ATLANTIS-PAK

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Packaging Solutions

Casings iPeel

iPeel

Process Operating Manual

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1. APPLICATION

The **iPeel** is an easy-peel plastic casing permeable to process smoke, and is designed for production of all kinds of frankfurters, wieners, hot dogs, and mini-sausages made by the traditional technologies that involve the stage of smoking (smoke roasting), which makes it possible to obtain products with traditional sensory characteristics typical of products packaged in cellulose, protein, and natural casings.

The **iPeel** casing (**type A, type P**) is intended for finished products processable by means of automatic peelers. At the same time, the **iPeel** casing can be used for production and subsequent storage of the finished products (in links). It is recommended to use secondary packaging to prolong the period of preservation of the sensory characteristics of the products.

The **iPeel** is the first ever plastic casing designed for automatic peeling, and is made by a unique proprietary technology in accordance with TU 2291-047-27147091-2011 from a blend of high quality materials developed for Atlantis-Pak by leading suppliers of polymers. The quality of the raw materials used for production of the casing is confirmed by Russian and international quality certificates.

The **iPeel** casing has successfully passed the tests performed by the Russian Consumer Rights Protection Agency (Rospotrebnadzor) as confirmed by the state registration certificate, the test report and the conformity certificate.

2. PROPERTIES AND ADVANTAGES of the iPeel casing

2.1. Specifications of the casing

2.1.1. The **iPeel** casing is made on advanced equipment, which ensures:

- continuous control of all parameters;
- maximum automation of the production process

2.1.2. See Table 1 for the basic quality characteristics and test conditions for the **iPeel** casing.

2.2. Advantages of the casing

2.2.1. Automatic peeling of the casing. The **iPeel** casing is made by a proprietary technology, and its properties make it possible to remove the casing off the finished product by means of automatic peelers **(type C-A, type C-P)**.

2.2.2. **Optimal adhesion of the iPeel casing** to various types of stuffing provides for easy removal of the casing (**type A, type P**) off the finished product by means of automatic peelers; at the same time the casing adequately protects the finished product (links) during the storage.

2.2.3. **High permeability** of the casing to process smoke and water vapor makes it possible to roast and smoke the products to impart to them the traditional smoked taste and flavor. Products can be made with the traditional sensory characteristics typical of foodstuffs packaged in cellulose, collagen, and natural casings. This also contributes to formation of a dense coagulated protein crust with a glossy surface of the product under the casing, which provides for

consistent removal of the casing off the finished product without damaging the surface layer of coagulated protein (crust).

2.2.4. **Extensive assortment of products.** The **iPeel** casing is supplied straight or curved, which extends the range of products by diversification of their appearance. The curved version of the **iPeel** casing makes it possible to supply products in the shape of half rings, without the use of expensive natural or collagen casings, and to remove the casing by peelers.

2.2.5. **High heat resistance** of the polymers used to make the **iPeel** casings significantly extends the temperature range of utilization of the casing in comparison with collagen and cellulose casings.

2.2.6. High mechanical strength of the **iPeel** casing makes it possible to mold the products by using various types of equipment to achieve a high speed of production and 6-8% overstuffing relative to the nominal caliber. The caliber consistency in the **iPeel** casings provides for stable filling on the modern high-capacity frankfurter lines and stuffers with twisting devices.

2.2.7. Microbiological resistance. The materials used for production of the **iPeel** casings are impervious to bacteria and mold fungi. This improves the hygienic characteristics of both the casing itself, and the finished products.

2.2.8. Optimal oxygen and water vapor transmission rate compared with collagen and cellulose casings at the finished product storage temperatures (+2...+6 °C) provide for the following advantages:

- retardation of oxidative processes in the finished products;
- better preservation of the smoke flavor in the finished products until removal of the casing by means of a peeler, and throughout the shelf life of the product (link)
- reduced weight losses (≈ 2 – 5%) during the storage (it is recommended to keep the products in a gas atmosphere, inside vacuum packaging);
- slowing down of the process of syneresis (liquid separation) in the finished product inside
  the vacuum packaging (≈ by 1.5 – 2 times).

