PENTOPAK
ТОВ "ПЕНТОПАК УКРАЇНА"

Revision date 09.01.2025	B-У.1-00:2025 In accordance with I-02:2017

Instructions for Use
Pentaflex-Universal® Multilayer Heat-Shrink Synthetic Casing for meat products packaging

Purpose

Pentaflex-Universal® casing is manufactured in accordance with TU U 25.2-20620489-006-2003 and is intended for packaging of all types of cooked sausages, blood sausages, liver sausages, pâtés, fats, head cheeses, unformed cooked hams, minced meat (chilled and frozen), and other similar products.

Advantages

Compared to viscose-reinforced, natural, and protein casings, Pentaflex-Universal® offers:
biological inertness;
high barrier properties;
high mechanical strength;
elasticity;
low oxygen and water vapor permeability;
operating temperature range of the product in casing from –40°C to +115°C;
no losses during thermal processing;
extended shelf life of sausages (up to 60 days, provided storage at +0°C to +6°C).

Storage at the Manufacturing Facility

The casing must be stored in the manufacturer's original packaging in clean, dry warehouse premises, free from foreign odors and aggressive substances, protected from direct sunlight, at least 1 meter away from heating devices, at a room temperature not exceeding +25°C and relative humidity not exceeding 80%.

The casing must remain in the manufacturer's packaging until use to prevent premature moisture absorption inside the roll.

Failure to comply with this requirement may result in sticking of the casing inside the roll.

The guaranteed shelf life of the casing is 36 months.

Dropping cartons with casing or subjecting them to impacts is strictly prohibited.

The casing is frost-resistant and withstands temperatures down to –40°C. Mechanical abrasion must be avoided.

If the casing is stored at temperatures below 0°C, it must be conditioned at room temperature for at least 24 hours before opening the packaging.

Preparation of the Casing Before Use

During preparation (unwinding the roll, cutting into lengths), friction between the roll ends and the casing sleeve against uneven surfaces must be avoided.

It is recommended to unwind the casing with the roll positioned vertically.

Before use, Pentaflex-Universal® casing must be cut into lengths of the required size and soaked in water at a temperature of +18°C to +25°C for 30 minutes.

During the winter period, water at +25°C may be used to accelerate soaking.

Cutting of the casing prior to use must be carried out outside the production area, as high humidity may cause sticking in the roll and ruptures during unwinding and stuffing.

After cutting, unused casing remaining on the rolls must be stored in the original factory packaging (mandatory in a polyethylene bag).

Soaking the casing in hot water is strictly prohibited.

To ensure uniform soaking, it is recommended to open one end of the casing segment and flush water through the sleeve so that both inner and outer surfaces are evenly wetted. This significantly increases elasticity, facilitates stuffing, and ensures uniform filling along the entire length of the sausage loaf.

When using shirred casing, the shirred sticks must be fully submerged in water (secured with a grid) at +18°C to +25°C for at least 40 minutes.

Casing consumption should be calculated according to the planned production volume. In case of partial use, the casing should be kept in a container with cold water and used within 24 hours.

Technological Recommendations for Sausage Production Using Polyamide Casings

Due to the gas- and moisture-barrier properties of Pentaflex-Universal®, moisture loss during thermal processing does not occur.

To prevent broth-fat pockets and casing ruptures during thermal processing, all requirements of current technological instructions for sausage production and the use of functional additives must be strictly followed.

Stuffing of the Casing

Forming and clipping of sausages is a critical process during which the casing most frequently contacts equipment parts. Ensure that the equipment is in proper condition, free of damage and burrs, and that the clips are correctly selected according to the casing diameter to prevent casing damage.

Stuffing should be performed according to the nominal caliber within the recommended stuffing diameter range (RSD) of 10–11% overstuffing.

The overstuffing percentage is selected experimentally depending on production conditions and equipment type and must remain stable throughout the entire stuffing process. Stuffing must be dense along the entire length of the sausage loaf.

