the percentage of overstuffing relative to the nominal caliber.

The clip must securely hold the ends of the chub, without damaging the casing. Observe the recommendations of the clipping equipment manufacturer to ensure tightness of clipping. See the recommendations on selection of the clips for **AMIFLEX Optima** in Table 1.

Table 1



Recommended clip types for **AMIFLEX Optima** casings

Caliber	POLY-CLIP		TIPPER TIE	TECHNOPACK		COMPO	CORUND
	Clip interval 15 interval 18	Clip series S	Clip interval 15 interval 18	Clip series E	Clip series G	Clip series B, BP	
35 - 40	15-7-5×1.5 18-7-5×1.75 15-8-5×1.75	625 628 735	15 /7-5×1.5 18 /7-5×1.75 15 /8-5×1.5	210 220 410	175 370	B 1, BP 2	XE210 XE 220 2.5x13.6x14
45 - 50	15-7-5×1.5 15-8-5×1.75 18-7-5×1.5	628 735	15 /7-5×1.5 15 /8-5×1.5 18 /7-5×1.75	210 220 410	175 370	B 2, BP 2	XE 210 2.5x13.6x14
55 - 60	15-7-5×1.5 15-8-5×1.75 18-7-5×1.5	628 632 735	15 /7-5×1.5 15 /8-5×1.75 18 /7-5×1.75	210 220 410	175 370	B 2, BP 2	XE 220 2.5x13.6x14 2.5x13.6x15
65 - 70	15-8-5×1.5 18-7-5×1.5	628 632 735	15 /8-5×1.75 18 /7-5×1.75	220 410	175 370	B 2, BP 2	XE 220 2.5x13.6x15
75 - 80	15-9-5×1.75 18-9-5×2.0	632 638 735 844	15 /9-5×1.75 18 /9-5×2.0	220 410	175 200 370	B2, BP 2 B3, BP3	XE 220 2.5x13.6x15 2.5x13.6x16
85 - 100	15-10-5×2.0 18-9-5×2.0 18-10-5×2.5	740 844	15 /10-5×2.0 18 /9-5×2.0 18 /10-5×2.5	220 420	200 370	-	XE 220 2.5x13.6x15 2.5x13.6x16
105- 120	15-10-5×2.0 15 -11-5×2.0 18-11-5×2.0 18-12-5×2.2	740 744 844	15 /10-5×2.0 15 /11-5×2.0 18 /10-5×2.5 18 /12-5×2.5	220 230 420	200 225 370 390	-	-

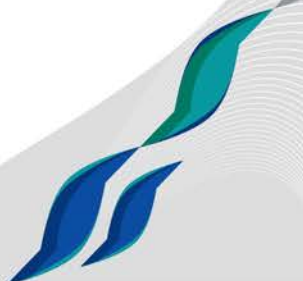
For all types of clippers, blocks are used, each of which corresponds to a certain clip type indicated in the Table. In order to determine whether the clip matches the block, see recommendations of the manufacturer and the technical description of the clipper.

4.5. Thermal processing

Selective smoke permeability of the **AMIFLEX Optima** casing means that under the conditions of elevated humidity and temperature, the **AMIFLEX Optima** casing will be permeable to the dissolved fractions of the process smoke, which ensure the sausage taste and flavor. Under the conditions of wet smoking there is no coloring or crust formation on the sausage surface. Thus, smoking of sausages in the **AMIFLEX Optima** casing is regarded not as a method of preservation of the product, but as a way to impart aromas to the casing and sausage surface.

Thermal processing of cooked, and semidry sausages in the **AMIFLEX Optima** casing can be performed in heat chambers of different types, by the best results are achieved in programmable heat chambers.

Thermal processing of sausages in the **AMIFLEX Optima** casing consists of the following stages:



- heating at moderate temperatures (45-50 °C) to provide for a slow coagulation of proteins and redistribution of temperature throughout the volume;
- drying at a temperature of 55-60 °C and relative humidity of 15-20% for evaporation of moisture off the surface of the casing to facilitate diffusion of the smoke substances into the product;
- wet smoking (cooking with smoke) at a temperature of 65-75 °C and a relative humidity of 60-85%;
- cooking until ready for consumption (72 °C in the product core, during 10-15 minutes);
- cooling (spraying with cold water to reduce the temperature in the chub core to 25-35 °C. After the spraying the sausages must be air-dried before going into the cold store.

Each manufacturer should choose its own thermal processing mode, with regard to the heat chambers used, the caliber of the casing and the emulsion type.

The following is an example of thermal processing of cooked sausage in the **AMIFLEX Optima** casing caliber 65 in a RexPol heat chamber.

Table 2

Process stage	Temperature, °C	Time, minutes	Actual humidity, %
Drying	50	20	25
Cooking 1 (with smoke)	55	20	60
Cooking 2 (with smoke)	65	20	65
Cooking 3	78	Until ready for consumption	75
Total time		130 minutes	

4.6. Maturing of sausages

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

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 casing without UV-printing is 3 years from manufacture subject to compliance with these Specifications.

5.3 The shelf life of the casing with UV-printing is 2 years from manufacture subject to compliance with these Specifications.

5.4 The shelf life of the casing with an R2U option is 6 months from manufacture subject to compliance with these Specifications.



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