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AMITAN Pro Stretch, Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga and Pro U Sinuga Ko CASINGS

Process Operating Manual

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1. APPLICATION

This Process Operating Manual describes the production process for all types of encased cooked sausages and hams made with the use of technologies that involve smoking, which makes it possible to obtain products with traditional organoleptic characteristics typical of products in natural casings.
The **AMITAN Pro Stretch, Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga,** and **Pro U Sinuga Ko** are monolayer plastic casings ***permeable to process smoke*** and imitating the natural gut materials (bung, bladders, rounds).
All these casing types are made from blends of high-quality materials of synthetic and natural origin.
Recommended shelf life for cooked sausages:
-in the **AMITAN Pro Stretch, Pro Sinuga** and **Pro Sinuga Ko** casings: not more than 6 days after completion of the technological process, at a temperature of 4±2ºC and air relative humidity not more than 75%;
-in the **AMITAN Pro U Sinuga,** and **Pro U Sinuga Ko** casings: not more than 20 days at a temperature of 4±2ºC and air relative humidity not more than 75%.

2. ADVANTAGES

2.1. Use of the **AMITAN Pro Stretch, Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga,** and **Pro U Sinuga Ko** casings widens the assortment of the products by diversification of the appearance of sausages (rings, half rings, festoons, bladders, etc.).
2.2. The high mechanical strength of the casings makes it possible to mold chubs with the use of high-capacity automatic and semi-automatic clippers at high rates of production.
2.3. The high elasticity of the casing makes it possible to significantly overstuff the casings relative to the nominal caliber. This reduces the consumption of the casing per 1 ton of the finished products in comparison with the traditional types of permeable casings.
2.4. The high heat resistance of the polymers used for production of the casings significantly extends the utilization temperature range of this casing in comparison with natural and collagen casings.
2.5. The low permeability to oxygen and water vapor provides for the following advantages:
-the casings are an economic alternative to natural casings, because of reduced moisture losses during the thermal processing and storage;
-excellent selling appearance (no wrinkles) of the finished products throughout the shelf life;
-retardation of the oxidation processes that cause rancidification of fats and changes.

2.6. Microbiological resistance. The polymers used for production of the **AMITAN Pro Stretch, Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga,** and **Pro U Sinuga Ko** casings are inert to the action of bacteria and mold fungi. This improves the hygienic characteristics of both the casing itself, and the finished products.

3. ASSORTMENT OF PRODUCTS

Supplied calibers:
-**AMITAN Pro Stretch**: 35-65mm;
-**AMITAN Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga,** and **Pro U Sinuga Ko**: 50-80mm.
Internal diameter of the ring in the ring-shaped casings: 20-50cm.
Colors of the casings: white, light smoke, smoke, orange, pink.
The customer may order double-sided single-color imitation printing (two patterns: Sinuga1 or Sinuga2). Multicolor single- or double-sided printing (the number of print colors varies from 1 to 6), or CMYK printing is optional.
The customer's purchase order should specify the location of the printing on the ring (the inner, the outer, or the lateral surface, or at 45º relative to the outer surface). By default, printing is applied on the outer surface of the ring.
The location of printing on the **AMITAN Pro Sinuga Ko** and Pro U **Sinuga Ko** is not regulated.
The casing is supplied in the following forms:
-AMITAN Pro Sinuga Ko and **Pro U Sinuga Ko**: 100-800m in rolls, or 25m in shirred sticks;
-AMITAN Pro Stretch, Pro Sinuga and **type Pro-U Sinuga**: 500m in rolls, or 31m, 38m or 50m in shirred sticks.

4. UTILIZATION TECHNOLOGY

4.1 Storage and transportation of the casing

4.1.1. The casing must be stored in the original packing in closed dry and clean rooms conforming to the sanitary-hygienic standards for the relevant sector of the food industry, at a distance of not less than 1m from heating devices, and in the absence of any strong-smelling or corrosive substances, at a temperature not exceeding 25ºC, and relative humidity of the air 50-60%.
4.1.2. During transportation the casing should not be exposed to temperatures exceeding +40ºC, or direct sunlight.

