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Casings dyplex

DYPLEX R-a

Process Operating Manual

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1. APPLICATION

This Process Operating Manual describes the process of production of sausages with the use of the **DYPLEX P-a** casing.

The **DYPLEX P-a** is a multilayer casing made of polyamide, polyolefin, and an adhesive (modified polyethylene) duly approved for contact with food products. The quality of the raw materials used for production of the **DYPLEX P-a** multilayer casing is confirmed by Russian and international quality certificates.

The **DYPLEX P-a** casing is made in accordance with TU 2291-054-27147091-2013 and is intended for production, packaging, storage and sale of all types of semi-smoked, cooked-and-smoked, and cooked sausages made by technologies that involve smoking (smoke-roasting).

The distinctive features of **DYPLEX P-a** are:

- dynamic permeability, which consists in a substantial increase in the WVTR and the OTR of the casing (up to the level of permeable casings) at temperatures above 60 °C, and a dramatic reduction of the WVTR and the OTR (down to the level of barrier casings) at the temperature of 0-6 °C;
- enhanced mechanical strength, which makes the casing suitable for processing on high-capacity automatic equipment;
- rough texture of the outer layer, which makes the casing similar to viscose-reinforced casings.

The **DYPLEX P-a** casing is intended for products sold at retail outlets as whole chubs.

The recommended shelf life for cooked sausages in the **DYPLEX P-a** casing is not more than 60 days at a temperature between 0 and 6 °C with the air relative humidity not exceeding 75 - 78 %.

The recommended shelf life for semi-smoked or cooked-and-smoked sausages in the **DYPLEX P-a** casing is not more than 60 days at a temperature between 0 and 6 °C with the air relative humidity not exceeding 75 - 78 %.

2. PROPERTIES AND ADVANTAGES

The **DYPLEX P-a** is a multilayer barrier casing and, as such, possesses all advantages of such casings, the most important of which being the following:

- **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.

- **heat shrinkability,** which provides for an attractive appearance of the products, above all, no wrinkles on the finished sausage products.

- physiological safety, ensured by the fact that the **DYPLEX P-a** casing is impervious to microbiological degradation, because the materials in its formula are proof to bacteria and mold fungi.

DYPLEX P-a is distinguished from other multilayer barrier casings by its property of ***dynamic smoke permeability.*** Dynamic permeability of the **DYPLEX P-a** casing makes it possible to offer products with the traditional sensory characteristics (the smoke taste and flavor), and at the same time to achieve zero weight losses and microbiological stability of the products during an extended storage period, comparable to the shelf life of products in barrier casings.

See the technical characteristics of various types of the **DYPLEX P-a** casing in the Product Specifications and in TU 2291-054-27147091-2013.

3. ASSORTMENT

Dyplex P-a	rough casing (imitation of viscose-reinforced casings); overfilling ratio 10%	35-80 mm

The **DYPLEX P-a** casing can be used for single-color, multi-color or CMYK printing with inks based on volatile solvents.

The forms of supply are reels or sticks of shirred casing.

4. HOW TO USE THE CASING

4.1. Storage and transportation of the casing

4.1.1. The casing must be stored in its original packing in dry and clean rooms (at the temperature from 5 °C to 35 °C with the air relative humidity not exceeding 80%) compliant with the sanitary and hygienic standards applicable to 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. Never stack casing reels without spacers between the reel ends.

4.1.4. During storage and transportation, the casing should not be exposed to high temperatures or direct sunlight. Transportation of the casing must be made at a temperature not exceeding 40 °C.

4.1.5. If the casing was stored at a subzero temperature, then prior to use hold it in its original packing at room temperature for not less than 24 hours.

4.1.6. Never drop the boxes containing the casing or subject them to impacts.

4.1.7. Throughout the technological cycle of production, take care to avoid damage of the casing. Especially damaging is contact with various burrs, uneven or rough surfaces, etc.

4.2. Preparation for processing

To impart elasticity to the casing and provide for its uniform stuffing, the **DYPLEX P-a** casing must be pre-soaked. Soak in potable water (SanPiN 2.1.4.1074-01 'Potable Water. Hygienic Requirements for the Quality of Water in Centralized Potable Water Supply Systems. Quality Control') with the temperature of 25-30°C.

