



**ATLANTIS-PAK**

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## **EXTRAFLEX CASING**

Process Operating Manual



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## 1. APPLICATION

This Process Operating Manual describes the process of production of cooked sausage and ham products, as well as spreads and liver sausages with the use of the **EXTRAFLEX and EXTRAFLEX Ko casings**.

The **EXTRAFLEX and EXTRAFLEX Ko** casings are multilayer plastic casings 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 **EXTRAFLEX and EXTRAFLEX Ko** multilayer casings is confirmed by Russian and international quality certificates.

The **EXTRAFLEX and EXTRAFLEX Ko** casings are made and designed for production, transportation, storage and sale of:

- cooked sausages and ham products;
- blood and liver sausages, and spreads;
- brawns, aspic and jellied products;
- processed cheeses;
- food animal fats, margarines, and sour milk products (sour cream, cottage cheese);
- frozen products (sausage and meat emulsions, ice cream)
- other food products.

The distinctive feature of the **EXTRAFLEX and EXTRAFLEX Ko** casings is the striking appearance imitating the look of viscose-reinforced casings due to the unique structure of the casing surface.

The recommended shelf life for cooked sausages made in the **EXTRAFLEX and EXTRAFLEX Ko** casings is 60 days at a temperature from 2 to 6 °C and air relative humidity not higher than 75%.

## 2. PROPERTIES AND ADVANTAGES OF THE CASING

The **EXTRAFLEX and EXTRAFLEX Ko** are multilayer barrier casings possessing all properties of such casings, the most important of which are the following:

- **mechanical strength**, which 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.
- **high elasticity**, which provides for possibility of a significant overstuffing relative to the nominal diameter of the casing, and, in combination with the **heat-shrink properties**, ensures the absence of wrinkles on the finished sausage products.
- **high heat resistance** of the **EXTRAFLEX and EXTRAFLEX Ko** casings, which significantly extends the utilization temperature range in comparison with natural, cellulose and collagen casings.



- **low permeability to oxygen and water vapor** ensured by the careful selection of polymers, which provides for the following advantages of the **EXTRAFLEX** and **EXTRAFLEX Ko** casings:

- 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.

- **physiological safety**, ensured by the fact that the **EXTRAFLEX** and **EXTRAFLEX Ko** 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.

The **EXTRAFLEX** casing is distinguished by controlled (spiral) peelability.

The **EXTRAFLEX** and **EXTRAFLEX Ko** casings differ from other multilayer barrier casings by their striking appearance imitating the texture of viscose-reinforced casings, which may serve as a distinctive feature of a whole class of sausages, and create a corporate style.

The casing is supplied straight or ring-shaped, which makes it possible to widen the assortment of the products through diversification of the shapes of sausages (rings, half rings, festoons).

### 3. ASSORTMENT OF THE PRODUCTS

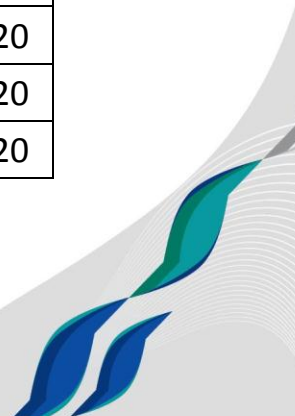
Calibers supplied:

- **EXTRAFLEX** casing: 32 - 120 mm;
- **EXTRAFLEX Ko** casing: 32 - 51 mm.

The ring-shaped **EXTRAFLEX Ko** casing can be supplied as rings of various diameters (see Table 1).

Table 1

Caliber of casing, mm	Diameter of the sausage chub ring, cm				
	7 - 9	10 - 12	12 - 13	14 - 17	17 - 20
32 - 35					
36 - 42		10 - 12	12 - 13	14 - 17	17 - 20
43 - 51			11 - 14	14 - 17	17 - 20



Colors of the **EXTRAFLEX** and **EXTRAFLEX Ko** casings: clear, brown, red, gold, light gold, bronze. Bespoke colors are an option.

The casing can be used for single- or double-sided multicolor or CMYK printing with inks based on volatile solvents.

The ring-shaped casing can be printed on the internal, external, or lateral surface of the ring. The customer must specify the location of the marking in the order.

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%) conforming to the sanitary-hygienic standards for the meat processing industry.

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.