3. ASSORTMENT OF PRODUCTS

iPeel type A has a closed end in the shirred stick; this casing is designed for processing on automatic equipment;

iPeel type C-A has a closed end in the shirred stick; this casing is designed for processing and peeling on automatic equipment;

iPeel type U-A has a closed end in the shirred stick; this casing is designed for processing on automatic equipment and sale of packaged products;

iPeel FE type A is intended for the Far East and South Asia markets; it has a closed end in the shirred stick; this casing is designed for processing on automatic equipment;

iPeel A3 type A is economy version; it has a closed end in the shirred stick; this casing is designed for processing on automatic equipment and sale of packaged products;

iPeel type P has an open end in the shirred stick; this casing is designed for processing on stuffer linkers;
iPeel type C-P has an open end in the shirred stick; this casing is designed for processing on stuffer linkers and automatic peelers;
iPeel type U-P has an open end in the shirred stick; this casing is designed for processing on stuffer linkers and sale of packaged products;
iPeel FE type P is intended for the Far East and South Asia markets; it has an open end in the shirred stick; this casing is designed for processing on stuffer linkers;
iPeel A3 type P is economy version; it has an open end in the shirred stick; this casing is designed for processing on stuffer linkers and sale of packaged products;
iPeel type Ako is a curved casing with a closed end in the shirred stick; this casing is designed for processing on automatic equipment;
iPeel type Pko is a curved casing with an open end in the shirred stick; this casing is designed for processing on stuffer linkers;
iPeel Gut is an opaque plastic casing intended for production, transportation, storage and sale of traditional wieners, hot dogs or mini-sausages.
The **iPeel** casing is supplied shirred. See Table 2 for the parameters of the casing.

Assortment of the iPeel casing (iPeel)

Table 1

Casing caliber, mm	Stick type	Shirring type	Length of casing in a stick, m (±2%)
15*	A/ P	tight	25,0
16	A/ P	tight	25,0
17	A/ P	tight	25,0
18	A/ P	tight	25.0
19	A/ P	tight	25.0
20**	A/ P	tight	25.0
21	A/ P	tight	25.0
22**	A/ P	tight	25.0
22	Ако/Рко	tight	25.0
23	A/ P	tight	25.0
24**	A/ P	tight	33.3
24	Ако/Рко	tight	25.0
25	A/ P	tight	33.3
26**	A/ P	tight	33.3
27	A/ P	tight	33.3
28	A/ P	tight	33.3
29	A/ P	tight	33.3
30	A/ P	tight	33.3
31	A/ P	tight	33.3
32	A/ P	tight	33.3
32	P	loose	30.0
32	Рко	loose	30.0
34	A/ P	tight	33.3
34	P	loose	50.0 (30.0)
34	Рко	loose	30.0
36	P	loose	50.0 (30.0)
36	Рко	loose	30.0
38	P	loose	50.0 (30.0)

38	Pko	loose	30.0

**caliber 15 only for iPeel type A casing (type P);*
***for iPeel PRO casing (type A, P) manufacturing calibers 20, 22, 24, 26.*

Assortment of the iPeel-Gut (PRO) casing

Table 2

Casing caliber, mm	Stick type	Colors	Printing	Length in a stick, m	Stick length, mm	Shirring type
						loose
30	P	Clear Light smoke Smoke Orange Dark orange	From 1+0 to 6+6	38	360	+
32	P			38	470	+
30	Pko			25	470	+
32	Pko			31	470	+
34	P/Pko			38/31	470	+
36	P/Pko			38/31	470	+
38	P/Pko			38/31	470	+
40	P/Pko			38/31	470	+

See the colors of **iPeel** casings is the Catalogue of Colors.
The color range is subject to change.
The casing is suitable for single- or double-side printing.
The number of print colors varies from 1 + 0 to 6 + 6.
Printing on the curved versions of the casing is not specified.

The **iPeel** casing is supplied shirred and packaged under vacuum in accordance with the requirements of international standards. This provides for:

- optimal preservation of the casing characteristics;
- integrity during transportation;
- flawless sanitary/hygienic condition of the product during the transportation to the production area (without the carton) and storage of the casing;
- reduction of waste disposal costs (no cartons to dispose of).

