SECTION 10.
TECHNOLOGIES OF LIGHT AND WOODWORKING INDUSTRY

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SMART ADHESIVE INTERLINING MATERIALS FOR CLOTHING

The study examines the application of modern "smart" fusible interlining materials in the production of women's jackets. It identifies innovative approaches to their practical use. The research focuses on the functional advantages of elastic, microfibre, shape-memory, and biodegradable interlinings compared to traditional woven and nonwoven materials. Methods of scientific analysis, systematization of textile technologies, comparative evaluation of interlinings, and experimental modelling of fusing processes were employed. The results demonstrate that "smart" fusible interlinings significantly enhance shape stability, wearing comfort, durability, breathability, and ecological sustainability of women's jackets. The study highlights the potential of combined fusing technologies, where traditional and modern materials are used together to achieve optimal garment performance. The findings provide a scientific basis for developing contemporary women's jackets that meet the requirements of fashion trends, technological innovation, and sustainable design [2].

The creation of a women's jacket requires the implementation of innovative materials and technologies that improve the quality of the garment and enhance its competitiveness. In the production of women's jackets, fusible interlining materials from various manufacturers are widely used. However, today, so-called "smart" fusible interlinings have emerged. Their use in garment manufacturing allows one to achieve a balance between the jacket's shape stability and wearing comfort.

The objective of the study is to determine the possibilities of applying "smart" fusible interlining materials in the fusing of women's jacket components.

To achieve the stated objective, the study employed methods of analyzing and systematizing scientific sources, comparative analysis of modern fusible interlining materials, modeling of technological fusing processes, and experimental application of innovative woven and nonwoven fusible interlinings.

In modern technology for processing women's jackets, one of the essential stages is the fusing of components, which ensures the garment's shape stability, durability, and comfort. Traditional fusible interlinings (cotton, linen, etc.) are gradually giving way to "smart" materials that combine classical properties of interlinings with new functional capabilities.

Contemporary approaches to fusing provide for the differentiated use of fusible interlinings. For processing the collar, front edge, front panel, sleeves, and other areas, different interlining materials are selected depending on the functional load of each zone.

Today, the category of "smart" fusible interlinings includes:

- Elastic fusible interlinings with high breathability, which do not affect the fabric's drape.
- Example: *Vlieseline H609 (bi-elastic fusible interlining),* weight ≈ 41 g/m², 100% PA.
- Shape-memory interlinings, capable of restoring their original structure after deformation. SMP polymers (polyurethane, PLA hybrids).
- Functional microfibre interlinings, which regulate heat exchange.
- Eco-friendly biopolymer materials.

Biodegradable fusible interlinings made of 100% cotton and a biopolymer adhesive, creating a fully biodegradable material. They resemble natural fibers in terms of touch and performance, but decompose over time. They are available in three density options.

Example: *Freudenberg Performance Materials Apparel (Germany)* – base fabric: 100% cotton; adhesive layer: 100% biodegradable biopolymer; weight classes: 55 g/m², 90 g/m², 150 g/m² [4].

Table 1

Comparison of Classical and Modern Fusible Interlining Materials

Jacket Area / Function	Classical Fusible Interlinings (cotton, nonwoven)	Modern "Smart" Fusible Interlinings (elastic, microfibre, biopolymer)	Advantage for Jacket Construction
Front edge, front panel (shape stability, silhouette)	Medium stiffness; nonwoven PA or viscose; breathability 80-100 L/m²·s	Elastic polyester or bi-elastic interlinings (H609, Freudenberg); breathability 400-600 L/m²·s	Provides silhouette stability without creasing; comfortable fit

Table continuation 1

Collar and lapels (clear shape, flexibility)	**Woven cotton/linen interlinings, PA adhesive; thickness 0.35-0.40 mm**	**Microfibre fusible interlinings (PES, PA) with double-dot technology; thickness 0.18-0.25 mm; shape memory**	**Better shape retention after washing; no twisting; smooth collar lines**
Cuffs and sleeve hems (volume retention, softness)	Dense nonwovens with low elasticity (2-5% stretch)	Elastic interlinings (20-30% stretch), highly plastic knit interlinings	Preserve soft sleeve drape and movement freedom
Front facing and facings (clean edges)	Dense fusible interlinings prone to creases after pressing	Thin biodegradable PLA or chitosan-based interlinings; fusing temp. 125-135°C	Eco-friendly; do not alter fabric color or structure
Front panel (inner area, stability)	Polyester nonwovens, stiff, poorly compatible with stretch fabrics	Multifunctional interlinings with zonal adhesive dotting	Compatible with modern fabrics (stretch, tweed, gabardine); ensure smooth, lightweight shaping
Back panel (extra stabilization)	Rarely used to avoid stiffness	Ultra-thin microfibre interlinings (30-35 g/m²) with high vapor permeability	Improve jacket back fit without adding rigidity

developed by the authors based on [1-4]

In producing a woman's jacket, the use of combined fusing technologies, where traditional woven/nonwoven interlinings are paired with innovative "smart" materials, is especially relevant. It allows achieving a more precise balance between shape stability and comfort [1].

Research indicates that modern interlining materials enhance jacket durability, minimize the risk of defects during wear, and help maintain the garment's appearance [3].

The development of "smart" interlinings opens new perspectives for women's apparel design, particularly for trendy jackets where not only silhouette and design are important, but also functional characteristics such as:

- shape stability and silhouette retention
- breathability and thermal comfort
- durability and wear resistance
- eco-friendliness and biodegradability
- low weight combined with high strength

Conclusions. The conducted research confirms that the use of "smart" fusible interlining materials represents a significant direction in enhancing the quality and functional characteristics of women's jackets. Elastic interlinings with shape-memory properties, microfibre materials, and biodegradable biopolymer interlinings ensure enhanced silhouette stability, comfort, durability, and eco-friendliness when compared to conventional fusible materials. Their differentiated application in specific jacket zones allows for precise shaping without adding unnecessary weight or stiffness. The integration of innovative interlinings into modern fusing technologies reduces the risk of deformation, improves garment longevity, and supports sustainable production practices. Overall, "smart" fusible interlinings expand the possibilities for designing fashionable and technologically advanced women's jackets that align with modern environmental and functional requirements.

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