Take special care to ensure that water penetrates inside the tube to wet 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 reel vertical throughout the unwinding to avoid damaging the ends.

Soak shirred casings without removing the net.

Pre-soaking time:

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

4.3. Forcemeat composition

During the thermal processing the sausage forcemeat inside the **DYPLEX P-a** casing loses from 0.5 to 1% of moisture, therefore the quantity of water to be added to the forcemeat at the stage of cutting shall be determined with regard to this property of the casing.

When new recipes are developed, 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 the yield) lead to a growth of the pressure in the forcemeat during the thermal processing. Forcemeats with an elevated percentage of meat substitutes tend to swell more. In order to preserve the forcemeat'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 water-binding additives into the cutter not in a dry form, but in the form of jellies or emulsions.

4.4. Forming of sausages

The **DYPLEX P-a** casing is intended for use with automatic and semi-automatic stuffing and clipping equipment.

Never prick the chubs (puncture 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 reduce the risk of water and fat pockets, it is recommended to **overfill the DYPLEX P-a casings with forcemeat by 10%.**

During the forming 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 itself, but also on the emulsion consistency and temperature, the stuffing pressure, and the conditions of cooling after the thermal processing. Thus, if the emulsion has a high binding or swelling ability, it is recommended to reduce the overfilling ratio relative to the nominal casing 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 Table 2 for recommendations on selection of the clips for the **DYPLEX P-a** casings.

Table 2

Caliber	POLY-CLIP		ALPINA	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	210 410	175 370	B 1, BP 2	XE 210 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	210 410	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	210 410	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	210 220 410	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	220 410 420	175 200 370	B 2, BP 2 B3, BP3	XE 220 2.5x13.6x15 2.5x13.6x16

All types of clippers use blocks, each of which corresponds to a certain clip type indicated in Table 2. 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 cooked, cooked-and-smoked and semi-smoked sausages in the **DYPLEX P-a** casing can be performed in heat chambers of different types, but the best results are achieved in universal programmable heat chambers.

The manufacturers should choose their individual thermal processing modes, because the equipment capacity is all important in this process.

The optimal smoking temperature for the **DYPLEX P-a** casing is 65 – 75 °C, with the duration of smoking not less than 30 minutes. Adjustment of the temperature and duration of smoking controls the thermal processing losses, the thickness of the resulting crust, as well as the color and taste of the product.

We recommend the classical thermal processing, which includes the stages of curing, reddening (heating of the product), drying (color formation), smoking, and cooking:

- heating is done at moderate temperatures (45 – 50 °C) to provide for a slow coagulation of proteins and redistribution of heat throughout the volume;
- drying should start at a temperature of 50 – 55 °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. As the drying cycle progresses, the temperature is gradually raised to 60 – 65 °C. At this stage the batter protein coagulates and the 'protein crust' is formed;
- the next stage is smoking at a temperature of about 65 - 75 °C. At this stage the crust further consolidates, and its coloring occurs under the effect of the smoke components;
- cooking is done at the air humidity of 100% and the temperature of 75 – 80 °C until the product is ready for consumption (72 °C in the core during 10 - 15 minutes); cooking can be combined with smoking.

After completion of the cooking process, it is recommended to carry out a short drying during 5-10 minutes at the temperature of 65 °C.

4.6. Cooling

Upon completion of the thermal processing, the sausage chubs in the **DYPLEX P-a** casing must be immediately cooled. Cooling can be carried out under running water or shower, or by means of sprayers with timing devices, until the chub core temperature is down to 25 – 35 °C.

Cold air cooling is not allowed. Exclude any exposure of the finished products to air drafts until completely cooled, because this may cause wrinkles on the surface.

4.7. Transportation and storage of sausages

Transportation and storage of the sausage products in the **DYPLEX P-a** casing shall be in accordance with the regulatory documentation for such products (GOST, TU).

5. MANUFACTURER'S GUARANTEE

5.1. The Manufacturer guarantees conformity of the casing with the requirements of the Specifications 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 the date of manufacture.

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