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Casings dyplex

DYPLEX

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** casing.
DYPLEX 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** multilayer casing is confirmed by Russian and international quality certificates.
The **DYPLEX** casing is made in accordance with TU 2291-054-27147091-2013 and is intended for production, packaging, long-term 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 feature of **DYPLEX** is 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.
The **DYPLEX** casing is intended for products sold at retail outlets as whole chubs.
The recommended shelf life for semi-smoked, cooked-and-smoked, and cooked sausages in the **DYPLEX** casing is not more than 60 days at a temperature between 0 and 6 °C with the relative humidity of the air not exceeding 75 - 78 %.

2. PROPERTIES AND ADVANTAGES

DYPLEX 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 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.
- **heat-shrinkage,** 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** casing is impervious to microbiological degradation, because the

materials in its formula are inert to the action of bacteria and mold fungi.

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

3. ASSORTMENT

DYPLEX M	a matt casing with 10% overstuffing capacity	30 – 100mm
DYPLEX Mp	a matt casing with 10% overstuffing capacity and increased smoke permeability	30 – 100mm
DYPLEX Mc	a matt silky casing Increased degree of overfilling Increased adhesion to prevent from water pockets, with 10% overstuffing capacity	30 – 100mm
DYPLEX T	a glossy casing with 10% overstuffing capacity	30 – 100mm
DYPLEX P	a rough casing (imitation of viscose-reinforced casings), with 10% overstuffing capacity	30 – 100mm
DYPLEX Pp	a rough casing (imitation of viscose-reinforced casings), with 10% overstuffing capacity and increased smoke permeability	30 – 100mm
DYPLEX C-M	a matt casing for net-wrapped or ball-shaped products, with 20 – 25% overstuffing capacity	35 – 80mm
DYPLEX C-Mp	a matt casing for net-wrapped or ball-shaped products, with 20 – 25% overstuffing capacity and increased smoke permeability	35 – 80 mm
DYPLEX C-Me	a matt casing for net-wrapped or ball-shaped products, with 35 – 40% overstuffing capacity and increased elasticity	35 – 80 mm

DYPLEX Papyrus	a matt ‘paper-like’ surface, increased smoke permeability	29 – 100mm

The **DYPLEX** casing can be used for single-color, multi-color or CMYK printing with inks based on volatile solvents.
See the available casing colors in the Catalogue of Colors.
The casing is supplied in rolls or shirred sticks.

4. CASING USE TECHNOLOGY

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 relative humidity of the air not exceeding 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 just immediately before use of the casing.
4.1.3. Never stack casing rolls without spacers between the roll end parts.
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 casings 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 of the casing for use

To impart elasticity to the casing and provide for its uniform stuffing, the **DYPLEX** 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 external, but also the internal 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.

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

4.3 Preparation of the batter

During the thermal processing the sausage batter inside the **DYPLEX** casing loses from 0.5 to 5% of moisture, therefore the quantity of water to be added to the batter at the stage of cutting shall be determined with regard to this property of the casing.
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 the yield) lead to a growth of the pressure in the batter during the thermal processing. Batters with an elevated percentage of meat substitutes tend to swell more. 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 water-binding additives into the cutter not in a dry form, but in the form of jellies or emulsions.

4.4. Molding of sausage products

The **DYPLEX** casing is intended for use with automatic and semi-automatic stuffing and clipping equipment.
Never puncture the chubs (perforate the casing). The casing will rupture, 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 **overstuff the DYPLEX M, T и R casings by 10%;** while the **DYPLEX S-M** casings should be overstuffed by 20 – 25%.

It is expedient to use the **DYPLEX C-M** casings in an elastic net to form, on the sausage surface, a characteristic pattern, the markedness of which depends on the percentage of overstuffing of the casing relative to the nominal gauge. Follow the manufacturer's recommendations for the right selection of the net mesh.

Put the pre-soaked casing on the horn, then pass the cardboard spool over the casing onto the horn. The net diameter must correspond to the casing diameter. Pull the casing under the cardboard spool outside through the brake and the clipping units. Pass the free end of the net, after the casing, through the output hole of clipper, and then apply the first clip (Fig.1). Further clipping will be performed in the automatic mode.

When nets on spools are used, setting of the equipment consists in adjustment of the brake ring and the stuffing rate. If the brake unit contains two brake rings, remove the one nearest to the thread.

In the course of molding it is necessary to hold the spool with the net in position, to keep it from rotating, otherwise the mesh on the finished product will be skewed.

When using the net, make sure that the cut-off blade is sharp

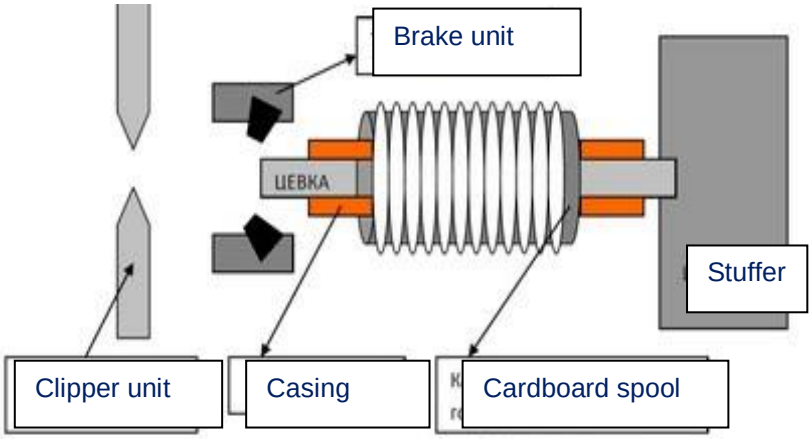

Fig. 1

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 itself, but also on the batter consistency and temperature, the stuffing pressure, and the conditions of cooling after the thermal processing. Thus, if the batter has a high binding or swelling ability, it is recommended to somewhat reduce the percentage of overstuffing 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** casings.

Table 2

Caliber	POLY-CLIP			ALPINA	TECHNOPACK		КОМПО	CORUND
	Clip interval 15 interval 18	Clip series S	R-ID	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	M07-150 L07-175 M08-175	15 /7-5×1.5 18 /7-5×1.75 15 /8-5×1.5	210 410	175 370	B 1, BP 1 B 2, BP 2	XE210 2,5x13,6x14
45 - 50	15-7-5×1.5 15-8-5×1.75 18-7-5×1.5	628 735	M07-150 M08-175 L07-150	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	M07-150 M08-175 L07-150	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	M08-150 L07-150	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	M09-175 L09-200	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
85 - 100	15-10-5×2.0 18-9-5×2.0 18-10-5×2.5	740 844	M10-200 L09-200 L10-225	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

When clipping the **DYPLEX C-M** casing with a net, it is necessary to use a larger clip, considering the greater size of the bundle to be clipped.

For all types of clippers, blocks are used, 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 and semidry sausages in the **DYPLEX** 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** 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 occurs 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** 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 sausage products

Transportation and storage of the sausage products in the **DYPLEX** casing shall be in accordance with the regulatory documentation for such products.

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 manufacture.

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