4. HOW TO USE THE CASING

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 compliant with the sanitary-hygienic standards for the relevant sector of the food industry, at a distance of not less than 1m away from any heaters, in the absence of strong-smelling or corrosive substances, at a temperature from +5 to +35 °C and the air relative humidity of not more than 80%.

4.1.2. The **iPeel** casing must be transported at a temperature not exceeding +40°C, and protected against exposure to direct sunlight.

4.1.3. If the casing was stored at a temperature below +5 °C, hold it at room temperature for not less than 24 hours before opening of the packing and processing.

4.1.4. Never drop the boxes with casings or subject them to impacts.

4.2. Preparation of the casing for processing

Preparation of the **iPeel** casing for processing consists in the following:

Bring the original packing to the production shop from the store, put it on a dry surface (table), then open the manufacturer's packing immediately before processing of the casing.

The **tightly shirred iPeel** casing does not require soaking before use, because the high elasticity of the casing easily provides for the recommended stuffing caliber. This not only improves the production rate, but also ensures a high hygienic level of production.

The **loosely shirred iPeel** casing should be wetted before processing by soaking in potable water (SanPiN 2.1.4.559-96) with the temperature of 25-30 °C during 2-3 minutes.

Extract the shirred casing sticks from the packing in such a manner as to preserve their integrity.

In order to ensure integrity of the shirred sticks after opening of the manufacturer's packing, avoid exposure of the casing to moisture before use.

Throughout the technological cycle of production, take care to keep the casing safe from damage. Especially hazardous is contact with various burrs, uneven or rough surfaces, etc.

4.3 Forcemeat composition

For production of frankfurters and wieners in the **iPeel** casing according to GOST R 52196-2011 and other regulatory specifications (TU), the quantity of moisture added to the emulsion must be the same as for collagen or cellulose casings.

When new recipes are developed according to the regulatory specifications (TU), 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 or animal proteins, etc.), and the relevant instructions on use must be followed to avoid formation of water and fat pockets.

4.4 Forming of products

Forming of the **iPeel** casing starts with inspection of the equipment and the work table.

Make sure that there are no burrs on the equipment parts, or sharp objects, indentations, or rough areas on the working surface of the table, in order to avoid damages to the casing.

Never prick the products (puncture the casing). The casing will burst, if punctured.

When using stuffer linkers, observe the direction of stuffing - the shirred sticks must be put onto the horn with the 'herring-bone' inward, i.e. with the 'herring-bone' apex towards the stuffer.

When molding the products, bear in mind that the packing indicates the minimum stuffing caliber. The nominal caliber is not specified.

To avoid the 'zebra' effect on the product after smoking, strictly observe the following rules:

- never touch the shirred stick with wet hands (the hands must be dry!) when putting it into the storage hopper;
- always keep the storage hopper dry.

Failure to observe these rules may cause dark spiral stripes on the products after the thermal processing.

The stuffed caliber for the **iPeel** casing depends on the end use of the finished product. When the finished products are intended for automatic peeling, it is recommended to use the minimum stuffed caliber, e.g. for the 20mm nominal caliber, the recommended stuffed caliber should be 21 to 21.5mm.

If the products will be stored and sold with the casing on (in links), the recommended stuffed caliber should be 22.0 to 22.5mm.

Table 3 shows the recommended stuffed calibers for automatic peeling, and for storage with the casing on (in links).

It should be borne in mind that the ultimate stuffed gauge and the stuffing rate for both stuffing options may vary not only with the technical condition of the forming equipment, but also depending on the emulsion temperature and consistency. The lower the emulsion temperature, the less should be the stuffed caliber and the forming rate.

In the case of maximum overfilling of the **iPeel** casing (for storage of products in the casing) bear in mind that emulsions with more meat substitutes will swell more in the course of thermal processing, which leads to the pressure build-up inside the product. In this case, bursting of the casing during the thermal processing is avoided by using the minimum recommended stuffed caliber (e.g. for the 20mm nominal caliber, the recommended stuffed caliber should be 22mm).