### 4.2. Preparation of the casing for use

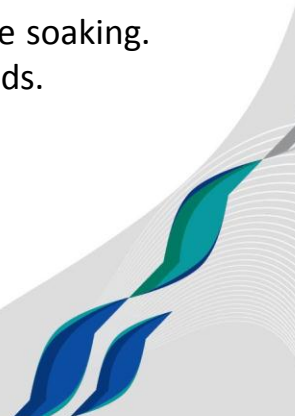
To provide for elasticity and uniform stuffing, the **EXTRAFLEX** and **EXTRAFLEX Ko** casings must be pre-soaked in potable water with a temperature of 20 - 25°C. The use of higher temperatures will cause an uncontrolled heat shrinkage of the casing and reduction of its length and caliber.

Take care to ensure that the water penetrates inside the tube and wets not only the outer, but also the inner surface of the casing.

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 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.

### 4.3. Preparation of the emulsion

During the thermal processing the sausage batter inside the **EXTRAFLEX and EXTRAFLEX Ko** casings 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.

When sausages are made, 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.

In 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. In order to preserve the ability of the batter to bind significant amounts of water and to prevent rupture of the casing during the thermal processing, it is recommended to introduce all water-binding additives into the cutter not in a dry form, but in the form of jellies or emulsions.

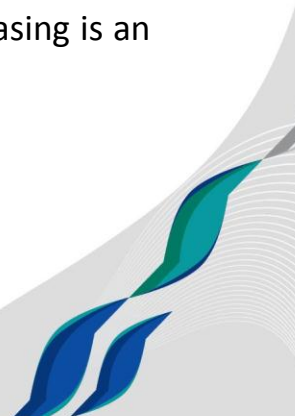
The batter for hams must be prepared in accordance with the regulatory documentation applicable to these products.

### 4.4. Molding of sausage products

The **EXTRAFLEX and EXTRAFLEX Ko** casings are designed for automatic or semi-automatic stuffing and clipping equipment, but they can also be manually tied.

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

The ratio between the stuffed caliber to the nominal caliber of the casing is an important factor for the correct use of the casing.



The **EXTRAFLEX** and **EXTRAFLEX Ko** casings should be filled with the sausage emulsion with **12 – 15%** overstuffing. E.g., when the diameter 60 mm casing is used, the recommended stuffed caliber should be 67 - 69 mm.

The recommended overstuffing relative to the nominal caliber may, however, be somewhat reduced or increased depending on the batter consistence and temperature, the stuffing pressure, and the conditions of cooling after thermal processing. E.g., if the batter has a good binding ability or swelling capacity, it is recommended to reduce overstuffing of the casing relative to the nominal caliber to avoid rupture.

For production of spreads, when the emulsion is liquid and its temperature exceeds 40 °C, overstuffing relative to the nominal caliber should be increased by 3 – 5% in excess of the recommended value.

Compliance with these recommendations ensures a good appearance of the finished products, increases the holding capacity of the casing, and reduces the risk of water or fat pockets.

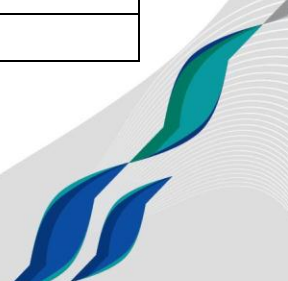
When using shirred casings, make sure that the stuffing horn diameter is appropriate for the inner diameter of the shirred stick: the stick must freely fit the stuffing horn, and the difference between the inner diameter of the stick and the outer diameter of the horn must be as small as possible to mitigate any structural changes in the batter matrix.

Table 2

Diameter of the Extraflex Ko casing, mm	Shirring tube diameter, mm	Recommended outer diameter of the stuffing horn, mm
32 – 34	21	18
35 - 39	24	18, 20
40 - 42	26	20, 22
43 - 46	28	22, 24
47 - 57	32	24, 28

Table 3

Diameter of the Extraflex casing, mm	Shirring tube diameter, mm	Recommended outer diameter of the stuffing horn, mm
32 - 34	24	18, 20
35 - 37	26	20, 22
38 - 44	28	22, 24



45 - 53	32	24, 28
54 - 69	40	28, 36
70 - 79	52	36, 48
80 - 87	61	48
88 - 99	71	60
100 - 120	81	60

The ring-shaped **EXTRAFLEX Ko** casing is processed with the use of automatic and semi-automatic clippers equipped with a string feeder and a special receiver tray for the sausage rings. The string length between the sausage ends is adjusted by means of the string feeder. However, if the string feeder is not included in the standard delivery set, this should not be a problem for processing of the ring-shaped casings. The string can be fed manually.