4.1.3. If the casing was transported or stored at a temperature below 0°C, then hold it at room temperature for not less than 24 hours before opening and use.
4.1.4. Never drop the boxes or packages with casings or subject them to impacts.
4.1.5. Never stack casing rolls without cardboard spacers between the roll ends.

4.2 Preparation of the casing for use

The procedure for preparation of the casing for stuffing consists in the following:
Bring the casing in the manufacturer's packing to the shop from the store room, put it on a dry surface (floor, table), then open the manufacturer's packing immediately before use of the casing.
Soak in potable water at a temperature of 25-30 ºC during 5-15 minutes. Do not soak the casing in hot water, otherwise it will shrink during the soaking process.
The casing in rolls must be first cut into lengths, then soaked.
When shirred sticks are used, keep the shirred stick fully submerged in water. Water must freely penetrate inside the shirred stick, driving out the air.
After the soaking, remove the residual water from the tube, and put the casing over the stuffing horn.
Do not soak more casing than is required. If too much casing was soaked, take the casing out of the water, remove the excess water, and leave the casing until the eventual processing in a cold room (shop) away from any sources of heat or air draft. The casing can be re-used after re-soaking by dipping.
If these requirements are observed, the casing will acquire a high elasticity, which significantly facilitates the stuffing process, and provides for uniform filling through the entire length of the chub.

4.3 Preparation of the emulsion

For the production of cooked sausages and hams in the casings the quantity of water added to the emulsion shall be the same as when natural collagen casings are used.

In the development if new recipes according to the regulatory documentation (specifications), the amount of the added water should be determined with regard to the moisture-retaining properties of the gelling agents used, such as carrageenans, plant proteins, animal proteins, etc., and the relevant instructions on use must be complied with to prevent formation of water pockets.

4.4 Molding

Start molding of the casing with inspection of the equipment and the work table. Make sure that there are no burrs on the equipment parts, or sharp objects, dents, or rough areas on the working surface of the table, in order to avoid damage to the casing.

Do not allow any rubbing of the casing roll end against rough surfaces during the processing.

Never puncture the casing of the chubs. The casing will burst, if punctured.

The ratio between the stuffed caliber and the nominal caliber of the casing is an important factor. In the process of molding of the sausage products, take care to fill the casing as tight as possible, without air trapped inside. The **AMITAN Pro Stretch** casing has been specially developed for products in the shape of a **bladder**, and can be considerably overstuffed relative to the nominal caliber.

It is recommended to fill the **AMITAN Pro Stretch** casing with 85-95% overstuffing.

E.g., when the 50mm nominal caliber casing is used, the stuffed caliber can vary from 92.5 to 97.5mm, depending on the actual production conditions (emulsion consistence and structure, filling pressure, etc.). This provides for a good appearance of the finished products, raises the holding capacity, and reduces the risk of water and fat pockets.

The **AMITAN Pro Stretch** casing can be stuffed by several methods:

-Stuffing of casing sections (pre-clipped on one side) with the required amount of emulsion, then clipping the other side of the chub. The casing section put over the stuffer horn is then stuffed until full. Start filling with a slight braking of the casing. Then 'brake' the casing more to increase the emulsion pressure in the casing and achieve the recommended stuffed caliber. After that reduce the emulsion pressure on the casing by easing-off the braking to obtain a chub in the desired shape (a '**bladder**', or a round or oval shape). When this method of stuffing is used, the portioning is carried out 'by eye', and the consumption of the casing is higher.

-Stuffing, by means of automatic or semi-automatic clipping equipment, of a shirred or non-shirred casing tube, with simultaneous portioning and clipping of the chub ends. This method of stuffing makes it possible to produce chubs of uniform weight.