Recommended stuffing calibers

Table 3

Casing caliber, mm	Stick type	Recommended stuffing caliber for automatic peeling	Recommended stuffing caliber for product storage with the casing on	Recommended		Recommended chuck number
				horn number	horn diameter, mm	
16	A/P	16.5-17.0	17.0-17.5	10-11	7.9-8.7	17/18/19
17	A/P	17.5 -18.0	18.0 -18.5	10-11	7.9-8.7	17/18/19
18	A/P	19.0 - 19.5	19.5 - 20.5	10-11	7.9-8.7	18/19
19	A/P	20.0 - 20.5	21.0 - 21.5	10-11-12	7.9-8.7-9.5	19/20

20	A/P	21.0 - 21.5	22.0 - 22.5	12-13	9.5-10.3	20/21
21	A/P	22.0 - 22.5	23.0 - 23.5	12-13	9.5-10.3	20/21/22
22	A/P	23.0 - 23.5	24.0 - 24.5	13-14	10.3-11.1	21/22/23
22Ko	A/P	-	24.0 - 25.0	13-14	10.3-11.1	21/22/23
23	A/P	24.0 - 24.5	25.0 - 25.5	14-15	11.1-11.9	22/23
24	A/P	25.0 - 25.5	26.0 - 26.5	14-15-16	11.1-11.9-12.7	22/23/24
24Ko	A/P	-	26.0 - 27.0	14-15-16	11.1-11.9-12.7	22/23/24
25	A/P	26.0 - 26.5	27.0 - 27.5	14-15-16	11.1-11.9-12.7	23/24/25
26	A/P	27.0 - 27.5	28.0 - 28.5	14-15-16	11.1-11.9-12. 7	25/26
27	A/P	28.0 - 28.5	28.5 - 29.0	14-15-16	11.1-11.9-12. 7	25/26/27
28	A/P	29.0 -29.5	29.5 - 30.0	14-15-16	11.1-11.9-12. 7	26/27/28
29	A/P	30.0 -30.5	30.5 - 31.0	14-15-16	11.1-11.9-12. 7	29
30	A/P	31.0 -31.5	31.5 -32.0	18-19-20	14.3-15.2-16	29
31	A/P	32.0 - 32.5	32.5 - 33.5	18-19-20	14.3-15.2-16	29
32	A/P	33.0 - 33.5	34.5 - 35.0	18-19-20	14.3-15.2-16	29
32Ko	P	-	35.0 - 36.0	-	14-16-17	29
34	A/P	35.0 - 35.5	37.5 - 38.0	20	16	29
34Ko	P	-	38.0 - 39.0	-	14-16-17	29
36	P	37.0 - 37.5	38.0 - 39.0	-	14-16-17	29
36Ko	P	-	39.0 - 40.0	-	14-16-17	29
38	P	39.0 - 39.5	40.5 - 41.0	-	14-16-17	29
38Ko	P	-	41.0 - 42.0	-	14-16-17	29
40	P	41.5-42.0	41.5 - 42.0	-	14-16-17	29
40Ko	P	-	42.0 – 43.0	-	14-16-17	29

Recommended stuffing calibers for the iPeel Round (PRO) casing

Table 4

Casing caliber, mm	Stick type	Recommended stuffing caliber for product storage with the casing on	Recommendations				Recommended chuck number
			Recommended horn diameter, mm, Handtmann/ Vemag/Hitec	Recommended horn diameter, mm, Compo	Horn number, Townsend	Horn diameter, (mm) Townsend	
30	P	32.0 – 32.5	14-15-16	12.5	18-19-20	14.3-15.1-15.9	29
30Ko	P	33.0 -33.5	14-15-16	12.5	18-19-20	14.3-15.1-15.9	29
32	P	34.0 - 34.5	14-15-16	16.9	18-19-20	14.3-15.1-15.9	30
32Ko	P	35.0 - 35.5	15-16-17	16.9	18-19-20	14.3-15.1-15.9	30

34	P	36.0 - 36.5	15-18	16.9-20	20	15.9	30-32
34Ko	P	37.0 - 37.5	15-18	16.9-20	20	15.9	30-32
36	P	38.0 - 38.5	18-20	16.9-20	20	15.9	32-34
36Ko	P	39.0 - 40.0	18-20	16.9-20	20	15.9	32-34
38	P	40.5 - 41.0	18-20	16.9-20	20	15.9	34
38Ko	P	42.0 - 42.5	18-20	16.9-20	20	15.9	34
40	P	42.5 - 43.0	18-20	16.9-20	20	15.9	34
40Ko	P	44.0 – 44.5	18-20	16.9-20	20	15.9	34

The production rate and the overfilling ratio for the **iPeel** casings should be determined with regard to the technical condition of the equipment used for making of frankfurters and wieners. The required forming parameters are achieved by adjustment of the forming equipment within the range of its specifications.