Example: when using a casing with a nominal diameter of 65 mm and an overstuffing rate of 11%, the final diameter of the stuffed loaf should reach approximately 72 mm.

When selecting the overstuffing percentage, all factors must be considered: casing properties, equipment used, clip size, and mince formulation, especially formulations containing protein additives with swelling capacity.

To prevent casing rupture during thermal processing, it is recommended to carefully control overstuffing relative to the nominal caliber and, if necessary, reduce it.

Control of the recommended stuffing diameter should be carried out periodically by measuring the loaf diameter with a calibrated measuring tape. If required, mince dosing should be adjusted on the stuffing machine in automatic equipment.

Compliance with the recommended stuffing diameter ensures good product appearance, increased filling capacity, reduced risk of broth-fat pockets, and increased yield of finished products.

The casing withstands freezing down to –40°C.

When stuffing mince intended for freezing, the overstuffing percentage should be within 5–8% (determined experimentally). During freezing, moisture crystallizes and the mince volume increases, creating additional pressure on the casing, which may lead to rupture.

Clipping of the Casing

Pentaflex-Universal® casing is suitable for use on automatic (POLI-CLIP, ALPINA, TECHNO-PACK), semi-automatic, and manual clipping equipment, including all KOMPO clipper types.

During clipping, special attention must be paid to proper clipper adjustment and correct clip selection corresponding to the casing type and diameter. The clips must ensure a firm closure of the casing ends, must not shift sideways, and must not damage the casing.

Thermal Processing

Thermal processing of sausage products must be carried out in accordance with applicable technological instructions following the scheme:

preheating – cooking – showering – cooling.

Due to the gas-impermeability of the casing, the roasting stage is excluded. To ensure proper color formation, stepwise cooking with gradual temperature increase must be applied. Cooking should start at 50–55°C.

Example for Ø65 mm casing:

55°C in the thermal chamber at 100% humidity – 15 min

65°C at 100% humidity – 20 min

75°C at 100% humidity – 30 min

80°C at 100% humidity until internal loaf temperature reaches 72°C

The final stage is cooking until full readiness: 72°C inside the loaf for 10–15 minutes.

The number of temperature steps depends on loaf diameter: the larger the diameter, the more steps required.

Heating duration is determined by the manufacturer based on technological instructions and equipment capabilities.

After cooking, sausages must not be cooled with cold air**.** Rapid air cooling dries the casing and may cause surface wrinkling. Drafts must be eliminated until complete cooling.

Cooking may also be performed in boiling kettles, strictly following technological requirements:

Load sausages into water at +55°C to +60°C;
Loading into water at +80°C is strictly prohibited, as it may cause premature casing shrinkage and loaf deformation;
Sausages must be fully submerged;
Temperature increase must be gradual, in stages;
When loading subsequent batches, water temperature must not exceed +60°C;
Product readiness is confirmed by an internal loaf temperature of +72°C.

Cooling

After cooking, sausages are cooled in two stages:

Water shower cooling to an internal temperature of +25°C to +30°C.
Air drying at ambient temperature, followed by transfer to a chilling chamber at 0°C to +6°C.
Stepwise cooling ensures simultaneous and uniform shrinkage of both casing and mince, preventing surface wrinkling.
Freezing
Freezing of mince in loaves is carried out at temperatures from –18°C to –30°C.

Slicing and Casing Removal

Pentaflex-Universal® casing is easily removed from the sausage loaf.
Before slicing, both clips must be cut off to reduce casing tension and prevent tearing.

Packaging and Storage of Sausages

After cooling, sausages are transferred to storage facilities for warehousing and distribution. Storage temperature must comply with the technological instructions for the specific product.
Loaves with clean, dry surfaces are packed into sanitized containers in compliance with maximum permissible net weight and dispatched for sale.
During storage, significant temperature fluctuations are not allowed to prevent condensation on the loaf surface.
Frozen mince in loaves is stored at –18°C.
In retail outlets, sausages must be removed from transport packaging and placed in refrigerated display cases, showcases, etc.