When manual clippers are used, the string is fed into the clipper working zone from the side of the shirred stick and clipped together with the casing.

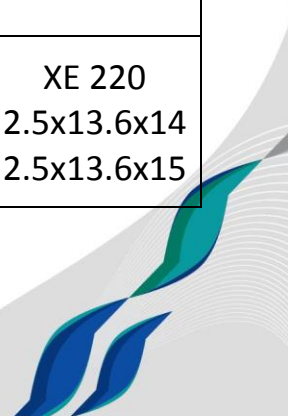
When the casing is put over the horn, it must be positioned in such a way as to prevent the resulting rings twisting into the working parts of the clipper, and to guide them into the receiver tray.

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 Table 5 for recommendations on selection of the clips.

#### Recommended clip types

Table 5

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	
32 - 40	15-7-5×1.5						XE210 XE 220 2.5x13.6x14
	18-7-5×1.75	625	15 /7-5×1.5	210	175	B 1, BP 2	
	15-8-5×1.75	628	18 /7-5×1.75	220	370		
		735	15 /8-5×1.5	410			
45 - 50	15-7-5×1.5						XE 210 2.5x13.6x14
	15-8-5×1.75	628	15 /7-5×1.5	210	175	B 2, BP 2	
	18-7-5×1.5	735	15 /8-5×1.5	220	370		
			18 /7-5×1.75	410			
55 - 60	15-7-5×1.5						XE 220 2.5x13.6x14 2.5x13.6x15
	15-8-5×1.75	628	15 /7-5×1.5	210	175	B 2, BP 2	
		632	15 /8-5×1.75	220	370		
		735	18 /7-5×1.75	410			



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 2.5×13.6×15
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	B 2, BP 2 B3, BP3	XE 220 2.5×13.6×15 2.5×13.6×16
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 2.5×13.6×15 2.5×13.6×16
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	-	-

Note: The POLY-CLIP FCA, TIPPER TIE TT1815, TT1512, SVF 1800 и COMPO CN-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

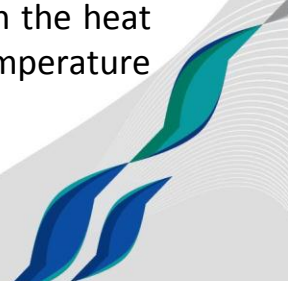
Thermal processing of sausages in the **EXTRAFLEX** and **EXTRAFLEX Ko** casings consists in cooking and cooling. The stages of drying and roasting can be excluded from the technological process.

Thermal processing of sausages can be made in heat chambers of various types, or in stationary boiling cauldrons.

##### 4.5.1. Cooking

For the purposes of thermal processing in heat chambers, it is recommended to use either staged cooking, or delta cooking. In either case, cooking should start at a temperature of 50-55°C to trigger the coloring reactions. Higher starting temperatures may cause separation 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 '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 (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 at 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 consumption readiness point of the product (72 °C in the chub core, during 10 - 15 minutes).

The following is an example of thermal processing for 60mm caliber sausage chubs:

- 55 °C in a heat chamber at 100% humidity - 25 minutes.
- 65 °C in a heat chamber at 100% humidity - 25 minutes.
- 75 °C in a heat chamber at 100% humidity - 35 minutes, or until 60 °C in the chub core is reached.
- 80 °C in a heat chamber at 100% humidity until 72 °C in the chub core is reached.

For cooking in cauldrons, it is recommended to:

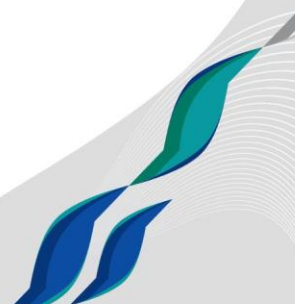
- load the chubs in the water at the temperature of 55 – 60°C, in order to prevent the uncontrollable shrinkage and deformation of the chubs;
- keep the sausages underwater, and move them for uniform cooking;
- before loading each new batch of sausages, reduce the water temperature in the cauldron to 60°C.

#### 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 sausage must be air-dried before putting it into a cold store.

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

#### 4.6. Transportation and storage of sausage products



Transportation and storage of sausage products manufactured with the use of the **EXTRAFLEX** and **EXTRAFLEX Ko** casings 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 is 3 years from manufacture.

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