Compliance with the recommended stuffed caliber ensures consistently easy removal of the casing by peelers, reduces the risk of water/fat pockets and ruptures of the casing in the process of forming and thermal processing, and preserves the good look of the finished products during their storage in the casing (links).

4.5. Thermal processing

The **iPeel** casing is designed for production based on the traditional technologies, including smoking (smoke roasting), to make products with traditional sensory characteristics typical of the products in cellulose, natural, and artificial collagen casings.

Manufacturers should choose their individual thermal processing conditions, because the capacity of the heat chamber and the type of smoking (steam generator or atomization system) are all-important in this process, while the required result is achievement of a characteristic dense crust resistant to mechanical impacts, which makes the casing suitable for automatic peeling, or reduction of the thermal processing losses for the products stored with the casing on.

We recommend the classical thermal processing mode, which includes the stages of drying (color formation), roasting, smoking, and cooking.

Automatic peeling requires a minimal adhesion of the casing to the product and a dense surface crust resistant to mechanical impacts.

To achieve these parameters of the product, thermal processing should be performed by raising the temperature gradually.

Drying should start at a temperature of 50-55 °C, depending on the emulsion temperature. As the drying progresses, the temperature is raised stepwise to 65 °C. At this stage coagulation of the emulsion proteins is achieved, and the 'protein crust' is formed.

The **iPeel** casing makes it possible to perform the stages of roasting and smoking at higher temperatures, which greatly extends the adjustment range of the thermal processing conditions, and optimizes the process.

The recommended next stage is smoking at a temperature of 65-75 °C and air humidity of 40-60%. At this stage further consolidation of the crust occurs and the crust becomes colored by the smoke components. For additional solidification of the crust and color improvement, smoking can be performed in two stages, with an intermediate stage of drying or roasting. Then cooking is performed at the air humidity of 100% and a temperature of 75-80 °C until the product is ready for consumption.

The processes of drying and smoking significantly influence the quality of the finished product. By adjusting the temperature, humidity, and duration of these stages, the thermal processing losses, the crust thickness, the color, and the intensity of the smoke flavor and taste of the finished product can be varied.

Smoking in universal heat chambers can be achieved by three principal methods:

- smoking with an air and smoke mixture (chips or sawdust smoldering by means of a heating element or a rotating wooden friction bar);
- smoking with a steam and smoke mixture (steam is heated to the required temperature and passed through sawdust);
- smoking by atomization (spraying of liquid smoke).

Below are examples of thermal processing conditions for frankfurters intended for automatic peeling:

Example 1 (see Table 5).
Heat chamber: Vemag. Smoldering smoke generator, beech chips. Diameter of stuffed products: 25mm

Table 5

Process stage	Temperature, °C.	Time, min.	Preset humidity, RH, %	Actual humidity, RH, %
Heating	55	15	50	50
Drying	60	10	20	20
Roasting	65	15	20	20
Smoking	70	15	40	40-45
Roasting	75	10	20	20-25
Smoking	75	15	40	40-45
Cooking	80	15 to 72 °C in the core	100	100
Total time		95 min.		

The desired intensity of the smoked flavor and taste at the stages of smoking is achieved by varying the time, humidity, and temperature. Smoking at minimum humidity makes it possible to dispense with the additional stage of drying or roasting after cooking. The crust density will be sufficient for removal of the casing by peelers.