The amount of emulsion stuffed into the casing depends on the caliber of the casing and the desired shape of the product. E.g., for the 50mm nominal caliber casing with the stuffed caliber of 92.5- 97.5mm, the weight of the product may vary from 800 to 1000 g, and the chub shapes may be different, depending on the length.

To obtain a product of the desired weight, take into account the moisture losses of the product during the thermal processing.

The **AMITAN Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga** and **Pro U Sinuga Ko** casings should be filled with 30-50% overstuffing (e.g., for the 50mm nominal caliber casing the recommended stuffed caliber is 65.0 - 75mm), depending on the emulsion

consistence and temperature, and the filling pressure. The less the emulsion temperature and the denser the consistence, the less is the stuffed caliber.
In case of manual tying of sausage chubs in the **AMITAN Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga** and **Pro U Sinuga Ko**, it is recommended to use the tying pattern typical of products in the natural bung, i.e. with loops spaced by a certain interval.
When automatic or semi-automatic clippers are used, consider the maximum diameter of the sausage chub that passes through the working part of the clipper. Should the chub diameter exceed the allowable value, it will be hard to guide it through the clipping zone, which increases the probability of damaging the casing, and contributes to the wear of the equipment
The clip must securely hold the ends of the chub, without damaging the casing. See Table 1 for the recommended clip types.

Table 1

Casing caliber	POLY-CLIP		TECHNOPACK		COMPO	ALPINA
	Clip interval 15 interval 18	Clip series S	Clip series E	Clip series G	Clip series B	Clip interval 15 interval 18
35-65	15-7-5×1.5 15-8-5×1.75 18-7-5×1.75	524 528 625 628	210 410	175 370	B1 B2	15-7-5×1.5 15-8-5×1.75 18-7-5×1.75
66-80	15-8-5×1.5 15-7-5×1.5 18-7-5×1.75	632	212 220 222 410	175 200 370	B2 BP2	15-8-5×1.5 15-7-5×1.75 18-7-5×1.5 18-7-5×1.75

4.5 Thermal processing

Thermal processing of cooked sausages and hams in the casing is carried out in stationary shaft-type chambers, and in universal heat chambers.
Each manufacturer should choose his individual thermal processing modes, because the equipment (shaft-type chamber or universal heat chamber) capacity is all-important in this process.
We recommend the classical thermal processing, which includes the stages of drying (color formation), smoking, and cooking.

Drying should start at a temperature of 50 - 55 °C. As the drying cycle progresses, the temperature is gradually raised to 60 - 65ºC. At this stage coagulation of the emulsion proteins is achieved, and the 'protein crust' is formed.
The next stage is smoking at a temperature of about 70 - 75 °C. At this stage further consolidation of the crust occurs and the crust becomes colored under the effect of the smoke components.

Then the product is cooked at the air humidity of 100% and a temperature of 75 - 80°C until ready for consumption.

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

The process of drying and smoking have a significant impact on the quality of the finished product. By adjusting the temperature and duration of these stages, the thermal processing losses, the crust thickness, the color and the taste of the product can be varied.

Example. Thermal processing conditions for 90mm caliber sausage chubs.

Two-frame Vemag heat chamber, alder+beech chips

Table 2

Process stage	**90mm caliber sausage chubs**
Drying	55˚C – 40 min.
Smoking	60˚C – 20 min.
Smoking	65˚C – 20 min.
Smoking	70˚C – 30 min.
Cooking	78˚C – to 72˚C in chub core
Drying	65˚C – 10 min.
Thermal processing losses	5-7%
Total time	2 hrs 40 min.

4.6. Cooling

Upon completion of the thermal processing, the products in the **AMITAN Pro Stretch, Pro Sinuga, Pro Sinuga Ko, Pro U Sinuga** and **Pro U Sinuga Ko** casings must be immediately cooled. Cooling can be carried out under running water or shower, or by means of spraying with time-delayed equipment, 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 complete cooling of sausages, because this may cause wrinkles on the surface of the product.

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.
5.2. The guarantee term of storage of the casing is 2 years from manufacture, subject to integrity of the manufacturer's packing.

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