Example 2 (see Table 6).
Heat chamber: Autotherm. Steam smoke generator. Diameter of stuffed products: 25mm

Table 6

Heating	T, °C	Time, minutes	Preset humidity, RH, %.	Actual humidity, RH, %.
Drying	55	10	50	50
Smoking	60	5	20	20
Roasting	65	15	-	80-85
Smoking	70	15	20	20-25
Cooking	75	15	-	80-85
Drying	80	8 to 72 °C in the core	100	100
Total time	65	15	20	30
Heating	-	83 min..	-	-

Example 3 (see Table 7). Heat chamber: Atmos. Atomization system. Cycle: 2 minutes of liquid smoke supply, 3 minutes of convection. Diameter of stuffed products: 25mm

Table 7

Process stage	T, °C	Time, minutes	Preset humidity, RH, %.	Actual humidity, RH, %.
Heating	55	15	50	50
Drying	60	5	30	30
Smoking	65	15	-	70-75
Roasting	70	10	20	20-25
Smoking	75	15	-	70-75
Cooking	80	10 to 72 °C in the core	100	100
Drying	65	10	20	30
Total time	-	80 min.	-	-

When smoking is performed at elevated humidity (70-80%), the resulting coagulated protein crust is not sufficiently dense or resistant to mechanical impacts to be processed by means of peelers. In this case it is recommended to supplement the thermal processing, after the cooking stage, with a stage of drying during 10-15 minutes at the temperature of 65 °C. If the atomization process runs parallel to the cooking process (spraying of liquid smoke during the cooking), it is also recommended to add a 10-15 min. stage of drying at the temperature of 65 °C.

When it becomes necessary to change the intensity of smoking in the course of thermal processing, the temperature, duration, and humidity of the smoking stages can be adjusted.

The above thermal processing conditions have been tested at many meat processing facilities. Under such thermal processing conditions, frankfurters

form a characteristic glossy crust with a smoked flavor and taste. The crust is resistant to mechanical impacts, which provides for excellent automatic peeling of the casing without damaging the product. Such processing conditions are just as well suited for products intended for storage in casing (links).

4.6. Cooling for storage of products in casing (links)

Upon completion of the thermal processing, the products must be immediately cooled. Cold air cooling is not recommended, because it may lead to appearance of wrinkles on the surface of the product. Cooling should be performed under running water, preferably under a spraying shower to increase the cooling area, until the product core temperature is down to 25-35 °C. After that the products must be moved into a cold store.

Exclude any exposure of the finished products to air draughts (fast-moving air flows) during the storage, because this leads to accelerated evaporation of moisture from the product surface and may cause wrinkles on the surface.

4.7. Cooling and removal of the casing

As a rule, the processors remove the casing on the next day after manufacture of the frankfurters. In this case cooling of the products is done under the standard conditions for products intended for storage in casing (see 4.6 above).

Casing can be removed on the day of manufacture. The recommended product core temperature is 10-12 °C. Avoid any exposure of the finished products to air draughts (fast-moving air flows) during the storage, because this leads to accelerated evaporation of moisture from the product surface and may cause wrinkles on the surface.

Just before removal of the casing, spray the products with cold water again.

Peelers are provided with replacement sets for different product diameters; install the required set according to the recommendations of the equipment manufacturer.

In the process of removal of the casing, supply steam to the steam pipe of the peeler.

Immediately before putting of a link of products into the steam pipe of the peeler, remove the knots from the ends of the link to prevent the knots getting into the vacuum roller holes, which may result in winding of the casing on the vacuum roller.

The pressure rollers of the peeler must be adjusted depending on the diameter of the product. The roller pressure must be sufficient to maintain the required contact with the product for a free and steady (without slipping) transport of the link to the casing incision area, without damaging the product.

Provide for free passing of the link of products through the steam pipe, without the link looping or knotting.

The peeler speed must be adjusted on a case-by-case basis, depending on the length, diameter, and shape of the products.

The blade should be adjusted for effective cutting of the casing, with a minimal depth of incision.

Adjust the supply of compressed air to open the casing after incision. The compressed air flow should reliably open the cut casing, without damaging the protein crust on the product.

4.8. Transportation and storage of products

Transportation and storage of the products made with the use of the **iPeel** casing must conform to the applicable regulatory documents (GOST, TU).

5. MANUFACTURER'S GUARANTEES

5.1 The Manufacturer guarantees conformity of the **iPeel** casing with the requirements of the Specifications 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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